EDUCATION RESEARCH GRANTS

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REQUEST FOR APPLICATIONS

INSTITUTE OF EDUCATION SCIENCES
http://ies.ed.gov

APPLICATION DEADLINE DATES: June 26, 2008 and October 2, 2008

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, evaluation of state and local education policies and programs research program, 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 Policies; Middle and High School Reform; Interventions for Struggling Adolescent and Adult Readers and Writers; Postsecondary Education; and Education Technology. For the FY 2009 competition, the Institute will consider only applications that meet the requirements outlined below under Part II Research Grant Topics and Part III Requirements of 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 (e.g., language skills) and developmental outcomes for infants and toddlers with disabilities. 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 Policies
- Middle and 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 and education leadership through its programs on (a) Teacher Quality – Reading and Writing; (b) Teacher Quality – Mathematics and Science Education, (c) Education Leadership, and (d) Education Technology.

c. Administration, systems, and policy

A third approach to improving student outcomes is to identify systemic differences 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) Middle and 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) Early Childhood Programs and Policies; and (b) Education Technology.

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) prekindergarten 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 and toddlers 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 – evaluate the efficacy of fully developed programs, practices, and policies; (d) Goal Four – evaluate the impact of programs, practices, and policies implemented at scale; and (e) Goal Five – develop and/or validate data and measurement systems and tools.

For a list of the Institute's FY 2009 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 2009 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 Policies
- Middle and 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
- Center on Teacher Effectiveness
- Center on Rural Education
- Center on Turning Around Chronically Low Achieving Schools

4. Statistical and Research Methodology in Education

5. Evaluation of State and Local Education Programs and Policies

National Center for Special Education Research

1. Research Grant Topics
- Early Intervention and Early Childhood Special Education
- Reading, Writing, and Language Development
- Mathematics and Science Education
- Social and Behavioral Outcomes to Support Learning
- Transition Outcomes for Special Education Secondary Students
- Cognition and Student Learning in Special Education
- Teacher Quality
- Related Services
- Systemic Interventions and Policies for Special Education
- Autism Spectrum Disorders

2. Research Training Grant Topics
- Postdoctoral Special Education Research Training

PART II RESEARCH GRANT TOPICS

For FY 2009, the Institute's National Center for Education Research is accepting applications for research grants on June 26, 2008, and October 2, 2008. 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.

3. READING AND WRITING

Program Officer: Dr. Emily Doolittle (202-219-1201; Emily.Doolittle@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 impact of curricula or instructional approaches for teaching reading or writing skills that are implemented at scale; and (5) developing and/or validating assessments of reading or writing that can be used to support instruction.

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 2007 National Assessment of Educational Progress (NAEP), 33 percent of fourth graders and 26 percent of eighth graders cannot read at the basic level; on the 2005 NAEP, 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 2007 NAEP, only 33 percent of fourth graders and 31 percent of eighth graders were reading at the proficient or advanced levels. On the 2005 NAEP, 35 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 2009 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 Part III Requirements of the Proposed Research. Here, 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.

4. MATHEMATICS AND SCIENCE EDUCATION

Program Officer: Dr. Christina Chhin (202-219-2280; 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) evaluating the efficacy of fully developed curricula and instructional approaches to mathematics and science education with small efficacy or replication trials; (4) evaluating the impact of mathematics and science curricula and instructional approaches that are implemented at scale; and (5) developing and/or validating assessments for diagnosing sources of mathematics difficulties in order to support instruction. 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 21st 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 2007 NAEP, 18 percent of Grade 4 students and 29 percent of Grade 8 students scored below the "basic" level in mathematics. On the 2005 NAEP, the most recent assessment of Grade 12 students, 39 percent of Grade 12 students scored below the basic level. 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, 237 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, two studies met the Clearinghouse's evidence standards for drawing causal conclusions, seven studies met the evidence standards with reservations, and 227 studies

did not meet the evidence screens.[1] For the middle school mathematics curricula, 158 studies were identified as curriculum evaluations with relevant math outcomes that covered at least one semester. Out of these 158 studies, four studies met the Clearinghouse's evidence standards, 17 met the evidence standards with reservations, and 137 did not meet the evidence screens.[2] Out of the 395 evaluations of elementary and middle school mathematics curricula, the What Works Clearinghouse has found that 92% 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 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 for 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 2009 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 Part III Requirements of the Proposed Research. Here, 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;

[1] Accessed from the What Works Clearinghouse on February 8, 2008, at http://ies.ed.gov/ncee/wwc/reports/.
[2] Accessed from the What Works Clearinghouse on February 8, 2008, at http://ies.ed.gov/ncee/wwc/reports/.

- 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 instruction from kindergarten through high school or to support teaching basic mathematics skills to adults.

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.

5. COGNITION AND STUDENT LEARNING

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

A. Purpose

The purpose of the Cognition and Student Learning (Cognition) research program is to improve student learning by applying recent advances in cognitive science to education practice. The objectives of the Cognition research program are to (1) identify underlying processes involved in reading, writing, mathematics, 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, as well as cognitive and developmental psychology 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 to bridge 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.

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.

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.

Under the Cognition research program, the Institute also funds 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 propose research to simply examine 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.

In addition, the Institute encourages 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

a. <u>Requirements for all Cognition applications</u>

(i) Submission to specific goals.

For the FY 2009 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 Goals One, Three, and Five are listed in Part III Requirements of the Proposed Research. Methodological requirements for Cognition Goal Two applications are described below in section II.5.C.b, Methodological requirements for Goal Two Cognition applications. Here, specific requirements that apply to all applications to the Cognition and Student Learning topic are described.

(ii) Content and sample requirements.

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 basic education or developmental (remedial) programs for under-prepared college students.

(iii) Authentic education settings and laboratory settings for Goals One, Two, and Five.

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. Laboratory and classroom research with college students may be proposed as a means to identifying underlying principles or testing critical components of an intervention that is being developed. However, within the award period, the interventions must be tested for use with the student population for which the intervention is intended. These student populations along with the content requirements are described above in section II.5.C.a.ii Content and sample requirements.

(iv) Authentic education settings for Goal Three.

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.

b. <u>Methodological requirements for Goal Two Cognition applications</u>

The methodological requirements described in this section are to be followed instead of the Methodological Requirements listed in Part III.D.d Methodological requirements for Goal 2. The other requirements for Goal 2 that are described in Part III.D. Requirements for Goal Two (i.e., a. Purpose of Goal Two; b. Requirements for the proposed intervention; c. Significance of the project; e. Personnel; f. Resources; g. Additional considerations; and h. Awards) *do* apply to Goal Two Cognition applications.

Under the Cognition program, typical Goal Two projects consist of a series of small experiments to determine which strategies, alone or in combination, in which sequence and for what duration optimizes learning. The experimental process is used to put together the components of the intervention.

A detailed description of the research design, measures, data collection procedures, and data analysis plans must be provided.

(i) Setting for proposed research.

The proposed project must include research that is conducted in an education delivery setting and may include some experiments that are conducted in the laboratory.

(ii) Research questions.
Research questions or hypotheses should be clearly specified.

(iii) Sample.
A clear description of, and a rationale for, the sample or study participants, including justification for exclusion and inclusion criteria, should be included.

