

**EDUCATION RESEARCH GRANTS**

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**INSTITUTE OF EDUCATION SCIENCES**

<http://ies.ed.gov>

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## **PART I GENERAL OVERVIEW**

### **1. REQUEST FOR APPLICATIONS**

In this announcement, the Institute of Education Sciences (Institute) describes the research grant programs that are funded through the National Center for Education Research. Separate announcements are available on the Institute's website that pertain to the predoctoral and postdoctoral research training programs, and national research and development centers funded through the National Center for Education Research and to the discretionary grant competitions funded through the Institute's National Center for Special Education Research (<http://ies.ed.gov/ncser>).

The Institute invites applications for research projects that will contribute to its education research programs in [Reading and Writing](#); [Mathematics and Science Education](#); [Cognition and Student Learning](#); [Teacher Quality – Reading and Writing](#); [Teacher Quality – Mathematics and Science Education](#); [Social and Behavioral Context for Academic Learning](#); [Education Leadership](#); [Education Policy, Finance, and Systems](#); [Early Childhood Programs and Practices](#); [High School Reform](#); [Interventions for Struggling Adolescent and Adult Readers and Writers](#); [Postsecondary Education](#); and [Education Technology](#). For the FY 2008 competition, the Institute will consider only applications that meet the requirements outlined below under [Part II Research Grant Topics](#) and [Part III Requirements for the Proposed Research](#).

### **2. OVERVIEW OF THE INSTITUTE'S RESEARCH PROGRAMS**

The Institute's over-arching priority is research that contributes to improved academic achievement for all students, and particularly for those whose education prospects are hindered by inadequate education services and conditions associated with poverty, race/ethnicity, limited English proficiency, disability, and family circumstance.

With academic achievement as the major priority, the Institute focuses on outcomes that differ by periods of education. In the infancy and preschool period, the outcomes of interest are those that enhance readiness for schooling, for example, language skills, and for infants and toddlers with disabilities, developmental outcomes. In kindergarten through 12th grade, the core academic outcomes of reading and writing (including reading and writing in the disciplines), mathematics, and science are emphasized, as well as the behaviors and social skills that support learning in school and successful transitions to employment, independent living, and post-secondary education. At the post-secondary level, the focus is on enrollment in and completion of programs that prepare students for successful careers and lives. The same outcomes are emphasized for students with disabilities across each of these periods, and include the functional outcomes that improve educational and transitional results. The acquisition of basic skills by adults with low levels of education is also a priority.

In conducting research on academic outcomes, the Institute concentrates on conditions within the control of the education system, with the aim of identifying, developing, and validating effective education programs, practices, policies, and approaches as well as understanding the factors that influence variation in their effectiveness such as implementation. Conditions that are of highest priority to the Institute are in the areas of curriculum, instruction, assessment (including the identification of students

with disabilities), the quality of the education workforce, and the systems and policies that affect these conditions and their interrelationships (for example, accountability systems, delivery mechanisms including technology, and policies that support the ability of parents to improve educational results for their children through such means as choice of education services and provision of school-related learning opportunities in the home).

In this section, the Institute describes the overall framework for its research grant programs. Specific information on the research topics described in this announcement may be found in the sections pertaining to each education research program:

- [Reading and Writing](#)
- [Mathematics and Science Education](#)
- [Cognition and Student Learning](#)
- [Teacher Quality – Reading and Writing](#)
- [Teacher Quality – Mathematics and Science Education](#)
- [Social and Behavioral Context for Academic Learning](#)
- [Education Leadership](#)
- [Education Policy, Finance, and Systems](#)
- [Early Childhood Programs and Practices](#)
- [High School Reform](#)
- [Interventions for Struggling Adolescent and Adult Readers and Writers](#)
- [Postsecondary Education](#)
- [Education Technology](#)

The Institute addresses the educational needs of typically developing students through its Education Research programs and the needs of students with disabilities through its Special Education Research programs. Both the Education Research and the Special Education Research programs are organized by [outcomes](#) (e.g., reading, mathematics), [type of education condition](#) (e.g., curriculum and instruction; teacher quality; administration, systems, and policy), [grade level](#), and [research goals](#).

### **A. Outcomes**

The Institute's research programs focus on improvement of the following education outcomes: (a) readiness for schooling (pre-reading, pre-writing, early mathematics and science knowledge and skills, and social development); (b) academic outcomes in reading, writing, mathematics, and science; (c) student behavior and social interactions within schools that affect the learning of academic content; (d) skills that support independent living for students with significant disabilities; and (e) educational attainment (high school graduation, enrollment in and completion of post-secondary education).

### **B. Conditions**

In general, each of the Institute's research programs focuses on a particular type of condition (e.g., curriculum and instruction) that may affect one or more of the outcomes listed previously (e.g., reading). The Institute's research programs are listed below according to the primary condition that is the focus of the program.

**a. Curriculum and instruction.** Several of the Institute's programs focus on the development and evaluation of curricula and instructional approaches. These programs include: (a) [Reading and Writing](#);

(b) [Mathematics and Science Education](#); (c) [Cognition and Student Learning](#); (d) [Social and Behavioral Context for Academic Learning](#); (e) [Early Childhood Programs and Policies](#); (f) [Interventions for Struggling Adolescent and Adult Readers and Writers](#); and (g) [Education Technology](#).

**b. *Quality of the Education Workforce.*** A second condition that affects student learning and achievement is the quality of teachers and education leaders (e.g., principals, superintendents). The Institute funds research on how to improve teacher quality through its programs on (a) [Teacher Quality – Reading and Writing](#); (b) [Teacher Quality – Mathematics and Science Education](#); and (c) [Research on Education Leadership](#).

**c. *Administration, systems, and policy.*** A third approach to improving student outcomes is to identify systemic changes in the ways in which schools and districts are led, organized, managed, and operated that may be directly or indirectly linked to student outcomes. The Institute takes this approach in its programs on (a) [Education Policy, Finance, and Systems](#); (b) [Early Childhood Programs and Policies](#); (c) [High School Reform](#); and (d) [Postsecondary Education](#).

Applicants should be aware that some of the Institute's programs cover multiple conditions. For example, the following programs cover multiple conditions: (a) [Cognition and Student Learning](#); (b) [Early Childhood Programs and Policies](#); (c) [High School Reform](#); (d) [Education Technology](#); and (e) [Postsecondary Education](#).

### **C. Grade Levels**

The Institute's research programs also specify the ages or grade levels covered in the research program. The specific grades vary across research programs and within each research program, and grades may vary across the research goals. In general, the Institute supports research for (a) pre-kindergarten and kindergarten, (b) elementary school, (c) middle school, (d) high school, (e) post-secondary education, (f) vocational education, and (g) adult education. In addition, the Institute supports research on infants with disabilities.

### **D. Research Goals**

The Institute has established five research goals for its research programs. Within each research program one or more of the goals may apply: (a) [Goal One](#) – identify existing programs, practices, and policies that may have an impact on student outcomes and the factors that may mediate or moderate the effects of these programs, practices, and policies; (b) [Goal Two](#) – develop programs, practices, and policies that are theoretically and empirically based; (c) [Goal Three](#) – establish the efficacy of fully developed programs, practices, and policies; (d) [Goal Four](#) – provide evidence on the effectiveness of programs, practices, and policies implemented at scale; and (e) [Goal Five](#) – develop or validate data and measurement systems and tools.

For a list of the Institute's FY 2008 research and training grant topics – including grant competitions through the Institute's National Center for Education Research and National Center for Special Education Research, please see Table 1 below. Funding announcements for these competitions may be downloaded from the Institute's website at <http://ies.ed.gov>.

**Table 1: FY 2008 Research and Training Grant Topics**

**National Center for Education Research**

1. Research Grant Topics
  - [Reading and Writing](#)
  - [Mathematics and Science Education](#)
  - [Cognition and Student Learning](#)
  - [Teacher Quality – Reading and Writing](#)
  - [Teacher Quality – Mathematics and Science Education](#)
  - [Social and Behavioral Context for Academic Learning](#)
  - [Education Leadership](#)
  - [Education Policy, Finance, and Systems](#)
  - [Early Childhood Programs and Practices](#)
  - [High School Reform](#)
  - [Interventions for Struggling Adolescent and Adult Readers and Writers](#)
  - [Postsecondary Education](#)
  - [Education Technology](#)
2. Research Training Grant Topics
  - Postdoctoral Research Training Program
  - Predoctoral Research Training Program
3. National Research and Development Center Topics
  - Cognition and Science Instruction
  - Instructional Technology

**National Center for Special Education Research**

1. Research Grant Topics
  - Early Intervention, Early Childhood Special Education, and Assessment for Young Children with Disabilities Research
  - Mathematics and Science Special Education Research
  - Reading, Writing, and Language Development Special Education Research
  - Serious Behavior Disorders Special Education Research
  - Individualized Education Programs and Individualized Family Service Plans Research
  - Secondary and Transition Services Research
  - Autism Spectrum Disorders Research
  - Response to Intervention Research
  - Related Services Special Education Research
2. Research Training Grant Topics
  - Postdoctoral Special Education Research Training
3. National Research and Development Center Topics
  - Center on Serious Behavior Disorders at the Secondary Level
  - Center on Response to Intervention in Early Childhood Special Education

## **PART II RESEARCH GRANT TOPICS**

For FY 2008, the Institute's National Center for Education Research is accepting applications for research grants under 13 topics. There are two application deadlines for each of these 13 topics: July 26, 2007, and November 1, 2007. In this section, the Institute describes the 13 research grant topics.

Across its research programs, the National Center for Education Research is particularly interested in interventions for students who are from low income backgrounds and/or racial, ethnic, and linguistic minority groups that have underachieved academically, but will consider applications that focus on other populations if the results are likely to be applicable across socioeconomic, racial, ethnic, and linguistic categories.

### **1. READING AND WRITING**

Program Officer: Dr. Elizabeth Albro (202-219-2148; [Elizabeth.Albro@ed.gov](mailto:Elizabeth.Albro@ed.gov))

#### **A. Purpose**

Through its Research on Reading and Writing (Read/Write) grants program, the Institute intends to contribute to improvement of reading and writing skills by (1) identifying curriculum and instructional practices that are associated with better reading or writing outcomes as well as mediators and moderators of the relations between these practices and student outcomes; (2) developing new curricula or instructional approaches for teaching individuals reading or writing skills or for addressing the underlying causes of reading or writing difficulties (e.g., poor oral language skills); (3) evaluating fully developed curricula or instructional approaches for teaching reading or writing skills, or for reducing/preventing reading or writing difficulties through efficacy or replication trials; (4) evaluating the effectiveness of curricula or instructional approaches for teaching reading or writing skills that are implemented at scale; and (5) developing and validating assessments that can be used in instructional settings to identify sources of reading and writing difficulties.

The long-term outcome of this program will be an array of tools and strategies (e.g., assessments, instructional approaches) that have been documented to be effective for improving reading and writing.

#### **B. Background**

Too many students are unable to understand what they read. According to the 2005 National Assessment of Educational Progress (NAEP), 36 percent of fourth graders, 27 percent of eighth graders, and 27 percent of twelfth graders cannot read at the basic level. That is, when reading grade appropriate text, these students cannot extract the general meaning or make obvious connections between the text and their own experiences, or make simple inferences from the text. In other words, they cannot understand what they have read. By fourth grade, students are expected to learn new information by reading subject matter textbooks (Chall, 1996). Poor reading skills may hinder students' progress in learning academic content in all areas.

A similar picture emerges in the development of writing skills. According to the 2002 NAEP writing assessment, 14 percent of fourth graders, 15 percent of eighth graders, and 26 percent of twelfth graders cannot write at the basic level.

Although tremendous advances have been made in understanding how children learn to read, we have less systematic knowledge about how individuals become proficient readers or proficient writers. There is subsequently less agreement as to what a teacher can or should do to cultivate active, engaged, and proficient readers and writers. On the 2005 NAEP, only 32 percent of fourth graders and 31 percent of eighth graders were reading at the proficient or advanced levels. On the 2002 NAEP, 36 percent of twelfth graders were reading at the proficient or advanced levels. With regard to writing, on the 2002 NAEP, 28 percent of fourth graders, 31 percent of eighth graders, and 24 percent of twelfth graders were at the proficient or advanced levels.

The Institute intends for the Reading and Writing program to support research on the identification, development, and evaluation of curricula, instructional approaches, and assessments designed to support the development of proficient readers and writers from kindergarten through postsecondary education.

The Institute encourages researchers to consider multivariate analyses of district or state databases in order to identify existing programs and practices that may be associated with better reading or writing outcomes, and to examine factors and conditions that may mediate or moderate the relations between the students outcomes and these programs and practices. Another approach to the identification of potentially effective instructional practices is for researchers to conduct detailed, quantifiable observational measures of reading instruction (types of instruction, frequency, duration, under what circumstances), and then use the instructional data in conjunction with child characteristics to predict subsequent reading performance (e.g., Connor, et al., 2007). The goal here is to identify what type or combinations of instructional activities are associated with better student outcomes and for which students. Researchers following this strategy who can successfully predict student performance could use this information as the basis for developing an intervention.

In addition to the identification, development, and evaluation of curricula and instructional approaches for improving reading and writing skills, the Institute intends for the Reading and Writing program to address the need to develop and validate reading and writing measurement tools for classroom assessments to be used for instructional purposes (e.g., progress monitoring). To improve reading and writing skills, instruction may need to be tailored to the sources of difficulty that individual students experience. An ideal learning environment might involve regular and frequent assessment of skills and the possibility of individualized instruction for students based on the particular source of their difficulties. The Institute intends to support the development of diagnostic assessments in reading and writing and assessments to monitor progress in reading and writing. In addition, the Institute will support the development, modification, and validation of assessments in reading and writing for English learners.

### **C. Specific Requirements**

For the FY 2008 Reading and Writing topic, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Reading and Writing topic are described.

Under the Read/Write program, applications must address:

- reading or writing curricula designed to support the development of proficient readers or writers from kindergarten through high school; or
- instructional approaches for teaching reading or writing that could be implemented within the context of an existing reading or writing program from kindergarten through high school;
- at the postsecondary level, English composition courses intended to teach basic writing skills (e.g., instruction in grammar, organization, audience, style, and writing clear prose). Proposals to conduct research on curricula or instructional approaches for teaching creative writing or literature will not be considered; or
- reading or writing assessments to support instruction from kindergarten through high school or to support basic writing instruction at the postsecondary level.

Researchers who are interested in proposing to develop or evaluate curricula or instructional approaches targeting struggling adolescent or adult readers or writers should apply to the [Interventions for Struggling Adolescent and Adult Readers and Writers](#) program.

Researchers, who are interested in identifying underlying or component processes of reading or writing, and the relations of these processes to proficiency in reading or writing, should refer to the [Cognition and Student Learning](#) research program.

## **2. MATHEMATICS AND SCIENCE EDUCATION**

Program Officer: Dr. Christina Chhin (202-219-2280; [Christina.Chhin@ed.gov](mailto:Christina.Chhin@ed.gov))

### **A. Purpose**

The Institute intends for the research program on Mathematics and Science Education (Math/Science) to fulfill five goals: (1) identifying curriculum and instructional practices that are associated with better mathematics or science outcomes, as well as mediators and moderators of the relations between these practices and student outcomes; (2) developing new curricula and instructional approaches to mathematics and science education that will eventually result in improving mathematics and science achievement; (3) establishing the efficacy of fully developed curricula and instructional approaches to mathematics and science education with small efficacy or replication trials; (4) providing evidence on the effectiveness of mathematics and science curricula and instructional approaches that are implemented at scale; and (5) developing and validating assessments for diagnosing sources of mathematics difficulties. The long-term outcome of this program will be an array of tools and strategies (e.g., curricula, programs) that have been demonstrated to be effective for improving mathematics and science learning and achievement.

### **B. Background**

Current levels of mathematics and science achievement at the elementary and secondary levels suggest that the United States is neither preparing the general population with levels of mathematics and science knowledge necessary for the 21<sup>st</sup> century workplace, nor producing an adequate pipeline to meet national needs for domestic scientists and mathematicians. In the 2005 National Assessment of Educational Progress (NAEP), only two percent of U.S. students attained advanced levels of mathematics or science achievement by Grade 12. In mathematics, large numbers of U.S. students continue to score below the basic level. In the 2005 NAEP, 20 percent of Grade 4 students, 31 percent of Grade 8 students, and 39 percent of Grade 12 students scored below the "basic" level in mathematics. At Grade 4 scoring below the basic level means that the student is likely to miss problems such as using

a ruler to find the total length of three line segments. At Grade 12 scoring below the basic level means that the student is unlikely to be able to solve problems such as finding the perimeter of a figure. Despite the fact that levels of mathematics achievement have improved over the past decade, achievement gaps remain wide with low levels of achievement being more likely among minority groups and students from low-income backgrounds

As in mathematics, many U.S. students are not attaining mastery of rudimentary science knowledge and skills. In the 2005 NAEP, 32 percent of Grade 4 students, 41 percent of Grade 8 students, and 46 percent of Grade 12 students scored below the “basic” level in science. At Grade 4, students performing below the basic level are likely to miss problems such as using a data table to determine which day has the most daylight. At Grade 12, students performing below the basic level are likely to miss problems such as graphing the populations of two species. As in mathematics, low levels of achievement are more likely among minority groups and students from low-income backgrounds.

Very little rigorous research has been conducted to evaluate the effectiveness of mathematics or science curricula and instructional practice for improving student learning and achievement. For example, the Institute of Education Sciences' What Works Clearinghouse conducted reviews of elementary and middle school mathematics curricula. For elementary school mathematics curricula, 77 studies were identified that were (a) curriculum evaluations, (b) with relevant math outcome measures, and (c) covering at least one semester. Out of these studies, one study met the Clearinghouse's evidence standards for drawing causal conclusions, seven studies met the evidence standards with reservations, and 69 studies did not meet the evidence screens.<sup>1</sup> For the middle school mathematics curricula, 76 studies were identified as curriculum evaluations with relevant math outcomes that covered at least one semester. Out of these 76 studies, three studies met the Clearinghouse's evidence standards, 11 met the evidence standards with reservations, and 62 did not meet the evidence screens.<sup>2</sup> Out of the 153 evaluations of elementary and middle school mathematics curricula, the What Works Clearinghouse has found that 86% of the studies either employed research methods that were inappropriate for supporting causal conclusions, or insufficient information was reported for the Clearinghouse to calculate effect sizes. To address the need to improve mathematics and science education in the United States, the Institute seeks to fund applications that address the need to develop and evaluate mathematics or science curricula and instructional approaches.

The Institute intends for the Mathematics and Science Education program to support research on the identification, development, and evaluation of curricula and instructional approaches designed to improve mathematics and science proficiency from kindergarten through high school, and basic mathematics skills at the postsecondary and adult education levels.

The Institute encourages researchers to consider multivariate analyses of district or state databases in order to identify existing programs and practices that may be associated with better mathematics or science outcomes and to examine factors and conditions that may mediate or moderate the relations between the student outcomes and these programs and practices. Another approach to the identification

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<sup>1</sup> Downloaded from the What Works Clearinghouse on February 20, 2007, at <http://www.whatworks.ed.gov/Topic.asp?tid=04&ReturnPage=default.asp>.

<sup>2</sup> Downloaded from the What Works Clearinghouse on February 20, 2007, at <http://www.whatworks.ed.gov/Topic.asp?tid=03&ReturnPage=default.asp>.

of potentially effective instructional practices is for researchers to conduct detailed, quantifiable observational measures of mathematics or science instruction (types of instruction, frequency, duration, under what circumstances), and then use the instructional data in conjunction with child characteristics to predict subsequent math or science performance. The goal here is to identify what type or combination of instructional activities is associated with better student outcomes and for which students. Researchers following this strategy who can successfully predict student performance could use this information as the basis for developing an intervention.

In addition to the identification, development, and evaluation of curricula and instructional approaches from improving mathematics and science achievement, the Institute invites proposals to develop and validate mathematics and science measurement tools for classroom assessments to be used for instructional purposes (e.g., progress monitoring). To improve mathematics and science skills, instruction may need to be tailored to the sources of difficulty that individual students experience. An ideal learning environment might involve regular and frequent assessment of skills and the possibility of individualized instruction for students based on the particular source of their difficulties. Under the Math/Science research program, the Institute intends to support the development of diagnostic assessments in mathematics and science and assessments to monitor progress in mathematics and science.

### **C. Specific Requirements**

For the FY 2008 Mathematics and Science Education topic, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Mathematics and Science Education topic are described.

Under the Math/Science program, applications must address:

- mathematics or science curricula designed to improve mathematics or science proficiency from kindergarten through high school;
- instructional approaches for teaching mathematics or science that could be implemented within the context of existing mathematics or science curricula from kindergarten through high school;
- curricula or instructional approaches for teaching basic mathematics skills to adults through adult and vocational education programs or through developmental/bridge programs designed to help under-prepared students acquire the skills to succeed in college; or
- mathematics or science assessments to support teaching from kindergarten through high school or to support teaching basic mathematics skills to adults.

Mathematics and science curricula and instructional approaches must be intended for use through schools and other education delivery settings (e.g., after-school programs).

Researchers, who are interested in identifying underlying or component processes of mathematics reasoning or science reasoning, and the relations of these processes to proficiency in mathematics or science, should refer to the [Cognition and Student Learning](#) research program.

### **3. COGNITION AND STUDENT LEARNING**

Program Officer: Dr. Carol O'Donnell (202-208-3749; Carol.O'Donnell@ed.gov)

#### **A. Purpose**

The purpose of the Cognition and Student Learning (Cognition) research program is to improve student learning by bringing recent advances in cognitive science to (1) identify underlying processes involved in reading, writing, mathematics skills, or science that are predictive of student achievement in the relevant domain; (2) develop interventions – instructional approaches, practices, and curriculum – for improving student learning; (3) establish the efficacy of existing interventions and approaches for improving student learning with efficacy or replication trials; and (4) develop measurement tools that can be used to improve student learning and achievement. The long-term outcome of this program will be an array of tools and strategies (e.g., instructional approaches, computer tutors) that are based on principles of learning and information processing gained from cognitive science and that have been documented to be efficacious for improving learning in education delivery settings.

#### **B. Background**

The most important outcome of education is student learning. Recent advances in understanding learning have come from cognitive science, cognitive psychology, and neuroscience research, but these advances have not been widely or systematically tapped in education. The Institute intends for the Cognition research program to establish a scientific foundation for education by building on these theoretical and empirical advances and applying them to education practice with the goal of improving student learning and academic achievement. The Institute is supporting research on this topic in order to establish a stream of research bridging basic cognitive science and education.

Cognitive science has shown explosive growth in the last 30 years. Basic research in cognitive science within disciplines such as psychology, linguistics, and neuroscience has generated new and important fundamental knowledge on how people learn. Cognitive scientists have identified a number of basic principles of learning that are supported by a solid research base (for examples, see Carver & Klahr, 2001). For the most part, however, these research principles have not been incorporated into education practice, either at the level of instruction or through the creation of materials that support teaching and learning.

