INSTITUTE OF EDUCATION SCIENCES

REQUEST FOR APPLICATIONS

Education Research Grants

CFDA Number: 84.305A

COMPETITION ROUND	Letter of Intent Due Date	Application Package Available	Application Due Date
	https://iesreview.ed.gov/	http://www.grants.gov/	http://www.grants.gov/
JUNE	April 21, 2011	April 21, 2011	June 23, 2011
SEPTEMBER	July 21, 2011	July 21, 2011	September 22, 2011

PART I GENERAL OVERVIEW

1. REQUEST FOR APPLICATIONS

In this announcement, the Institute of Education Sciences (Institute) requests applications for research projects that will contribute to its education research programs in Reading and Writing; Mathematics and Science Education; Cognition and Student Learning; Social and Behavioral Context for Academic Learning; Education Technology; Effective Teachers and Effective Teaching; Improving Education Systems: Policies, Organization, Management, and Leadership; Postsecondary and Adult Education; Early Learning Programs and Policies; and English Learners. For the FY 2012 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*.

Separate funding announcements are available on the Institute's web site that pertain to the other research and research training grant programs funded through the Institute's National Center for Education Research (http://ncer.ed.gov) and to the discretionary grant competitions funded through the Institute's National Center for Special Education Research (http://ncser.ed.gov). An overview of the Institute's research grant programs is available at http://ies.ed.gov/funding/overview.asp

2. OVERVIEW

Through its Education Research grant program, the Institute supports research over a diverse set of education outcomes and for a range of purposes. The outcomes include school readiness for prekindergarten; learning, achievement, and higher order thinking in core academic content (reading, writing, mathematics, science) for students from kindergarten through Grade 12; behaviors that support learning in academic contexts for students from prekindergarten through high school; high school graduation; access, retention, and completion in postsecondary education; and reading, writing, and mathematics skills for adult learners. The Institute supports research from prekindergarten through Grade 12 for the typically developing student. For postsecondary and adult learners the Institute supports research on typically developing students and students with disabilities. Applicants interested in research on students with disabilities from birth through high school are eligible to apply to the Institute's National Center for Special Education Research (http://ncser.ed.gov).

The work of the Institute is grounded in the principle that effective education research must address the interests and needs of education practitioners and policymakers, as well as students, parents and community members (see http://ies.ed.gov/director/board/priorities.asp for the Institute's priorities). To this end, the Institute encourages researchers to develop partnerships with stakeholder groups to advance the relevance of their work, the accessibility of their publications, and the usability of their findings for the day-to-day work of education practitioners and policymakers.

Applications submitted to the FY 2012 competition must address a specific topic (e.g., Reading and Writing) and goal. The topics are described in Part II. A brief description of the research goals is presented below with the full description given in Part III. The research goals are designed to span the range from basic translational research to evaluation of the impact of interventions when the interventions are implemented under conditions of routine practice.

Project Goal

Exploration The Institute solicits projects to explore the relations between education outcomes and malleable factors (i.e., factors that can be changed, such as child behaviors, teachers' practices, school management practices, and education programs and policies), as well as mediators or moderators of those relations. Exploring the relations between malleable factors and education outcomes is translational research; it is intended to inform the development of interventions (e.g., programs, practices, or policies) that can improve education outcomes or to identify the conditions that are associated with better implementation of interventions.

Exploratory research can also be used to identify existing practices, programs, or policies that are associated with better education outcomes. The results from this work may either inform the development of interventions or lead to evaluations of interventions to determine whether they are the actual cause of the better outcomes, as opposed to some other factor that has yet to be uncovered.

Since the Institute established the goal structure, approximately 11 percent of the projects funded through the Education Research grant program have been exploratory projects.[1]

Development and Innovation

The Institute supports projects to develop innovative education interventions – programs, practices, technology, policies – or to improve existing education interventions. To develop or improve education interventions requires an iterative process of designing, testing, revising, and testing to produce a product or system that functions in the way that the developer intends for it to function and that can be implemented in actual education delivery settings (e.g., schools). This iterative process, sometimes called a systems-engineering approach, is important for producing interventions that have the potential to be *potent* and *robust*.

Since the Institute established the goal structure for its Education Research grant program, about 48 percent of the funded projects have been development projects.[1]

Efficacy and Replication

The vast majority of the education programs, practices, and policies that are implemented in U.S. schools have never been rigorously evaluated to determine if they are able to improve student learning (or other desired education outcomes) relative to any other education intervention. The Institute funds experimental and quasi-experimental research projects to evaluate the efficacy of newly developed and existing education programs, practices, and policies under limited conditions. Efficacy projects determine whether an intervention can have a positive impact on the outcomes of interest within a narrow or limited set of conditions – in particular, under conditions in which researchers are providing support for the proper implementation of the intervention

Efficacy projects also provide an estimate of how *potent* the intervention is for producing the desired outcome. By potent, the Institute refers to the strength of the impact of the intervention. For example, suppose a district has students who are two years below grade-level expectations on reading assessments at the beginning of first grade and wants to have all students reading at grade level by the end of fourth grade. The district might look for reading interventions that are potent enough to produce 1.5 years of growth per year in first, second, third, and fourth grades. An extra half year of growth in each year could bring the students who are two years behind in first grade up to grade-level expectations by the end of fourth grade.

The utility of the intervention – the degree to which it is feasible and practical for implementation in schools – is a key aspect of efficacy evaluations. Interventions that are difficult to implement with fidelity under the supported conditions of an efficacy study are unlikely to be implemented well when the intervention is implemented under conditions of routine practice. In addition, the Institute expects

[1]This percentage is based on all grants funded through the Education Research competitions and does not include grants awarded under competitions for which the Institute's research goal structure did not apply (e.g., all grants awarded prior to 2004, all Research & Development Center awards)

efficacy projects to identify the conditions that are needed to support implementation of the intervention with high fidelity.

Since the Institute established the goal structure for its Education Research grant program, about 26 percent of the funded projects have been efficacy and replication projects.[1]

Scale-up Evaluation

The Institute funds Scale-up evaluations to determine whether or not an intervention is effective when it is implemented under conditions of routine implementation, that is, implementation that would happen if the district were to implement it on its own without special support from the developer or research team. Scale-up evaluations are conducted by evaluation teams, which are independent from the developer/distributor of the intervention.