(iv) Research methods.
Research methods must be appropriate to the specified research questions or hypotheses. The study design should be clearly described. Independent and dependent, or predictor and criterion, or descriptive and explanatory variables should be distinguished. Where groups or conditions are involved, strategies for assigning participants to groups should be clear. If the research is intended to test hypotheses, the design should make it possible, in principle, to obtain results that disconfirm the hypotheses. In competitive applications, a power analysis is included to provide some assurance that the sample is of sufficient size. For research including interventions conducted in education settings, methods and measures for tracking implementation of the intervention should also be described.

(v) Measures and data collection procedures.
Measures and data collection procedures should be clearly described, including information on the reliability and validity of the measures. In addition, when data are collected on student learning in authentic education delivery settings (e.g., schools), researchers should include some outcome measures that are relevant to school learning (e.g., classroom tests) and not rely solely on researcher-developed instruments.

(vi) Data analysis.
A detailed description of the data analysis plan must be included. Descriptions of the design and data analysis strategies should provide sufficient detail for reviewers to determine if the research questions are appropriately addressed.

Finally, the Institute recognizes that when an investigator proposes a series of experiments to develop an intervention there are times when the exact nature of one or more experiments in the series depends on the results from prior experiments. In such cases, the applicant should provide sufficient information on how results from one experiment will be used to determine the parameters for subsequent studies so that reviewers are able to understand the overall approach that the applicant is proposing.

6. TEACHER QUALITY – READING AND WRITING

Program Officer: Dr. Harold Himmelfarb (202-219-2031**;** 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 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 or practices 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 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 professional development that will eventually result in improving teacher practices and through them student learning and achievement; (3) evaluating the efficacy of programs and practices for teacher professional development for improving teacher practices and through them student learning and achievement; (4) evaluating the effectiveness of teacher 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 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., 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 *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 2007 National Assessment of Educational Progress (NAEP), 33 percent of fourth graders and 26 percent of eighth graders cannot read at the basic level; on the 2005 NAEP, 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.

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 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*.

Under Teacher Quality, the Institute encourages research to determine *what content* should be delivered to teachers to improve instruction and thereby student outcomes. That is, what are the knowledge and skills that, if applied by teachers, would improve student outcomes? The Institute also invites proposals to determine *how to deliver* the content of the professional development, in order to change teacher behaviors and have an impact on relevant student outcomes. The Institute suggests that researchers consider testing different delivery modes using 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?

Whatever professional development model is proposed for study, the Institute expects the applicant to clearly delineate (a) what information will be communicated to teachers and (b) how that information will be delivered. For example, if coaches are delivering content to teachers, applicants should clearly describe (a) the content to be delivered, (b) what steps coaches are expected to follow to train the teachers, (c) how the coaches will be trained, (d) the frequency and duration of the intervention, and (e) how the coaching sessions will be observed to determine the degree to which coaches are delivering the

expected content in the prescribed way (i.e., fidelity of the intervention). In strong applications, researchers are careful to explain 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.

Further, 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 developers of teacher professional development programs have utilized this knowledge base. The Institute strongly encourages those who propose to develop new professional development to build on this knowledge base (e.g., Anderson, Reder, & Simon, 2000; Carver & Klahr, 2001).

In addition to research on the development and evaluation of teacher professional development 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. 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*.

The Institute also invites applications to develop and/or validate measures of teacher 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 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 2009 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 Part III Requirements of the Proposed Research. Here, 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 for teaching reading or writing from kindergarten through Grade 12;

- teacher professional development 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 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; 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 professional development 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.

Projects for Teacher Quality – Read/Write Topic	Projects for the Reading and Writing Topic
Example A 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.	**Example 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.
Example C 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.	**Example D** 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.

7. TEACHER QUALITY – MATHEMATICS AND SCIENCE EDUCATION

Program Officer: Dr. Harold Himmelfarb (202-219-2031**;** 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 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 or teacher practices that are associated with better student outcomes in mathematics or science in kindergarten through Grade 12; and identifying programs and practices for 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 professional development that will eventually result in improving teacher practices and through them student learning and achievement; (3) evaluating the efficacy of programs and practices for professional development for improving teacher practices and through them student learning and achievement; (4) evaluating the impact of 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 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., 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 *professional development* refers to the in-service training of current teachers.

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 21st 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 2007 NAEP, 18 percent of Grade 4 students and 29 percent of Grade 8 students scored below the "basic" level in mathematics. On the 2005 NAEP, the most recent assessment of Grade 12 students, 39 percent of Grade 12 students scored below the basic level. 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 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*.

Under Teacher Quality, the Institute encourages research to determine *what content* should be delivered to teachers to improve instruction and thereby student outcomes. That is, what are the knowledge and skills that, if applied by teachers, would improve student outcomes? The Institute also invites proposals to determine *how to deliver* the content of the professional development, in order to change teacher behaviors and have an impact on relevant student outcomes. The Institute suggests that researchers consider testing different delivery modes using 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?

Whatever professional development model is proposed for study, the Institute expects the applicant to clearly delineate (a) what information will be communicated to teachers and (b) how that information

will be delivered. For example, if coaches are delivering content to teachers, applicants should clearly describe (a) content to be delivered, (b) what steps coaches are expected to follow to train the teachers, (c) how the coaches will be trained, (d) the frequency and duration of the intervention, and (e) how the coaching sessions will be observed to determine the degree to which coaches are delivering the expected content in the prescribed way (i.e., fidelity of the intervention). In strong applications, researchers are careful to explain 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.

Further, 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 developers of teacher professional development programs have utilized this knowledge base. The Institute strongly encourages those who propose to develop new professional development to build on this knowledge base (e.g., Anderson, Reder, & Simon, 2000; Carver & Klahr, 2001).

In addition to research on the development and evaluation of teacher professional development 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. 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*.

The Institute also invites applications to develop and/or validate measures of teacher 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 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 2009 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 Part III Requirements of the Proposed Research. Here, specific requirements that apply to applications to the Teacher Quality – Math/Science topic are described.

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 for teaching mathematics or science at any grade from kindergarten through Grade 12;
- teacher professional development 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 new or continuing 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; 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 officers listed at the end of this announcement to help them identify the more appropriate topic under which to submit their application.

Projects for Teacher Quality – Math/Science Topic	Projects for the Mathematics and Science Education Topic
Example A 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.	**Example 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.
Example C 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.	**Example D** 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.

8. SOCIAL AND BEHAVIORAL CONTEXT FOR ACADEMIC LEARNING

Program Officer: Dr. Emily Doolittle (202-219-1201; Emily.Doolittle@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 impact 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 and child behaviors that support learning in school.

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 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. academic achievement) 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 skills that support learning in academic contexts, 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.[3] 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 intended to improve 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.

[3]Accessed from the What Works Clearinghouse on February 8, 2008, at http://ies.ed.gov/ncee/wwc/reports/.

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 applicants to specify a theory of change that describes 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 evaluate a program intended to improve 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 theory of change.

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 measures of children's behaviors that support learning in school and assessments of teacher classroom management practices from kindergarten through high school. Measures of classroom management practices could be used to assess the effectiveness of teacher practices and should be validated against both student behavioral outcomes and academic outcomes.