One explanation for the limited use of instructional practices based on cognitive science is that authentic education settings are often quite different from the laboratory. Contrasted with learning in laboratory settings, learning in everyday instructional settings typically involves content of greater complexity and scope, delivered over much longer periods of time, with much greater variability in delivery, and with far more distractions and competitors for student time and effort. Moreover, the parameters that have defined "learning" in laboratory experiments are often not the same as what defines learning in school. For example, in laboratory experiments learning is typically defined as having occurred if individuals can recall an item a few minutes or hours after presentation; rarely are individuals asked to recall items days, weeks, or months after presentation. In school, however, students are expected to remember information presented in September the following May, and to be able to use that information in subsequent years. Students in school are expected to learn sets of related concepts and facts, and to build on that knowledge over time. Before some principles of learning generated from research in cognitive science can be applied to instruction in classroom settings, we need to understand if the

principles generalize beyond well-controlled laboratory settings to the complex cognitive and social conditions of the classroom.

Another explanation for why principles of learning based on cognitive research have not been incorporated into instructional practice may be that cognitive scientists have not traditionally worked directly with those involved in teacher training and curriculum development. Consider, for instance, research on the structure and organization of knowledge. Cognitive scientists have examined differences between experts and novices in a variety of domains and have discovered basic principles underlying how learners organize knowledge as a function of familiarity and expertise within a given domain. Understanding how novices acquire and organize new information would seem to be critical, for example, to sequencing the content of curricula. Typically, however, curricula reflect how knowledge in a field is organized by experts and do not reflect how knowledge is acquired by novices.

Yet another explanation for why advances in understanding how people learn have not affected learning in applied settings is that little attention has been devoted to engineering solutions based on that understanding. Knowledge of how brain and mind work does not lead directly and immediately to methods and approaches that will enhance learning in the everyday world; knowledge of how people learn is not, in and of itself, pedagogy, nor is there any one-to-one relationship between cognitive principles and particular methods of instruction.

Through the Cognition research program, the Institute will support research that utilizes cognitive science to develop, implement, and evaluate approaches that promise to improve teaching and learning in authentic education settings. Typical Cognition projects begin by identifying a specific learning or instructional problem in schools, considering which findings from the empirical literature might be relevant to tackling the problem, and then proposing a research plan for translating those findings into an educational strategy to address the problem. Researchers should note that the Institute is interested in the development of strategies and materials that involve students learning educationally meaningful or relevant components or units of academic content, such as would be covered in a chapter or multiple chapters addressing a topic or learning goal in a textbook. The Institute strongly encourages cognitive scientists to collaborate with education researchers who understand teaching and learning in the context of authentic education settings.

For FY 2008, the Institute opens the Cognition program to include projects designed to identify the cognitive processes underlying the acquisition of reading, writing, mathematics knowledge and skills, science knowledge and skills, or general study skills. Such studies might include short-term longitudinal studies in which the objective is to identify the component skills that are both predictive of reading, writing, mathematics, or science proficiency in academic settings, and that can be improved, accelerated, or advanced through instruction. In order for applications to be competitive, the researcher should make explicit the link between the underlying cognitive process and improving academic achievement. That is, it is not sufficient to simply describe cognitive processes. The objective here is to gain a better understanding of which processes and skills are predictive of subsequent proficiency in reading, writing, mathematics, science, or study skills that would allow researchers to develop interventions (e.g., curricula or instructional approaches) that target these processes and ultimately result in improving academic achievement. For example, a researcher might propose to measure early mathematical skills and correlate differences in the emergence of these skills with measures of academic achievement (e.g., performance on mathematics achievement tests in the elementary grades). Strong applications would

include a rationale that justifies the plausibility of developing interventions that might improve the targeted underlying skills.

For FY 2008, the Institute also expands the Cognition program to projects that address how principles and knowledge emerging from research in cognitive science can be used to better understand teacher knowledge and classroom practice, in order to improve teacher instructional practices and ultimately student learning. For example, researchers could identify teachers whose students typically gain more than students of the average teacher, conduct detailed observations to compare the instructional practices of high-gain teachers with average-gain teachers, and use these data to identify instructional approaches or patterns of instructional strategies that distinguish the two groups (e.g., Connor, et al., 2007). The ultimate objective would be to obtain an understanding of the instructional approaches of high-gain teachers that would lead to the development of interventions.

### C. Specific Requirements

For the FY 2008 Cognition and Student Learning topic, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Five](#). The Institute numbers goals consistently across research grant programs. The Institute does *not* accept applications under [Goal Four](#) for the Cognition program. More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Cognition and Student Learning topic are described.

Under the Cognition program, applications must address:

- curriculum, instructional practice, or assessment in reading, pre-reading, writing, pre-writing, mathematics, early mathematics, science, early science, or study skills for students from prekindergarten through high school; or
- curriculum, instructional practice, or assessment in basic reading, writing, or mathematics skills or study skills for students in vocational or adult education or developmental (remedial) programs for under-prepared college students.

As noted above, under the Cognition program, applicants may submit proposals under Goals One, Two, Three, and Five (see descriptions below). Under Goals One, Two, and Five, the *majority* of the proposed work should be conducted in authentic education settings (e.g., elementary school classrooms, distance learning or online education delivery modes); however, some work may be conducted in laboratory settings. For example, laboratory research may be used to identify critical components of the intervention that is being developed.

The methodological requirements listed under Goal 2 (see Part III Requirements of the Proposed Research) do not preclude applicants to the Cognition program from proposing small classroom-based or laboratory-based experiments to test specific hypotheses.

Goal Three is appropriate for applicants proposing to evaluate fully developed interventions. Although applicants proposing projects under Goals One, Two, and Five may include some experimental work that is conducted in laboratory settings, the Institute does **not** support laboratory research under Goal Three projects. Interventions that are ready to be evaluated through efficacy trials must be fully developed and ready to be implemented in authentic education settings.

#### **4. TEACHER QUALITY – READING AND WRITING**

Program Officer: Dr. Harold Himmelfarb (202-219-2031; [Harold.Himmelfarb@ed.gov](mailto:Harold.Himmelfarb@ed.gov))

##### **A. Purpose**

The general purpose of the Institute's Teacher Quality – Reading and Writing research program is to identify effective strategies for preparing future teachers or improving the performance of current classroom teachers in ways that increase student learning and school achievement. The Institute intends for the Teacher Quality research program to fulfill five goals: (1) identifying the characteristics of teachers that are associated with better student outcomes in reading or writing in kindergarten through Grade 12; and identifying programs and practices for teacher preparation or teacher professional development that are associated with better student outcomes in reading or writing from kindergarten through Grade 12, as well as mediators and moderators of the relations between student outcomes and these teacher characteristics, programs, or practices; (2) developing new programs and practices for teacher preparation or professional development that will eventually result in improving teacher practices and through them student learning and achievement; (3) establishing the efficacy of programs and practices for teacher preparation or professional development for improving teacher practices and through them student learning and achievement; (4) providing evidence of the effectiveness of teacher preparation or professional development programs that are implemented at scale and intended for improving teacher practices and through them student learning and achievement; and (5) developing and validating new assessments of teacher quality, or validating existing assessments for teachers at any grade level from prekindergarten through high school against measures of student achievement. Under these goals, the Institute supports development and evaluation of teacher preparation and teacher professional development interventions for (a) teaching reading or writing from elementary school through high school and (b) teaching basic skills in reading or writing to adults.

Long term outcomes of the Teacher Quality program will be an array of tools and strategies (e.g., preservice and in-service programs, assessments) that have been demonstrated to be effective for improving and assessing teacher performance in ways that are linked to increases in student achievement. In this Request for Applications, the term *teacher preparation* refers to preservice training of teachers, and the term *professional development* refers to the in-service training of current teachers.

##### **B. Background**

Too many U.S. students are not becoming proficient in basic academic knowledge and skills in reading and writing. Too many students are unable to understand what they read. According to the 2005 National Assessment of Educational Progress (NAEP), 36 percent of Grade 4 students, 27 percent of Grade 8 students, and 27 percent of Grade 12 students cannot read at the basic level. That is, when reading grade appropriate text, these students cannot extract the general meaning or make obvious connections between the text and their own experiences, or make simple inferences from the text. In other words, they cannot understand what they have read. By fourth grade, students are expected to learn new information by reading subject matter textbooks (Chall, 1996). Poor reading skills may hinder students' progress in learning academic content in all areas.

A similar picture emerges in the development of writing skills. According to the 2002 NAEP writing assessment, 14 percent of fourth graders, 15 percent of eighth graders, and 26 percent of twelfth graders cannot write at the basic level.

One approach to improving student learning is to identify effective curricula and instructional approaches; a second approach is to improve teachers' knowledge and skills. That is the approach taken by the Institute's Teacher Quality research program. Through this program, the Institute intends to improve the quality of teaching through development and evaluation of teacher preparation and professional development programs. *Those interested in improving teacher quality through systemic practices and policies (e.g., alternative certification, incentives for recruiting and retaining highly qualified teachers) should refer to the topic on [Education Policy, Finance, and Systems](#).*

The field of professional training in reading and writing requires more rigorous research evidence to help determine *what content* should be delivered to teachers, and *how to deliver* the content of the professional development, in order to have an impact on student academic achievement.

- (i) *What the content should be.* A major criticism of current teacher preparation programs is that many courses are not evidence-based and are often poorly linked to state standards. Another criticism is that content and pedagogy courses are often inadequate. Content courses do not train students how to teach specific content, and pedagogy courses typically focus on generic, rather than content-specific instructional strategies. The Institute is interested in empirical tests of the efficacy of teacher preparation programs that are designed to develop broadly knowledgeable and competent preschool and elementary school teachers who will be teaching all subjects to their students, as well as more specialized middle and secondary school teachers. Such studies require careful attention to what dependent variables will be included as indicators of the efficacy of the teacher preparation programs. In most cases, evaluating the effects of a teacher preparation program against the achievement of the students of teachers who have been prepared by Program A versus Program B is not feasible. Competitive applications will include a strong rationale, including theoretical arguments and empirical evidence, to support their choices for outcome measures.

The Institute is also interested in examining professional development programs that are designed to develop different types of knowledge and skills. These include, but are not limited to, professional development programs designed to develop teachers' knowledge about a specific academic content area (e.g., reading), and professional development programs designed around a specific curriculum, where the intent is to provide teachers with specific skills, strategies, and perhaps lesson plans for delivering this specific curriculum. Is it more beneficial for students if teachers are taught broad conceptual understanding of content or trained to deliver highly structured and well-researched content? Does the answer depend on factors such as the degree of teacher mobility within a school, the experience level of the teachers, or grade level (e.g., elementary versus secondary schools)?

- (ii) *How content should be delivered.* We have little reliable evidence about how to improve teacher preparation programs; how to appropriately balance content, pedagogy, and clinical training experiences; and who should deliver courses (e.g., discipline-based departments, like mathematics, or departments of teacher education). Similarly, although experts commonly believe that most current professional development offerings are not very effective, very little research exists that allows for clear causal interpretations of the impact of specific professional development programs or for knowing which elements of professional development programs (e.g., coaching) are critical or relatively more important than others. The Institute encourages

researchers to test different delivery modes using, for example, a curriculum or instructional approach that has already been shown to be effective for improving student outcomes.

The Institute encourages researchers to consider how the *complexity* and *amount of content* to be delivered may affect the type and amount of professional development that is necessary for enabling teachers to reach a set performance criterion level. For example, is one-on-one coaching a critical component of professional development training for all types of knowledge and skills or only for the development of complex skills? In strong applications that include a coaching as a component of a professional development program, the Institute expects the applicant to clearly delineate (a) what type of information the coaches will provide, (b) how that information will be delivered, (c) the frequency and duration of contact, (d) how the coaches will be trained, and (e) what the comparison group will receive so that reviewers can better determine if the project would move the field forward in terms of understanding why and how coaching works when it is effective, and under what conditions coaching is needed or not needed as a support to other forms of professional development.

In addition, despite the bodies of research in the cognitive sciences that identify basic principles of knowledge acquisition and memory, and elaborate distinct differences in the ways that experts and novices organize and use information, it is not evident that teacher professional development or teacher preparation programs have utilized this knowledge base. The Institute strongly encourages those who propose to develop new professional development or teacher preparation programs to build on this knowledge base (e.g., Anderson, Reder, & Simon, 2000; Carver & Klahr, 2001).

In addition to research on the development and evaluation teacher training (in-service and preservice) programs, the Teacher Quality program supports research on the development of practical assessments of teacher subject matter knowledge, pedagogical knowledge, and instructional skills, and validation of these assessments (or existing assessments) against measures of student learning and achievement. Understanding what skills and knowledge make a teacher effective, and identifying teacher candidates and current teachers who have these skills and knowledge is critical to developing a highly qualified teacher workforce. Ideally, assessments of pedagogical knowledge and skills and subject matter knowledge would not only predict student achievement but also be practical to administer and cost-effective. Although some existing tests of pedagogical knowledge and subject matter knowledge have been correlated with the test takers' SAT or ACT scores, validation of existing tests against measures of student learning and achievement remains to be accomplished (e.g., Gitomer, Latham, & Ziomek, 1999). Hence, the Institute is interested in proposals to *validate existing measures* of pedagogical knowledge and subject matter knowledge against measures of student learning and achievement as well as proposals to *develop and validate new measures*. Assessments of teacher pedagogical and subject matter knowledge that predict student outcomes could form the basis for an improved system of certification and for determining the effectiveness of professional development activities. The Institute also invites applications to develop and/or validate measures of instructional practices that could be used by schools to provide feedback to teachers and improve the quality of classroom instruction; such measures must be validated against measures of student achievement.

Finally, the Institute encourages researchers to consider multivariate analyses of district or state databases in order to identify the characteristics of teachers or teacher in-service or preservice programs that are associated with better student outcomes and then supplement these analyses with analyses of

original data collected to identify the instructional practices that occur in those teachers' classrooms that might account for these achievement gains. The objective is to identify the practices that better teachers implement (e.g., type or combinations of instructional activities) that are associated with higher student achievement and for which students (e.g., Connor, et al., 2007). Researchers following this strategy who can successfully predict student performance could use this information as the basis for developing an intervention.

### C. Specific Requirements

For the FY 2008 Teacher Quality – Read/Write topic, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Teacher Quality – Read/Write topic are described.

Applications submitted to the Teacher Quality – Read/Write topic must be relevant to programs for teachers of typically developing students or teachers of English language learners.

Under the Teacher Quality – Read/Write program, applications must address:

- teacher professional development or teacher preparation for teaching reading or writing from kindergarten through Grade 12;
- teacher professional development or teacher preparation for teaching reading or basic writing skills to adults through vocational education, adult education, or developmental (remedial) programs designed to help under-prepared students acquire the skills to succeed in college; or
- development and/or validation of assessments of teacher subject matter, pedagogical knowledge, or instructional practices for students in teacher preparation programs, and new or current teachers at any level from kindergarten through high school. These assessments must be of relevant core academic content areas (e.g., reading, writing, social studies, history), except mathematics and science.

Under Goal Three and Goal Four, applicants must include measures of teacher behaviors as well as measures of student outcomes.

Applicants interested in teacher training for prekindergarten teachers should apply to the [Early Childhood Programs and Policies](#) research program (program officer: Dr. Caroline Ebanks; email: [Caroline.Ebanks@ed.gov](mailto:Caroline.Ebanks@ed.gov); phone: 202-219-1410).

#### *Distinction between the Teacher Quality – Read/Write topic and the Reading and Writing topic.*

Applicants sometimes wonder whether the project they plan to propose is more appropriate for the Teacher Quality – Read/Write topic or for the [Reading and Writing](#) topic. Applications that are appropriate for the Reading and Writing topic are those that develop and/or evaluate specific reading or writing curricula or instructional approaches for students, whereas applications that are appropriate for the Teacher Quality program are those that have teachers as the primary target of the intervention. The Institute recognizes that this distinction may be blurred. Oftentimes implementation of a specific reading or writing curriculum includes training for teachers on how to best deliver the curriculum, but the focus of the intervention is the new curriculum for students. Similarly, implementation of a new instructional approach almost always includes training for teachers on the instructional approach, but the

focus of the intervention is on a different approach for teaching students, not on different ways to train teachers. If the investigator is focusing on the outcomes of variations in curriculum content or variations in instructional approaches, then the application should be submitted to the Research on Reading and Writing topic. If the researcher is examining outcomes of variations in approaches to teacher training (preservice or in-service training), then the application should be submitted to the Teacher Quality – Read/Write topic. Below are some examples to help clarify the intent of the two programs. In all cases, the Institute strongly encourages applicants to contact the program officer listed at the end of this announcement to help them identify the more appropriate topic under which to submit their application.

<b>Projects for Teacher Quality – Read/Write Topic</b>	<b>Projects for the Reading and Writing Topic</b>
<p><b>Example A</b> The district uses Reading Curriculum A for its elementary school students. Applicant proposes to test professional development training on reading instruction; half of the teachers receive the new training and half receive the district's regular training. All students receive Reading Curriculum A.</p>	<p><b>Example B</b> The applicant proposes to evaluate a reading curriculum for Grade 4 students. Half of the students will receive the new curriculum; half of the students will use the district's existing reading curriculum. The teachers whose students receive the new curriculum will receive training on how to implement the new curriculum. All teachers will participate in the district's professional development on reading.</p>
<p><b>Example C</b> The applicant wants to test whether professional development to improve writing instruction can be delivered effectively using an online coaching model for teachers that is available to teachers on a daily basis versus a writing instruction coach who visits the classroom. Half of the teachers receive online coaching; half receive in-class coaching. The content of the professional development is the same for teachers in both groups. The basic curriculum that the students receive is the same in both groups.</p>	<p><b>Example D</b> The applicant proposes to compare two different instructional approaches for teaching reading comprehension strategies to middle school students in the context of a social studies curriculum. All students receive the same social studies curriculum. Half of the students receive instruction using Instructional Approach A; the remaining students receive instruction using Instructional Approach B.</p>

**5. TEACHER QUALITY – MATHEMATICS AND SCIENCE EDUCATION**

Program Officer: Dr. Harold Himmelfarb (202-219-2031; [Harold.Himmelfarb@ed.gov](mailto:Harold.Himmelfarb@ed.gov))

**A. Purpose**

The general purpose of the Institute's Teacher Quality – Mathematics and Science research program is to identify effective strategies for preparing future teachers or improving the performance of current classroom teachers in ways that increase student learning and school achievement in mathematics and science. The Institute intends for the Teacher Quality research program to fulfill five goals: (1) identifying the characteristics of teachers that are associated with better student outcomes in mathematics or science in kindergarten through Grade 12; and identifying programs and practices for

teacher preparation or teacher professional development that are associated with better student outcomes in mathematics or science from kindergarten through Grade 12, as well as mediators and moderators of the relations between student outcomes and these teacher characteristics, programs, or practices; (2) developing new programs and practices for teacher preparation or professional development that will eventually result in improving teacher practices and through them student learning and achievement; (3) establishing the efficacy of programs and practices for teacher preparation or professional development for improving teacher practices and through them student learning and achievement; (4) providing evidence of the effectiveness of teacher preparation or professional development programs that are implemented at scale and intended for improving teacher practices and through them student learning and achievement; and (5) developing and validating new assessments of teacher quality, or validating existing assessments for teachers at any grade level from kindergarten through high school against measures of student achievement. Under these goals, the Institute supports development and evaluation of teacher preparation and teacher professional development interventions for (a) teaching mathematics or science from elementary school through high school and (b) teaching basic skills in mathematics to adults.

Long term outcomes of the Teacher Quality program will be an array of tools and strategies (e.g., preservice and in-service programs, assessments) that have been demonstrated to be effective for improving and assessing teacher performance in ways that are linked to increases in student achievement. In this Request for Applications, the term *teacher preparation* refers to preservice training of teachers, and the term *professional development* refers to the in-service training of current teachers.

## **B. Background**

Too many U.S. students are not becoming proficient in basic academic knowledge and skills in mathematics and science. Current levels of mathematics and science achievement at the elementary and secondary levels suggest that the United States is neither preparing the general population with levels of mathematics and science knowledge necessary for the 21<sup>st</sup> century workplace, nor producing an adequate pipeline to meet national needs for domestic scientists and mathematicians. In the 2005 National Assessment of Educational Progress (NAEP), only two percent of U.S. students attained advanced levels of mathematics or science achievement by Grade 12. In mathematics, large numbers of U.S. students continue to score below the basic level. In the 2005 NAEP, 20 percent of Grade 4 students, 31 percent of Grade 8 students, and 39 percent of Grade 12 students scored below the "basic" level in mathematics. At Grade 4 scoring below the basic level means that the student is likely to miss problems such as using a ruler to find the total length of three line segments. At Grade 12 scoring below the basic level means that the student is unlikely to be able to solve problems such as finding the perimeter of a figure. Despite the fact that levels of mathematics achievement have improved over the past decade, achievement gaps remain wide with low levels of achievement being more likely among minority groups and students from low-income backgrounds

As in mathematics, many U.S. students are not attaining mastery of rudimentary science knowledge and skills. In the 2005 NAEP, 32 percent of Grade 4 students, 41 percent of Grade 8 students, and 46 percent of Grade 12 students scored below the "basic" level in science. At Grade 4, students performing below the basic level are likely to miss problems such as using a data table to determine which day has the most daylight. At Grade 12, students performing below the basic level are likely to miss problems such as graphing the populations of two species. As in mathematics, low levels of achievement are more likely among minority groups and students from low-income backgrounds.

One approach to improving student learning is to identify effective curricula and instructional approaches; a second approach is to improve teachers' knowledge and skills. That is the approach taken by the Institute's Teacher Quality research program. Through this program, the Institute intends to improve the quality of teaching through development and evaluation of teacher preparation and professional development programs. *Those interested in improving teacher quality through systemic practices and policies (e.g., alternative certification, incentives for recruiting and retaining highly qualified teachers) should refer to the topic on [Education Policy, Finance, and Systems](#).*

Substantial numbers of students in middle and high school grades are taught mathematics or science by teachers without a college major or certification in the areas in which they are teaching. This is particularly the case in middle school. For example, the U.S. Department of Education's Condition of Education 2003 report indicated that 23 percent of fifth through ninth graders, and 10 percent of high school students receive mathematics instruction from teachers who had neither a major nor certification in mathematics; in science, these percentages are 17 and 7 percent, respectively. There is some research demonstrating that students taught by “out-of-field” teachers learn less in mathematics and science than do students of teachers who are trained in the field in which they are teaching (e.g., Goldhaber & Brewer, 1997; Goldhaber & Brewer, 2000; Monk, 1994).

The field of professional training in math/science requires more rigorous research evidence to help determine *what content* should be delivered to teachers, and *how to deliver* the content of the professional development, in order to have an impact on student academic achievement.

- (i) *What the content should be.* A major criticism of current teacher preparation programs is that many courses are not evidence-based and are often poorly linked to state standards. Another criticism is that content and pedagogy courses are often inadequate. Content courses do not train students how to teach specific content, and pedagogy courses typically focus on generic, rather than content-specific instructional strategies. The Institute is interested in empirical tests of the efficacy of teacher preparation programs that are designed to develop broadly knowledgeable and competent preschool and elementary school teachers who will be teaching all subjects to their students, as well as more specialized middle and secondary school teachers. Such studies require careful attention to what dependent variables will be included as indicators of the efficacy of the teacher preparation programs. In most cases, evaluating the effects of a teacher preparation program against the achievement of the students of teachers who have been prepared by Program A versus Program B is not feasible. Competitive applications will include a strong rationale, including theoretical arguments and empirical evidence, to support their choices for outcome measures.