Since the Institute established the goal structure for its Education Research grant program, about 2 percent of the funded projects have been scale-up evaluations.[1]

Measurement

The Institute supports research to develop and validate measurement instruments that are intended for purposes such as screening, progress monitoring, and outcome assessments. Typically, the instruments are ones used by practitioners. For example, the Institute encourages the development and validation of formative assessments intended to provide teachers with information that can be used to inform subsequent instruction. However, the Institute also recognizes that there are circumstances in which an instrument needs to be developed that will primarily be used by researchers whose translational research will ultimately lead to improvements in education and special education practices. The Institute supports research to develop and validate such measurement instruments.

Since the Institute established the goal structure for its Education Research grant program, about 13 percent of the funded projects have been measurement projects.[1]

The Institute's research programs are intended to cover the range of research, development, and evaluation activities necessary for building a scientific enterprise that can provide solutions to the education problems in our nation. Focusing on only one type of research activity will not produce the results that the nation seeks. We need *innovation and development* because we have not yet solved old problems (e.g., the achievement gap) and we continue to face new problems and opportunities (e.g., integrating new technologies, building on new findings on how students learn, addressing large groups of students new to the United States and moving to communities that have not worked with such students before). Innovation and development can lead to the design of potent and robust interventions that may be effective for improving education outcomes. However, development and innovation cannot stand-alone. On the front end, the work of creating more potent and more robust interventions benefits from exploratory research to uncover underlying processes and identify promising approaches to test. This research, although at times quite basic, is translational research that is intended to inform the development of new and more powerful interventions. On the back end, we need evaluations that test the effect of the interventions on their intended outcomes. Education has always produced new ideas, new innovations, and new approaches, but as in any field, new is not always better. Evaluations can tell us which programs and policies actually produce positive effects on education outcomes, which need more work to become more potent or more robust, and which should be discarded. Only appropriate empirical evaluation can identify those programs that do in fact improve student outcomes.

Finally, the Institute intends for its research programs to contribute to the generation of new knowledge and theories relevant to learning, instruction, and education systems. The goal structure of the Institute's research programs divides the research process into stages. Under the Exploration goal,

researchers generate hypotheses about the components and processes involved in learning and instruction and in the operation of education systems. They develop models about how they think systems function to bring about education outcomes. Under Development and Innovation, investigators build on prior theoretical and empirical work to propose a theory of change for a specific intervention. The intervention, in essence, is an instantiation of the theory. Efficacy and Replication trials test the impact of specific interventions under limited conditions. Scale-up evaluations assess the impact of specific interventions when implemented under conditions of routine practice. Both Efficacy and Scale-up evaluations constitute tests of the theory. Results from these studies should inform further theory development and refinement. Development and validation of assessments also contribute to theory development and theory testing. Taken together, work across the various goals should not only yield information on the practical benefits about the effects of specific interventions on education outcomes but also contribute to the bigger picture of scientific knowledge and theory on learning, instruction, and education systems.

PART II RESEARCH GRANT TOPICS

For FY 2012, the Institute's National Center for Education Research is accepting applications for research grants on June 23, 2011 and September 22, 2011. In this section, the Institute describes the 10 research grant topics.

3. CHANGES IN THE FY 2012 REQUEST FOR APPLICATIONS

There are a number of changes to the Education Research Grants program (CFDA 84.305A) in FY 2012. Applicants should carefully read the requirements listed under each topic in Part II and in Part III. Major changes include the following.

Because the Institute is making a substantial investment in reading comprehension research through the Reading for Understanding Research Initiative (CFDA 84.305F) that was competed in FY 2010, the Institute is limiting the types of applications that will be accepted under the Reading and Writing research topic in FY 2012. Reading applications are limited to Exploration, Efficacy and Replication, Scale-up Evaluation, and Measurement (i.e., no Development and Innovation applications). Applicants interested in research on improving writing may apply under any of the goals.

To streamline its research programs, the Institute has consolidated several of its previous research programs.

Two previous research programs on Teacher Quality – Read/Write and Teacher Quality – Math/Science have been merged into a research program on Effective Teachers and Effective Teaching. Through this program, the Institute will support research on teacher professional development for reading, writing, mathematics, and science education. In addition, the Institute will support research on the recruitment, retention, and certification of teachers, as well as exploratory research on preservice training of teachers.

The Institute has created a new research program – Improving Education Systems: Policies, Organization, Management, and Leadership. This program merges our previous research programs on Education Policies, Finance, and Systems; Organization and Management of Schools and Districts; Education Leadership; and Analysis of Longitudinal Data to Support Education Reform.

Given the natural overlap in some issues pertaining to adult education and postsecondary education, we have combined these two topics to create a single research program on Postsecondary and Adult Education.

The Institute has modified requirements for Exploration, Efficacy/Replication, and Scale-up projects.

A third appendix (Appendix C) has been added so that applicants can include all letters of agreement.

The Institute strongly advises all applicants to carefully read through the requirements relevant to the proposed research regarding topics (Part II), research goals (Part III), and general submission information (Part IV).

4. READING AND WRITING

Program Officer: Dr. Emily Doolittle (202-219-1201; Emily.Doolittle@ed.gov)

A. Purpose

Through its research program on Reading and Writing (Read/Write), the Institute intends to contribute to the improvement of reading and writing skills of students from kindergarten through Grade 12. 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.

Because the Institute is investing substantial funds on reading research through the Reading for Understanding Research Initiative, the Institute will not accept applications to the Read/Write program to develop reading interventions in FY 2012. The Institute will, however, accept applications to develop writing interventions.

B. Background

The Institute began funding research on reading and writing in 2002. Since that time 66 grants have been awarded under the Read/Write program with an additional 12 projects funded under the Interventions for Struggling Adolescent and Adult Readers and Writers program (the Adolescent/Adult Readers research program has subsequently been subsumed by the Read/Write and Postsecondary and Adult Education research programs). Almost half of these projects focus on developing new interventions designed to support the reading and writing outcomes of learners from prekindergarten through adulthood. The Institute's goal structure encourages researchers not only to develop new interventions, but also to evaluate the causal effects of participating in these interventions on student outcomes. Of the projects funded since the goal structure was introduced in 2004, 32% are Efficacy and Replication or Scale-up Evaluation projects. Curricula being evaluated under these categories range from researcher-developed interventions, such as *Peer-Assisted Learning Strategies (PALS)* and the *Intelligent Tutoring System for the Structure Strategy (ITSS)*, to widely-used reading interventions such as *Open Court* and *Breakthrough to Literacy*. The Institute is also actively supporting measurement development projects, most of which are focused on assessing reading comprehension. Research on reading and writing is also supported through several of the Institute's other research programs (e.g., Cognition and Student Learning; Effective Teachers and Effective Teaching; Education Technology; English Learners; Early Learning Programs and Policies; and the Reading for Understanding Research Initiative). To date, approximately 76 of these projects have focused on or are addressing how to improve literacy outcomes.