C. Specific Requirements

For the FY 2009 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 Part III Requirements of the Proposed Research. Here, 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 children's behaviors and 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. Applicants under Goal Three and Goal Four must provide measures of the primary mediators (i.e., proximal outcomes), as well as measures of student academic outcomes (e.g., grades, on-time graduation rates, achievement test scores, end-of-course exam scores). For example, applicants proposing to evaluate a program to improve student behavior must include measures of the student behaviors the intervention is designed to affect directly (e.g., disruptive classroom behaviors) as well as measures of academic outcomes. 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 outcomes). 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.

9. EDUCATION LEADERSHIP

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

A. Purpose

The Institute's Education Leadership research program addresses five goals: (1) identifying the behaviors, practices, and characteristics 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) evaluating 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) evaluating the impact 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 kindergarten 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).

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 or performance 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 invites proposals to develop assessments to measure the performance of principals and other building or district-level leaders, and validate of such measures against student performance. The Institute's concern is to provide practitioners with instruments that will be useful for giving feedback that enables leaders to identify the specific actions they need to take to improve their performance and ultimately the outcomes of the students for whom they are responsible. By way of illustration, an applicant might use existing research in education leadership or organizational management to propose that performance on a set of specific practices would distinguish between highly effective and less effective principals. These practices would be operationalized at a relatively specific level. For example, an overarching category might be "providing a vision for the school" and include subcategories such as, developing goals and strategies for attaining goals; communicating vision to staff, students, parents, and community; monitoring progress; and initiating corrective actions. Items for each subcategory (e.g., monitoring progress) would address specific practices or behaviors that are used to meet the objective of that subcategory (e.g., has an established schedule for assessing progress on each goal, regularly communicates progress on each goal to staff). For the Goal Five measurement project, the applicant would propose to develop this instrument and then validate it against relevant school and student outcomes. The Institute recognizes that the critical skills that principals (or other leaders) need to exercise to improve their school's overall student performance may differ depending on the school's starting point (e.g., skills for transforming chronically low-performing schools may be different from maintaining steady progress for schools that are meeting adequately yearly progress) and that instruments may be nuanced by such conditions.

Although the Institute does not provide funding for the development (Goal Two) or evaluation (Goals Three and Four) of pre-service leadership training programs in general, the Institute will support research to identify, develop, or evaluate alternative certification pathways (and their components). By alternative certification pathways, the Institute means relatively short programs that are intended to provide intensive training to professionals and have them leading schools within 18 to 24 months. Such programs lend themselves to rigorous research, in part, because the effects of the programs can be evaluated against school and student outcomes within the time period for an award (e.g., Goal 3 Efficacy awards are for a maximum of four years).

C. Specific Requirements

For the FY 2009 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 Part III Requirements of the Proposed Research. Here, 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 policies (e.g., recruitment, retention, certification, performance) 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 programs or policies (e.g., professional development, recruitment, retention programs, alternative certification programs) intended to improve the quality of education leaders at the building or district-level from kindergarten through high school and thereby improve student outcomes; or

- development and validation of assessments of education leaders at the building or district-level from kindergarten through high school.

By education leader, the Institute refers to building, district, or regional administrators and decision-makers, including principals, superintendents and other district administrators who have administrative or managerial responsibilities.

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). Relevant proximal outcomes might include measures of relevant behaviors of the education leaders and assessments of the quality of the instructional environment. Relevant distal outcomes might include student attendance, grades, disciplinary actions, end-of-course exam scores, and scores on end-of-year state assessments.

10. EDUCATION POLICY, FINANCE, AND SYSTEMS

Program Officer: Dr. Katina Stapleton (202-219-2154; 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) evaluating the impact 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, substantial proportions of high-poverty students). 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 for improving student learning? How can these services be aligned with the instructional programs of districts and with state academic, content, and achievement standards to maximize student learning?

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 invites applications to develop 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 who have traditionally underachieved academically, and students with disabilities), and the excess costs of educating students with special needs in specific categories of expenditure. The Institute encourages researchers to work with large districts or consortia of districts to develop cost accounting tools that would enable administrators to analyze the relations between resource allocation and student achievement

C. Specific Requirements

a. Requirements for all Policy/Finance applications

For the FY 2009 Policy/Finance topic, applicants must submit under *either* Goal One *or* Goal Two *or* Goal Three *or* Goal Four *or* Goal Five. The Institute numbers goals consistently across research grant programs. More details on the requirements for Goals One, Two, Three, and Four are listed in Part III Requirements of the Proposed Research. Requirements for Policy/Finance Goal Five applications are described below in section II.10.C.b Requirements for Goal Five Policy/Finance applications. Here, specific requirements that apply to all 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, mathematics, attendance, graduation rates) directly or indirectly for education systems that include kindergarten through high school; 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.

Applicants interested in systems-level policies or programs at the prekindergarten level should refer to the Early Childhood Programs and Policies topic.

b. Requirements for Goal Five Policy/Finance applications

The requirements described in this section are to be followed instead of the requirements listed under Goal 5 (i.e., section III.16.G Requirements for Goal 5) for Policy/Finance Goal 5 applications that address cost-accounting tools.

(i) 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.

(1) ***Rationale***. 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.

(2) ***Components of proposed cost-accounting tool*****.** 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.

(3) ***Significance of proposed project***. 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.

(ii) 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.

(iii) Personnel.
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.

(iv) Resources.
Competitive applicants will have access to institutional resources that adequately support research.

(v) 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.

11. EARLY CHILDHOOD PROGRAMS AND POLICIES

Program Officer: Dr. Caroline Ebanks (202-219-1410; 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 children (i.e., three- to five-year-olds) 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 impact 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 (three- to five-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 living 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. 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- to five-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. The Institute also 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.[4] 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.

[4] 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.

C. Specific Requirements
For the FY 2009 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 Part III Requirements of the Proposed Research. Here, 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 (three- to five-year-olds).

12. MIDDLE AND HIGH SCHOOL REFORM

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

A. Purpose
The purpose of the Institute's education research program on Middle and High School Reform (Middle/High School) 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 Middle/High School research program is to provide an array of effective middle and 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 middle and high school education. Although these research programs include research on interventions appropriate for middle and high schools, the Middle/High School education research program is different from these research programs in three ways. First, it focuses exclusively on improving educational outcomes in middle schools and 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 Middle/High School research program, 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[5] – 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 Middle/High School research program. 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) alternative schools and additional opportunities for high school completion.

A combination of intervention strategies targeted to 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 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

[5] The averaged freshmen graduation rate is an estimate of the percentage of a freshman class that graduates on time. 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 on time.

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 rates 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.

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 2009 Middle/High School 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 Part III Requirements of the Proposed Research. Here, specific requirements that apply to applications to the Middle/High School topic are described.

Applications submitted to the Middle/High School topic must focus on:

- interventions implemented in high schools in which 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.

13. INTERVENTIONS FOR STRUGGLING ADOLESCENT AND ADULT READERS AND WRITERS

Program Officer: Dr. Elizabeth Albro (202-219-2148; 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 the 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 the efficacy of curricula and instructional practices for improving reading or writing skills of struggling adolescent or adult readers and writers; (4) evaluating the impact of reading or writing curricula and instructional practices for struggling adolescent and adult readers and writers when implemented at scale; and (5) developing and validating assessments that can be used in instructional settings to support instruction.