The Institute is also interested in examining professional development programs that are designed to develop different types of knowledge and skills. These include, but are not limited to, professional development programs designed to develop teachers' knowledge about a specific academic content area (e.g., mathematics), and professional development programs designed around a specific curriculum, where the intent is to provide teachers with specific skills, strategies, and perhaps lesson plans for delivering this specific curriculum. Is it more beneficial for students if teachers are taught broad conceptual understanding of content or trained to deliver highly structured and well-researched content? Does the answer depend on factors such as the

degree of teacher mobility within a school, the experience level of the teachers, or grade level (e.g., elementary versus secondary schools)?

- (ii) *How content should be delivered.* We have little reliable evidence about how to improve teacher preparation programs; how to appropriately balance content, pedagogy, and clinical training experiences; and who should deliver courses (e.g., discipline-based departments, like mathematics, or departments of teacher education). Similarly, although experts commonly believe that most current professional development offerings are not very effective, very little research exists that allows for clear causal interpretations of the impact of specific professional development programs or for knowing which elements of professional development programs (e.g., coaching) are critical or relatively more important than others. The Institute encourages researchers to test different delivery modes using, for example, a curriculum or instructional approach that has already been shown to be effective for improving student outcomes.

The Institute encourages researchers to consider how the *complexity* and *amount of content* to be delivered may affect the type and amount of professional development that is necessary for enabling teachers to reach a set performance criterion level. For example, is one-on-one coaching a critical component of professional development training for all types of knowledge and skills or only for the development of complex skills? In strong applications that include a coaching as a component of a professional development program, the Institute expects the applicant to clearly delineate (a) what type of information the coaches will provide, (b) how that information will be delivered, (c) the frequency and duration of contact, (d) how the coaches will be trained, and (e) what the comparison group will receive so that reviewers can better determine if the project would move the field forward in terms of understanding why and how coaching works when it is effective, and under what conditions coaching is needed or not needed as a support to other forms of professional development.

In addition, despite the bodies of research in the cognitive sciences that identify basic principles of knowledge acquisition and memory, and elaborate distinct differences in the ways that experts and novices organize and use information, it is not evident that teacher professional development or teacher preparation programs have utilized this knowledge base. The Institute strongly encourages those who propose to develop new professional development or teacher preparation programs to build on this knowledge base (e.g., Anderson, Reder, & Simon, 2000; Carver & Klahr, 2001).

In addition to research on the development and evaluation teacher training (in-service and preservice) programs, the Teacher Quality program supports research on the development of practical assessments of teacher subject matter knowledge, pedagogical knowledge, and instructional skills, and validation of these assessments (or existing assessments) against measures of student learning and achievement. Understanding what skills and knowledge make a teacher effective, and identifying teacher candidates and current teachers who have these skills and knowledge is critical to developing a highly qualified teacher workforce. Ideally, assessments of pedagogical knowledge and skills and subject matter knowledge would not only predict student achievement but also be practical to administer and cost-effective. Although some existing tests of pedagogical knowledge and subject matter knowledge have been correlated with the test takers' SAT or ACT scores, validation of existing tests against measures of student learning and achievement remains to be accomplished (e.g., Gitomer, Latham, & Ziomek, 1999). Hence, the Institute is interested in proposals to *validate existing measures* of pedagogical knowledge

and subject matter knowledge against measures of student learning and achievement as well as proposals to *develop and validate new measures*. Assessments of teacher pedagogical and subject matter knowledge that predict student outcomes could form the basis for an improved system of certification and for determining the effectiveness of professional development activities. The Institute also invites applications to develop and/or validate measures of instructional practices that could be used by schools to provide feedback to teachers and improve the quality of classroom instruction; such measures must be validated against measures of student achievement.

Finally, the Institute encourages researchers to consider multivariate analyses of district or state databases in order to identify the characteristics of teachers or teacher in-service or preservice programs that are associated with better student outcomes and then supplement these analyses with analyses of original data collected to identify the instructional practices that occur in those teachers' classrooms that might account for these achievement gains. The objective is to identify the practices that better teachers implement (e.g., type or combinations of instructional activities) that are associated with higher student achievement and for which students (e.g., Connor, et al., 2007). Researchers following this strategy who can successfully predict student performance could use this information as the basis for developing an intervention.

### **C. Specific Requirements**

For the FY 2008 Teacher Quality – Math/Science topic, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#).

Applications submitted to the Teacher Quality – Math/Science topic must be relevant to programs for teachers of typically developing students or teachers of English language learners.

Under the Teacher Quality – Math/Science program, applications must address:

- teacher professional development or teacher preparation for teaching mathematics or science at any grade from kindergarten through Grade 12;
- teacher professional development or teacher preparation for teaching basic mathematics skills to adults through adult education, vocational education, or developmental (remedial) programs designed to help under-prepared students acquire the skills to succeed in college;
- development and/or validation of assessments of teacher subject matter, pedagogical knowledge or instructional practices for students in teacher preparation programs, and new or current teachers at any level from kindergarten through high school. These assessments must be assessments relevant to mathematics and science.

Under Goal Three and Goal Four, applicants must include measures of teacher behaviors as well as measures of student outcomes.

Applicants interested in teacher training for prekindergarten teachers should apply to the [Early Childhood Programs and Policies](#) research program (program officer: Dr. Caroline Ebanks; email: [Caroline.Ebanks@ed.gov](mailto:Caroline.Ebanks@ed.gov); phone: 202-219-1410).

*Distinction between the Teacher Quality – Math/Science topic and the Mathematics and Science Education topic.* Applicants sometimes wonder whether the project they plan to propose is more appropriate for the Teacher Quality – Math/Science topic or for the [Mathematics and Science Education](#) topic. Applications that are appropriate for the Mathematics and Science Education topic are those that develop and/or evaluate specific mathematics or science curricula or instructional approaches for students, whereas applications that are appropriate for the Teacher Quality program are those that have teachers as the primary target of the intervention. The Institute recognizes that this distinction may be blurred. Oftentimes implementation of a specific mathematics or science curriculum includes training for teachers on how to best deliver the curriculum, but the focus of the intervention is the new curriculum for students. Similarly, implementation of a new instructional approach almost always includes training for teachers on the instructional approach, but the focus of the intervention is on a different approach for teaching students, not on different ways to train teachers. If the investigator is focusing on the outcomes of variations in curriculum content or variations in instructional approaches, then the application should be submitted to the Mathematics and Science Education topic. If the researcher is examining outcomes of variations in approaches to teacher training (preservice or in-service training), then the application should be submitted to the Teacher Quality – Math/Science topic. Below are some examples to help clarify the intent of the two programs. In all cases, the Institute strongly encourages applicants to contact the program officer listed at the end of this announcement to help them identify the more appropriate topic under which to submit their application.

<b>Projects for Teacher Quality – Math/Science Topic</b>	<b>Projects for the Mathematics and Science Education Topic</b>
<p><b>Example A</b> The district uses Math Curriculum A for its elementary school students. Applicant proposes to test professional development training on math instruction; half of the teachers receive the new training and half receive the district's regular training. All students receive Math Curriculum A.</p>	<p><b>Example B</b> The applicant proposes to evaluate a math curriculum for Grade 4 students. Half of the students will receive the new curriculum; half of the students will use the district's existing math curriculum. The teachers whose students receive the new curriculum will receive training on how to implement the new curriculum. All teachers will participate in the district's professional development on math.</p>
<p><b>Example C</b> The applicant wants to test whether professional development to improve science instruction can be delivered effectively using an online coaching model for teachers that is available to teachers on a daily basis versus a science instruction coach who visits the classroom. Half of the teachers receive online coaching; half receive in-class coaching. The content of the professional development is the same for teachers in both groups. The basic curriculum that the students receive is the same in both groups.</p>	<p><b>Example D</b> The applicant proposes to evaluate an instructional approach for teaching science to middle school students. All students use the same textbooks. Half of the students are taught the content using the new instructional approach; the remaining students are taught as their teachers normally teach their classes. Only the teachers of students in the treatment group are trained to use this new instructional approach for teaching science.</p>



## **6. SOCIAL AND BEHAVIORAL CONTEXT FOR ACADEMIC LEARNING**

Program Officer: Dr. Christina Chhin ((202) 219-2280; [Christina.Chhin@ed.gov](mailto:Christina.Chhin@ed.gov))

### **A. Purpose**

Through its Social and Behavioral Context for Academic Learning Research Program (Social/Behavioral), the Institute intends to support research on interventions designed to improve social skills and behaviors that support academic and other important school-related outcomes (e.g. attendance, high school graduation rates) in typically developing students from kindergarten through Grade 12. Under this research grant program, the Institute will fund research to (1) identify programs and practices that are associated with better social skills and behaviors that support academic learning, as well as mediators and moderators of the relations between these practices and student outcomes; (2) developing new programs and practices for improving social skills and behaviors that support academic learning; (3) evaluating fully developed programs and practices for improving social skills and behaviors that support academic learning through efficacy or replication trials; (4) evaluating the effectiveness of programs and practices for improving social skills and behaviors that support academic learning that are implemented at scale; and (5) developing and validating measures of teacher classroom management practices.

The long-term outcome of this program will be an array of tools and strategies (e.g. assessment tools and behavioral interventions) that have been documented to be effective for improving social skills and behaviors that support academic and other important school-related outcomes of students from kindergarten through Grade 12.

### **B. Background**

Despite great interest and effort among teachers, principals, educators, researchers, and parents, the behavior problems of children and adolescents in schools continue to be a major source of public concern. A substantial body of literature has shown that disruptive classroom behavior, conduct problems, aggression, delinquency, and substance use are associated with poor academic achievement, as well as a lack of school connectedness and involvement (e.g., Bennett, et al., 2003; Najaka, Gottfredson, & Wilson, 2001). The National Center for Education Statistics (2001) reported that students between the ages of 12 and 18 are victim to some 2.5 million crimes of violence or theft at school each year. On the positive side, social competencies have been linked with higher levels of achievement and school adjustment (e.g., Carlson, et al., 1999; Malecki, & Elliot, 2002; Wentzel, 1993).

School interventions aimed at reducing negative behaviors (e.g. disruptions to classroom instruction, anti-social behaviors, bullying, suspensions, absenteeism) and increasing academic competencies (e.g. social skills, academic achievement, improving grades) have proliferated in the past 20 years. To date, many of the classroom or school-based strategies and techniques used by teachers and other school personnel have not been subject to rigorous evidence-based research. Although schools commonly use support services, intervention curricula, and discipline management strategies to prevent problem behavior and to promote social and character development, evidence of effectiveness is limited (e.g., Gottfredson & Gottfredson, 2001). There have been evaluations of promising elementary school-based programs, in particular programs based on social, cognitive, developmental, and ecological theory; however, many evaluations have suffered from a lack of rigorous methodology, design, and analysis (e.g., small sample sizes and low statistical power, severe attrition, lack of randomization to condition, and inappropriate level of analysis). For example, the What Works Clearinghouse reviewed the research

on school-based interventions designed to improve character education. Fifty-five evaluation studies of character education interventions covering 13 character education interventions were identified, but only one-third of the studies met the What Works Clearinghouse standards of evidence with or without reservations. Moreover, the What Works Clearinghouse identified an additional 14 interventions for which no evaluation studies were found. Similarly, when the What Works Clearinghouse reviewed interventions intended to reduce dropout rates, twenty-three studies were identified, but again only one-third met the What Works Clearinghouse standards of evidence with or without reservations.<sup>3</sup> Through the Social/Behavioral research program, the Institute intends to address this problem by supporting research to identify, develop, and/or evaluate classroom or school interventions designed to improve the academic learning context by promoting positive student behaviors or reducing negative student behaviors that are correlated with academic outcomes.

Teachers and parents report a need for better classroom management practices (Evertson & Weinstein, 2006). Beginning teachers in their early teaching years consistently rank classroom management as their most pressing concern, and it continues to be a major cause of job dissatisfaction and teacher burnout. Classroom management consistently ranks as the first or second most serious educational problem in the eyes of the general public. Through the Social/Behavioral research program, the Institute endeavors to address this problem by supporting research on the development and evaluation of teacher professional programs to improve classroom management skills.

Under the Social/Behavioral research program, the Institute seeks to encourage rigorous research of interventions that are implemented in schools for the purpose of improving the social and behavioral context of academic learning. Examples of interventions appropriate for development and/or evaluation under the Social and Behavioral Context for Academic Learning Research Program include: (a) curricula designed to improve students' social and behavioral skills for succeeding in school, (b) classroom behavior management programs, (c) teacher professional development programs geared toward improving teacher's behavior management practices in the classroom, and (d) curriculum designed to reduce student anti-social behavior (e.g. aggression, delinquency, bullying) in the classroom or school.

The Institute recognizes that programs and practices designed to improve social skills and behaviors that support academic learning are likely to include academic achievement as a distal outcome measure. Consequently, it will be important for the applicant to specify a logic model of how their program or practice is hypothesized to influence proximal student outcomes that serve to mediate the effects on academic learning outcomes. For example, an applicant might choose to develop a new teacher professional development training geared towards improving teacher's classroom management skills. Although improved student achievement is the distal outcome that the intervention seeks to improve, researchers should identify and measure the proximal outcomes (e.g., teacher classroom management practices, teacher time spent on classroom management versus instruction, student problem behaviors) that reflect the elements of their logic model.

In addition to the identification, development, and evaluation of programs and practices for improving the social and behavioral context for academic learning, the Institute invites proposals to support the development and validation of assessments of teacher classroom management practices from kindergarten through high school. Measures of classroom management practices could be used to assess

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<sup>3</sup>Accessed from the What Works Clearinghouse website (<http://whatworks.ed.gov>) on February 22, 2007.

the effectiveness of teacher practices and should be validated against both student behavioral outcomes and academic outcomes.

### **C. Specific Requirements**

For the FY 2008 Social/Behavioral program, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Social/Behavioral topic are described.

Under the Social/Behavioral program applications must address:

- interventions (e.g., curriculum, classroom management, teacher professional development) that are implemented in schools and are intended to improve the social and behavioral context for academic learning in schools or other education delivery entities from kindergarten through high school; or
- measures of teacher classroom management practices that are predictive of academic learning from kindergarten through high school.

The Institute recognizes that, in general, Social/Behavioral interventions are designed to change directly the teaching and learning environment and indirectly affect student learning and achievement. In such cases, applicants under Goal Three and Goal Four must provide measures of the primary mediators (i.e., proximal outcomes), as well as measures of student achievement. For example, applicants proposing to evaluate a program to improve student behavior must include measures of the student behaviors the intervention is designed to directly affect (e.g., disruptive classroom behaviors) as well as measures of student achievement. Alternatively, applicants proposing to evaluate a teacher professional development program on classroom management must include measures of teacher behaviors (i.e., proximal outcomes) and measures of student learning and achievement (i.e., distal outcome). In such cases, strong applications would likely include measures of student behaviors that are intended to be addressed through the classroom management strategies (i.e., such measures would be mediators between the proximal teacher behavior outcomes and the distal student learning outcomes).

Note that under the Social/Behavioral program the Institute will support research on interventions for students that are implemented by teachers or other school staff (e.g., school administrators, guidance counselors, school psychologists) and research on professional development training programs for teachers and other school staff that are intended to provide staff with skills to improve the social and behavioral context for academic learning from kindergarten through high school.

## **7. EDUCATION LEADERSHIP**

Program Officer: Dr. Katina Stapleton (202-219-2154; [Katina.Stapleton@ed.gov](mailto:Katina.Stapleton@ed.gov))

### **A. Purpose**

The Institute's Education Leadership research program addresses five goals: (1) identifying the characteristics and practices of education leaders (e.g., principals, district superintendents) that are associated with better student outcomes from kindergarten through Grade 12, and identifying programs and practices for the professional development of education leaders that are associated with better student outcomes (e.g., student achievement, high school graduation) from kindergarten through Grade 12, as well as mediators and moderators of the relations between student outcomes and these leadership characteristics, programs, or practices; (2) developing new programs and practices for the professional

development, recruitment, or retention of education leaders that will result in improving the teaching and learning environment at the local level and, ultimately, student learning and achievement; (3) establishing the efficacy of programs and practices for the professional development, recruitment, or retention of education leaders for improving the teaching and learning environment and, ultimately, student learning and achievement; (4) providing evidence of the effectiveness of programs and practices for the professional development, recruitment, or retention of education leaders that are implemented at scale and intended for improving the teaching and learning environment and through it, student learning and achievement; and (5) developing and validating new assessments of the quality of education leaders, or validating existing assessments of education leaders against measures of student achievement from elementary grades through high school.

Long-term outcomes of the Education Leadership program will be an array of tools and strategies (e.g., in-service programs, policies, assessments) that have been demonstrated to be effective for improving and assessing the performance of education leaders (e.g., principals, superintendents) in ways that are linked to increases in student achievement. In this Request for Applications, the term *professional development* refers to the in-service training of current leaders.

## **B. Background**

Through the Education Leadership research program, the Institute supports research to improve the quality of leadership and administration at the local level (e.g., building, district, region) in order to enhance the teaching and learning environment for students and thereby improve student outcomes. This program is intended to support research on innovative approaches to the recruitment and retention of education leaders, as well as the development and evaluation of professional development programs for education leaders. Innovative approaches to recruitment of education leaders include alternative pathways to school leadership that are designed to eliminate barriers that keep talented potential school leaders from joining the profession, and to provide the preparation and support necessary for these leaders to effectively function in today's complex education environment.

Although existing research suggests that by establishing conditions that support and strengthen teaching and learning, education leaders may have an indirect effect on student achievement, little rigorous research has addressed this topic. A recent meta-analysis suggests that there may be specific leadership practices that are associated with higher student achievement (Waters, Marzano, & McNulty, 2003). Much, however, is unknown about the causal impact of leadership practices on the teaching and learning environment and, subsequently, on student learning. Some researchers have suggested that conventional principal preparation programs are misaligned with the skill-sets and knowledge actually needed by principals on a day-to-day basis (e.g., Hess & Kelly, 2005). However, there has been little systematic empirical research examining the full range of skills and knowledge (e.g., in areas such as finance, instruction, assessment, and accountability) needed by principals, and their relation to the quality of the teaching and learning environment and, in turn, to student achievement. Nor is there much research examining how these needed skills and knowledge might vary according to school context (teacher-turnover, poverty-status, parental involvement, political and policy environments).

In addition, little systematic research has been conducted to determine the effects on student learning of making different choices in leadership-related strategies or investments at the state or district level (e.g., recruitment incentives, principal placements, leadership evaluations). Limited research exists on whether and how district-level leaders (e.g., superintendents, school boards) influence student learning;

most empirical research on education leadership has focused on principals. Moreover, we know little about how variations in leadership roles and functions across schools or districts are associated with student achievement, or about the differential leadership needs of schools with differing management structures (e.g., schools operating under site-based management or reconstitution).

Through the Education Leadership research program, the Institute encourages the development of in-service professional development for education leaders that draws on innovations and lessons learned from professional development in other fields (e.g., business administration, public administration, organizational psychology, public health).

The Institute also encourages the development of evaluation systems to measure the performance of principals and other building or district-level leaders, and the validation of such measures against student performance.

### **C. Specific Requirements**

For the FY 2008 Education Leadership topic, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Education Leadership topic are described.

Under the Education Leadership program, applications must address:

- (a) identification of the characteristics and practices of education leaders that are predictive of student achievement; (b) identification of leadership recruitment and retention policies that are predictive of student achievement; or (c) identification of leadership professional development programs that are predictive of student achievement on indices that matter to the state, parents, and governing boards (e.g., school board) from kindergarten through high school;
- development and/or evaluation of education leadership professional development programs, recruitment programs, or retention programs for school leaders from kindergarten through high school; or
- development and validation of assessments of education leaders at the building or district-level from kindergarten through high school.

The Institute recognizes that, in general, Education Leadership interventions are designed to change directly the behaviors of education leaders and indirectly affect student learning and achievement. In such cases, applicants under Goal Three and Goal Four must provide measures of the primary mediators (i.e., proximal outcomes), as well as measures of student achievement (i.e., distal outcomes). For example, applicants proposing to evaluate a professional development program for education leaders must include measures of the behaviors of the education leaders that the intervention is designed to directly affect as well as measures of student achievement. In addition, strong applications would likely include measures of the teaching and learning environment that are intended to be addressed through the education leaders' behaviors (i.e., such measures would be mediators between the proximal education leader behavior outcomes and the distal student learning outcomes).

## **8. EDUCATION POLICY, FINANCE, AND SYSTEMS**

Program Officer: Dr. Katina Stapleton (202-219-2154; [Katina.Stapleton@ed.gov](mailto:Katina.Stapleton@ed.gov))

### **A. Purpose**

The Institute intends for the Education Policy, Finance, and Systems (Policy/Finance) research program to address five goals: (1) identifying policies, systemic programs or practices, and education finance programs or practices that are associated with better student outcomes (e.g., student learning, high school graduation rates); (2) developing new policies, education finance and systemic practices that are intended to improve student outcomes either directly or indirectly by improving the teaching and learning environment; (3) evaluating the efficacy of education policies, education finance programs and practices, and systemic programs and practices that are intended to improve student outcomes either directly or indirectly by improving the teaching and learning environment; (4) providing evidence on the effectiveness of policies, finance programs and practices, and other systemic practices that are implemented at scale and are intended to improve student outcomes either directly or indirectly by improving the teaching and learning environment; and (5) developing and testing cost accounting tools and measurement systems that will enable education administrators to link student-level resources to student-level achievement data.

### **B. Background**

Improving student achievement and educational attainment (e.g., high school graduation, enrollment in postsecondary education) is a national concern. Through the Policy/Finance program, the Institute supports research to improve student learning and achievement by identifying changes in the ways in which schools and districts are organized, managed, and operated that may be directly or indirectly linked to student outcomes. Rather than improving student learning by changing the curricula or instructional approaches, organizational and management approaches are generally designed to change the structure and operation of schools or districts in ways that may improve the overall teaching and learning environment, and indirectly improve student achievement. For example, differences in achievement among schools and districts serving students of similar economic and racial/ethnic backgrounds are likely to reflect, in part, differences in the alignment of components of policy and practice. When these differences occur within states where every school is operating under the same state standards and accountability system, they point to the potential importance of organizational and management variables at the local level in enhancing student learning.

As part of the Policy/Finance research program, the Institute encourages research to identify ways in which money and resources matter to student learning. For example, how can schools and districts use and allocate resources to improve the performance and capacity of teachers in ways that are tied to student achievement? In districts that serve high proportions of students from low income families or minority groups, for example, how can incentives be structured to recruit and retain highly qualified and experienced teachers in the schools that serve children with the greatest needs (e.g., bonuses for the most skillful teachers and administrators to serve in high needs schools)?

Little rigorous research has been performed that examines either a direct causal relation or associations between student achievement and various systemic or organizational strategies. For example, the Institute encourages research on the relations between different forms of school governance (e.g., elected versus appointed boards, state or mayoral takeovers) and student achievement, and research on the relations between different forms of school organization and structure (e.g., extended-day versus traditional school day, year-round schooling versus traditional academic year calendar) and student achievement. There is a dearth of rigorous research on how the implementation or effects of specific systemic strategies might vary according to school characteristics (e.g., experience-level or turnover rate

of teaching staff). Similarly, little work has been conducted to determine the effects on student learning of making different choices in strategies or investments (e.g., smaller classes with less experienced, lower salaried teachers versus larger classes with higher paid, more experienced, and highly skilled teachers).