Through the Reading and Writing program, the vast majority of projects to date have focused on reading; only a few projects incorporate an explicit focus on writing. Although advances have been made in understanding how children learn to write, we have less systematic knowledge about how individuals become proficient writers. There is subsequently little agreement as to what a teacher can or should do to cultivate proficient writers. On the 2007 NAEP writing assessment 24 percent of 12th graders were at or above the proficient level in writing; 18 percent could not write at the basic level. The Institute is interested in receiving additional applications focused on writing interventions.

Institute-supported research on reading has contributed to a growing body of knowledge of ways to improve the reading outcomes of elementary school readers. This research has shown that specific strategies – repeated practice reading aloud for poor readers in elementary school (O'Connor, Swanson & Garaghty, 2010), integrated root word vocabulary instruction and decoding practice for kindergarten English learners (Nelson, Vadasy & Sanders, in press), and teaching middle school readers to apply comprehension strategies as they work in collaborative groups (Vaughn et al., in press) – result in improvements in student outcomes. The Institute intends to continue its support of research that addresses the challenge of improving reading and writing outcomes for U.S. students.

Under the Reading and Writing program, the Institute is interested in improving learning, higher-order thinking, and achievement in reading and writing. The Institute encourages researchers to explore malleable factors (e.g., children's behaviors, instructional practices) that are associated with better reading and writing outcomes, as well as mediators and moderators of the relations between these factors and student outcomes, for the purpose of identifying potential points of intervention. The Institute continues to solicit research on assessments of reading and writing appropriate for students from kindergarten through high school. The Institute is interested in applications to evaluate reading interventions and proposals to develop or evaluate writing interventions. *Again, because the Institute is investing substantial funds on reading research through the Reading for Understanding Research Initiative, the Institute will not accept applications to develop reading interventions in FY 2012 under the Reading and Writing program.* However, the Institute will accept applications to develop writing interventions.

C. Specific Requirements

a. Submission to a specific goal

For the Reading and Writing topic, applicants must submit under one of five goals: *either* Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Scale-up Evaluation *or* Measurement. 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.

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

b. Content and sample requirements

- Research must focus on students from kindergarten through Grade 12. For research that spans early childhood and the early elementary grades, the applicant may choose to submit the application to the Early Learning Programs and Policies topic or to the Read/Write topic.
- The Institute especially encourages research on K-12 students who are at-risk for failing to achieve in school but also is interested in research to improve outcomes for all K-12 students, including K-12 students who are gifted.
- Research must address reading or writing outcomes.
- For FY 2012 the Institute is *not* accepting applications to develop reading interventions (i.e., reading applications under the Development and Innovation goal).
- Interventions must be for use in schools, alternative school settings, or supplemental education services as defined in Section 1116(e) of the Elementary and Secondary Education Act of 1965, as amended.
- Researchers who are interested in conducting reading or writing research that addresses the needs of English learners may apply to the English Learners topic or the Read/Write topic.
- Researchers who are interested in conducting reading or writing research that addresses the needs of postsecondary and adult learners should apply to the Postsecondary and Adult Education topic.
- Researchers who are interested in teacher professional development in reading or writing should apply to the Effective Teachers and Effective Teaching topic.

5. 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 contribute to the improvement of mathematics and science knowledge and skills of students from kindergarten through Grade 12. The long-term outcome of this program will be an array of tools and strategies (e.g., curricula, programs, assessments) that have been demonstrated to be effective for improving or assessing mathematics and science learning and achievement.

B. Background

The Mathematics and Science Education Research program began in 2003 and is one of the longest running programs in the Institute. Through this program, the Institute has supported 39 mathematics education research grants, 24 science education grants, and 4 grants that include both mathematics and science education. Approximately half of these grants are focused on developing or refining interventions to improve mathematics or science performance of K-12 students. The Institute is interested in supporting the development of mathematics or science interventions that have the potential to substantially increase student learning relative to currently available curricula and approaches.

In addition to supporting development research, the Institute is currently supporting 21 evaluations of the effects of specific interventions on student outcomes. Math curricula being evaluated under the Math/Science program range from researcher-developed interventions, such as *Animal Watch* (an intelligent tutor designed to support pre-algebra students' learning), to widely used mathematics curricula, such as *Everyday Mathematics* and *Cognitive Tutor*. A recent, large-scale impact evaluation of four first- and second-grade mathematics curricula – Investigations in Number, Data, and Space (Investigations); Math Expressions; Saxon Math; and Scott Foresman-Addison Wesley Mathematics (SFAW) – demonstrated that curricula make a difference in student learning (Agodini, Harris, Thomas, Murphy, & Gallagher, 2010). The average math achievement of first graders in schools using Math Expressions was higher than in schools using Investigations and SFAW (equivalent to moving a student from the 50th to the 54th percentile), but was not different from students in schools using Saxon Math. The average math test score for second graders in schools using Math Expressions and in schools using Saxon Math was higher than that in schools using SFAW, but not in schools using Investigations (equivalent to moving a student from the 50th to the 55th and 57th percentile, respectively). In science education, most of the research teams are developing science curricula. The Institute is currently supporting six evaluations of the efficacy of science curriculum on student outcomes through the Math/Science program. For example, one team of researchers is evaluating the high school version of the *Biological Sciences Curriculum Study (BSCS)*. The Institute encourages applications to evaluate the effects of science curricula on student achievement from K-12.