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 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 the past two years 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.

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 2007 National Assessment of Educational Progress (NAEP), 26 percent of eighth graders cannot read at the basic level; on the 2005 NAEP, 27 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 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.

Through this program, the Institute intends to support research on the development and evaluation of interventions that are appropriate for use in middle and high school and/or adult basic education programs for native English speakers and for English language learners. Appropriate interventions include curricula, instructional approaches, and training teachers or para-professionals who provide instruction for struggling adolescent or 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 2009 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 Part III Requirements of the Proposed Research. Here, 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 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;
- training for teachers or para-professionals who provide instruction to struggling adolescent or adult readers and writers; or
- reading or writing assessments to support instruction 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.

14. POSTSECONDARY EDUCATION

Program Officer: Dr. Ram Singh (202-219-2025; 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 widely used assessments like these. 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 2009 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 Part III Requirements of the Proposed Research. Here, 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.

15. EDUCATION TECHNOLOGY

Program Officer: Dr. Edward Metz (202-208-1983; 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 improve reading, writing, mathematics, science, or general study skills; (2) evaluating fully developed education technology tools intended to improve 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 improve 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 2007 National Assessment of Educational Progress (NAEP), 33 percent of fourth graders and 26 percent of eighth graders cannot read at the basic level; and on the 2005 NAEP 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. 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 2007 NAEP, 18 percent of Grade 4 students and 29 percent of Grade 8 students scored below the "basic" level in mathematics. On the 2005 NAEP, the most recent assessment of Grade 12 students, 39 percent of Grade 12 students scored below the basic level. 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 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 the 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

a. Requirements for all Technology applications

For the FY 2009 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 Part III Requirements of the Proposed Research. Here, 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 (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.

b. Methodological requirements for Goal Two Technology applications

The methodological requirements described in this section are to be followed instead of the Methodological Requirements listed under Goal 2 (i.e., section III.16.D.d Methodological requirements). The other requirements for Goal 2 that are described under section III.16.D. Requirements for Goal Two (i.e., a. Purpose of Goal Two; b. Requirements for the proposed intervention; c. Significance of the project; e. Personnel; f. Resources; g. Additional considerations; and h. Awards) do apply to Goal Two Technology applications.

Under the Technology program, typical Goal Two projects consist of a series of small experiments to determine which strategies, alone or in combination, in which sequence and for what duration optimizes learning. The experimental process is used to put together the components of the intervention.

A detailed description of the research design, measures, data collection procedures, and data analysis plans must be provided.

(i) Setting for proposed research.
The proposed project must include research that is conducted in an education delivery setting and may include some experiments that are conducted in the laboratory.

(ii) Research questions.
Research questions or hypotheses should be clearly specified.

(iii) Sample.
A clear description of, and a rationale for, the sample or study participants, including justification for exclusion and inclusion criteria, should be included.

(iv) Research methods.
Research methods must be appropriate to the specified research questions or hypotheses. The study design should be clearly described. Independent and dependent, or predictor and criterion, or descriptive and explanatory variables should be distinguished. Where groups or conditions are involved, strategies for assigning participants to groups should be clear. If the research is intended to test hypotheses, the design should make it possible, in principle, to obtain results that disconfirm the hypotheses. In competitive applications, a power analysis is included to provide some assurance that the sample is of sufficient size. For research including interventions conducted in education settings, methods and measures for tracking implementation of the intervention should also be described.

(v) Measures and data collection procedures.
Measures and data collection procedures should be clearly described, including information on the reliability and validity of the measures. In addition, when data are collected on student learning in authentic education delivery settings (e.g., schools), researchers should include some outcome measures that are relevant to school learning (e.g., classroom tests) and not rely solely on researcher-developed instruments.

(vi) Data analysis.
A detailed description of the data analysis plan must be included. Descriptions of the design and data analysis strategies should provide sufficient detail for reviewers to determine if the research questions are appropriately addressed.

Finally, the Institute recognizes that when an investigator proposes a series of experiments to develop an intervention there are times in which the exact nature of one or more experiments in the series depends on the results from prior experiments. In such cases, the applicant should provide sufficient information on how results from one experiment will be used to determine the parameters for subsequent studies in order for reviewers to be able to understand the overall approach that the applicant is proposing.

PART III REQUIREMENTS OF THE PROPOSED RESEARCH

16. GENERAL REQUIREMENTS OF THE PROPOSED RESEARCH

A. NEW THIS YEAR

The Institute has modified requirements for Goals One and Two and encourages applicants who are familiar with previous Requests for Applications to read carefully through these sections.

B. BASIC REQUIREMENTS

a. Resubmissions

Applicants who intend to revise and resubmit a proposal that was submitted to one of the Institute's previous competitions but that was not funded must indicate on the application form that their FY 2009 proposal is a revised proposal. Their prior 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 a topic

Applicants must submit their proposal to one of the specific topics described in Part II Research Grant Topics.

c. Applying to multiple topics

Applicants may submit proposals to more than one of the Institute's FY 2009 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.

Applicants who submit a proposal for the June 26, 2008 deadline may not submit the same or a very similar proposal to the October 2, 2008 deadline.

d. Applying to a particular goal within a topic

For the FY 2009 Education Research Grants Programs, applicants must submit under *either* Goal One *or* Goal Two *or* Goal Three *or* Goal Four *or* Goal Five. The numbering of goals is consistent across the Institute's research programs. Each goal has specific requirements that are described in the following section.

e. 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 31 if they have any questions regarding the appropriateness of a particular project for submission under a specific goal.

C. 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 Goal One (Identification)

Through all of its research programs that include the Identification goal (Goal One), the Institute is interested in the (1) identification of programs and practices that may be associated with better educational outcomes; (2) examination of factors and conditions that may mediate or moderate the relations between student outcomes and these programs and practices; and (3) identification of malleable factors predictive of achievement and potentially amenable to intervention.

For Goal One, a number of methodological approaches are appropriate. One approach is to conduct secondary data 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 (e.g., students receiving different math curricula) or discontinuities in education practices (e.g., when a new policy is implemented). Longitudinal data may also be used to identify predictor variables for relevant outcomes that are malleable and a potential target for intervention. For example, Duncan and colleagues (2007) conducted secondary regression analyses on six longitudinal datasets to identify early predictors of reading and math achievement in school. By including beginning of kindergarten academic, socioemotional, and attention skills in one model, they were able to estimate the relative effects of these factors on later school achievement.

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 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. That, in turn, can direct future efforts in avenues that are more likely to be productive. Under Goal One, the Institute does *not* support secondary data analyses to determine the effect of interventions. Applicants interested in secondary data analyses using approaches such as interrupted time series analyses, regression discontinuity designs, or other quasi-experimental designs to determine the effect of an intervention should refer to Goal 3 or Goal 4.