The Institute welcomes proposals to examine the relation between specific strategies (such as alignment of curriculum, assessment, and performance standards) and student outcomes. For example, the Institute encourages research on supplemental education services such as tutoring. What kinds of supplemental education services (one-on-one tutoring, small-group prescriptive skill-building, individualized gap assessment and remediation, small-group drill and practice) are effective in producing student learning gains? How can these services be aligned with the instructional programs of districts and with state academic, content, and achievement standards to maximize student learning?

The Institute also encourages researchers to work with their local school districts to identify policies or programs that the districts are considering implementing (e.g., double-blocking reading in the primary grades with the goal of having all students reading at grade-level by third grade), and for which the district would like to determine whether the policy improves student outcomes in their schools. A rigorous evaluation could be conducted if the district would phase in the policy or program rather than implementing the new program in all of its schools in the first year (e.g., half of the schools begin the double-blocking program in Year 1; the remaining schools would be scheduled to begin double-blocking in Year 2), and then use a lottery to decide which assignment of schools to conditions. The researchers could apply for funding under the Policy/Finance program to allow them to gather and analyze the data for research purposes and to provide timely feedback to the district on the effects of the policy on student outcomes. As another example, suppose a district was considering a mandatory summer school policy for all students who score below a set criterion on the state end-of-year assessment. A researcher could propose a regression discontinuity study to compare the following year's academic performance of students just above and just below the criterion score.

Finally, over the past decade, numerous problems have been noted with respect to using per-pupil expenditure data that are aggregated at the district- or school-level for answering questions related to how schools can make better use of their resources to improve student learning (National Research Council, 1999). For example, school districts commonly use district-wide averages of teacher salaries in estimating costs for individual schools; district-wide averages tend to hide the disparity across schools within a district. School-level per-pupil expenditure data collapse expenditures across students receiving different services, and when these data are associated with school-level student achievement scores, the data do not enable administrators to make informed decisions about the allocation of resources in ways that are meaningfully linked to student learning.

Under Goal Five, the Institute is interested in the development of practical cost accounting tools or measurement systems that will allow schools and districts to track *student-level resources* in ways that will enable administrators to make resource allocation decisions that are tied to student learning outcomes. As noted in the National Research Council (1999) report, "traditional function and object categories that were developed to track revenues and expenditure data for fiscal auditing purposes do not represent a particularly useful lens on educational activity when the focus shifts to what schools strive to do instructionally and how they do it." Researchers are encouraged to develop and test new cost accounting tools or measurement systems that will invent, test, and analyze student or school resource measures to determine productivity. Researchers may build on or modify previous systems, such as

those identified by Berne and Stiefel (1997), or develop and test entirely new approaches. Proposed systems should take into account the need for an overall cost accounting tool or measurement system that will enable schools and districts to determine student-level resources for educating students with special needs (including, for example, students from racial, ethnic, and linguistic minority groups that have traditionally underachieved academically, and students with disabilities), and the excess costs of educating students with special needs in specific categories of expenditure.

### **C. Specific Requirements**

For the FY 2008 Policy/Finance topic, applicants must submit under *either* [Goal One](#) *or* [Goal Two](#) *or* [Goal Three](#) *or* [Goal Four](#) *or* [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Policy/Finance topic are described.

Under the Policy/Finance program, applications must address:

- policy, finance, or systems-level interventions intended to improve student outcomes (e.g., reading, writing, mathematics, science, school readiness, graduation rates) directly or indirectly for kindergarten through high school education systems; or
- cost accounting, budgeting, or other measurement tools that will enable education administrators to link student-level resources to student-level learning outcomes for education systems that include kindergarten through high school.

The Institute recognizes that, in general, Policy/Finance interventions are designed to change directly the teaching and learning environment and indirectly affect student learning and achievement. In such cases, applicants under Goal Three and Goal Four must provide measures of the primary mediators (i.e., proximal outcomes), as well as measures of student achievement.

## **9. EARLY CHILDHOOD PROGRAMS AND PRACTICES**

Program Officer: Dr. Caroline Ebanks (202-219-1410; [Caroline.Ebanks@ed.gov](mailto:Caroline.Ebanks@ed.gov))

### **A. Purpose**

Through its Early Childhood Programs and Policies (Early Childhood) research program, the Institute intends to contribute to improvement of school readiness skills (e.g., pre-reading, early mathematical skills, language, vocabulary, social skills) of prekindergarten (i.e., four-year old) children by: (1) identifying early childhood curriculum, instructional practices, programs, and policies that are associated with better school readiness outcomes, as well as mediators and moderators of the relations between these interventions and child outcomes; (2) developing new early childhood curriculum, instructional practices, programs, and policies for improving school readiness; (3) evaluating fully developed early childhood curriculum, instructional practices, programs, and policies for improving school readiness through efficacy or replication trials; (4) evaluating the effectiveness of early childhood curriculum, instructional practices, programs, and policies that are implemented at scale; and (5) developing and validating assessments for use in early childhood instructional settings.

The long-term outcome of this program will be an array of tools and strategies (e.g., assessments, instructional approaches, programs, and policies) that have been documented to be effective for improving school readiness skills for prekindergarten (four-year-old) children.

## **B. Background**

Despite decades of federal, state, and local programs intended to support young children's preparation for schooling, children from low-income families continue to begin formal schooling at a disadvantage. Findings from the Early Childhood Longitudinal Study, a multiyear study following over 22,000 children in the kindergarten class of 1998 through the fifth grade, show that children from families living in poverty had lower reading achievement scores, on average, than students living in households at or above the poverty line. In particular, 61 percent of students in poverty scored in the lowest third of the distribution of reading achievement scores, compared with 25 percent of students in households at or above the poverty threshold. These differences in reading achievement based on poverty status are evident at the beginning of kindergarten and persist throughout the elementary years (Princiotta, Flanagan, & Germino Hausken, 2006). There is a similar pattern of findings in mathematics. In short, substantial numbers of children from low-income families begin kindergarten behind their more affluent peers, and remain behind throughout the school years.

In previous years, the National Center for Education Research has supported research on early childhood education through its regular [Reading and Writing](#), [Mathematics and Science Education](#), [Teacher Quality](#), and [Education Policy, Finance, and Systems](#) research programs, as well as through its FY 2002 and FY 2003 Preschool Curriculum Evaluation Research program. Although the Institute has received and funded several early childhood projects in early literacy, early mathematical skills, and teacher quality, the Institute believes that its regular competitions are not reaching many researchers who typically apply to early childhood research programs. The Institute also recognizes that early childhood curricula and programs are often designed to be comprehensive programs that cover several domains (e.g., early literacy, mathematical skills, social skills), and as such, may not be well suited for research programs that focus on a single domain. In addition, the Institute seeks to attract more proposals that address early childhood policies. Hence, the Institute has established its Early Childhood Programs and Policies research program.

Currently many states are considering the costs and benefits of different early childhood policies, such as: (a) universal prekindergarten programs versus targeted prekindergarten programs; (b) full-day prekindergarten programs versus half-day prekindergarten programs; and (c) one-year programs (i.e., for four-year olds) versus two-year programs (i.e., for three- and four-year olds). The Institute encourages proposals that address these and other important systems-level issues including: (a) financing early childhood programs (e.g., are there more efficient and effective ways to coordinate funding streams?); (b) alignment of state early learning standards with Kindergarten to Grade 12 standards; (c) assessment of children's kindergarten readiness (e.g., what should be assessed or what is predictive of later school achievement?); and (d) teacher certification requirements (what criteria are predictive of child outcomes?).

The Institute is interested in the identification, development, and evaluation of programs and practices intended to improve young children's pre-reading, pre-writing, language and vocabulary, and early mathematical skills. In addition, the Institute encourages research on the identification, development, and evaluation of programs and practices intended to improve young children's socioemotional readiness. Socioemotional competence covers a broad range of knowledge and skills. The Institute encourages research on those skills that are predictive of later school performance.

In addition to the identification, development, and evaluation of interventions to improve school readiness, the Institute intends for the Early Childhood program to support research on the development of practical assessments of teacher subject matter knowledge, pedagogical knowledge, and instructional skills, and validation of these assessments (or existing assessments) against measures of student learning and achievement. Understanding what skills and knowledge make a teacher effective, and identifying teacher candidates and current teachers who have these skills and knowledge is critical to developing a highly qualified teacher workforce. Ideally, assessments of pedagogical knowledge and skills and subject matter knowledge would not only predict student achievement but also be practical to administer and cost-effective. Although some existing tests of pedagogical knowledge and subject matter knowledge have been correlated with the test takers' SAT or ACT scores, validation of existing tests against measures of school readiness remains to be accomplished (Gitomer, Latham, & Ziomek, 1999). Hence, the Institute is interested in proposals to *validate existing measures* of pedagogical knowledge and subject matter knowledge against measures of school readiness as well as proposals to *develop and validate new measures*. Assessments of teacher pedagogical and subject matter knowledge that predict student outcomes could form the basis for an improved system of certification and for determining the effectiveness of professional development activities. The Institute also invites applications to develop and/or validate measures of instructional practices that could be used by schools to provide feedback to teachers and improve the quality of classroom instruction; such measures must be validated against measures of student achievement.

Under the Early Childhood program, the Institute intends to support the development and validation of assessments of school readiness, pre-reading, pre-writing, early mathematics, early science, and social skills. Such assessments could be used to monitor progress in these domains and/or for purposes of screening for school readiness. Applications that would be appropriate for consideration include, but are not limited to: (a) proposals to develop new assessments that teachers could use to inform classroom instruction; (b) proposals to modify or adapt existing assessments so that teachers can use them to inform daily or weekly instructional plans for specific students; and (c) proposals to adapt assessments originally designed and used for research purposes for broader use in instructional settings.

Finally, according to the U.S. Department of Health and Human Services, Administration for Children and Families, approximately 27 percent of the children who are enrolled in Head Start programs are English language learners.<sup>4</sup> The Institute encourages applications on early childhood practices for English language learners. What curricula and instructional approaches are most effective for preparing English language learners for school? What is the effect of different languages of instruction (e.g., home language only, English only, two-way immersion programs, bilingual instruction) on the school readiness of English language learners? In addition, the Institute is interested in the development and/or validation of assessments for English language learners.

### **C. Specific Requirements**

For the FY 2008 Early Childhood Programs and Policies topic, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section,

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<sup>4</sup> U.S. Department of Health and Human Services, Administration for Children and Families, downloaded from <http://eclkc.ohs.acf.hhs.gov/hslc/ecdh/eecd> on February 12, 2007.

specific requirements that apply to applications to the Early Childhood Programs and Policies topic are described.

Under the Early Childhood program, applications must address:

- curriculum or instructional practices in pre-reading, pre-writing, early mathematics, early science, or social skills intended to prepare young children for school and designed to be used in center-based programs;
- assessment of prekindergarten children's pre-reading, pre-writing, early mathematics, early science, or social skills;
- teacher professional development training related to school readiness;
- assessments of teacher subject matter knowledge, pedagogical knowledge, or instructional practices for prekindergarten teachers; or
- state or local policies that apply to the implementation or improvement of early childhood programs and initiatives.

The Institute recognizes that some interventions are designed to change directly the teaching and learning environment and indirectly affect student outcomes. In such cases, applicants under Goal Three and Goal Four must provide measures of the primary mediators (i.e., proximal outcomes), as well as measures of student achievement.

Under the Early Childhood program, the Institute is primarily interested in programs and policies intended to improve school readiness for children who are at-risk for later school failure. The focus of the Early Childhood program is on center-based programs and policies for prekindergarten children (four-year old children), but the Institute will accept applications that include three-year old children in center-based programs with four-year old children.

## **10. HIGH SCHOOL REFORM**

Program Officer: Dr. David Sweet (202-219-1748; [David.Sweet@ed.gov](mailto:David.Sweet@ed.gov))

### **A. Purpose**

The purpose of the Institute's education research program on High School Reform is to support research on approaches, programs, and practices that enhance the potential of at-risk students to complete high school with the skills necessary for success in the workplace or in postsecondary education. The long-term goal of the High School Reform research program is to provide an array of effective high school reform practices that have been shown to be effective for improving student outcomes. This research program is designed to support crosscutting reform efforts. It will complement the Institute's existing research programs on [teacher quality](#), [reading and writing](#), [interventions for struggling adolescent and adult readers](#), [mathematics and science education](#), [education leadership](#), and [policy and systems](#), each of which includes high school education. Although these research programs include research on interventions at the high school level, the High School Reform education research program is different from these research programs in three ways. First, it focuses exclusively on improving educational outcomes in high schools. Second, it focuses on a particular population – students who are at-risk of dropping out of high school or who finish high school without the skills necessary to be ready for the demands of the workplace or college. Third, it focuses on approaches, strategies, and interventions that are intended to supplement, complement, intensify, or in some sense, act as a catalyst to increase the benefit at-risk students would otherwise derive from their academic coursework. In other words, for the

Research on High School Reform initiative, the Institute is interested in approaches that can augment the effects of better instruction and higher quality teachers in the core academic subjects (e.g., double-blocking, structural reforms) and thereby, better serve the needs of students who are poorly prepared academically and motivationally for the demands of high school.

## **B. Background**

Improving high school students' academic achievement and graduation rates is of national concern. According to the most recent National Assessment of Educational Progress, only 36 percent of twelfth grade students read at or above the proficient level, and only 26 percent write at or above that level. Similarly for mathematics, only 16 percent of Grade 12 students scored at or above the proficient level, and only 18 percent for science. Low levels of academic achievement in high school affect postsecondary education. According to the National Center for Education Statistics, in 2000, 28 percent of college freshmen took at least one remedial course in reading, writing or mathematics. Further, the ACT reports that in the class of 2004, only 26 percent of high school students who took the ACT college entrance exam had scores predictive of earning a "C" or higher in college algebra. Across the board, low levels of achievement are more likely among minority groups and students from low-income backgrounds than among students from advantaged backgrounds.

More problematic than the generally low levels of academic achievement in Grade 12 are the large numbers of students who do not complete a high school diploma. In 2002-03, the averaged freshman graduation rate<sup>5</sup> – an estimate of the percentage of a freshman class that graduates – across states and the District of Columbia ranged from 59.6 percent to 87.0 percent, and was 73.9 percent for the nation as a whole (U.S. Department of Education, National Center for Education Statistics, 2006).

Although rigorous research on high school reform is meager, there are a few findings and developments that point the way toward approaches, strategies, and practices that could benefit from an intensive research and development effort through the Institute's High School Reform Research Initiative. These include but are not limited to (a) closer monitoring of student academic progress, (b) more demanding course requirements in high schools and middle schools, (c) academic and career-related academies, (d) mentoring, (e) alternate remediation strategies, (f) positive incentives, and (g) alternate schools and additional opportunities for high school completion.

A combination of intervention strategies targeted on academic needs and designed to engage and strengthen students' existing interests and skills is likely to be critical to enhancing the probability that at-risk youth will complete high school with the skills needed for the workplace, college, or the military. For example, the Institute encourages applications to develop and evaluate promising academic remediation programs that cover reading, mathematics, and other basic academic skills, including programs that begin in middle school and are intended to better prepare and support the transition of at-risk students into high school. In addition, the Institute encourages research on the availability of rigorous coursework (e.g., Advanced Placement or International Baccalaureate courses), or increased requirements in mathematics and science and the impact of such practices and policies on high school completion and dropout rates, school achievement, and college enrollment, particularly among students

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<sup>5</sup> The averaged freshmen graduation rate is an estimate of the percentage of a freshman class that graduates. It is based on calculating the average of (a) the number of 8th-graders 5 years prior to the graduation date, (b) the number of 9th graders 4 years prior to the graduate date, and (c) the number of 10th graders 3 years prior to the graduation date, and then determining the percentage of the "averaged freshman class" that graduates.

at-risk for failure in high school. For example, when districts have policies requiring algebra or higher for all ninth-graders, what are the most effective ways to enable under-prepared students to complete ninth-grade algebra (e.g., double-blocking math courses, summer school)?

The issues of student accountability and achievement monitoring permeate discussions of high school reform. For example, there is accumulating evidence suggesting that when high school exit exams are in place, schools and districts cover more of their state content standards, align their curricula and instruction with such standards, and are more likely to provide remedial instruction and other interventions designed to help students at-risk of failing (Wise, et al., 2003). The Institute encourages applications proposing, for instance, interrupted time series analyses to examine the potential effect of high school exit examinations on high school completion and dropout rates, college enrollment, and academic achievement. In addition, the Institute is interested in applications to develop, implement, and assess the impact of using well-designed benchmark assessments to track academic progress toward state achievement standards.

Evidence on the effectiveness of programs that put careers and occupation-oriented knowledge at the center of high school life is mixed. There is a need for research on the conditions under which career and technical education can enhance the potential for at-risk students to complete high school with the skills needed to be successful in the workplace, college, or the military. A number of new directions have been proposed that have not been subjected to rigorous research or evaluation, such as dual enrollment/credit programs that permit students to obtain college-level credits or provide the opportunity to earn an industry-recognized credential while still in secondary school.

Incentives that encourage high school completion take many forms, ranging from “No pass, no play” laws that make participation in extracurricular activities contingent on passing all courses to cash rewards or gift certificates for school completion. Although there is some evidence of the potential benefit of such interventions in other countries, research is needed on the effects of various types of incentives on high school completion and academic achievement in the United States and the conditions that may moderate the impact of such incentives.

Mentoring provides an individualized intervention with an adult who helps with many aspects of a student’s life — academic, social, work, personal. Mentoring is a central component of a number of programs that are intended to enhance high school success for at-risk students. For example, Check and Connect, a dropout prevention program for youth with disabilities, increased ninth grade course completion rate and student engagement for special education students (Sinclair, Christenson, Evelo, & Hurley, 1998). Empirical questions remain about the kind of training, levels of intensity, and cost-effective ratios of mentors to students needed to affect dropout/completion behavior and academic achievement.

Preliminary evidence suggests that broad based comprehensive school management reforms can produce positive results. These models, such as Talent Development and High Schools That Work, share several characteristics: a rigorous curriculum, high expectations for students, professional development for teachers, high levels of support for schools seeking to change, strong leadership at both the school and district level, and close ties among schools, the families of students, and their communities. Implementation, however, appears to be a significant challenge for comprehensive reforms. For example, studies of the High Schools That Work model demonstrate substantial variation in

implementation, with greater gains for students in high-implementation sites than in moderate- and low-implementation schools. The consistency of results represents another challenge: A recent non-experimental evaluation of the Talent Development High School Model in Philadelphia found gains in attendance, academic course credits earned, and promotion rates for first time ninth grade students. However, there were only small gains in 11<sup>th</sup> grade standardized test scores in mathematics and no statistically significant gains in reading scores (Kemple, Herlihy, & Smith, 2005). The Institute is interested in research that addresses issues such as implementation in existing comprehensive reform models as well as research that will support local capacity to engage in comprehensive school-based management. For example, if truancy and low-reading skills among English language learners are major problems for high schools, then a management plan that compares promising reading and vocabulary approaches, coupled with low-tolerance truancy prevention might be tested.

Alternative education programs for high school students are commonplace in today's school systems. Schools and programs have been developed with the understanding that some students need more than what a traditional high school experience can provide and may incorporate curriculum modifications, schools within a school, flexible schedules (including evening and weekend classes), small class sizes, individualized instruction, vocational counseling, social service linkages, tutoring, mentoring, and/or parent involvement programs. Given the limited research base, evaluation of alternative education programs and schools as "interventions" for at-risk students would contribute to our understanding of the costs and benefits of such programs (and their components), with outcomes of interest including: academic achievement; disciplinary problems; school attendance, engagement, and connectedness; and high school completion or GED attainment.

In addition to applications to identify, develop, and/or evaluate interventions to improve student outcomes in high school, the Institute invites applications to develop and validate measures of students' non-cognitive behaviors (e.g., timeliness, responsibility, persistence, discipline, initiative, social competence) that could be used by teachers to evaluate students. Such evaluations could be incorporated into student transcripts and provide students with a way to document growth and development in skills that are potentially important for future education or employment. Applications to develop and/or validate such instruments are appropriate for Goal Five. Individuals interested in examining the impact of such assessments on students or institutions, or the relation between implementation of the assessments and student/institutional outcomes should consider Goals One, Two, Three, or Four.

### **C. Specific Requirements**

For the FY 2008 High School Reform topic, applicants must submit under *either* [Goal One](#) *or* [Goal Two](#) *or* [Goal Three](#) *or* [Goal Four](#) *or* [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the High School Reform topic are described.

Applications submitted to the High School Reform topic must focus on:

- interventions implemented in high schools (and/or in middle schools) where the intent of the program is to support successful completion of high school and preparation for postsecondary education or the workplace;
- interventions implemented in middle schools where the intent of the program is to support the transition into high school;

- assessments of non-cognitive behaviors (e.g., timeliness, engagement, responsibility, persistence, discipline, initiative, social competence) that could be used by teachers to evaluate students on behavioral dimensions that are potentially important for future education or employment.

## **11. INTERVENTIONS FOR STRUGGLING ADOLESCENT AND ADULT READERS AND WRITERS**

Program Officer: Dr. Elizabeth Albro (202-219-2148; [Elizabeth.Albro@ed.gov](mailto:Elizabeth.Albro@ed.gov))

### **A. Purpose**

Through its Research on Interventions for Struggling Adolescent and Adult Readers and Writers (Adolescent/Adult Readers/Writers) grants program, the Institute intends to contribute to improvement of reading and writing skills among struggling adolescent and adult readers and writers by (1) identifying curriculum and instructional practices that are associated with better reading or writing outcomes, as well as mediators and moderators of the relations between these practices and reading or writing outcomes; (2) developing curricula and instructional practices for teaching reading or writing to struggling adolescent and adult readers and writers, or for addressing the underlying causes of their reading or writing difficulties; (3) evaluating fully developed curricula and instructional practices for teaching reading or writing to struggling adolescent or adult readers and writers through efficacy or replication trials; (4) evaluating the effectiveness of reading or writing curricula and instructional practices for struggling adolescent and adult readers and writers implemented at scale; and (5) developing and validating assessments that can be used in instructional settings to identify sources of reading and writing difficulties.

The long-term outcome of this program will be an array of tools and strategies (e.g., assessments, instructional approaches) that have been documented to be effective for improving the reading and writing skills of struggling adolescent and adult readers and writers.

### **B. Background**

The Institute created its Adolescent/Adult Readers/Writers research program last year to call attention to the need for rigorous research to develop and evaluate interventions to improve the reading and writing skills of adolescents and adults. In previous years, researchers interested in submitting reading or writing research proposals that targeted adolescents or adults could have submitted to the research on [Reading and Writing program](#). However, the low response in terms of numbers of applications that focused on adolescent or adult readers/writers suggested that we needed to do something else to draw more attention to the need for research in this area. Hence, we created a separate Adolescent/Adult Readers/Writers research program. In FY 2007 we received a substantial increase in the numbers of reading and writing applications that focus on the needs of adolescents and adults who have difficulty reading or writing and are continuing the program this year.

A significant number of adolescent and adult readers are not able to read well enough to make sense of short passages, much less the longer stretches of text that most readers are expected to understand everyday. According to the 2005 National Assessment of Educational Progress (NAEP), 27 percent of eighth graders cannot read at the basic level; on the 2002 NAEP, 26 percent of twelfth graders could not read at the basic level. That is, when reading grade-appropriate text, these adolescents cannot extract the

general meaning or make obvious connections between the text and their own experiences, or make simple inferences from the text. In other words, they cannot understand what they have read. Studies show that adolescents who are struggling readers are at high risk of dropping out of high school, graduating unprepared for college, and having limited opportunities in the workforce (National Center for Education Statistics, 2003).