Research on mathematics and science interventions is also supported through some of the Institute's other research programs (e.g., Effective Teachers and Effective Teaching, Education Technology, Early Learning Programs and Policies, and Cognition and Student Learning). Currently, there are about 114 such projects examining how to improve mathematics and science outcomes. In addition, two of the Institute's National Research and Development Centers focus on mathematics and science instruction. Through the National Research and Development Center on Cognition and Science Instruction, the Institute is supporting a team of researchers to apply principles of learning based on cognitive research to refine two widely-used middle school science curricula – Holt Science and Technology Series and FOSS (Full Option Science System) – and then conduct efficacy evaluations of the revised curricula. The National Center for Cognition and Mathematics Instruction is applying cognitive principles of learning to redesign components of a widely used middle school mathematics curriculum, *Connected Mathematics Project*, and evaluating the efficacy of the redesigned curriculum materials.

The Institute intends for the Math/Science program to support research on curricula and instructional approaches intended to improve mathematics and science proficiency from kindergarten through high school. The Institute is primarily interested in interventions that address core mathematics and science content (e.g., Math: addition/subtraction, fractions, algebra, geometry, trigonometry, calculus; Science: physical science, earth science, life science). The majority of the projects in the Math/Science program have focused on developing or evaluating mathematics or science curricula or technology. Few projects in the Math/Science program have focused on research on instructional approaches to improve student learning in mathematics or science. The Institute encourages applications focusing on the development or evaluation of instructional approaches to improve the mathematics and science performance of K-12 students.

The Institute also encourages researchers to explore malleable factors (e.g., children's abilities and skills, instructional practices) that are associated with better mathematics or science outcomes, as well as mediators and moderators of the relations between these factors and student outcomes, for the purpose of identifying potential targets of intervention.

Finally, 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. For example, the Institute is currently funding the development and validation of formative assessments in mathematics and science that are intended to provide teachers with timely data on students' progress that can inform subsequent instruction.[2] Under the Math/Science research program, the Institute invites proposals to develop and validate new assessments of, as well as proposals to validate existing measures of, mathematics or science learning to be used for instructional purposes (e.g., progress monitoring measures, diagnostic assessments).

C. Specific Requirements

a. Submission to a specific goal

For the Mathematics and Science Education research program, applicants must submit under one of five goals: *either* Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Scale-up Evaluation *or* Measurement. 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 Math/Science topic are described.

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

b. Content and sample requirements

- Research must focus on mathematics or science education for students at any level from kindergarten through Grade 12. For research that spans early childhood and the early elementary grades, the applicant may choose to submit the application to the Early Learning Programs and Policies topic or to the Math/Science topic.
- The Institute especially encourages research on K-12 students who are at-risk for failing to achieve in school but also is interested in research to improve outcomes for all K-12 students, including K-12 students who are gifted.

[2] See, for example, http://ies.ed.gov/ncer/projects/grant.asp?ProgID=12&year=2010&grantid=1015 and http://ies.ed.gov/ncer/projects/grant.asp?ProgID=12&grantid=602&InvID=480 .

- Interventions must be for use in schools, alternative school settings, or supplemental education services as defined in Section 1116(e) of the Elementary and Secondary Education Act of 1965, as amended.
- Researchers who are interested in conducting mathematics or science education research that addresses the needs of English learners may apply to the English Learners topic or the Math/Science topic.
- Researchers who are interested in conducting mathematics education research that addresses the needs of postsecondary and adult learners should apply to the Postsecondary and Adult Education topic.
- Researchers who are interested in teacher professional development in mathematics or science education should apply to the Effective Teachers and Effective Teaching topic.
- Researchers who are interested in in conducting research on education technology interventions for mathematics or science may apply to the Education Technology topic or the Math/Science topic.

6. 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 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 from prekindergarten through high school and for vocational or adult basic education or developmental (remedial)/bridge programs for under-prepared college students.

B. Background

The Cognition and Student Learning research program was first competed in FY 2002. Over the past 9 years, a total of 79 research projects have been supported. Focusing on a content domain such as mathematics, reading, science, or social studies, and working with learners from prekindergarten through college, most of the Cognition researchers examine ways to leverage underlying cognitive principles to revise instruction and support student learning. This research program has been instrumental in moving cognitive scientists from pure laboratory research into applied education contexts, where many teams are exploring the degree to which foundational cognitive principles generalize across learner ages, education settings, and academic content areas.

A subset of the Cognition researchers has been exploring ways in which implicit learning can help or hinder mastery of academic concepts. For example, when young students' arithmetic practice is limited to problems using a traditional format (e.g., where the sum is always on the right side of the equation, 1 + 2 = 3; 4 + 5 = 9), students may implicitly learn that the equal sign means "add it all up," even after explicit instruction in which the teacher explains that the equal sign means equivalence. This misunderstanding of the symbolic meaning of the equal sign has both short-term negative consequences for solving arithmetic problems that do not share this formal structure and potential long-term negative effects when students are asked to solve algebraic equations. Recognizing this problem, McNeil (2008) experimentally demonstrated that providing students in second grade classrooms with opportunities to solve arithmetic problems with many different structures (e.g., varying where the equal sign is placed) leads to improved understanding of mathematical equivalence compared to practicing the same number of problems where the equal sign is always placed in the same location.

As a second example, consider the research of Kellman and Massey (2008). A fundamental discovery of perception research is that human cognition depends upon pattern recognition. One classic line of research finds that expert chess players perceive the chess board as composed of sets of pieces that make up possible moves; in contrast, novices perceive many individual pieces. It is rare, however, to find education interventions that leverage the perceptual foundations of cognition. Kellman and Massey decided to exploit the potential of perceptual learning by developing a computer-delivered intervention in which students are asked to match hundreds of instances of different representations of the same equation (e.g., a number sentence to the correct word problem) in 30-minute practice sessions. Students are not asked to solve these equations, but only to identify the representations that are equivalent. This repeated exposure to instances, with feedback as to whether the match is correct or incorrect, draws upon the human capacity to seek out structure and turns out to be a powerful technique that has been found to improve short-term and long-term mastery of fractions.

Through the Cognition research program, the Institute supports research that utilizes cognitive science to develop and test innovative approaches intended to improve teaching and learning in authentic education settings. For typical Cognition projects, researchers begin by identifying a specific learning or instructional problem in schools, consider which findings from the empirical literature might be relevant to tackling the problem, and then propose a research plan for translating those findings into an education strategy that addresses 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 and practitioners who understand teaching and learning in the context of authentic education settings.