Another approach for identifying promising practices or malleable factors predictive of achievement and potentially amenable to intervention is through the use of meta-analysis of the statistical and descriptive information reported in existing studies when sufficient numbers of studies are available to support a probing meta-analysis. Such meta-analyses are sensitive to issues that potentially affect or moderate the results, such as quality of the research design (e.g., Wilson, et al., 2003), and type of implementation[6] (e.g., Lipsey, 1999; Weisz et al., 1995; Wilson et al., 2003).[7] For Goal One applications, meta-analysis of intervention studies must be clearly directed toward identification of the characteristics of education practices or programs that are associated with the most positive outcomes, as well as moderators or mediators of those effects, or focus on the identification of factors that are

[6] By type of implementation, the Institute refers to a distinction in the literature between research and demonstration projects versus routine implementation by appropriate practitioners. Research and demonstration projects are those in which the implementation is either delivered by the researcher or the researcher provides support for the implementation beyond what would be typically available if school leaders decided to implement the intervention apart from involvement in any study. Routine implementation is implementation by practitioners that is comparable to what would happen if they were using intervention apart from involvement in a study.

[7] For additional information, see Cooper, H., & Hedges, L. V. (Eds.) (1994). *The Handbook of Research Synthesis*. New York: Russell Sage Foundation; Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis: Applied social research methods series* (Vol. 49). Sage Publications: Thousand Oaks, CA.

predictive of the most positive outcomes and potentially amenable to intervention. Such meta-analyses go beyond a simple identification of the mean effect found in studies to determine moderators of the effects such as breaking out the effects of (a) specific types of intervention within the broad intervention category that is the focus of the meta-analysis (e.g., Graham & Perin, 2007); (b) variations of a particular intervention (e.g., Cepeda, et al., 2006); (c) age or grade level subgroups (e.g., Wilson, et al., 2003); and (d) relevant population subgroups (e.g., Wilson, et al., 2003). Meta-analysis of correlational relationships can be used to identify the most positive causal mediators of outcomes (e.g., Fan & Chen, 2001; La Paro & Pianta, 2000).[8] For example, Najaka, Gottfredson, and Wilson (2002) conducted a meta-analysis to examine the strength of various predictors (e.g., social skills) to problem behavior in school and determined that bonding to school was the strongest predictor of problem behaviors. Based on this information, researchers might refine existing interventions intended to reduce problem behaviors by developing components that target improving students' relational ties to school.

The Institute does *not* intend to support meta-analyses to draw conclusions about the efficacy or effectiveness of particular interventions or types of interventions. Through the What Works Clearinghouse, the Institute supports activities to summarize evaluations of specific interventions.

As an alternative to secondary data analyses or meta-analyses, applicants may propose a small scale, descriptive study with primary data collection in which they attempt to identify associations between desired outcomes (e.g., student achievement, graduation rate, teacher retention) 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.

Evidence obtained through a Goal One project of the association between exposure to a program, practice, or policy 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.

b. Significance of the 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.

c. 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

[8] For further information, please see W. R. Shadish (1996). Meta-analysis and the exploration of causal mediating processes: A primer of examples, methods, and issues. *Psychological Methods, 1* (1), 47-65.

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.

Applicants proposing meta-analysis should describe clearly the criteria for including or excluding studies and their rationale, the search procedures for ensuring that a high proportion of the eligible published and unpublished studies will be located and retrieved, the coding scheme and procedures that will be used to extract data from the respective studies, and the procedures for ensuring the reliability of the coding. The applicant should demonstrate that sufficient numbers of studies are available to support the meta-analysis and that the relevant information is reported frequently enough and in a form that allows an adequate database to be constructed. The effect size statistics to be used should be clearly defined along with the associated weighting function, procedures for handling outliers, and any adjustments to be applied (e.g., reliability corrections).

(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.

d. <u>Personnel</u>

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.

e. Resources
Competitive applicants will have access to institutional resources that adequately support research.

f. 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.

D. 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, technology, 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, under Goal Two, the Institute does not intend to support applications in which the researcher proposes to spend one year developing the intervention and the second and third years testing the effect of the intervention in a significant number of classrooms or schools. Instead, 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 two- to three-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 pilot data addressing the feasibility of its implementation in an authentic education delivery setting and the promise of the intervention for generating outcomes the intervention is designed to effect. Feasibility of implementation might be addressed, for example, with data demonstrating that an intervention intended to increase student time on task does so for samples of students exposed to the intervention in the development context. Alternatively, it might be addressed with observational and survey data on the use of the fully developed intervention in a few test sites in authentic education delivery settings like those for which the intervention is intended. The promise of the intervention for achieving outcomes could be addressed, for example, by demonstrating better outcomes for participants with successive iterations of the intervention, better outcomes associated with more participant exposure to the intervention, normatively rare outcomes consistent with the goals of the intervention, post-intervention scores on an outcome measure that are substantially higher than pre-intervention scores on that measure, or data demonstrating that implementation of the intervention is associated with changes in activities and behaviors that are consistent with the theory of change underlying the intervention. The Institute anticipates that investigators with successful development projects would submit proposals to subsequent competitions for Goal Three (Efficacy) awards. The pilot data on feasibility of implementation and promise of positive outcomes to be collected under a Goal Two (Development) award are intended to help the Institute and its reviewers determine whether it would be appropriate to fund a proposal to examine the efficacy of the intervention.

b. Requirements for the 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?*

(i) Context for the proposed intervention.

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.

(ii) Theory of change.

Applicants should clearly describe the intervention and the theory of change 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 theory of change 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. In addition to providing a clear description of the intervention – particularly, the unique features of the intervention ("active ingredients") that are hypothesized to produce the desired improvement in student outcomes – applicants should describe typical existing practices. A comparison of the proposed intervention with typical practice helps reviewers determine if 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.

(iii) Practical importance.

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 student outcomes in educationally meaningful increments, if it were implemented over the course of a semester or school year? Would the proposed intervention be both affordable for schools and easily implemented by schools (e.g., not involve major adjustments to normal school schedules)?

c. Significance of the project

By describing (a) the intervention (e.g., features, components) and the theory of change 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.

d. 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.

The primary purpose of Goal Two projects is the development of interventions. 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 upon 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 pilot data that address the feasibility of implementing the intervention in authentic education delivery settings as well as the promise of the intervention for generating outcomes the intervention is designed to effect. Feasibility of implementation might be addressed, for example, with evidence demonstrating that the intervention can be implemented with fidelity in a few authentic education delivery settings that represent the type of settings (e.g., classrooms) for which the intervention is intended. Feasibility should be demonstrated on a small sample of users (e.g., teachers, students) who are like those for whom the product is intended and should show that they can utilize or implement the intervention in the way that the developer intends the intervention to be implemented. The promise of the intervention for achieving the intended outcomes could include evidence that performance on outcome measures is progressing in the appropriate direction (e.g., students' post-intervention scores on a curriculum-based test are substantially higher than pre-intervention scores) or data demonstrating that implementation of the intervention is associated with changes in activities and behaviors that are consistent with the theory of change underlying the intervention. Whatever pilot data are proposed, applicants should be aware that (a) no more than 25 percent of the funds may be used to support the collection of pilot data and (b) the review of methodological requirements will focus on methods for developing the intervention as detailed below. The pilot data are not intended to be a test of the efficacy of the intervention.