Although the research base on the basic components of literacy and strategies to help young children learn to read is strong, much less research has examined how to identify, prevent, and remediate reading difficulties in middle and high school students (Snow, Burns, & Griffin, 1998). Some middle and high school students struggle with basic reading skills, such as decoding and word recognition. Other adolescent students have learned basic reading skills, but continue to struggle with vocabulary, fluency, and comprehension.

Similarly, the 2003 National Assessment of Adult Literacy finds that 14 percent of adults have no more than the most simple and concrete literacy skills. These adults are able to sign their names and can locate information in short prose texts, but are unable to read and understand material presented in pamphlets or newspaper articles. Another 29 percent of the adult population demonstrates basic prose literacy skills, but cannot perform moderately challenging literacy activities, such as summarizing a text. Given the increasing need for literacy in the workplace (Barton, 2000), it is unsurprising that more than half of adults with below basic literacy levels are unemployed. In addition, adults with a basic mastery of prose literacy skills also confront challenges in the workplace. Approximately 38 percent of such individuals are currently unemployed.

Given that substantial numbers of adolescents and adults struggle with the basic tasks of reading and writing, the Institute requests applications targeting the development and evaluation of reading and writing interventions and assessments designed for struggling adolescent and adult readers. By struggling adolescent readers and writers, the Institute means those middle or high school students who have not been identified with disabilities, but whose reading or writing skills are at least two years below grade level. By struggling adult readers and writers, the Institute refers to adults whose reading and writing skills prevent them from carrying out simple daily tasks. Struggling adolescent and adult readers/writers typically have received reading and writing instruction during their schooling, but continue to perform below grade-level expectations. The Institute is particularly interested in research efforts targeting adolescents and adults who may be able to read and/or write, but whose performance level impedes their success either in the classroom or workplace. Adolescent students may not qualify for special education services, but their performance levels indicate a need for additional reading and/or writing instruction.

In general, the Interventions for Struggling Adolescent and Adult Readers and Writers research program focuses on approaches, strategies, and interventions that are intended to supplement, complement, or intensify the benefit struggling readers and writers would derive from the reading/writing instruction they typically receive. Examples of these tasks include reading and completing a simple form and summarizing a short newspaper article. Struggling adult readers find that their inability to read and write well impedes their ability to pursue formal education and limits their employment opportunities. By soliciting applications that focus exclusively on struggling adolescent and adult readers and writers, the Institute intends to support the identification, development, and validation of approaches that can improve the outcomes of struggling adolescent and adult readers and writers.

In addition to supporting the identification, development, and evaluation of curricula and instructional approaches for struggling adolescent and adult readers and writers, the Institute intends for the Adolescent/Adult Readers/Writers program to address the need to develop and validate reading and writing measurement tools for classroom assessments to be used for instructional purposes (e.g., progress monitoring). To improve reading and writing skills, instruction may need to be tailored to the sources of difficulty that individual students experience. An ideal learning environment might involve regular and frequent assessment of skills, and the possibility of individualized instruction for students based on the particular source of their difficulties. Through Goal Five, the Institute intends to support the development of diagnostic assessments in reading and writing and assessments to monitor progress in reading and writing.

### **C. Specific Requirements**

For the FY 2008 Interventions for Struggling Adolescent and Adult Readers and Writers topic, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Interventions for Struggling Adolescent and Adult Readers and Writers topic are described.

Under the Adolescent/Adult Readers/Writers program, applications must address:

- reading or writing curricula for teaching reading or writing to struggling adolescent and adult readers and writers or for addressing the underlying causes of their reading or writing difficulties;
- instructional approaches curricula for teaching reading or writing to struggling adolescent and adult readers and writers or for addressing the underlying causes of their reading or writing difficulties; or
- diagnostic or progress monitoring assessments in reading and writing intended for use with adolescent and adult readers and writers.

Researchers who are interested in identifying underlying or component processes of reading or writing and the relations of these processes to proficiency in reading or writing should refer to the [Cognition and Student Learning](#) research program.

## **12. POSTSECONDARY EDUCATION**

Program Officer: Dr. Ram Singh (202-219-2025; [Ram.Singh@ed.gov](mailto:Ram.Singh@ed.gov))

### **A. Purpose**

The Institute intends for the Postsecondary Education research program to address five goals: (1) identifying policies, programs or practices that are associated with improving access to, persistence in, or completion of postsecondary education; (2) developing new programs, practices, or policies that are intended to improve access to, persistence in, or completion of, postsecondary education; (3) evaluating the efficacy of programs, practices, or policies that are intended to improve access to, persistence in, or completion of postsecondary education; (4) providing evidence on the effectiveness of programs, practices, or policies for improving access to, persistence in, or completion of, postsecondary education when they are implemented at scale; and (5) developing and validating assessments of cognitive (e.g.,

problem-solving, creativity, writing) and social cognitive (e.g., communication and interpersonal) skills that are outcomes of postsecondary education.

## **B. Background**

Improving participation and persistence in postsecondary education is a national concern, especially for high-risk students. According to the National Center for Education Statistics, there are substantial gaps across income groups in the percentages of high school graduates who enrolled in college the fall semester after high school graduation: 53 percent of students from low income families, 58 percent from middle income families, and 80 percent from upper income families. Similarly, there are differences across racial and ethnic groups in the percentages of high school graduates who enroll in college right after high school graduation: 66 percent of White students, 58 percent of African American students, and 59 percent of Hispanic students. Moreover, there continue to be gaps across income groups in the proportions of students who graduate from college or persist in college five years after their initial enrollment: 61 percent from low income families, 65 percent from middle income families, and 71 percent from upper income families (Horn & Berger, 2004). Across racial and ethnic groups, the five-year graduation or persistence rate also varies: 55 percent for African American students, 77 percent for Asian/Pacific Islander students, 60 percent for Hispanic students, 59 percent for Native American students, and 66 percent for White students.

Through the Postsecondary Research program, the Institute supports research to improve postsecondary access and completion by identifying programs, practices, and policies that are effective for improving access to or persistence in postsecondary education. In recent years, a number of innovative programs for improving access to postsecondary education have been implemented. For example, the California State University system has partnered with California's Department of Education and State Board of Education to develop the Early Assessment Program for high school students. Through the Early Assessment Program, students in Grade 11 are assessed in English and mathematics to determine their readiness for college-level coursework. Students can use the results of the test to identify skills that they need to work on during their senior year in order to be better prepared for college. Nationwide, many school systems offer dual enrollment or "early college" high school programs that allow a wide range of students to earn a high school diploma while progressing toward an associate degree or certificate. Innovative dropout recovery programs such as Diploma Plus, and Portland Community College's Gateway to College program specifically use dual enrollment to reconnect out-of-school youth with a formal education. However, little rigorous research exists to evaluate the impact such programs have on college enrollment and persistence.

Institutions of higher education have implemented a variety of programs and practices to improve student retention. Many institutions have courses or workshops that focus on building the skills of under-prepared students (e.g., developmental mathematics courses, study skills courses, workshops designed to improve students' general test-taking or note-taking skills). Some programs target freshmen in their first two semesters; other programs may be designed as intensive programs the summer prior to the freshman year. The Institute encourages applications to test the effectiveness of such programs on students' grades, retention, and graduation. Some institutions have policies designed to identify and provide support to students who are struggling early on. Such policies include mandatory roll-taking policies that require (a) instructors to contact students' advisors when students miss a specified number of classes, and (b) advisors to follow-up with students, or policies that require instructors to inform advisors early in the semester if the student is failing so that advisors can be proactive about providing

assistance to struggling students. The Institute invites applications to examine the impact of such programs on student retention and graduation.

The Institute encourages research on interventions to provide students and parents with information that may be related to students' choices regarding whether to go to college and where to go to college. According to the National Center for Education Statistics, both high school students and their parents are likely to markedly overestimate the cost of tuition and fees for one year of college (Horn, Chen, & Chapman, 2003). Further, among households in the lowest income groups, parents are more likely to report that they are not able to estimate the cost of tuition and among those who do estimate the cost, they are less likely to be within 25 percent of the actual average tuition cost for the type of institution in their state that their student wanted to attend. A number of different types of programs (e.g., parent education, counselors, websites) address students' and parents' access to information about college and planning ahead for college. The Institute encourages research to evaluate the impact of such programs on student enrollment.

A number of states have implemented merit-based scholarship programs intended to provide students with an incentive to perform well in high school and attend college. For example, in 1993, Georgia introduced the Georgia Hope Scholarship program, which covers tuition, allowable mandatory fees, and a book allowance in public colleges to Georgia high school graduates with a B average or better, or a voucher of equal value for students who choose to attend private college. Continued receipt of the scholarship is contingent upon satisfactory academic progress. The introduction of the program was associated with increases in four-year public and private college attendance among young adults residing in Georgia (Cornwell, Mustard, & Sridhar, 2005). The Institute is interested in supporting rigorous evaluations of such programs.

The high cost of attending college continues to be an important issue in postsecondary education. According to the College Board, in the 2005-2006 academic year, annual prices for undergraduate tuition, fees, room, and board were estimated to be over \$12,000 at four-year public colleges and \$29,000 at four-year private colleges; for the same year, undergraduates at two-year public institutions on average spent approximately \$2,200 a year for tuition and fees (College Board, 2005). The Institute invites applications to examine the complex relations between student financial aid programs (including federal, state, and private sources), and access to and completion of postsecondary education. Because financial aid comes from multiple sources, we encourage research on the interactions of aid programs (e.g., how institutions package available sources of financial aid to eligible students) and their subsequent effects on access to and completion of postsecondary education.

Policymakers and higher education administrators seek answers to practical questions regarding the relative impact – both costs and benefits – of alternative approaches to student financial aid on access to and completion of postsecondary education for a wide range of student groups (e.g. traditional, nontraditional, economically disadvantaged). Applicants might consider, for example, the impact of loan financing or loan forgiveness on college completion of at-risk students, or whether extending grant aid eligibility to high school students would spur development of dual enrollment programs and increase college enrollment of at-risk students. As another example, investigators might compare the impact of student financial aid policies (e.g., alternative methods for calculating student financial aid eligibility, the use of merit versus need based criteria for student financial aid) on access to and completion of postsecondary education. Applicants might also examine how the interactions of student financial aid

and student support services affect access to and completion of postsecondary education. All 50 states offer tax-deferred plans for saving for college (529 plans) and some states have college saving plans that guarantee full-tuition payment in the future. Who is utilizing these programs? What is the impact of such programs on access to postsecondary education? The Institute also invites rigorous research on new and existing federal and state financial aid programs intending to encourage students from low income families to prepare for, enroll in, and succeed in postsecondary education.

Finally, many colleges and universities have implemented assessments of students' college-level reading, writing, mathematics, and critical thinking skills in order to provide feedback for the improvement of their general education curriculum or for accreditation and accountability purposes. For example, the *Measure of Academic Proficiency and Progress* by ETS and the *Collegiate Assessment of Academic Proficiency* by ACT are two commercially available assessments for institutions of higher education. The Institute invites applications to examine the validity and utility of such assessments. What do these types of assessments predict? What are their effects on institutions and on students? Applications to develop and/or validate such instruments are appropriate for Goal Five under this topic. Individuals interested in examining the impact of the use of assessments on students or institutions, or the relation between implementation of the assessments and student/institutional outcomes, should consider Goals One, Two, or Three (e.g., does a university's requirement of a writing exit exam influence students' writing proficiency?).

### **C. Specific Requirements**

For the FY 2008 Postsecondary Education Research topic, applicants must submit under *either* [Goal One](#) or [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Postsecondary Education Research topic are described.

Under the Postsecondary Education Research program, applicants must address:

- interventions implemented at the high school or postsecondary level that are intended to increase access to postsecondary education, support the transition from high school into postsecondary education, improve the persistence of students in postsecondary education, or the completion of postsecondary education; or
- measures of learning at the postsecondary level (e.g., college-level proficiencies in reading, writing, critical thinking, and mathematics) to be used by institutions of higher education to assess what students have learned in college.

## **13. EDUCATION TECHNOLOGY**

Program Officer: Dr. Edward Metz (202-208-1983; [Edward.Metz@ed.gov](mailto:Edward.Metz@ed.gov))

### **A. Purpose**

Through its Education Technology research grants program, the Institute intends to support research on education technology tools that are designed to provide or support instruction in reading, writing, mathematics, or science (including pre-reading, pre-writing, early mathematics, and early science) or to provide professional development for teachers related to instruction in reading, writing, mathematics, or science. The Institute intends to contribute to improvement of reading, writing, mathematics, and

science learning by (1) developing new education technology tools intended to improving reading, writing, mathematics, science, or general study skills; (2) evaluating fully developed education technology tools intended to improving reading, writing, mathematics, science, or general study skills through efficacy or replication trials; (3) evaluating the effectiveness of fully developed education technology tools intended to improving reading, writing, mathematics, science, or general study skills that are implemented at scale; and (4) developing and validating assessments that use education technology and that can be used in instructional settings. The long-term outcome of this program will be an array of education technology tools that have been documented to be effective for improving reading, writing, mathematics, and science achievement.

## **B. Background**

The Institute created its Education Technology research to call attention to the need for rigorous research to develop and evaluate new education technology tools or evaluate existing education technology products that are intended (a) to improve student outcomes in reading, pre-reading, writing, pre-writing, mathematics, or science skills from prekindergarten through high school; (b) to teach basic reading, writing, mathematics, and study skills at the postsecondary level, including vocational education and adult education; and (c) to provide teacher professional development relevant to reading, writing, mathematics, or science. In previous years, researchers interested in submitting education technology research proposals could have submitted to the Institute's basic research programs (e.g., Read/Write, Math/Science, and Teacher Quality), as long as the technology addressed the topic identified in the particular research program. Although the Institute has received and funded some technology projects, the Institute believes that its regular competitions are not reaching researchers who typically apply to education technology research programs. Hence, the Institute has established its Education Technology research program.

Too many U.S. students are not becoming proficient in basic academic knowledge and skills in reading, writing, mathematics, and science. For example, on the 2005 National Assessment of Educational Progress (NAEP), 36 percent of fourth graders and 27 percent of eighth graders cannot read at the basic level; and on the 2002 NAEP 26 percent of twelfth graders cannot read at the basic level. That is, when reading grade appropriate text these students cannot extract the general meaning or make obvious connections between the text and their own experiences or make simple inferences from the text. In other words, they cannot understand what they have read. A similar picture emerges in the development of writing skills. According to the 2002 NAEP writing assessment 14 percent of fourth graders cannot write at the basic level, 15 percent of eighth graders cannot write at the basic level, and 26 percent of twelfth graders cannot write at the basic level. On the 2003 National Assessment of Adult Literacy, 14 percent of adults demonstrated no more than the most simple and concrete literacy skills. These adults are able to sign their names and can locate information in short prose texts, but are unable to read and understand material presented in pamphlets or newspaper articles. Another 29 percent of the adult population demonstrated basic prose literacy skills, but could not perform moderately challenging literacy activities, such as summarizing a text. Given the increasing need for literacy in the workplace (Barton, 2000), it is unsurprising that more than half of adults with below basic literacy levels are unemployed. In addition, adults with a basic mastery of prose literacy skills also confront challenges in the workplace. Approximately 38 percent of those individuals are currently unemployed.

In mathematics and science, large numbers of U.S. students continue to score below the basic level. In the 2005 NAEP, 20 percent of Grade 4 students, 31 percent of Grade 8 students, and 39 percent of Grade

12 students scored below the "basic" level in mathematics. At Grade 4 scoring below the basic level means that the student is likely to miss problems such as using a ruler to find the total length of three line segments. At Grade 12 scoring below the basic level means that the student is unlikely to be able to solve problems such as finding the perimeter of a figure. In science, on the 2005 NAEP, 32 percent of Grade 4 students, 41 percent of Grade 8 students, and 46 percent of Grade 12 students scored below the "basic" level in science. At Grade 4, students performing below the basic level are likely to miss problems such as using a data table to determine which day has the most daylight. At Grade 12, students performing below the basic level are likely to miss problems such as graphing the populations of two species. In mathematics and science, low levels of achievement are more likely among minority groups and students from low-income backgrounds.

One approach to improving student learning is to identify effective curricula and instructional approaches; a second approach is to improve teachers' knowledge and skills. In the Education Technology program, researchers may choose to develop and/or evaluate technology that is intended (a) to provide or support instruction to students (e.g., intelligent tutors, online courses for advanced high school science and mathematics courses), (b) to deliver professional development for teachers, or (c) to assess student learning. The Institute also encourages proposals to develop and validate education technology measurement tools to be used for instructional purposes (e.g., progress monitoring). Through the Education Technology program, the Institute is interested in proposals to develop and evaluate new products, as well as proposals to evaluate the effects of existing products (including commercially available products) on relevant student outcomes (e.g., reading or mathematics achievement).

Competitive applications will have a strong rationale for the developmental appropriateness of the product's user-interface design for the targeted students as well as a strong theoretical, pedagogical, and empirical justification for the scope and sequence of the content. The Institute strongly encourages applicants interested in applying to this program to assemble research teams that collectively have expertise in development of advanced technology (e.g., with artificial intelligence capabilities), instructional design, the targeted content domain (e.g., reading, mathematics), and implementation of rigorous experimental and quasi-experimental program evaluations.

### **C. Specific Requirements**

For the FY 2008 Education Technology topic, applicants must submit under either [Goal Two](#) or [Goal Three](#) or [Goal Four](#) or [Goal Five](#). The Institute numbers goals consistently across research grant programs. The Institute does *not* accept applications under [Goal One](#) for the Education Technology program. More details on the requirements for each goal are listed in the section on [General Requirements of the Proposed Research](#). In this section, specific requirements that apply to applications to the Education Technology topic are described.

Under the Education Technology program, applicants must propose education technology that is intended for use in schools or other education delivery settings or through formal programs operated by schools and other education delivery settings (e.g., after-school programs, distance learning programs).

- Education technology for reading, pre-reading, writing, or pre-writing must target typically developing students from prekindergarten through postsecondary. At the postsecondary level, proposals must address basic reading or writing skills for adults (e.g., remedial courses for

under-prepared college students or adult literacy courses through vocational or adult education programs), or basic English composition courses intended to teach basic writing skills (e.g., instruction in organization, audience, style, and writing clear prose) at the college level (note: proposals to conduct research on education technology for teaching creative writing or literature will not be considered).

- Education technology for *mathematics* must target typically developing students at any level from prekindergarten through high school or must propose education technology for teaching basic mathematics skills to adults through adult and vocational education programs or through developmental/bridge programs designed to help under-prepared students acquire the skills to succeed in college.
- Education technology for *science* must target typically developing students at any level from prekindergarten through high school.
- Education technology for teacher professional development relevant to reading, pre-reading, writing, pre-writing, mathematics, or science must target teachers from prekindergarten through high school. The Institute will also accept proposals for education technology for teacher professional development for teachers to teach basic reading, mathematics, writing, and study skills classes to adults through college developmental (remedial) programs, vocational education, and adult education. Under [Goal Three](#) and [Goal Four](#), applicants proposing teacher professional development interventions must provide measures of the teacher behaviors the (i.e., proximal outcomes), as well as measures of student achievement.
- Education technology assessments for reading, pre-reading, writing, pre-writing, mathematics, or science must target students at any level from pre-kindergarten through high school. In addition, the Institute will accept applications to develop and/or validate education technology assessments intended for adults who are learning basic reading, writing, or mathematics skills through adult and vocational education programs or through developmental/bridge programs designed to help under-prepared students acquire the skills to succeed in college.

## PART III REQUIREMENTS OF THE PROPOSED RESEARCH

### **14. GENERAL REQUIREMENTS OF THE PROPOSED RESEARCH**

#### **A. Basic Requirements**

**a. *Resubmissions.*** Applicants who intend to revise and resubmit a proposal that was submitted to one of the Institute's FY 2007 competitions but that was not funded must indicate on the application form that their FY 2008 proposal is a revised proposal. Their FY 2007 reviews will be sent to this year's reviewers along with their proposal. Applicants should indicate the revisions that were made to the proposal on the basis of the prior reviews using no more than 3 pages of Appendix A.

**b. *Applying to multiple topics.*** Applicants may submit proposals to more than one of the Institute's FY 2008 competitions or topics. In addition, within a particular competition or topic, applicants may submit multiple proposals. However, applicants may submit a given proposal only once (i.e., applicants may not submit the same proposal or very similar proposals to multiple topics or to multiple goals in the same topic or to multiple competitions). If the Institute determines prior to panel review that an applicant has submitted the same proposal or very similar proposals to multiple topics within or across competitions and the proposal is judged to be compliant and responsive to the submission rules and requirements described in the Request for Applications, the Institute will select one version of the application to be reviewed by the appropriate scientific review panel. If the Institute determines after panel review that an applicant has submitted the same proposal or very similar proposals to multiple topics within or across competitions and if the proposal is determined to be worthy of funding, the Institute will select the topic under which the proposal will be funded.

**c. *Applying to a particular goal within a topic.*** To submit an application to one of the Institute's research programs, applicants must choose the specific goal under which they are applying. Each goal has specific requirements.

**d. *Determining which goal is most appropriate for the proposed project.*** Applicants should read carefully the requirements for each Goal and the examples of appropriate projects under each Goal. The Institute strongly encourages potential applicants to contact the relevant program officer listed in [Section 28](#) if they have any questions regarding the appropriateness of a particular project for submission under a specific goal.

#### **B. Requirements for Goal One (Identification Projects)**

*Because the requirements for Goal One are essentially the same across the Institute's research grant topics, a generic description is used in the funding announcement. Consequently, the examples provided may not apply to a particular topic.*

**a. *Purpose of identification studies.*** Through all of its research programs that include the Identification goal (Goal One), the Institute is interested in the identification of existing programs and practices that may be associated with better academic outcomes and examination of factors and conditions that may mediate or moderate the relations between student outcomes and these programs and practices.

For Goal One, the Institute invites applications to conduct analyses of multivariate data, such as longitudinal individual student data that exist in a number of federal-, state-, and district-level databases. Using existing longitudinal data sets, investigators are able to capitalize on natural variation or discontinuities in education practices. For example, in a particular year, a large district might have implemented an intervention (e.g., curriculum, program, policy) at the beginning of a specific year. An investigator might propose interrupted time series analyses of the district's longitudinal datasets to examine changes in student outcomes that follow the implementation of the new intervention.

The strongest approaches to statistical modeling of multivariate data involve testing two or more models of relationships using the same data. Because multivariate analyses cannot fully adjust for selection biases and the effects of variables that were not measured or were not measured well, they are seldom if ever sufficient to support strong causal conclusions about what works. However, when two or more models of relationships among variables are tested with the same data, it may be possible to determine that one is more plausible than another, thus providing information relevant to understanding what does not work, as well as what does work. That, in turn, can direct future efforts in avenues that are more likely to be productive.

As an alternative to analyzing existing longitudinal databases, applicants may propose to conduct a small scale descriptive longitudinal study with primary data collection in which they attempt to predict student outcomes based on differences in observed education practices. For example, a researcher might propose to conduct detailed, quantifiable observational measures of instructional practices (types of instruction, frequency, duration, under what circumstances), and then use the instructional data in conjunction with child characteristics to predict subsequent student performance. The objective here is to identify what type or combinations of instructional activities are associated with better student outcomes and for which students. Researchers following this strategy who can successfully predict student performance could use this information as the basis for developing an intervention (see, e.g., Connor, et al., 2007).