Under the Cognition program, the Institute also funds projects designed to explore the cognitive processes underlying the acquisition of reading, writing, mathematics knowledge and skills, science knowledge and skills, or general study skills. This is translational research intended to inform the development of innovative programs, practices, or products to improve student outcomes. Researchers interested in *exploratory research* can take a variety of different approaches, including short-term longitudinal studies and small laboratory or classroom-based experiments.

Finally, the Institute also encourages projects that address how principles and knowledge emerging from research in cognitive science can be used to improve teacher 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. 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. Submission to a specific goal

For the Cognition and Student Learning topic, applicants must submit under one of four goals: *either* Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Measurement. The Institute does *not* accept applications under the Scale-up Evaluation goal for the Cognition 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 Cognition topic are described.

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

b. Content and sample requirements

- Research must focus on reading, pre-reading, writing, pre-writing, mathematics, early mathematics, science, early science, or study skills for students from prekindergarten through Grade 12 or reading, writing, or mathematics skills or study skills for students in vocational or adult basic education or remedial (developmental)/bridge programs for under-prepared college students.
- The Institute especially encourages research on prekindergarten-12 students who are at-risk for failing to achieve in school but also is interested in research to improve outcomes for all prekindergarten-12 students, including prekindergarten-12 students who are gifted.
- Researchers who are interested in conducting research that addresses the needs of adult learners in vocational or adult basic education or under-prepared college students in remedial programs may apply to either the Postsecondary and Adult Education topic or the Cognition topic.

c. Research setting requirements

Under Exploration and Measurement, the research may be conducted in laboratory and/or authentic education settings. Under Exploration, laboratory research with typically developing college students is allowable provided that the researcher also examines the relation between the malleable factors and outcomes with the student population of interest (i.e., prekindergarten-12 students, adult learners in vocational or adult basic education, or under-prepared college students in remedial programs) within the award period.

Under Development and Innovation, 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 typically developing college students may be proposed as a means to identify 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 (i.e., prekindergarten-12 students, adult learners in vocational or adult basic education, or under-prepared college students in remedial programs).

Efficacy and Replication is appropriate for applicants proposing to evaluate fully developed interventions. The Institute does **not** support laboratory research under the Efficacy and Replication goal. Interventions that are ready to be evaluated through efficacy trials must be fully developed and ready to be implemented in authentic education settings.

d. Methods appropriate for Exploration and Development studies

Under Exploration and Development/Innovation, the research may involve small experiments to test hypotheses regarding the cognitive processes involved in a particular learning task.

7. SOCIAL AND BEHAVIORAL CONTEXT FOR ACADEMIC LEARNING

Program Officer: Dr. Emily Doolittle (202-219-1201; Emily.Doolittle@ed.gov)

A. Purpose

Through its research program on Social and Behavioral Context for Academic Learning (Social/Behavioral), the Institute supports research on interventions designed to improve social skills, dispositions, 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 high 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 or assessing social skills, dispositions, and behaviors that support academic and other important school-related outcomes of students from kindergarten through high school.

B. Background

Behavior problems in schools continue to be a pressing concern for school staff and parents. Under the Social/Behavioral research program, the Institute seeks to encourage rigorous research on 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 or evaluation under the Social/Behavioral 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 teachers' behavior management practices in the classroom, and (d) curricula designed to reduce student anti-social behavior (e.g., aggression, delinquency, bullying) in the classroom or school. Most of the currently funded projects are devoted to developing new interventions (49%) or evaluating fully developed interventions to determine their impact on students' social skills, behaviors, and academic achievement (38%). The Institute has also funded three measurement projects that address social/behavioral processes in schools (two projects examine measurement of self-regulation in young children; one project is to develop and validate a teacher progress monitoring scale for assessing classroom management practices and child behavioral outcomes).

In addition to research on social/behavioral interventions and measures, the Institute supports research to explore the relations between malleable factors (i.e., things that can be changed, such as student competencies and education practices) and education outcomes in order to identify potential targets of interventions. Under the Social/Behavioral research program, malleable factors may be those social skills, dispositions (e.g., conscientiousness), and behaviors (e.g., self-regulation) that support student learning and would be correlated with education outcomes (e.g., grades, test scores, graduation rates). Although dispositions may include traits that may not be seen as being malleable, the Institute is interested in those dispositions or characteristics that may be changeable and are related to education outcomes. For example, Dweck's work on conceptualizations of intelligence as being fixed versus malleable indicates that, although children may tend toward one or the other view of intelligence, these conceptualizations of intelligence can be influenced and are related to children's persistence on academic tasks (e.g., Blackwell, Trzesniewski, & Dweck, 2007; Dweck & Leggett, 1988). To date, the Institute has funded three projects under the Exploration goal to explore malleable factors that are associated with better social skills and behaviors to support academic learning, as well as mediators and moderators of the relations between these factors and student outcomes, for the purpose of identifying potential targets of intervention.

The Institute encourages researchers to consider applications to conduct secondary data analyses using the longitudinal data set resulting from the Institute's Social and Character Development (SACD) multi-program evaluation. This data set includes child, primary caregiver, teacher, and principal reports on 20 student and school outcomes related to social and emotional competence, behavior, academics, and perceptions of school climate collected at five time points from the beginning of third grade to the end of fifth grade for 6,660 students in 84 schools, as well as annual teacher and principal reports on the level

of SACD activities taking place in the classroom and school. The SACD multi-program evaluation report, *Efficacy of Schoolwide Programs to Promote Social and Character Development and Reduce Problem Behavior in Elementary School Children*, is available at http://ies.ed.gov/ncer/pubs/20112001/index.asp. To use the data set, researchers will need to obtain a restricted-use data license for the *Multisite Data, Social and Character Development Research Program, Complete Restricted Use Data Files and Documentation, February 2009*. (For information on how to obtain a restricted-use data license see http://nces.ed.gov/pubsearch/licenses.asp.)

C. Specific Requirements

a. Submission to a specific goal

For the Social/Behavioral topic, applicants must submit under one of five goals: *either* Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Scale-up Evaluation *or* Measurement. 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.