(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 describe 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 theory of change that they describe. The number of times a component or intervention is revised, implemented, observed, and revised depends on the complexity of the intervention and its implementation. It is helpful if applicants explain: (a) how they define "operating as intended" for the proposed intervention; (b) what data they will collect to determine how the intervention (or component) is operating; (c) how they will use the data they collect to revise the intervention; and (d) what criteria they will use to determine if the intervention (or component) operates as intended.

(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.

e. Personnel

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.

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.

f. Resources

Competitive applicants will have access to institutional resources that adequately support research.

g. Additional Considerations

Applicants who previously held or currently hold development (Goal Two) 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. In general, 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. However, the Institute recognizes that there are situations in which researchers may appropriately apply for a second development award to further develop or extend an intervention that was the focus of a previous development project. In such cases, the applicant should also provide a compelling rationale of the need for a second development award.

h. 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.

Under Goal Two, no more than 25 percent of the total funds may be used for collection of pilot data.

E. Requirements for Goal Three (Efficacy and Replication Projects)

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 Goal Three (Efficacy and Replication)

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, and policies – 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).

Applicants should use the efficacy and replication trials to determine the conditions, if any, under which an intervention produces meaningful improvement of academic outcomes. For example, if a research team hypothesized that a variation in the delivery of the program would improve the impact of an intervention, the team might propose 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.

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 (without reservation) 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 the proposed intervention

Interventions appropriate for study under Goal Three are (1) interventions that are fully developed, have evidence of their feasibility for use in authentic education delivery settings, and empirical evidence of the potential efficacy of the intervention and (2) interventions that are already widely used but have not been rigorously evaluated. 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.

(i) Interventions are ready to be evaluated.
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.

(ii) Rationale for interventions that are already in wide use.
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 that is already in wide use, 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 of the program to justify the proposed efficacy evaluation. By widespread use, the Institute means used across multiple states or in the majority of districts in a single large state or in the majority of schools in two or more large districts. Typically, interventions that fall in this category are commercially produced and distributed.

(iii) Rationale for interventions that are not in wide use.
Applicants must provide a compelling rationale that justifies the Institute's investment in the evaluation of the proposed intervention. 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. Applicants should provide a strong rationale justifying the investment in the evaluation of the proposed intervention by including, for example, information on (a) the theoretical foundation on which the intervention was developed, (b) research on related interventions or components of the proposed interventions; or (c) empirical evidence of the potential effect of the proposed intervention based on pilot data. Appropriate pilot data include, but are not limited to, evidence of the feasibility of implementation of the intervention and data on outcomes for participants in the intervention that are consistent with the intended effect of the intervention, for example, change scores from pretest to posttest in the direction and magnitude that the intervention is designed to generate.

In essence, the applicant needs to address the question: Why is this intervention likely to produce better student outcomes relative to current practice? In addition, 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) Theory of change.
Applicants should clearly present the theory of change for the proposed intervention by 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 theory of change to identify 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 the intervention is sufficiently different from the comparison treatment so that one might reasonably expect a difference in student outcomes. In addition, reviewers are better able to determine if the proposed 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.

c. Significance of the project

By describing (a) the intervention (e.g., features, components) and the theory of change 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.

d. Methodological requirements

For all applications including those submitted 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.[9]

[9] 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.

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.[10]

(iv) Power.

Applicants should clearly address the power of the evaluation design to detect a reasonably expected and minimally important effect. When justifying 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.).[11] Strong applications will include empirical justification for the intraclass correlation and anticipated effect size used in the power analysis.

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[10]For more information, see Shadish, W. R., Cook, T. D., and Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin Company.

[11] 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.

(v) Measures.

Measures of student outcomes may include researcher developed measures and other measures that are closely aligned with the proposed intervention. However, applicants must also include relevant measures of student outcomes that are of practical interest to educators. For example, proposals to evaluate interventions to improve academic outcomes should include measures such as grades, standardized measures of student achievement, or state end-of-course exams. Proposals to evaluate interventions to improve behavioral outcomes should include practical measures of behaviors that are relevant to schools, such as attendance, tardiness, drop-out rates, disciplinary actions, or graduation rates. The applicant should provide information on the reliability, validity, and appropriateness of proposed measures. In strong applications, investigators will make clear how 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 must provide measures of student outcomes, as well as measures of the primary mediators (i.e., proximal 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 the 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).

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 is 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.

In efficacy studies, the Institute expects researchers to examine relevant mediating and moderating factors. 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).

Efficacy and replication evaluations 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.

e. <u>Personnel</u>

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.

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.

f. Resources

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.

g. 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.

F. 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 Goal Four (Scale-up)

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, and policies - 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 the 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 the 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. (1) 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? (2) Is the intervention reasonably affordable to schools and other education delivery entities? (3) 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) Strong evidence of 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.

Evidence for efficacy from single-subject experimental designs would involve multiple studies in different settings that demonstrate causal effects.

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.

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 proposed 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.

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.

d. Significance of project

By addressing the implementation of the intervention and the requirements for the intervention, Goal Four applicants are addressing the significance of their proposal.

e. Methodological requirements

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

For Goal Four projects, all of the methodological requirements listed under Goal Three apply to Goal Four projects.

In addition to the Goal Three methodological requirements, 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.[12]

f. Personnel

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

[12] 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.

research design that will be employed; and (d) working with schools and other education delivery settings.

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, data collection, and data analyses to individuals who were *not* involved in the development of the intervention and are not involved in the distribution of the intervention.

g. Resources

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.

h. 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.

Typical awards for projects at this level will be $500,000 to $1,200,000 (total cost = direct + indirect costs) per year for a maximum of 5 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.

G. Requirements for Goal Five (Measurement Projects)

Here, the Institute specifies the requirements for Goal Five projects for all topics except Education Policy, Finance, and Systems. Requirements for Goal 5 applications under the Policy/Systems topic are detailed in the specific requirements section for that topic (Part II.10.C.b).

a. Purpose of Goal Five (Measurement)

Applications appropriate for consideration under Goal Five are: (a) proposals to develop and validate new assessments; (b) proposals to adapt and/or validate existing assessments; (c) proposals to adapt and/or validate assessments originally designed and used for research purposes for broader use in instructional settings; (d) proposals to develop or test new techniques for assessment or analysis of assessment data in the context of state accountability standards and systems; and (e) proposals to develop assessments used to certify or assess professionals (e.g., teachers, related service providers) and/or validate such assessments against student outcomes. Proposed assessments must meet the specific requirements detailed under the topic to which the proposal is submitted.

Under Goal Five, the Institute intends to support research on assessments intended for use by practitioners for purposes of screening, diagnosis, progress monitoring, outcome assessment, and assessments of teachers and education leaders.

(i) Screening.

Screening involves brief assessments conducted with all children at the beginning of the school year and targets skills that are strongly predictive of important future outcomes. The goal of

screening is to identify children who are at risk of failure and likely to need additional or alternative forms of instruction either to supplement or supplant conventional instruction.

(ii) Diagnosis.
Diagnosis refers to more in-depth assessment of strengths and weaknesses in a particular domain, and should not be confused with assessment for the purpose of labeling children with disabilities. The goal of diagnostic assessment is to provide teachers with a profile of skills and deficits to guide instruction.