Evidence obtained through a Goal One project of the association between exposure to a program or practice and better student outcomes has the possibility of being used to support a subsequent application for a [Goal Two](#) (Development) or [Goal Three](#) (Efficacy) project.

*By addressing the theoretical and empirical rationale for the study and the practical importance of the intervention (e.g., program, practice) that will be examined, Goal One applicants are addressing the significance of their proposal.*

**b. Methodological requirements.** For all applications, including those submitted under Goal One, the proposed research design must be appropriate for answering the research questions or hypotheses that are posed.

- (i) *Research questions.* Applicants should pose clear, concise hypotheses or research questions.
- (ii) *Database.* Applicants proposing secondary data analyses should describe clearly the database(s) to be used in the investigation including information on sample characteristics, variables to be used, and ability to ensure access to the database if the applicant does not already have access to it. The database should be described in sufficient detail so that reviewers will be able to judge

whether or not the proposed analyses may be conducted with the database. If multiple databases will be linked to conduct analyses, applicants should provide sufficient detail for reviewers to be able to judge the feasibility of the plan. If the applicant does not currently have access to the databases needed for the study, the applicant should provide sufficient documentation (e.g., letters of agreement) to assure reviewers that access can be obtained and the project can be carried out in a timely fashion.

The applicant should describe the primary outcome measures to be used, including reliability and validity. In particular, applicants should provide sufficient information on the construct validity of the proposed measures. For example, if the applicant proposes to use a state database from which the primary outcome measure will be performance on a reading or mathematics achievement measure, the applicant should detail the standardized measure from which the reading or mathematics scores are derived.

- (iii) *Primary data collection.* Applicants may propose a Goal One project in which the primary focus is on the collection and analysis of original data. The applicant should carefully describe the sample, measures (including reliability and validity), and procedures proposed for the primary data collection. Because Goal One projects must be designed to predict student outcomes, if observational data are collected, applicants should describe how the data would be collected (e.g., procedures for maintaining inter-observer reliability), coded, and quantified to allow quantitative analyses predicting the relation between what was observed and student outcomes.

Applicants may also propose to collect original data as a supplement to be used with an existing longitudinal database in order to answer the question of interest. In such cases, applicants should describe the sample and how the sample is related to or links to the proposed secondary database, the measures to be used (including information on the reliability and validity of the proposed instruments), and data collection procedures.

- (iv) *Data analysis.* The applicant must include detailed descriptions of data analysis procedures. Because predictor variables relevant to education outcomes (e.g., student, teacher, or district characteristics) often covary, the Institute expects investigators to utilize the most appropriate state-of-the-art analytic techniques to isolate the possible effects of variables of interest. Analytic strategies should allow investigators to examine mediators and moderators of programs and practices. The relation between hypotheses, measures, independent and dependent variables should be well specified. Strong applications will include an explicit discussion of how exclusion from testing, or missing data, will be handled within the statistical analyses. Strong applications will propose an approach for comparing hypotheses or models of relationships among variables.

**c. *Personnel and resources.*** Competitive applicants will have research teams that collectively demonstrate expertise in: (a) the relevant student outcome (e.g., reading, mathematics, student behaviors); (b) the type of intervention under investigation (e.g., curriculum, program, policy); (c) implementation of, and analysis of results from, the research design that will be employed; and (d) working with teachers, schools, or other education delivery settings that will be employed if original data will be collected. Competitive applicants will have access to institutional resources that adequately support research.

**d. Awards.** Typical awards for projects at this level are \$100,000 to \$350,000 (total cost = direct + indirect costs) per year. For applicants proposing to do primarily secondary data analysis, the maximum duration of the award is 2 years. Applicants proposing to do short-term longitudinal studies may request up to 2 additional years (i.e., the maximum duration of the award is 4 years) and additional funds, but must justify the need for the additional time and funding. The size of the award depends on the scope of the project.

### **C. Requirements for Goal Two (Development Projects)**

*Because the requirements for Goal Two are essentially the same across the Institute's research grant topics, a generic description is used in the funding announcement. Consequently, the examples provided may not apply to a particular topic.*

**a. Purpose of Goal Two (Development).** Through all of its research programs that include the Development goal (Goal Two), the Institute intends to support the development of education interventions – curricula, instructional approaches and programs. The Institute stresses that Goal Two applications are about development, rather than demonstrations of the efficacy of an intervention. Under Goal Two, the Institute does not intend to support applications that propose to allocate substantial resources for testing the effect of the proposed intervention. For example, the Institute does not intend to support under Goal Two applications in which the researcher proposes to spend one year developing the intervention and the second and third years on testing the effect of the intervention in a significant number of classrooms or schools. Applicants who have an intervention that could be tested for efficacy should apply to Goal Three.

From the Institute's standpoint, a funded development project would be successful if at the end of a 1- to 3-year development award, the investigators had a fully developed version of the proposed intervention, including prototypes of all materials and products necessary for implementation of the intervention in authentic education delivery settings, and evidence demonstrating the feasibility of its implementation in an authentic education delivery setting. The Institute anticipates that investigators with successful development projects would submit proposals to subsequent competitions for Goal Three (Efficacy) awards.

**b. Requirements for proposed intervention.** Under Goal Two, the Institute invites applications to develop new interventions or further develop interventions that are in the early stages of development (e.g., those that do not have an entire program or product ready to evaluate). It is important for applicants to provide a strong rationale to support the development of the proposed intervention. In essence, applicants are answering the question: *Why is the proposed intervention likely to produce better student outcomes relative to current education practices?*

In strong applications, researchers provide context for the proposed intervention by including data on, or reviewing research describing, the attributes of typical existing practices. Understanding the shortcomings of current practice contributes to the rationale for the proposed intervention.

Applicants should clearly describe the intervention and the logic model for the intervention. For example, how do the features or components of the intervention relate to each other temporally (or operationally), pedagogically, and theoretically (e.g., why does A lead to B)? Applicants should provide

a strong theoretical and empirical justification for the design and sequencing of the features or components of the intervention. When applicants clearly describe the logic model that guides the intervention and the specific features making up the intervention, reviewers are better able to evaluate (a) the relation between the theoretical and empirical foundation for the intervention and the intervention (e.g., is the proposed intervention a reasonable operationalization of the theory?) and (b) the relation between the intervention and the outcome measures (e.g., do the proposed measures tap the constructs that the intervention is intended to address?).

Applicants should explain why the proposed intervention is likely to produce substantially better student outcomes relative to current practice. By clearly describing the intervention – particularly, the unique features of the intervention ("active ingredients") that are hypothesized to produce the desired improvement in student outcomes – as well as the typical existing practices, reviewers are better able to judge whether the proposed intervention has the potential to produce substantially better student outcomes because it is sufficiently different from current practices and has "active ingredients" that appear on the basis of theoretical or empirical reasons to be powerful agents for improving student learning.

In the rationale to support the proposed intervention, applicants should address the *practical* importance of the proposed intervention. For example, when the proposed intervention is fully developed, will it have the potential to improve students' achievement scores in educationally meaningful increments, if it were implemented over the course of a semester or school year? In addition, would the proposed intervention be both affordable for schools and easily implemented by schools (e.g., not involve major adjustments to normal school schedules)?

*By describing (a) the intervention (e.g., features, components) and the logic model for the intervention, (b) the theoretical and empirical support for the proposed intervention, and (c) the practical importance of the intervention, Goal Two applicants are addressing aspects of the significance of their proposal.*

**c. *Methodological requirements.* For all applications, including those submitted under Goal Two, the proposed research design must be appropriate for answering the research questions or hypotheses that are posed.**

For Goal Two projects, applicants must clearly address the proposed methods for developing the intervention and testing the feasibility of implementation of the prototype in an authentic education delivery setting. Applicants should describe the systematic process they will use to collect empirical data that will provide feedback for refining the intervention. A major objective of Goal Two projects is to refine and improve the initial version of the intervention by implementing it, or components of it, observing its functioning, and making necessary adjustments in the design of the intervention so that it functions more as intended.

Strong applications include clear descriptions of the development activities so that reviewers will understand (a) what will be developed, (b) how it will be developed, and (c) when the development will take place. Applicants should describe what they would measure or observe to determine whether the intervention is working as intended when they are testing the feasibility of successive versions of the intervention. A useful by-product of such testing is a set of fidelity of intervention measures that could be used if the intervention were evaluated in an efficacy trial (see [Goal Three](#)).

A timeline that delineates the iterative process of drafting and revising the intervention (e.g., features or components of the intervention, procedures, training activities, and materials) is often a simple way of showing reviewers how research activities will feed into subsequent development (refinement) activities, so that information can be used to make decisions and improvements. A variety of methodological strategies may be employed during this phase. *For Development projects, reviewers need to understand the iterative development process to be used in the design and refinement of the proposed intervention.*

By the end of a Goal Two project, the Institute expects investigators to have a fully developed intervention and demonstrated that the intervention can be implemented in an authentic education delivery setting.

- (i) *Sample.* The applicant should define, as completely as possible, the samples and settings that will be used to assess the feasibility and usability of the intervention.
- (ii) *Research plan.* The applicant must provide a detailed research plan in which they detail the proposed procedures for developing the intervention. Strong applications will include clear descriptions of: (a) what needs to be developed; (b) the procedures for developing the intervention; and (c) the procedures (including sample, measures, and procedures for analyzing data) for determining if the intervention is functioning as intended (e.g., Does the software program crash when students use it? Are the activities planned for a particular lesson do-able within the allotted time?). *Applicants should describe the iterative development process to be used in the design and refinement of the proposed intervention, and plans for acquiring evidence about the operation of the intervention according to the logic model that they describe.*
- (iii) *Measures.* Goal Two projects typically rely on the collection of process data that can help the researcher refine the intervention and provide insight into the feasibility and usability of the proposed intervention in authentic education delivery settings. Applicants should clearly describe (a) what needs to be observed in order to determine if the intervention is operating as intended and (b) how those observations will be collected. Observational, survey, or qualitative methodologies are encouraged to identify conditions that hinder implementation of the intervention.

**d. Personnel and resources.** Competitive applicants will have research teams that collectively demonstrate expertise in: (a) the relevant content area (e.g., reading, mathematics, student behaviors); (b) type of intervention to be developed; (c) implementation of, and analysis of results from, the research design that will be employed; and (d) working with schools and other education delivery settings. Competitive applicants will have access to institutional resources that adequately support research.

An applicant may be or may involve *for-profit entities* in the project. Involvement of the commercial developer or distributor must not jeopardize the objectivity of the research. *Collaborations including for-profit developers or distributors of education products must justify the need for Federal assistance to undertake the evaluation of programs that are marketed to consumers and consider cost-sharing part of the cost of the evaluation.*

Applicants who previously or currently hold development grants with the Institute should describe the results and outcomes of those grants to date. They should indicate whether what was developed has been (or is being) evaluated for efficacy ([Goal Three](#)) and if results are available, what the results of those efficacy evaluations have been. The Institute intends to support researchers under Goal Two who can demonstrate their ability to develop interventions that can be used in the field and tested for efficacy.

**e. Awards.** Typical awards for projects at this level are \$150,000 to \$500,000 (total cost = direct + indirect costs) per year. Development projects are for a maximum of 3 years. Development costs vary according to the type of intervention that is proposed. Larger awards will be considered. In all cases, the size of the award depends on the scope of the project.

#### **D. Requirements for Goal Three (Efficacy and Replication Trials)**

*Because the requirements for Goal Three are essentially the same across the Institute's research grant topics, a generic description is used in the funding announcement. Consequently, the examples provided may not apply to a particular topic.*

Under Goal Three, the Institute requests proposals to test the efficacy of fully developed interventions. By *efficacy*, the Institute means the degree to which an intervention has a net positive impact on the outcomes of interest in relation to the program or practice to which it is being compared.

**a. Purpose of efficacy and replication trials.** Through all of its research programs that include the Efficacy and Replication goal (Goal Three), the Institute intends to fund efficacy trials to determine whether or not fully-developed interventions – programs, practices – are effective under specified conditions (e.g., urban schools with a high turnover rate among teachers), and with specific types of students (e.g., English language learners). Results from efficacy projects have less generalizability than results from effectiveness (scale-up) evaluations under [Goal Four](#). The limited generalizability can arise both from the lack of a full range of types of settings and participants in the study, as well as through the intensive involvement of the developers and researchers in the implementation of the intervention. A well-designed efficacy trial provides evidence on whether an intervention **can** work, but not whether it would work if deployed widely. Under Goal Three, applicants may propose an efficacy trial to determine if an intervention will work under specific conditions or a replication trial to determine if an intervention shown to produce a net positive impact in one setting will produce a net positive impact under different conditions (e.g., with a different population of students).

Under Goal Three, an applicant might propose to examine the efficacy of the intervention in an experimental study in which, for example, half of the classrooms are randomly assigned to the intervention program and half are assigned to continue using standard district practices. Alternatively, if the research team hypothesized that a variation in the delivery of the program might improve the impact of the intervention, the team might propose instead to randomly assign: (a) one-third of the classrooms to the basic intervention; (b) one third of the classrooms to the variation; and (c) one-third of the classrooms to continue with standard district practices. *Applicants should use the efficacy and replication trials to determine the conditions, if any, under which an intervention produces meaningful improvement on academic outcomes.*

Also of interest to the Institute are proposals to compare the impact of two interventions that are based on different theoretical models. In such cases, the purpose might be to compare the efficacy of two

well-developed approaches to improving student learning. One advantage to this approach is that, relative to designs in which the comparison group experiences whatever the school or district currently provides (but see the discussion of "[business-as-usual](#)" treatments below), the investigator should have better knowledge of the critical components of each intervention and can attempt to create two conditions in which, for example, instruction varies on a number of critical components.

From the Institute's standpoint, a funded Efficacy/Replication project would be *methodologically successful* if at the end of the grant period, the investigators had rigorously evaluated the impact of a clearly specified intervention on relevant student outcomes and under clearly described conditions using a research design that meets the Institute's What Works Clearinghouse standards (<http://whatworks.ed.gov>), whether or not the intervention is found to improve student outcomes relative to the comparison condition. The Institute would consider methodologically successful projects to be *pragmatically successful* if the rigorous evaluation determined that the intervention has a net positive impact on student outcomes in relation to the program or practice to which it is being compared.

**b. Requirements for proposed intervention.** Interventions appropriate for study under Goal Three are interventions that are fully developed and have evidence of their feasibility for use in authentic education delivery settings.

- (i) Applicants must have an intervention that is fully developed and ready to be evaluated. Applicants who intend to devote a significant part of the project period to developing new components or materials for the intervention or new delivery approaches should apply to [Goal Two](#). Goal Three projects are limited to those interventions that are fully developed.

Applicants must provide evidence that the intervention can be implemented in authentic education delivery settings – that is, evidence of the feasibility and usability of the proposed intervention in authentic education delivery settings. The interventions may already be in wide use in education setting or may be newly (but fully) developed interventions.

Also appropriate for Goal Three applications are proposals to *replicate* the efficacy of an intervention in a different setting. For instance, in a previous study, the applicant could have demonstrated the efficacy of an intervention in a small random assignment trial in an urban school district, and a reasonable next step would be to *replicate* these findings in a rural school district.

- (ii) Applicants must provide a compelling rationale that justifies the Institute's investment in the evaluation of the proposed intervention. As justification for the evaluation of an intervention, the Institute will accept conceptual arguments of the importance of evaluating the proposed intervention because of its relevance to public policy or current education practice as would be judged by practitioners and policymakers. For example, the proposed intervention may already be widely used but have not been rigorously evaluated (e.g., a commercially distributed program, a specific education policy). To support this argument, applicants might include documentation of the widespread use (e.g., across multiple states, or a single large state) of the program to justify the proposed efficacy evaluation.

Alternatively, applicants could provide a strong rationale justifying the investment in the evaluation of the proposed intervention based on (a) the theoretical foundation on which the intervention was developed; (b) research on related interventions or components of the proposed interventions; and/or (c) empirical evidence of the effect or potential effect of the proposed intervention based on smaller scale studies. In such cases, the applicant needs to address the question: Why is this intervention likely to produce better student outcomes relative to current practice? In addition, such applicants should address the *practical* importance of the proposed intervention. For example, is the intervention sufficiently comprehensive to improve student outcomes on end-of-year assessments? Is there evidence indicating that the proposed intervention is sufficiently different from current practices to potentially improve student outcomes relative to current practices?

- (iv) Applicants should clearly describe a logic model for the proposed intervention (e.g., describing the features or components of the intervention and how they relate to each other and to the intended outcomes both temporally (or operationally) and theoretically (e.g., why A leads to B)). When applicants clearly describe the model that guides the intervention and the intervention itself (e.g., specific features or components of the intervention), reviewers are better able to evaluate the relation between the theoretical and empirical foundation for the intervention and the intervention (e.g., is the proposed intervention a reasonable operationalization of the theory?). Reviewers are also better able to evaluate the relation between the intervention and the outcome measures (e.g., do the proposed measures tap the constructs that the intervention is intended to address?).

Some interventions are designed to affect the teaching and learning environment and indirectly affect student outcomes. In such cases, it is important for applicants to be clear in their logic model of the mediators that the intervention is designed to affect and through which student outcomes are intended to be improved.

Strong applications will also include detailed descriptions of what the comparison group experiences. By clearly describing the intervention and the comparable treatment that the comparison group will receive, reviewers are better able to judge whether: (a) the intervention is sufficiently different from the comparison treatment so that one might reasonably expect a difference in student outcomes, and (b) fidelity measures and observations of the comparison group are sufficiently comprehensive and sensitive to identify and document critical differences between what the intervention and comparison groups receive.

*By describing (a) the intervention (e.g., features, components) and the logic model for the intervention, (b) the theoretical and empirical support for the proposed intervention, and (c) the practical importance of the intervention, Goal Three applicants are addressing aspects of the significance of their proposal.*

**c. Methodological requirements. Under Goal Three, the proposed research design must be appropriate for answering the research questions or hypotheses that are posed.**

- (i) *Research questions.* Applicants should pose clear, concise hypotheses or research questions.

- (ii) *Sample.* The applicant should define, as completely as possible, the sample to be selected and sampling procedures to be employed for the proposed study, including justification for exclusion and inclusion criteria. Additionally, the applicant should describe strategies to increase the likelihood that participants will remain in the study over the course of the evaluation (i.e., reduce attrition).
- (iii) *Research design.* The applicant must provide a detailed research design. Applicants should describe how potential threats to internal and external validity would be addressed. Studies using randomized assignment to treatment and comparison conditions are strongly preferred. When a randomized trial is used, the applicant should clearly state the unit of randomization (e.g., students, classroom, teacher, or school); choice of randomizing unit or units should be grounded in a theoretical framework. Applicants should explain the procedures for assignment of groups (e.g., schools) or participants to treatment and comparison conditions.<sup>6</sup>

*Only in circumstances in which a randomized trial is not possible* may alternatives that substantially minimize selection bias or allow it to be modeled be employed. Applicants proposing to use a design other than a randomized design must make a compelling case that randomization is not possible. Acceptable alternatives include appropriately structured regression-discontinuity designs or other well-designed quasi-experimental designs that come close to true experiments in minimizing the effects of selection bias on estimates of effect size. A well-designed quasi-experiment is one that reduces substantially the potential influence of selection bias on membership in the intervention or comparison group. This involves demonstrating equivalence between the intervention and comparison groups at program entry on the variables that are to be measured as program outcomes (e.g., student achievement scores), or obtaining such equivalence through statistical procedures such as propensity score balancing or regression. It also involves demonstrating equivalence or removing statistically the effects of other variables on which the groups may differ and that may affect intended outcomes of the program being evaluated (e.g., demographic variables, experience and level of training of teachers, motivation of students). Finally, it involves a design for the initial selection of the intervention and comparison groups that minimizes selection bias or allows it to be modeled. For example, a very weak quasi-experimental design that would *not* be acceptable as evidence of program efficacy would populate the intervention condition with teachers who volunteered for the program to be evaluated, and would select comparison teachers who had the opportunity to volunteer but did not. In contrast, an acceptable design would select teachers in one particular geographical area of a city to be in the intervention, whereas teachers in another geographical area, known to be demographically similar, would be selected to be in the comparison condition. In the former case, self-selection into the intervention is very likely to reflect motivation and other factors that will affect outcomes of interest and that will be impossible to equate across the two groups. In the latter case, the geographical differences between the participants in the two groups would ideally be unrelated to outcomes of interest, and in any case, could be measured and controlled for statistically.

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<sup>6</sup> For additional information on describing procedures for randomization, see the What Works Clearinghouse document, *Evidence Standards for Reviewing Studies* (p. 6), available at [http://www.whatworks.ed.gov/reviewprocess/study\\_standards\\_final.pdf](http://www.whatworks.ed.gov/reviewprocess/study_standards_final.pdf).

- (iv) *Power.* Applicants should clearly address the power of the evaluation design to detect a reasonably expected and minimally important effect. When applicants justify what constitutes a reasonably expected effect, applicants should indicate clearly (e.g., including the statistical formula) how the effect size was calculated.

Many evaluations of education interventions are designed so that clusters or groups of students, rather than individual students, are randomly assigned to treatment and comparison conditions. In such cases, the power of the design depends in part on the degree to which the observations of individuals within groups are correlated with each other on the outcomes of interest. For determining the sample size, applicants need to consider the number of clusters, the number of individuals within clusters, the potential adjustment from covariates, the desired effect, the intraclass correlation (i.e., the variance between clusters relative to the total variance between and within clusters), and the desired power of the design (note, other factors may also affect the determination of sample size, such as using one-tailed vs. two-tailed tests, repeated observations, attrition of participants, etc.).<sup>7</sup> Strong applications will include empirical justification for the intraclass correlation and anticipated effect size used in the power analysis.

- (v) *Measures.* Measures of student outcomes should include relevant standardized measures of student achievement in addition to other measures of student learning and achievement that are more closely aligned with the proposed intervention (e.g., researcher-developed measures). The applicant should provide information on the reliability, validity, and appropriateness of proposed measures. In strong applications, investigators will make clear that the skills or content the intervention is designed to address are captured in the various measures that are proposed.

Some interventions are designed to change directly the teaching and learning environment and indirectly affect student outcomes. In such cases, applicants should provide measures of the primary mediators (i.e., proximal outcomes), as well as measures of student outcomes.

- (vi) *Fidelity of implementation of the intervention.* The applicant should specify how the implementation of the intervention would be documented and measured. In strong applications, investigators will make clear how the fidelity measures capture the critical features of the intervention. Investigators should propose research designs that permit the identification and assessment of factors impacting the fidelity of implementation.
- (vii) *Comparison group, where applicable.* Comparisons of interventions against other conditions are only meaningful to the extent that one can tell what comparison group receives or experiences. Applicants should compare intervention and comparison groups on the implementation of critical features of the intervention so that, for example, if there is no observed difference between intervention and comparison student outcomes, they can determine if key elements of the intervention were also provided in the comparison condition (i.e., a lack of distinction between the intervention treatment and the comparison treatment).

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<sup>7</sup> For more information, see Donner, A., & Klar, N. (2000). *Design and Analysis of Cluster Randomization Trials in Health Research*. New York: Oxford University Press; Murray, D. M. (1998). *Design and Analysis of Group-Randomized Trials*. New York: Oxford University Press; W.T. Grant Foundation & University of Michigan, [http://sitemaker.umich.edu/group-based/optimal\\_design\\_software](http://sitemaker.umich.edu/group-based/optimal_design_software).