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

b. Content and sample requirements

- Research must focus on students from kindergarten through Grade 12. For research that spans early childhood and the early elementary grades, the applicant may choose to submit the application to the Early Learning Programs and Policies topic or to the Social/Behavioral topic.
- Research must address social skills, dispositions, or behaviors that are correlated with academic outcomes.
- The Institute will support research on interventions for students that are implemented by teachers, other school staff (e.g., school administrators, guidance counselors, school psychologists), or school-affiliated staff (e.g., clinical psychologists working with a school district) 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.
- Applicants should include measures of students' social and behavioral skills that support success in school and/or relevant measures of the school context (e.g., school climate, teacher use of behavior management practices). When research clearly articulates the proximal outcomes hypothesized to be improved, it can make stronger contributions to both the theory of action behind the intervention and its actual practice.
- All applicants must include measures of student academic outcomes. By *academic outcomes*, the Institute means those measures of learning and achievement that are important to parents, teachers, and school administrators (e.g., grades, achievement test scores, grade retention, graduation rates, drop-out rates).

8. EDUCATION TECHNOLOGY

Program Officer: Dr. Jonathan Levy (202-219-2096; Jonathan.Levy@ed.gov)

A. Purpose

Through its Education Technology research grants program, the Institute supports research on education technology tools that are designed to provide or support instruction in reading, writing, mathematics, or the sciences (including pre-reading, pre-writing, early mathematics, and early science), to improve study skills, or to provide professional development for teachers related to instruction in reading, writing, mathematics, or the sciences. The long-term outcome of this program will be an array of education technology tools that have been documented to be effective for improving student reading, writing, mathematics, and science achievement.

B. Background

Since 2002, the Institute has funded over 100 education technology research projects through the Education Technology research program, other research programs, and its research and development centers. This research addresses a broad array of education issues through innovative use of technology. A number of projects are intended to develop new tools for teachers such as a software tool that will enable teachers to adapt English texts into Spanish for English learners and formative and diagnostic assessments that will provide data to teachers in real time through PDAs or online systems. Several research teams are developing and testing intelligent tutoring systems for mathematics or science instruction. Others are developing curricula and supplementary modules delivered through computer simulations or game environments. Researchers are also using technology as the vehicle for delivery of teacher professional development in reading, mathematics, science, and classroom management.

For example, one team has developed a software program that utilizes students' beginning-of-the-year reading scores to develop an instructional profile of the type, duration, and timing of reading instruction recommended for each child and assigns children with similar profiles to reading groups for classroom instruction. This instructional profile information is designed to be used in conjunction with reading curricula currently used by schools. In an efficacy evaluation of this software program, the team found that, relative to children in the control classrooms, first- and second-grade students in the treatment group made greater gains in reading comprehension; in fact, there was about a two-month difference in grade equivalents between the groups (Connor et al., 2007; Connor, Morrison, & Underwood, 2007).

The Institute supports research on 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 (e.g., through intelligent tutors, online courses for advanced high school science and mathematics courses); (b) to teach basic reading, writing, mathematics, or study skills at the postsecondary level, including vocational education and adult education; (c) to provide teacher professional development relevant to reading, writing, mathematics, or science from prekindergarten through high school or to reading, writing, or mathematics instruction for learners in adult education programs that is linked to increases in student achievement; and (d) to assess student learning. Under the Institute's Education Technology research program, researchers are invited to propose rigorous research projects to develop innovative education technology tools or evaluate existing education technology products. 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 student outcomes. The Institute encourages applicants to read its report on the evaluation of education technology products.[3]

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. Submission to a specific goal

For the Education Technology research program, applicants must submit under one of four goals: *either* Development and Innovation *or* Efficacy and Replication *or* Scale-up Evaluation *or* Measurement. The Institute does *not* accept applications under the Exploration goal 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.

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

b. Content and sample requirements

- Applicants must propose education technology that is intended for use in schools or through formal programs operated by schools or educational agencies (e.g., after-school programs, distance learning programs, adult education programs).
- Education technology for *reading, pre-reading, writing, or pre-writing* must target students at any level from prekindergarten through postsecondary and adult education. At the postsecondary and adult education levels, proposals must address 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 introductory (beginning-level) writing courses intended to teach writing skills at the college level (e.g., instruction in organization, audience, style, and writing clear prose). Proposals to conduct research on education technology for teaching creative writing or literature will not be accepted.
- Education technology for *mathematics* must target students at any level from prekindergarten through high school; or must focus on basic mathematics skills for adults in adult education programs, vocational education programs, or developmental (remedial or bridge) programs designed to help under-prepared students acquire the skills to succeed in college.
- Education technology for *science* must target students at any level from prekindergarten through high school.
- Education technology to enhance study skills must target students at any level from prekindergarten through high school, students in programs for under-prepared college students, or students in adult education programs.

[3] *Effectiveness of Reading and Mathematics Software Products: Findings from Two Student Cohorts* may be downloaded from http://ies.ed.gov/ncee/pubs/20094041/index.asp.

- Education technology for *teacher professional development* relevant to reading, pre-reading, writing, pre-writing, mathematics, or science must target teachers or other instructional personnel at any level from prekindergarten through high school. The Institute will also accept proposals for education technology for teacher professional development for teachers or other instructional personnel to teach reading, mathematics, writing, and study skills classes to adults through college developmental (remedial or bridge) programs, vocational education, and adult education, as well as technology for professional development for teaching introductory English composition courses in college. Professional development refers to in-service training for current personnel.
- Education technology *assessments* for reading, pre-reading, writing, pre-writing, mathematics, or science must target students at any level from prekindergarten through high school. In addition, the Institute will accept applications to develop and/or validate education technology assessments intended for adults who are learning reading, writing, or mathematics skills through adult education programs, vocational education programs, or developmental/bridge programs designed to help under-prepared students acquire the skills to succeed in college.
- All applicants must include measures of student academic outcomes. Applicants addressing teacher professional development must also include measures of the behaviors of the teachers or other instructional personnel that are the target of the professional development.

9. EFFECTIVE TEACHERS AND EFFECTIVE TEACHING

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

A. Purpose

The general purpose of the Institute's Effective Teachers and Effective Teaching (Effective Teachers) research program is to identify effective strategies for improving the performance of classroom teachers in ways that increase student learning and school achievement in reading, writing, mathematics and the sciences for students from kindergarten through Grade 12. The long term outcomes of the Effective Teachers research program will be an array of programs (e.g., professional development programs), assessments, and strategies (e.g., recruitment and retention policies) that have been demonstrated to be effective for improving and assessing teacher quality in ways that are linked to increases in student achievement.