(iii) Progress monitoring.
Progress monitoring is assessment of students' performance on critical criterion performance skills a minimum of three times a year but typically more frequently (e.g., weekly, monthly, or quarterly) using alternate forms of a test. The purpose of progress monitoring is to estimate rates of improvement, to identify children who are not demonstrating adequate progress and, therefore, require supplementary instruction. Progress monitoring assessment provides information on a student's performance on an ongoing basis (e.g., weekly data on whether students are benefiting from a particular type of instruction). This information can be used to compare different types of instruction for a particular child on a frequent basis.

Under Goal 5, applicants may propose to develop and/or validate a progress-monitoring instrument**.** *Applicants who want to test whether implementation of a progress monitoring system or instrument improves student outcomes must apply under the appropriate intervention evaluation goal (Goal 3 or Goal 4).*

(iv) Outcome assessment.
Outcome assessment is designed to determine if students have achieved or not achieved grade-level performance or if their performance has improved or not improved.

(v) Assessments of teachers and education leaders.
Under the Early Childhood, Teacher Quality, and Education Leadership research topics, applicants may propose to develop assessments of teacher practices and validate them against student outcomes, as well as to develop and/or validate assessments used to certify professionals (e.g., teacher certification exams).

b. <u>Requirements for the proposed assessment</u>

(i) Rationale.
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. 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.

(ii) Description of the assessment.
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. 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. Applications to examine the use of assessments for accountability purposes should provide sufficient description of the proposed assessment instrument or technique in the context of state and federal accountability policies so that reviewers are able to judge the merits and feasibility of the proposed research on assessment for accountability.

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 proposed assessment, 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 assessment.

c. Significance of project

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.

d. Methodological requirements

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

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.

Applicants proposing to develop and/or validate assessments of teachers, education leaders, or education systems must validate the assessments against student outcomes.

e. Personnel

Competitive applicants will have research teams that collectively demonstrate expertise in (a) content area, (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.

f. Resources

Competitive applicants will have access to institutional resources that adequately support research activities and access to schools in which to conduct the research. Applicants should also demonstrate access to statistical and measurement resources and technical expertise needed for developing and studying assessment instruments and techniques.

g. 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.

PART IV GENERAL SUBMISSION AND REVIEW INFORMATION

17. MECHANISM OF SUPPORT

The Institute intends to award grants pursuant to this request for applications. The maximum length of the award period varies by goal. The maximum award length for each goal ranges from two to five years. Please see details for each goal in Part III Requirements of the Proposed Research section of the announcement.

18. FUNDING AVAILABLE

The size of the award depends on the scope of the project. Please see specific details in Part III 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.

19. ELIGIBLE APPLICANTS

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.

20. DESIGNATION OF PRINCIPAL INVESTIGATOR

The applicant institution is responsible for identifying the Principal Investigator. The Principal Investigator is the individual who has the authority and responsibility for the proper conduct of the research, including the appropriate use of federal funds and the submission of required scientific progress reports. An applicant institution may elect to designate more than one Principal Investigator. In so doing, the applicant institution identifies them as individuals **who share the authority and responsibility** for leading and directing the research project intellectually and logistically. All Principal Investigators will be listed on any grant award notification. However, institutions applying for funding must designate a single point of contact for the project. The role of this person is primarily for communication purposes on the scientific and related budgetary aspects of the project and should be listed as the Principal Investigator. All other Principal Investigators should be listed as Co-Principal Investigators.

21. 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, by 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 must budget for one meeting each year in Washington, DC, with other grantees and Institute staff for a duration of up to three days of meetings. At least one project representative must attend the three-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.

Applicants may propose studies that piggyback onto an existing study (i.e., requires access to subjects and data from another study). In such cases, the principal investigator of the existing study must be one of the members of the research team applying for the grant to conduct the new project.

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 three months of receipt of an award.

22. LETTER OF INTENT

A. Content

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 in 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.

B. Format and Page Limitation

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.

23. APPLICATION PACKAGE AVAILABLE ON GRANTS.GOV

A. Date Application Package is Available on Grants.gov

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).

Application forms and instructions for the electronic submission of applications will be available for the programs of research listed in this RFA from http://www.Grants.gov/ by the following dates:

Summer Application Forms Available on	April 28, 2008
Fall Application Forms Available on	August 4, 2008

B. Download Correct Application Package

a. CFDA number

Applicants must first search by the CFDA number for each IES Request for Applications without the alpha suffix to obtain the correct downloadable Application Instructions and Application Package. For the Education Research Request for Applications, applicants must search on: **CFDA 84.305**.

b. Education Research Application Instructions and Application Package

The Grants.gov search on CFDA 84.305 will yield more than one application package. For the Education Research Request for Applications (i.e., the research topics listed in this Request for Applications), applicants will be able to download packages marked:

CFDA 84-305A2009-1 Education Research Application Instructions and Application Package (June 2008 deadline) and

CFDA 84-305A2009-2 Education Research Application Instructions and Application Package (October 2008 deadline).

An applicant must download the application package designated for the competition and deadline date to which the applicant wishes to apply or the application will be submitted to the wrong competition. Although the two packages are similar, only CFDA 84-305A2009-1 can be used to apply in June and only CFDA 84-305A2009-2 can be used to apply in October.

24. SUBMISSION PROCESS AND DEADLINE

Applications must be submitted **electronically by 4:30 p.m**., **Washington, DC time** on the application deadline date, using the ED standard forms and the instructions provided on the Grants.gov website.

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

25. APPLICATION CONTENT AND FORMATTING REQUIREMENTS

A. Overview

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 that can 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.

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.

B. General Format Requirements

Margin, format, and font size requirements apply to the project summary, project narrative, bibliography, biographical sketches, narrative budget justification, Appendix A, and Appendix B. 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 the *Fiscal Year 2009 Application Package Highlights,* which will be part of the application instructions, to be available on http://www.Grants.gov.

a. Page and Margin Specifications
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.

b. Spacing
Text must be single spaced in the narrative.

c. Type Size (Font Size)
Type must conform to the following three requirements:

- The height of the letters must not be smaller than a type size of 12 point.
- Type density, including characters and spaces, must be no more than 15 characters per inch (cpi). For proportional spacing, the average for any representative section of text must not exceed 15 cpi.
- Type size must yield no more than 6 lines of type within a vertical inch.

Applicants should check the type size using a standard device for measuring type size, rather than relying on the font selected for a particular word processing/printer combination. The type size used must conform to all three requirements. Small type size makes it difficult for reviewers to read the application; consequently, the use of small type will be grounds for the Institute to return the application without peer review.

Adherence to type size and line spacing requirements is necessary so that no applicant will have an unfair advantage, by using small type or by providing more text in their applications. **Note, these requirements apply to the PDF file as submitted**. As a practical matter, applicants who use a 12-point Times New Roman font without compressing, kerning, condensing or other alterations typically meet these requirements.

Figures, charts, tables, and figure legends may be in a smaller type size but must be readily legible.

d. Graphs, diagrams, tables
Applicants must use only black and white in graphs, diagrams, tables, and charts. The application must contain only material that reproduces well when photocopied in black and white.