In evaluations of education interventions, individuals in the comparison group typically receive some kind of treatment; rarely is the comparison group a "no-treatment" control. For some evaluations, the primary question is whether the treatment is more effective than a particular alternative treatment. In such instances, the comparison group receives a well-defined treatment that is usually an important comparison to the target intervention for theoretical or pragmatic reasons. In other cases, the primary question is whether the treatment is more effective than what is generally available and utilized in schools. In such cases, the comparison group might receive what is sometimes called "business-as-usual." That is, the comparison group receives whatever the school or district is currently using or doing in a particular area. Business-as-usual generally refers to situations in which the standard or frequent practice across the nation is a relatively undefined education treatment. However, business-as-usual may also refer to situations in which a branded intervention (e.g., a published curriculum or program) is implemented with no more support from the developers of the program than would be available under normal conditions. In either case, *using a business-as-usual comparison group is acceptable*. When business-as-usual is one or another branded intervention, applicants should specify the treatment or treatments received in the comparison group. In all cases, applicants should account for the ways in which what happens in the comparison group are important to understanding the net impact of the experimental treatment. As noted in the preceding paragraph, in strong applications, investigators propose strategies and measures for comparing the intervention and comparison groups on key features of the intervention.

The purpose here is to obtain information useful for *post hoc* explanations of why the experimental treatment does or does not improve student learning relative to the counterfactual.

Finally, the applicant should describe strategies they intend to use to avoid contamination between treatment and comparison groups. Applicants do not necessarily need to randomize at the school level to avoid contamination between groups. Applicants should explain and justify their strategies for reducing contamination.

- (viii) *Mediating and moderating variables*. Observational, survey, or qualitative methodologies are encouraged as a complement to experimental methodologies to assist in the identification of factors that may explain the effectiveness or ineffectiveness of the intervention. Mediating and moderating variables that are measured in the intervention condition that are also likely to affect outcomes in the comparison condition should be measured in the comparison condition (e.g., student time-on-task, teacher experience/time in position).

The evaluation should be designed to account for sources of variation in outcomes across settings (i.e., to account for what might otherwise be part of the error variance). Applicants should provide a theoretical rationale to justify the inclusion (or exclusion) of factors/variables in the design of the evaluation that have been found to affect the success of education programs (e.g., teacher experience, fidelity of implementation, characteristics of the student population). The research should demonstrate the conditions and critical variables that affect the success of a given intervention. The most scalable interventions are those that can produce the desired effects across a range of education contexts.

- (ix) *Data analysis.* All proposals must include detailed descriptions of data analysis procedures. For quantitative data, specific statistical procedures should be described. The relation between hypotheses, measures, independent and dependent variables should be clear. For qualitative data, the specific methods used to index, summarize, and interpret data should be delineated.

Most evaluations of education interventions involve clustering of students in classes and schools and require the effects of such clustering to be accounted for in the analyses, even when individuals are randomly assigned to condition. Such circumstances generally require specialized multilevel statistical analyses using computer programs designed for such purposes. Strong applications will provide sufficient detail for reviewers to judge the appropriateness of the data analysis strategy. For random assignment studies, applicants need to be aware that typically the primary unit of analysis is the unit of random assignment.

**d. *Personnel and resources.*** Competitive applicants will have research teams that collectively demonstrate expertise in: (a) the relevant content area (e.g., reading, mathematics, student behaviors); (b) the type of intervention being evaluated (e.g., curriculum, teacher professional development, policy); (c) implementation of, and analysis of results from, the research design that will be employed; and (d) working with schools and other education delivery settings. Competitive applicants will have access to institutional resources that adequately support research.

For Goal Three projects, an applicant may be or may involve developers or distributors (*including for-profit entities*) in the project, from having them as full partners in its proposal to using off-the-shelf training materials without involvement of the developer or distributor. Involvement of the developer or distributor must not jeopardize the objectivity of the evaluation. *Collaborations including for-profit distributors of curriculum materials should justify the need for Federal assistance to undertake the evaluation of programs that are marketed to consumers and consider sharing the cost of the evaluation.*

Competitive applicants will have access to institutional resources that adequately support research activities and access to schools in which to conduct the research. Strong applications will document the availability and cooperation of the schools or other education delivery settings that will be required to carry out the research proposed in the application via a letter of support from the education organization.

**e. *Awards.*** Typical awards for projects at this level will be \$250,000 to \$750,000 (total cost = direct + indirect costs) per year for a maximum of 4 years. Larger budgets will be considered if a compelling case can be made for such support. The size of the award depends on the scope of the project.

#### **E. Requirements for Goal Four (Scale-up Evaluations)**

*Because the requirements for Goal Four are essentially the same across the Institute's research grant topics, a generic description is used in the funding announcement. Consequently, the examples provided may not apply to a particular topic.*

**a. *Purpose of scale-up evaluations.*** Through all of its research programs that include the Scale-up Evaluations goal (Goal Four), the Institute intends to support effectiveness evaluations of interventions - programs, practices - to determine whether or not fully developed interventions are effective when they are implemented under conditions that would be typical if a school district or other education delivery setting were to implement them (i.e., without special support from the developer or the research team)

across a variety of conditions (e.g., different student populations, different types of schools). The key differences between Scale-up Evaluations (Goal Four) and Efficacy Evaluations ([Goal Three](#)), as the Institute uses these terms, have to do with the delivery of the intervention and the diversity of the sample. Scale-up Evaluations require that intervention be implemented at a distance from the researcher/developer of the intervention. That is, the researchers must not be heavily involved in making the intervention work. The intervention must be implemented in the school or other authentic education setting, as it would be if the school, or entity, had purchased and implemented the intervention on its own without any involvement in a research study. Second, Scale-up Evaluations require sufficient diversity in the sample of schools, classrooms, or students to ensure appropriate generalizability. Scale-up Evaluations typically require a larger sample than an Efficacy Evaluation. For Scale-up Evaluations, the primary question of interest is, "Does this intervention produce a net positive increase in student learning and achievement relative to the control group?" As is true for Goal Three studies, for Goal Four studies, depending on the research question of interest, the control group may receive a well-defined alternative treatment, or may receive whatever programs and practices are already currently available and utilized by schools ([business-as-usual control group](#)). Finally, the Institute invests in Scale-up Evaluations for interventions that have strong prior evidence of the efficacy of the intervention.

**b. *Requirements for proposed intervention.*** To be considered for Goal Four awards, applicants must provide a clear rationale for the *practical* importance of the intervention. Applicants should address three questions related to practical importance. (i) Is the intervention likely to produce educationally meaningful effects on outcomes that are important to educational achievement (e.g., grades, achievement test scores) and, therefore, are of interest to parents, teachers, and education decision makers? (ii) Is the intervention reasonably affordable to schools and other education delivery entities? (iii) Is the intervention designed so that it is feasible for schools and other education delivery entities to implement the intervention? In addition, applicants should clearly describe the components of the intervention. Interventions appropriate for study under Goal Four are interventions that are fully developed and have strong evidence of the efficacy of the program on a limited scale.

(i) *Educationally meaningful effects.* Applicants must provide *strong* evidence of the efficacy of the program as implemented on a small scale to justify the proposal to conduct a large-scale evaluation of the effectiveness of the intervention. As an example of strong evidence of efficacy, an applicant might describe the results of two or more small scale, rigorously conducted evaluations using random assignment to intervention and comparison conditions in which the efficacy of the intervention is demonstrated with different populations (e.g., urban and rural school districts). Alternatively, a single efficacy evaluation might have involved schools from more than one district and included a diverse population of teachers and students and alone could constitute sufficient evidence of the efficacy of the intervention. Importantly, the evidence of efficacy must be based on the results of randomized field trials, or well-designed quasi-experimental evaluations. Strong applications will include information on the size and statistical significance of the effects that were obtained through efficacy trials. Effect sizes and confidence limits should typically be calculated based on a unit of analysis that is the same as the unit of random assignment. For example, the results of an efficacy trial in which classrooms were assigned to conditions should be analyzed based on classroom means rather than results from individual students. Applicants should indicate clearly (e.g., including the statistical formula) how the effect size was calculated when they use effect sizes as part of the rationale for

justifying their intervention. Furthermore, information on effect sizes is more useful to reviewers when sufficient context for interpreting the effect sizes is provided.

- (ii) *Feasible implementation.* The materials, training procedures, organizational arrangements, and all other aspects of the intervention must be developed to the point where the intervention is ready to be implemented under real-world circumstances in a real-world way. Strong applications will provide reviewers with sufficient information to evaluate whether implementation of the intervention is feasible for schools and other education entities under normal conditions (i.e., without any support from the researchers or developers of the intervention that would not typically be available to entities wanting to implement the intervention outside of a research study). For example, applicants might include results from prior efficacy trials indicating the degree of support provided for the implementation of the intervention and the level of fidelity attained across classrooms or schools.
- (iii) *Description of the intervention.* All applicants should clearly describe the intervention (e.g., features, components). When applicants clearly describe the intervention, reviewers are better able to evaluate the relation between the intervention and the outcome measures (e.g., do the proposed measures tap the constructs that the intervention is intended to address?). Strong applications will also include detailed descriptions of what the comparison group experiences. By clearly describing the components of the intervention and the comparable treatment (e.g., training program) that the comparison group will receive, reviewers are better able to judge whether (a) the intervention is sufficiently different from the comparison treatment so that one might reasonably expect a difference in student outcomes, and (b) fidelity measures and observations of the comparison group are sufficiently comprehensive and sensitive to identify and document critical differences between the intervention and comparison conditions.

**c. *Implementation of the intervention.*** One goal of scale-up evaluations of interventions is to determine if programs are effective when the developers of the program do not provide any more support than would be available under normal conditions. That is, the program should be implemented as it would be if the schools or other entities that are delivering the program were to obtain the program on their own and decide to use it apart from participation in any research and evaluation study. A second goal is to determine if programs implemented under these conditions are effective in a variety of settings. Interventions that are effective at scale are those that can produce the desired effects across a range of education contexts. For Goal Four, the applicant should detail the conditions under which the intervention will be implemented – including explicitly detailing what involvement the researcher/developer will have in the implementation of the intervention and justifying this level of involvement – and provide procedures that will capture the conditions and critical variables that affect the success of a given intervention.

*By addressing the implementation of the intervention and the requirements for the intervention in section [14.E.b](#), Goal Four applicants are addressing the significance of their proposal.*

**d. *Methodological requirements.*** Under Goal Four, the proposed research design must be appropriate for answering the research questions or hypotheses that are posed. For the methodological requirements for Goal Four projects, please refer to the [methodological requirements](#) listed under Goal Three.

In addition, to the methodological requirements listed under Goal Three, for Goal Four projects, strong applications will include a Cost-Feasibility analysis to assess the financial costs of program implementation and assist schools in understanding whether implementation of the program is practicable given their available resources. Data should be collected on the monetary expenditures for the resources that are required to implement the program. Financial costs for personnel, facilities, equipment, materials, and other relevant inputs should be included. Annual costs should be assessed to adequately reflect expenditures across the lifespan of the program. The Institute is *not* asking applicants to conduct an economic evaluation of the program (e.g., cost-benefit, cost-utility, or cost-effectiveness analyses), although applicants may propose such evaluation activities if desired.<sup>8</sup>

**e. *Personnel and resources.*** Competitive applicants will have research teams that collectively demonstrate expertise in: (a) the relevant content area (e.g., reading, mathematics, student behaviors); (b) the type of intervention proposed (e.g., program, practice, policy); (c) implementation of, and analysis of results from, the research design that will be employed; and (d) working with schools and other education delivery settings.

Competitive applicants will have access to institutional resources that adequately support research activities and access to schools in which to conduct the research. Strong applications will document the availability and cooperation of the schools or other education delivery settings that will be required to carry out the research proposed in the application via a letter of support from the education organization.

An applicant may involve developers or distributors (*including for-profit entities*) of the intervention in the project, from having the developers as full partners in its proposal to using off-the-shelf teacher training materials without involvement of the developer or publisher. However, involvement of the developer or distributor must not jeopardize the objectivity of the evaluation. Strong applications will carefully describe the role, if any, of the developer/distributor in the intervention. Developers may not provide any training or support for the implementation that is not normally available to users of the intervention. Applicants should describe how objectivity in the evaluation would be maintained. Strong applications will assign responsibility for random assignment to condition and data analyses to individuals who are *not* part of the organization that developed or distributes the intervention.

*Collaborations including for-profit distributors of materials should justify the need for Federal assistance to undertake the evaluation of programs that are marketed to consumers and consider sharing the cost of the evaluation.*

**f. *Awards.*** The scope of Goal Four projects may vary. A smaller project might involve several schools within a large urban school district in which student populations vary in terms of SES, race, and ethnicity. A larger project might involve large numbers of students in several school districts in different geographical areas.

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<sup>8</sup> For additional information on how to calculate the costs of a program or conduct an economic evaluation, applicants might refer to Levin, H.M., & McEwan, P.J. (2001). *Cost-Effectiveness Analysis*. 2nd Ed. Thousand Oaks, CA: Sage Publications.

Awards for Goal Four projects may go up to a limit of \$6,000,000 (total cost = direct + indirect costs) over a 5-year period. Typical awards are less. Awards depend in part on the number of sites, cost of data collection, and cost of implementation. The size of the award depends on the scope of the project.

#### **F. Applications under Goal Five (Measurement for Topics 1-3, 6-7, 10-13)**

In Section 14.F, the Institute specifies the requirements for Goal Five projects for the following topics: (Topic 1) [Reading and Writing](#); (Topic 2) [Mathematics and Science Education](#); (Topic 3) [Cognition and Student Learning](#); (Topic 6) [Social and Behavioral Context for Academic Learning](#); (Topic 7) [Education Leadership](#); (Topic 10) [High School Reform](#); (Topic 11) [Interventions for Struggling Adolescent and Adult Readers and Writers](#); (Topic 12) [Postsecondary Education](#); and (Topic 13) [Education Technology](#).

**a. Requirements of proposed assessments.** Applicants under Goal Five should propose to develop assessments that can be used in education delivery settings. Applications that would be appropriate for consideration under Goal Five include, but are not limited to: (a) proposals to develop new assessments; (b) proposals to modify or adapt existing assessments; and (c) proposals to adapt assessments originally designed and used for research purposes for broader use in instructional settings.

Applicants should provide a compelling rationale to support the development of the proposed assessment. Reviewers will consider (a) the strength of the theoretical foundation for the proposed assessment, (b) the existing empirical evidence supporting the proposed assessment, and (c) whether the proposed assessment duplicates existing assessments. Applicants should clearly describe (1) the construct(s) to be measured, and (2) the dimensions or components of the construct(s) to be measured. Applicants should clearly describe the components of the assessment instrument and their relation to the target construct(s). When applicants clearly describe the components of the assessment, reviewers are better able to evaluate the relation between the theoretical and empirical foundation for the assessment and the assessment itself (e.g., does the proposed assessment capture critical skills?), and whether the proposed assessment will meet the needs for which it is intended.

In developing these assessments, researchers should keep in mind the pragmatic constraints (e.g., number of students, limited class time, time required to train teachers to use the assessments, costs) that teachers and administrators will consider to determine whether the instrument is a viable option for use in classrooms and other education delivery settings. Applications should provide sufficient description of the proposed assessment, and how it could be utilized within education delivery settings for reviewers to judge the practicality of the proposed assessment for instructional purposes.

*By describing the theoretical and empirical support for the proposed assessment, the practical utility of the assessment, and the components of the assessment, applicants are addressing aspects of the significance of their proposal.*

**b. Methodological requirements.** There are two aspects of the research methodology that applicants must clearly address: (a) the proposed methods for developing the assessment, and (b) the proposed research methods for obtaining evidence of the *validity and reliability* of the instrument.

(i) *Assessment development.* Applicants must detail the proposed procedures for developing the assessment. Strong applications will include descriptions of: (a) the procedures for determining the constructs that will be "tapped" by the instrument; (b) the procedures for selecting items to be

used in the assessment, including assessing difficulty of selected items, and obtaining representative responses to items; and (c) the process for determining the administrative procedures for conducting the assessment (e.g., mode of administration, inclusion/exclusion of individual test takers, and whether make-ups or alternative administrative conditions will be allowed). Applicants should describe the process they will use to collect empirical data that will provide feedback for refining specific components of the assessment. *Applicants should describe the iterative development process to be used in the design and refinement of the proposed measurement tool.*

- (ii) *Assessment evaluation.* Applicants must clearly describe the research plans for determining the validity and reliability of the instrument. Applicants should describe the characteristics, size, and analytic adequacy of samples to be used in each study, including justification for exclusion and inclusion criteria. Applicants should describe detailed planned analytic methods (e.g., statistical and/or psychometric models), plans for treatment of missing responses, and criteria for interpreting results.

**c. Personnel and resources.** Competitive applicants will have research teams that collectively demonstrate expertise in: (a) the target domain (e.g., reading, mathematics, behaviors); (b) assessment; (c) implementation of, and analysis of results from, the research design that will be employed; and (d) working with teachers, schools, or other education delivery settings in which the proposed assessment might be used. Competitive applicants will have access to institutional resources that adequately support research activities and access to schools in which to conduct the research.

**d. Awards.** Typical awards under Goal Five will be \$150,000 to \$400,000 (total cost = direct + indirect costs) per year for up to 4 years. Larger budgets will be considered if a compelling case can be made for such support. The size of award depends on the scope of the project.

### **G. Applications under Goal Five (Measurement for Topics 4-5, 9)**

In Section 14.G, the Institute specifies the requirements for Goal Five projects for the following topics: (Topic 4) [Teacher Quality Read/Write](#), (Topic 5) [Teacher Quality Math/Science](#), and (Topic 9) [Early Childhood Programs and Practices](#).

**a. Requirements of proposed assessments.** Applications that would be appropriate for consideration under Goal Five include, but are not limited to: (a) proposals to develop new assessments; (b) proposals to modify or adapt existing assessments; (c) proposals to adapt assessments originally designed and used for research purposes for broader use in instructional settings; and (d) proposals to validate assessments of teacher content and pedagogical knowledge and skills against student outcomes.

Applicants must provide a compelling rationale to support the development and/or validation of the proposed assessment. Reviewers will consider the strength of the theoretical foundation for the proposed assessment, the existing empirical evidence supporting the proposed assessment, and whether the proposed assessment duplicates existing assessments of teacher subject matter knowledge, pedagogical knowledge, or instructional practices. Applicants should clearly describe the components of the assessment (e.g., specific knowledge and skills that the instrument is designed to tap) in sufficient detail to allow reviewers to evaluate relations between the theoretical and empirical foundations for the assessment and the assessment itself (e.g., does the proposed assessment capture critical skills?), and

whether the proposed assessment will meet the needs for which it is intended. Applicants should consider the pragmatic constraints, such as ease of administration and cost, that states or districts will use to determine whether the instrument is a reasonable option for general use. In short, applicants must clearly and concisely articulate why the proposed assessment, as opposed to some other assessment, should be developed and/or validated.

*By describing the theoretical and empirical support for the proposed assessment, the practical utility of the assessment, and the components of the assessment, applicants are addressing aspects of the significance of their proposal.*

**b. Methodological requirements.** For applicants proposing to develop an assessment, there are two aspects of the research methodology that they must clearly address: (a) the proposed methods for developing the assessment and (b) the proposed research methods for obtaining evidence of the validity and reliability of the instrument. Applicants proposing to validate existing assessments of teacher subject matter and pedagogical knowledge must clearly specify the proposed methods for obtaining evidence of the validity of the instrument.

- (i) *Assessment development.* Applicants must detail the proposed procedures for developing the assessment. Strong applications will include descriptions of: (a) the procedures for determining the constructs that will be "tapped" by the instrument (i.e., construct validity); (b) the procedures for selecting items to be used in the assessment, including assessing difficulty of selected items, and obtaining representative responses to items; and (c) the process for determining the administrative procedures for conducting the assessment (e.g., mode of administration, inclusion/exclusion of individual test takers, and whether make-ups or alternative administrative conditions will be allowed). Applicants should describe the process they will use to collect empirical (but not necessarily experimental) data that will provide feedback for refining specific components of the assessment. *Applicants should describe the iterative development process to be used in the design and refinement of the proposed measurement tool.*
- (ii) *Assessment evaluation.* Applicants must clearly describe the research plans for determining the validity and reliability of the instrument. Applicants should describe the characteristics, size, and analytic adequacy of samples to be used in each study, including justification for exclusion and inclusion criteria. Applicants should describe detailed planned analytic methods (e.g., statistical and/or psychometric models), plans for treatment of missing responses, and criteria for interpreting results.

Applicants proposing to use existing datasets (e.g., state or local student achievement databases) to validate an assessment should explicitly address how exclusion from testing, or missing data, will be handled within the statistical analysis. If multiple data sets will be linked for the proposed analyses, applicants should provide sufficient detail for reviewers to judge the feasibility of the plan.

Applicants proposing to collect original data should carefully describe the sample, measures (including reliability and validity), and procedures proposed for the primary data collection. If observational data are collected, applicants should describe how the data would be collected (e.g., procedures for maintaining inter-observer reliability), coded, and analyzed. In all cases,

teachers' scores on the proposed assessment must be validated against the achievement of their students.

**c. *Personnel and resources.*** Competitive applicants will have research teams that collectively demonstrate expertise in (a) the relevant academic content area (e.g., reading, mathematics, physics); (b) teacher training; (c) assessment; (d) implementation of, and analysis of results from, the research design that will be employed; and (e) working with teachers, schools, or other education delivery settings if original data will be collected. Competitive applicants will have access to institutional resources that adequately support research activities and access to schools in which to conduct the research.

**d. *Awards.*** Typical awards under Goal Five will be \$150,000 to \$400,000 (total cost = direct + indirect costs) per year for a maximum of 4 years. Larger budgets will be considered if a compelling case can be made for such support. The size of award depends on the scope of the project.

#### **H. Applications under Goal Five (Measurement for Topic 8)**

In Section 14.H, the Institute specifies the requirements for Goal Five projects for Topic 8: [Education Policy, Finance, and Systems](#).

**a. *Requirements of proposed measurement tools.*** Under the Education Policy, Finance, and Systems topic, the purpose of Goal Five is to develop and conduct research to validate cost accounting, budgeting, or other measurement tools that will enable education administrators to link student-level resources to student-level learning outcomes for education systems that include kindergarten through high school. The Institute is interested in cost accounting methods that are analogous to cost accounting systems used in business accounting, which are based on generally accepted accounting principles. The proposed development of the cost accounting tools must be supported by strong rationale or theory. The proposal must describe the principles, as well as the theory or rationale supporting the principles, to be used for the allocation of costs or expenditures to student levels. Developers of such tools should take into account the need for education administrators and policymakers to be able to determine the excess costs of educating students with special needs (e.g., English language learners, students with disabilities) in specific categories of expenditure.

The Institute recognizes that because the critical determinants of achievement may be, for example, *which* curriculum was purchased and *not* the amount that was spent on curriculum (or what type of professional development and not the amount that was spent on professional development, and so on), the Institute encourages the development of cost accounting systems that allow administrators to track such decisions along with the financial data. In addition, applicants should consider the pragmatic constraints (e.g., ease of use, flexibility, cost) that administrators will use to determine whether the system is a reasonable option for general use. Ultimately the goal is to develop a tool that will be practical, usable, and useful for school administrators.

Strong applications will include clear descriptions of the components of the proposed cost-accounting tool. When applicants clearly describe the components of the tool, reviewers are better able to judge whether the proposed tool will meet the needs for which it is intended.