B. Background

Through the Effective Teachers research program, the Institute intends to improve the quality of teaching through research on teacher professional development, assessment of teachers, teacher preparation, and the recruitment, retention, and certification of teachers. This program focuses on teachers in kindergarten through Grade 12 in reading, writing, mathematics, and the sciences.

Recent large-scale, experimental evaluations of teacher professional development programs have not found that professional development training results in improvements in student outcomes, even when changes in teacher practices were obtained (Garet et al., 2008; Garet et al., 2010). However, research is accumulating on specific instructional strategies that teachers may employ to improve reading outcomes (e.g., Connor, Morrison, Fishman et al., 2007; Justice et al., 2009; O'Connor, Swanson & Geraghty, 2010; Vadasy & Sanders, 2008). Further research is beginning to accumulate that shows that specific teacher professional development training can improve student outcomes (e.g., Powell, Diamond, Burchinal, & Koehler, 2010). The Institute encourages research on teacher professional development programs that incorporate instructional practices that have been demonstrated through rigorous evaluations to improve student outcomes. Further, despite the bodies of research in the cognitive sciences that identify basic principles of knowledge acquisition and memory and that 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).

The Institute particularly encourages researchers to explore the relations between malleable factors (e.g., teachers' skills or knowledge, professional development programs) and student outcomes, as well as mediators and moderators of the relations between these factors and student outcomes (e.g., contexts) for the purpose of identifying potential targets for interventions. One approach to the identification of malleable factors is for researchers to conduct detailed, quantifiable observations of teacher practices (types of instruction, frequency, duration, circumstances) and then use these data, in conjunction with child characteristics, to predict subsequent child outcomes. The goal here is to identify teacher practices that are strongly associated with better student outcomes. Researchers who can identify strong correlates of student performance could use this information as the basis for developing a professional development intervention.

Under the Effective Teachers program, the Institute 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 are 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, such as classroom observation instruments, that could be used by schools to provide feedback to teachers and improve the quality of classroom instruction; such measures need to be validated against measures of student learning.

Finally, the Institute invites research on teacher recruitment, retention, and certification and their relation to student outcomes (e.g., alternative recruitment and certification programs, incentives for recruiting highly qualified teachers). In addition, the Institute is interested in proposals to conduct Exploration research on teacher preparation programs. For example, using a state's longitudinal data that links teachers to student outcomes and includes information on teachers' undergraduate education, researchers could examine the associations between undergraduate education programs and student outcomes.

C. Specific Requirements

a. Submission to a specific goal

For the Effective Teachers topic, applicants must submit under one of five goals: *either* Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Scale-up Evaluation *or* Measurement. 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 Effective Teachers topic are described.

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

b. Content and sample requirements

The Institute supports research on teacher professional development interventions and teacher assessments relevant to teaching reading, writing, mathematics, or the sciences from kindergarten through Grade 12. By "professional development" the Institute refers to in-service training of or tools for

current instructional personnel. Under this program, the Institute supports research on teacher recruitment, retention, and certification for teachers from kindergarten through Grade 12. The Institute also supports research on teacher preparation programs under the Exploration Goal.

- Applications must address teachers or other instructional personnel (including coaches of teachers) of typically developing students in any grade(s) from kindergarten through Grade 12. Applications must address professional development, assessment of teachers, teacher preparation (pre-service) training, or teacher recruitment, retention, or certification.
- All applicants must include measures of student academic outcomes as well as measures of the behaviors of the teachers or other instructional personnel that are the target of the professional development.
- For professional development applications, the proposed research on teacher professional development must be relevant to the instruction of reading, writing, mathematics, or science. Professional development refers to in-service training for current personnel. Applicants interested in professional development for prekindergarten teachers should apply to the Early Learning Programs and Policies topic. If the research spans prekindergarten and kindergarten, applicants may choose to submit the application to the Early Learning Programs and Policies topic or to the Effective Teachers topic. Applicants interested in professional development to improve classroom management skills must apply under the Social/Behavioral topic.
- Applicants interested in professional development for teachers of English learners may choose to apply to the English Learner topic or to the Effective Teachers topic.
- For assessment applications, the proposed research must include validation of the proposed assessment (new or existing) against direct measures of student outcomes. Assessments may focus on teacher subject matter, pedagogical knowledge, and/or instructional practices. Assessments must be of a core academic content area (i.e., reading, writing, social studies, history, mathematics, or the sciences).
- For teacher preparation (pre-service training) applications, the proposed research must meet the requirements for Goal One—Exploration studies. Teacher preparation applications must address reading, writing, mathematics, or science. Teacher preparation applications must include measures of student outcomes of the teachers who were trained through the teacher preparation programs involved in the study.
- Applications focused primarily on curriculum or instructional practices that also include a professional development component are more appropriately directed to the Read/Write or Math/Science topics.
- For applications that address the recruitment, retention, or certification of effective teachers, applications must address teachers in grade(s) from kindergarten through Grade 12.
- Aspects of teacher effectiveness, such as recruitment and retention, may also fit under the Improving Education Systems: Policies, Organization, Management, and Leadership topic. Researchers who are interested in conducting research on these issues may apply to either the Improving Education Systems topic or the Effective Teachers topic.

10. IMPROVING EDUCATION SYSTEMS: POLICIES, ORGANIZATION, MANAGEMENT, AND LEADERSHIP

Program Officers: Dr. David Sweet (202-219-1748; David.Sweet@ed.gov)
Dr. Katina Stapleton (202-219-2154; Katina.Stapleton@ed.gov)
Dr. Hiromi Ono (202-208-2174; Hiromi.Ono@ed.gov)

A. Purpose

The purpose of the Improving Education Systems: Policies, Organization, Management, and Leadership (Improving Education Systems) research program is to improve student learning through direct improvements in the organization and management of schools and education systems and through the establishment of policies intended to foster such improvements. The long-term outcome of this program will be an array of tools and processes (e.g., organizational strategies, professional development strategies, management practices, assessments, and policies to foster improvements in the latter) that have been documented to be effective for improving the way in which schools and/or district operate and thereby improving student outcomes.