C. Project Summary/Abstract
a. Submission
The project summary/abstract will be submitted as a .PDF attachment.

b. Page limitations and format requirements
The project summary/abstract is limited to 1 single-spaced page and must adhere to the margin, format, and font size requirements above.

c. Content
The project summary/abstract should include:

(1) Title of the project;
(2) The RFA topic and goal under which the applicant is applying (e.g., Teacher Quality, Goal 2);
(3) Brief description of the purpose (e.g., to develop and document the feasibility of an intervention);
(4) Brief description of the setting in which the research will be conducted (e.g., rural school districts in Alabama);

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

Please see the website http://ies.ed.gov/ncer/projects/ for examples of project summaries/abstracts.

D. Project Narrative

a. Submission

The project narrative will be submitted as a .PDF attachment.

b. Page limitations and format requirements

The project narrative is limited to **25 single-spaced pages** for all applicants. The 25-page limit for the project narrative 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, subaward 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.

c. Format for citing references in text

To ensure that all applicants have the same amount of available space in which to describe their projects in the project narrative, applicants should use the author-date style of citation (e.g., James, 2004), such as that described in the *Publication Manual of the American Psychological Association, 5th Ed.* (American Psychological Association, 2001).

d. Content

Incorporating the requirements outlined under the section on Requirements of the Proposed Research, and the requirements listed under 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 four sections: (a) Significance, (b) Research Plan, (c) Personnel, and (d) Resources. Information to be included in each of these sections is detailed in **Part III: Requirements of the Proposed Research** and in specific requirements subsections for each research topic in **Part II: Research Grant Topics**.

E. Bibliography and References Cited

a. Submission

The section will be submitted as a .PDF attachment.

b. Page limitations and format requirements

There are no limitations to the number of pages in the bibliography. The bibliography must adhere to the margin, format, and font size requirements described in section IV.25.B. General Format Requirements.

c. Content
Applicants should include complete citations, including the names of all authors (in the same sequence in which they appear in the publication), titles (e.g., article and journal, chapter and book, book), page numbers, and year of publication for literature cited in the research narrative.

F. Biographical Sketches of Senior/Key Personnel
a. Submission
The section will be submitted as a .PDF attachment.

b. Page limitations and format requirements
A biographical sketch should be provided for the principal investigator and other key personnel**. Each biographical sketch (e.g., abbreviated curriculum vitae) is limited to 4 pages**. The biographical sketch must adhere to the margin, format, and font size requirements described in section IV.25.B. General Format Requirements.

c. Content
Each biographical sketch 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. Applicants are reminded to review information in section IV.20 Designation of Principal Investigator.

d. List of current and pending grants
Applicants should provide a list of all current and pending grants along with the proportion of the individual's time allocated to each project for the principal investigator and other key personnel for the project. This information is to be provided as a table attached to the biographical sketch (i.e., a fifth page).

G. Narrative Budget Justification
a. Submission
The section will be submitted as a .PDF attachment.

b. Page limitations and format requirements
There are no page limitations for the narrative budget justification. The narrative budget justification must adhere to the margin, format, and font size requirements described in section IV.25.B. General Format Requirements.

c. Content
The narrative budget justification 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".)

d. Indirect cost rate

Applicants should use their institution's federal indirect cost rate and use the off-campus indirect cost rate where appropriate (see instructions under Section IV.21 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.

H. Subaward Budget

a. Submission

The section will be submitted as a .PDF attachment.

b. Page limitations and format requirements

To allow applicants to enter subaward budget information in accordance with a prescribed format (R&R Subaward Budget), an Excel spreadsheet will be provided at:

http://ies.ed.gov/funding/

Applicants will download and complete the spreadsheet in Excel format, convert it to a .PDF file, and then upload it as an attachment. There are no page limitations to the spreadsheet.

c. Content

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.

I. Appendix A

a. Submission

Appendix A should be included at the end of the Project Narrative and submitted as part of the same .PDF attachment.

b. Page limitations and format requirements

Appendix A is limited to 15 pages. It must adhere to the margin, format, and font size requirements described in section 25.B. General Format Requirements.

c. Content

(i) Purpose.

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.

(ii) Letters of agreement.

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 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.

J. Appendix B (Optional)

a. Submission

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

b. Page limitations and format requirements

The appendix is limited to 10 pages. The Appendix B must adhere to the margin, format, and font size requirements described in section 25.B. General Format Requirements.

c. Content

Appendix B applies to applications under all topics in this RFA. The purpose of Appendix B is to allow applicants who are proposing to develop, evaluate, or validate 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. 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.

K. Research on Human Subjects

a. Submission

This section will be submitted as a .PDF attachment.

b. Requirements

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 2009 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.

L. 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) SF-LLL (if applicable) - Disclosure of Lobbying Activities
(4) Protection of Human Research Subjects assurance and/or Institutional Review Board certification, as appropriate*

*Refer to the Fiscal Year 2009 Application Package for New Grants, available on http://www.Grants.gov, which details the information about the Human Subjects narrative, if applicable, that is required to be submitted with the application.

26. APPLICATION PROCESSING

Applications must be received by **4:30 pm, Washington, D.C. time** on the application deadline date listed in the heading of this request for applications. Upon receipt, each application will be reviewed for completeness 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.

27. 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 will be 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.

28. 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 Part III Requirements of the Proposed Research and in the section of the relevant research grant topic.

A. Significance

Does the applicant provide a compelling rationale for the significance of the project as defined in the Significance of Project section for the Goal under which the applicant is submitting the proposal?

B. Research Plan

Does the applicant meet 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 appropriate 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?

29. RECEIPT AND START DATE SCHEDULE

A. Letter of Intent Receipt Dates:

Summer Application Letter of Intent	April 28, 2008
Fall Application Letter of Intent	July 10, 2008

B. Application Deadline Dates:

Summer Application Deadline Date	June 26, 2008
Fall Application Deadline Date	October 2, 2008

C. Earliest Anticipated Start Date:

For Summer Application	March 1, 2009
For Fall Application	July 1, 2009

30. 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

31. INQUIRIES MAY BE SENT TO:

A. Reading and Writing

Dr. Emily Doolittle
Institute of Education Sciences
555 New Jersey Avenue, NW
Washington, DC 20208

Email: Emily.Doolittle@ed.gov
Telephone: (202) 219-1201

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
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.ODonnell@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

Email: Harold.Himmelfarb@ed.gov

Telephone: (202) 219-2031

E. Social and Behavioral Context for Academic Learning

Dr. Emily Doolittle
Institute of Education Sciences
555 New Jersey Avenue, NW
Washington, DC 20208

Email: Emily.Doolittle@ed.gov
Telephone: (202) 219-1201

F. Education Leadership

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

Email: Katina.Stapleton@ed.gov
Telephone: (202) 219-2154

G. Education Policy, Finance, and Systems

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

Email: Katina.Stapleton@ed.gov
Telephone: (202) 219-2154

H. Early Childhood Programs and Policies

Dr. Caroline Ebanks
Institute of Education Sciences
555 New Jersey Avenue, NW
Washington, DC 20208

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

I. Middle and High School Reform

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

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

J. Interventions for Struggling Adolescent and Adult Readers and Writers

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

Email: 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
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
Telephone: (202) 208-1983

32. 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.

33. 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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