*By describing the theoretical and empirical support for the proposed cost-accounting system, the practical utility of the system, and the components of the system, applicants are addressing aspects of the significance of their proposal.*

**b. *Methodological requirements.*** The proposal must provide a detailed research design and detailed specification of the financial and outcome data that will be used for developing and testing the cost accounting, budgeting, or other measurement tool. The proposed analysis should include student cost estimates in relation to specific instructional programs or resource use patterns and a sensitivity study of how student cost estimates may change for alternative assumptions.

Applicants should detail how they will validate their system. For example, applicants might compare the results of their cost accounting, budgeting, or measurement tool with results obtained from using other cost-effectiveness measurement approaches on data from the same schools or districts. Alternatively, applicants might propose to apply their cost accounting tool to schools or districts that vary in student performance. Researchers might explore productivity and opportunity cost, as well as expenditures.

**c. *Personnel and resources.*** Competitive applicants will have research teams that collectively demonstrate expertise in (a) education finance; (b) technology related to development of the tool; (c) working with schools; and (d) implementation of, and analysis of results from, the research design that will be employed.

An applicant may be or may involve *for-profit entities* in the project. Involvement of the commercial developer or distributor must not jeopardize the objectivity of the evaluation. *Collaborations including for-profit distributors of cost accounting, budgeting, or other measurement tools must justify the need for Federal assistance to undertake the evaluation of programs that are marketed to consumers and consider sharing the cost of the evaluation.*

## **PART IV. GENERAL SUBMISSION AND REVIEW INFORMATION**

### **15. APPLICATIONS AVAILABLE**

Application forms and instructions for the electronic submission of applications will be available for the programs of research listed in this RFA from the following web site:

<http://www.Grants.gov>

by the following dates:

July 26, 2007 Application Deadline Date  
November 1, 2007 Application Deadline Date

April 23, 2007  
April 30, 2007

The application form approved for use in the competitions specified in this RFA is the government-wide SF424 Research and Related (R&R) Form (OMB Number 4040-0001).

### **16. MECHANISM OF SUPPORT**

The Institute intends to award grants pursuant to this request for applications. The maximum length of the award period varies by topic and within topic by goal. The maximum award length for each goal within a specific topic is specified in the award section for that topic and goal and ranges from two to five years. Please see details for each topic and goal in the [Requirements of the Proposed Research](#) section of the announcement.

### **17. FUNDING AVAILABLE**

The size of the award depends on the scope of the project. Please see specific details in the [Requirements of the Proposed Research](#) section of the announcement. Although the plans of the Institute include the research programs (topics) described in this announcement, awards pursuant to this request for applications are contingent upon the availability of funds and the receipt of a sufficient number of meritorious applications. The number of projects funded under a specific topic and goal depends upon the number of high quality applications submitted to that topic and goal. The Institute does not have plans to award a specific number of grants under each particular topic and goal.

### **18. ELIGIBLE APPLICANTS**

For the research grant topics, applicants that have the ability and capacity to conduct scientifically valid research are eligible to apply. Eligible applicants include, but are not limited to, non-profit and for-profit organizations and public and private agencies and institutions, such as colleges and universities.

### **19. SPECIAL REQUIREMENTS**

Research supported through this program must be relevant to U.S. schools.

Recipients of awards are expected to publish or otherwise make publicly available the results of the work supported through this program. The Institute asks IES-funded investigators to submit voluntarily

to the Educational Resources Information Center (ERIC) an electronic version of the author's final manuscript upon acceptance for publication in a peer-reviewed journal, resulting from research supported in whole or in part, with direct costs from the Institute. The author's final manuscript is defined as the final version accepted for journal publication, and includes all modifications from the peer review process.

Applicants should budget for one meeting each year in Washington, DC, with other grantees and Institute staff. At least one project representative should attend the two-day meeting.

The Institute anticipates that the majority of the research funded under this announcement will be conducted in field settings. Hence, the applicant is reminded to apply its negotiated off-campus indirect cost rate, as directed by the terms of the applicant's negotiated agreement.

Research applicants may collaborate with, or be, for-profit entities that develop, distribute, or otherwise market products or services that can be used as interventions or components of interventions in the proposed research activities. Involvement of the developer or distributor must not jeopardize the objectivity of the evaluation. Applications from, or collaborations including, such organizations should justify the need for Federal assistance to undertake the evaluation of programs that are marketed to consumers and consider sharing the cost of the evaluation, as well as sharing all or a substantial portion of the cost of the implementation of the product being evaluated (e.g., sharing the cost of textbooks for students).

The Institute strongly advises applicants to establish a written agreement among all key collaborators and their institutions (e.g., principal and co-principal investigators) regarding roles, responsibilities, access to data, publication rights, and decision-making procedures within 3 months of receipt of an award.

## **20. LETTER OF INTENT**

A letter indicating an applicant's intent to submit an application is optional, but encouraged, for each application. The letter of intent form must be submitted electronically by the date listed at the beginning of this document, using the instructions provided at: <https://ies.constellagroup.com>.

The letter of intent should include:

- Descriptive title;
- Topic and goal that the applicant will address;
- Brief description of the proposed project;
- Name, institutional affiliation, address, telephone number and e-mail address of the principal investigator(s);
- Name and institutional affiliation of any key collaborators and contractors;
- Duration of the proposed project;
- Estimated budget request for each year; and
- Total budget request.

The project description should be single-spaced and should not exceed one page (about 3,500 characters). Although the letter of intent is optional, is not binding, and does not enter into the review of

a subsequent application, the information that it contains allows Institute staff to estimate the potential workload to plan the review.

## **21. SUBMITTING AN APPLICATION**

Applications must be submitted **electronically by 4:30 p.m., Washington, DC time** by the application deadline date, using the standard forms and the instructions provided at the following web site:

<http://www.Grants.gov>

Potential applicants should check this site for information about the electronic submission procedures that must be followed and the software that will be required.

## **22. CONTENTS OF APPLICATION**

All applications and proposals for Institute funding must be contained within specified page limits. Internet Web site addresses (URLs) may not be used to provide information necessary to the review because reviewers are under no obligation to view the Internet sites.

All of the instructions and requirements regarding (a) submission of the application, (b) application page limits, (c) acceptable format, and (d) necessary attachments (.PDF files) will be provided in the **Application Instructions** document for this competition to be found under the “For Applicants -- Apply for Grants” link of Grants.gov. Also, all of the required forms will be provided in the **Application Package** that accompanies the Application Instructions.

You must search for the downloadable Application Instructions and Application Package for each competition by the CFDA number. Do not include the alpha suffix in your search (e.g., search for 84.305, not 84.305A). For this competition, make sure that you download the “Education Research” Application Instructions and Application Package.

In this section, the Institute provides instructions regarding the content of the (a) project summary/abstract, (b) project narrative, (c) bibliography and references cited, (d) biographical sketches of senior/key personnel, (e) narrative budget justification (f) subaward budgets, (g) Appendix A, (h) Appendix B, (i) human subjects narrative, and (j) additional forms. The instructions below will be reiterated in the Application Instructions document for this competition, which will be available, as noted above, under the “For Applicants -- Apply for Grants” link of Grants.gov.

### **A. Project Summary/Abstract**

The project summary/abstract will be submitted as a .PDF attachment, is limited to 1 single-spaced page and must adhere to the margin, format, and font size requirements described in the project narrative section.

The project summary/abstract should include (1) the title of the project; (2) the RFA topic and goal under which the applicant is applying (e.g., development, efficacy); and brief descriptions of (3) the purpose (e.g., to develop and document the feasibility of an intervention); (4) the setting in which the

research will be conducted (e.g., rural school districts in Alabama); (5) the population(s) from which the participants of the study(ies) will be sampled (age groups, race/ethnicity, SES); (6) if applicable, the intervention or assessment to be developed or evaluated or validated; (7) if applicable, the control or comparison condition (e.g., what will participants in the control condition experience); (8) the primary research method; (9) if applicable, measures of key outcomes; and (10) if applicable, data analytic strategy.

## **B. Project Narrative**

The project narrative will be submitted as a .PDF attachment. Incorporating the requirements outlined under the section on [Requirements of the Proposed Research](#) and the requirements listed under the Specific Requirements section of the relevant research grant topic, the *project narrative* provides the majority of the information on which reviewers will evaluate the proposal.

The project narrative must include the four sections described below (a. "Significance" through d. "Resources") in the order listed and must conform to the format requirements described on the application submission website.

The project narrative is limited to **25 single-spaced pages** for all applicants. This 25-page limit does not include any of the SF 424 forms, the one-page summary/abstract, the appendices, research on human subjects information, bibliography and references cited, biographical sketches of senior/key personnel, narrative budget justification, sub award budget information or certifications and assurances. **Reviewers are able to conduct the highest quality review when applications are concise and easy to read, with pages numbered consecutively.**

For the purposes of applications submitted under this RFA, a "page" is 8.5 in. x 11 in., on one side only, with 1 inch margins at the top, bottom, and both sides. Text must be single spaced in the narrative. To ensure that the text is easy for reviewers to read and that all applicants have the same amount of available space in which to describe their projects, applicants must adhere to the type size and format specifications for the entire narrative including footnotes. **It is very important that applicants review carefully the "Application Format Requirements" outlined in *Fiscal Year 2008 Application Package Highlights***, which will be part of the application instructions, available on <http://www.Grants.gov> by April 23, 2007.

**a. Significance.** In the [General Requirements of the Proposed Research](#) section and in the subsections describing the requirements for the proposed intervention for [Goal One](#), [Goal Two](#), [Goal Three](#), [Goal Four](#), and [Goal Five](#), the Institute details the information that the applicant should include in order to address the significance of the proposed project.

For projects in which an intervention or assessment is proposed (whether to be developed or to be evaluated), applicants may use Appendix B to include up to 10 pages of examples of materials to be used by participants (e.g., training materials for teachers, computer screens depicting how information is presented to students, examples of test items for a proposed assessment). Applicants should be aware that all narrative text describing the theoretical background, empirical support, components of the assessment or intervention, or any other aspect of the proposal must be included within the 25-page project narrative. The only materials that are allowed in Appendix B are examples of the materials that are used by or presented to participants in the intervention or assessment.

**b. *Methods.*** The Methods section of applications for [Goal One](#), [Goal Two](#), [Goal Three](#), [Goal Four](#), and [Goal Five](#) should address all of the requirements detailed in the methodological requirements sections for the appropriate research goal.

**c. *Personnel.*** Applicants must include brief descriptions of the qualifications of key personnel (information on personnel should also be provided in their curriculum vitae) in the research narrative to be compliant with the requirements of the Request for Applications. For each of the key personnel, please describe the roles, responsibilities, and percent of time devoted to the project.

**d. *Resources.*** Applicants must include a brief description of resources available to support the project at the applicant's institution and in the field settings in which the research will be conducted in the research narrative to be compliant with the requirements of the Request for Applications.

### **C. Bibliography and References Cited**

This section will be submitted as a .PDF attachment. Please include complete citations, including titles and all authors, for literature cited in the research narrative.

### **D. Biographical Sketches of Senior/Key Personnel**

This section will be submitted as a .PDF attachment. Abbreviated curriculum vitae should be provided for the principal investigator(s) and other key personnel. *Each vita is limited to 4 pages and should include information sufficient to demonstrate that personnel possess training and expertise commensurate with their duties (e.g., publications, grants, relevant research experience), and have adequate time devoted to the project to carry out their duties. The fifth page of the attachment should list current and pending grants with the proportion of the individual's time allocated to each project.* The curriculum vita must adhere to the margin, format, and font size requirements described in the project narrative section.

### **E. Narrative Budget Justification**

This section will be submitted as a .PDF attachment and should provide sufficient detail to allow reviewers to judge whether reasonable costs have been attributed to the project. The budget justification should correspond to the itemized breakdown of project costs that is provided in the Research & Related Budget (SF 424) Sections A & B; C, D, & E; and F-K. It should include the time commitments and brief descriptions of the responsibilities of key personnel. For consultants, the narrative should include the number of days of anticipated consultation, the expected rate of compensation, travel, per diem, and other related costs. A justification for equipment purchase, supplies, travel and other related project costs should also be provided in the budget narrative for each project year outlined in the Research & Related Budget (SF 424).

For those applications that include a subaward(s) for work conducted at collaborating institutions, the narrative should also provide the details about the subaward(s). Include the actual subaward budgets as a separate attachment. (See below [“Subaward Budget”](#).)

Applicants should use their institution's federal indirect cost rate and use the off-campus indirect cost rate where appropriate (see instructions under [Section 19 Special Requirements](#)). If less than 75 percent

of total indirect costs are based on application of the off-campus rate, the applicant should provide a detailed justification.

#### **F. Subaward Budget**

This section will be submitted as a .PDF attachment. For applications that include a subaward(s) for work conducted at collaborating institutions, applicants must submit an itemized budget spreadsheet for each subaward for each project year. As noted above, the details of the subaward costs should be included in the [Narrative Budget Justification](#). An Excel spreadsheet will be provided in the electronic application package to allow applicants to enter the subaward budget information in accordance with the prescribed format. Applicants will complete the spreadsheet in Excel format, convert it to a .PDF file, and then upload it as an attachment.

#### **G. Appendix A**

Appendix A should be included at the end of the [Project Narrative](#), and will be submitted as part of the same .PDF attachment.

The purpose of *Appendix A* is to allow the applicant to include any figures, charts, or tables that supplement the research text, examples of measures to be used in the project, and letters of agreement from partners (e.g., schools) and consultants. In addition, in the case of a resubmission, the applicant may use **up to 3 pages** of the appendix to describe the ways in which the revised proposal is responsive to prior reviewer feedback. These are the only materials that may be included in Appendix A; all other materials will be removed prior to review of the application. Narrative text related to any aspect of the project (e.g., descriptions of the proposed sample, the design of the study, or previous research conducted by the applicant) must be included in the research narrative. Letters of agreement should include enough information to make it clear that the author of the letter understands the nature of the commitment of time, space, and resources to the research project that will be required if the application is funded. The appendix is limited to 15 pages. The Institute recognizes that some applicants may have more letters of agreement than will be accommodated by the 15-page limit. In such instances, applicants should include the most important letters of agreement and may list the letters of agreement that are not included in the application due to page limitations.

#### **H. Appendix B (optional)**

If applicable, Appendix B should be included at the end of the [Project Narrative](#), following [Appendix A](#), and will be submitted as part of the same .PDF attachment.

The purpose of Appendix B is to allow applicants who are proposing an intervention or assessment to include examples of curriculum material, computer screens, test items, or other materials used in the intervention or assessment. These are the only materials that may be included in Appendix B; all other materials will be removed prior to review of the application. Appendix B is limited to 10 pages. Narrative text related to the intervention (e.g., descriptions of research that supports the use of the intervention/assessment, the theoretical rationale for the intervention/assessment, or details regarding the implementation or use of the intervention/assessment) must be included in the 25-page research narrative.

### **I. Research on Human Subjects**

This section will be submitted as a .PDF attachment. If an applicant proposes research activities involving human subjects at any time during the proposed project period, either at the applicant organization or at any other performance site or collaborating institution, then the applicant must provide either a human subjects "exempt research narrative" or a "nonexempt research narrative" and upload this narrative as instructed in the *Fiscal Year 2008 Application Package Highlights*. See the U.S. Department of Education's web page for detailed information about the protection of human subjects in research:

<http://www.ed.gov/policy/fund/guid/humansub/overview.html>

### **J. Additional Forms**

Please note that applicants selected for funding will be required to submit the following certifications and assurances before a grant is issued:

- (1) SF 424B-Assurances-Non-Construction Programs
- (2) Grants.gov Lobbying Form
- (3) ED 80-0014 (if applicable)-Lower Tier Certification
- (4) SF-LLL (if applicable) - Disclosure of Lobbying Activities
- (5) Protection of Human Research Subjects assurance and/or Institutional Review Board certification, as appropriate

## **23. APPLICATION PROCESSING**

Applications must be received by **4:30 p.m. Washington, DC time** on the application deadline date listed in the heading of this request for applications. Upon receipt, each application will be reviewed for compliance and for responsiveness to this request for applications. Applications that do not address specific requirements of this request will be returned to the applicants without further consideration.

## **24. PEER REVIEW PROCESS**

Applications that are compliant and responsive to this request will be evaluated for scientific and technical merit. Reviews will be conducted in accordance with the review criteria stated below by a panel of scientists who have substantive and methodological expertise appropriate to the program of research and request for applications.

Each application will be assigned to one of the Institute's scientific review panels. At least two primary reviewers will complete written evaluations of the application, identifying strengths and weaknesses related to each of the review criteria. Primary reviewers will independently assign a score for each criterion, as well as an overall score, for each application they review. Based on the overall scores assigned by primary reviewers, an average overall score for each application will be calculated and a preliminary rank order of applications prepared before the full peer review panel convenes to complete the review of applications.

The full panel will consider and score only those applications deemed to be the most competitive and to have the highest merit, as reflected by the preliminary rank order. A panel member may nominate for consideration by the full panel any proposal that he or she believes merits full panel review but would not have been included in the full panel meeting based on its preliminary rank order.

## **25. REVIEW CRITERIA FOR SCIENTIFIC MERIT**

The purpose of Institute-supported research is to contribute to the solution of education problems and to provide reliable information about the education practices that support learning and improve academic achievement and access to education for all students. Reviewers for all applications will be expected to assess the following aspects of an application in order to judge the likelihood that the proposed research will have a substantial impact on the pursuit of that goal. Information pertinent to each of these criteria is also described above in the section on [Requirements of the Proposed Research](#), in the Specific Requirements section of the relevant research grant topic, and in the description of the [project narrative](#), which appears in the section on Contents of Application.

### **A. Significance**

For significance of the project, Goal One applicants need to address the theoretical and empirical rationale for the study and the practical importance of the intervention (e.g., program, practice) that will be examined issues, as outlined in section [III.14.B.a](#) (Purpose of identification studies).

For significance of the project, Goal Two and Goal Three applicants need to describe (a) the intervention (e.g., features, components) and the logic model for the intervention, (b) the theoretical and empirical support for the proposed intervention, and (c) the practical importance of the intervention, as detailed in section [III.14.C.b](#) (for Goal Two: Requirements for proposed intervention.) and in section [III.14.D.b](#) for Goal Three.

For significance of the project, Goal Four applicants need to address the implementation of the intervention as discussed in section [III.14.E.c](#) and the requirements for the intervention in section [III.14.E.b](#).

For significance of the project, Goal Five applicants need to describe the theoretical and empirical support for the proposed assessment, the practical utility of the assessment, and the components of the assessment.

### **B. Research Plan**

Does the applicant address the requirements described in the methodological requirements section for the Goal under which the applicant is submitting the proposal?

### **C. Personnel**

Does the description of the personnel make it apparent that the principal investigator, project director, and other key personnel possess the training and experience and will commit sufficient time to competently implement the proposed research?

### **D. Resources**

Does the applicant have the facilities, equipment, supplies, and other resources required to support the proposed activities? Do the commitments of each partner show support for the implementation and success of the project?

## **26. RECEIPT AND START DATE SCHEDULE**

### **A. Letter of Intent Receipt Dates:**

July 26, 2007 Application Deadline Date	May 24, 2007
November 1, 2007 Application Deadline Date	September 6, 2007

### **B. Application Deadlines:**

Summer Deadline Date	July 26, 2007
Fall Deadline Date	November 1, 2007

### **C. Earliest Anticipated Start Date:**

July 26, 2007 Application Deadline Date	March, 2008
November 1, 2007 Application Deadline Date	July, 2008

## **27. AWARD DECISIONS**

The following will be considered in making award decisions:

- Scientific merit as determined by peer review
- Responsiveness to the requirements of this request
- Performance and use of funds under a previous Federal award
- Contribution to the overall program of research described in this request
- Availability of funds

## **28. INQUIRIES MAY BE SENT TO:**

### **A. Reading and Writing**

Dr. Elizabeth Albro  
Institute of Education Sciences  
555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [Elizabeth.Albro@ed.gov](mailto:Elizabeth.Albro@ed.gov)  
Telephone: (202) 219-2148

### **B. Mathematics and Science Education**

Dr. Christina Chhin  
Institute of Education Sciences  
555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [Christina.Chhin@ed.gov](mailto:Christina.Chhin@ed.gov)  
Telephone: (202) 219-2280

**C. Cognition and Student Learning**

Dr. Carol O'Donnell  
Institute of Education Sciences  
555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [Carol.O'Donnell@ed.gov](mailto:Carol.O'Donnell@ed.gov)

Telephone: (202) 208-3749

**D. Teacher Quality (Reading and Writing and Mathematics and Science Education)**

Dr. Harold Himmelfarb  
Institute of Education Sciences  
555 New Jersey Avenue, NW  
Washington, DC 20208

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Telephone: (202) 219-2031

**E. Social and Behavioral Context for Academic Learning**

Dr. Christina Chhin  
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555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [Christina.Chhin@ed.gov](mailto:Christina.Chhin@ed.gov)

Telephone: (202) 219-2280

**F. Education Leadership**

Dr. Katina Stapleton  
Institute of Education Sciences  
555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [Katina.Stapleton@ed.gov](mailto:Katina.Stapleton@ed.gov)

Telephone: (202) 219-2154

**G. Education Policy, Finance, and Systems**

Dr. Katina Stapleton  
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Washington, DC 20208

Email: [Katina.Stapleton@ed.gov](mailto:Katina.Stapleton@ed.gov)

Telephone: (202) 219-2154

**H. Early Childhood Programs and Policies**

Dr. Caroline Ebanks  
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555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [Caroline.Ebanks@ed.gov](mailto:Caroline.Ebanks@ed.gov)  
Telephone: (202) 219-1410

**I. High School Reform**

Dr. David Sweet  
Institute of Education Sciences  
555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [David.Sweet@ed.gov](mailto:David.Sweet@ed.gov)  
Telephone: (202) 219-1748

**J. Interventions for Struggling Adolescent and Adult Readers**

Dr. Elizabeth Albro  
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555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [Elizabeth.Albro@ed.gov](mailto:Elizabeth.Albro@ed.gov)  
Telephone: (202) 219-2148

**K. Postsecondary Education**

Dr. Ram Singh  
Institute of Education Sciences  
555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [Ram.Singh@ed.gov](mailto:Ram.Singh@ed.gov)  
Telephone: (202) 219-2025

**L. Education Technology**

Dr. Edward Metz  
Institute of Education Sciences  
555 New Jersey Avenue, NW  
Washington, DC 20208

Email: [Edward.Metz@ed.gov](mailto:Edward.Metz@ed.gov)  
Telephone: (202) 208-1983

**29. PROGRAM AUTHORITY**

20 U.S.C. 9501 *et seq.*, the “Education Sciences Reform Act of 2002,” Title I of Public Law 107-279, November 5, 2002. This program is not subject to the intergovernmental review requirements of Executive Order 12372.

### **30. APPLICABLE REGULATIONS**

The Education Department General Administrative Regulations (EDGAR) in 34 CFR parts 74, 77, 80, 81, 82, 84, 85, 86 (part 86 applies only to institutions of higher education), 97, 98, and 99. In addition 34 CFR part 75 is applicable, except for the provisions in 34 CFR 75.100, 75.101(b), 75.102, 75.103, 75.105, 75.109(a), 75.200, 75.201, 75.209, 75.210, 75.211, 75.217, 75.219, 75.220, 75.221, 75.222, and 75.230.

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