B. Background

How a school or district structures and uses its resources has major implications for the approach it takes to instruction and learning, the impact of its resources on student achievement, and the potential success of the education reforms it adopts to improve instruction and learning. Through the Improving Education Systems program, the Institute supports research to improve student learning and achievement through (a) the examination of education resources broadly defined including human capital (e.g., attributes of the administration, staff, and students), social assets (e.g., school climate, sense of trust among staff and students, sense of collective staff responsibility for student success), financial assets (e.g., funds available and how they are allocated), time assets (e.g., the school year and school day and how they are organized), and physical assets (e.g., building, facilities, equipment); (b) how these resources are drawn upon and structured to carry out the academic functions of the school or district; and (c) how these resources might be better developed, organized, managed, used, and maintained to improve student achievement.

The Institute seeks to support work on resource issues that schools, districts, and states must make decisions about and act on every day. Will a longer school day or school year lead to improved student outcomes? How can the leadership of a school best focus on improving instruction? Are there ways to reduce the impacts of ongoing budget cuts on student success? In addition, the Institute seeks to support research that examines schools and districts as organizations and study their functions as coordinated wholes (e.g., instructional program coherence and the use of data and feedback systems to improve instruction). Another purpose is to encourage research addressing the social aspects of the school that may be difficult to identify. This type of work might, for example, address how to foster a school culture that supports teaching and learning in ways that lead to improved student outcomes (e.g., developing a supportive school and classroom climate, maintaining high expectations for all students, facilitating collaborations among teachers). This type of research could also contribute to understanding how a school's organization and management may affect its adoption of new programs and practices that are intended to improve student outcomes.

Under the Improving Education Systems research program, the Institute also supports research to improve the quality of leadership and administration at the school and district in order to enhance the teaching and learning environment for students and thereby improve student outcomes. 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 school leaders 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. 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. Such research may address innovative approaches to the recruitment and retention of education leaders, as well as the development and evaluation of professional development programs for education leaders.

Through the Improving Education Systems research program, the Institute also supports research to improve student learning and achievement through the implementation of systemic programs and broad policies that affect large numbers of schools within a district, state, or the nation. Systemic programs and policies may seek to impact student outcomes by attempting to change the behavior of large numbers of students (e.g., offering material incentives for improved academic and behavioral outcomes). More often, systemic programs and policies work indirectly to impact student outcomes through changing how large numbers of schools or districts carry out instruction and the functions that support or evaluate instruction. For example, district and state curriculum standards and assessments directly impact what is taught, and district and state programs to improve low-performing schools affect how such schools reorganize and manage themselves. Policies may also offer students the opportunity to obtain instruction from alternatively organized and managed sources, for example, non-neighborhood schools including magnets, charters and those in other catchment areas, and virtual classes and schools. Policy research should also consider how the impacts of policy might vary by student characteristics (e.g., social and economic background, academic performance) and by school or district characteristics (e.g., experience-level or turnover rate of teaching staff, substantial proportions of high-poverty students). Research is also needed to determine the effects on student learning of making different policy choices (e.g., mandating smaller class size that will be staffed by less experienced, lower salaried teachers versus larger classes with higher paid, more experienced teachers).

The Institute is also interested in how funds can best be deployed to raise student achievement. This type of work includes the development and validatation of cost-accounting tools under the Measurement goal. Available per-pupil expenditure data may hide disparities among schools when used at the district level and disparities among students when used at the school level (National Research Council, 1999). The Institute is interested in 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.

The Institute would like to highlight the opportunity to use State and district longitudinal data sets for supporting research within the Improving Education Systems topic. Longitudinal data can be used to measure change in student outcomes and identify the factors that may be associated with both beneficial and adverse changes. If these factors can be modified by the school system, they may offer opportunities to improve student outcomes. Similarly, this data can be used in the evaluations of specific programs or policies. Research of this type offers an opportunity for researchers and State or Local Education Agencies to develop joint projects that will produce results directly applicable to local needs while also informing the field.

Finally, with a focus on indirect ways of improving student outcomes, research conducted under the research program on Improving Education Systems typically is based on theories of action that involve multiple steps before affecting student outcomes. The Institute requires applicants to obtain measures of student academic outcomes (e.g., test scores, graduation rates) and strong applications would also include measures of more proximal outcomes to help determine the validity of the proposed theory of action. For example, an evaluation of a program to reduce chronic student absences could include expected proximal outcomes such as increases in student attendance, time in class, and engagement in addition to academic outcomes.

C. Specific Requirements

a. Submission to a specific goal

For the Improving Education Systems topic, applicants must submit under one of five goals: *either* Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Scale-up Evaluation *or* Measurement. 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 Improving Education Systems topic are described.

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

b. Content and sample requirements

- Research must address the organization, leadership, and management (and related policies) of schools or districts that serve students at grade levels from kindergarten through Grade 12.
- All applicants must include measures of student academic outcomes (e.g., end-of-course exams, graduation rates, disciplinary actions, scores on state assessments).
- Research on measures of the organization, leadership, and management of schools or school systems must include validation of the proposed assessment against student academic outcomes (e.g., grades, state achievement test scores, graduation rates).
- Research on developing cost-accounting tools (under the Measurement goal) should include student cost estimates in relation to specific instructional approaches. In addition, the applicant should detail how the cost-accounting tool will be validated, for example, using results from other cost-effectiveness measures.
- The Institute generally does not support research on pre-service leadership programs. However, the Institute will support research on alternative certification pathways (and their components) for school and district administrators. By *alternative certification pathways* the Institute means relatively short programs that are intended to provide intensive training to professionals and have them working in schools within 18 to 24 months.
- Applicants proposing to use restricted-use data from State or Local Education Agencies or other entities must include explicit permission from the holder of the data for the applicant to use the data for the purpose described in the application. In addition, the applicant should note whether the applicant already has the data and, if not, when the data will be received.

11. POSTSECONDARY AND ADULT EDUCATION

Program Officers: Dr. Hiromi Ono (202-208-2174; Hiromi.Ono@ed.gov)
Dr. Meredith Larson (202-219-2025; Meredith.Larson@ed.gov)

A. Purpose

The purpose of the Postsecondary and Adult Education research program is to contribute to the improvement of reading, writing, and numeracy skills of learners in adult education programs; the enhancement of targeted learning outcomes of postsecondary students; and the increase in access to, persistence in, and completion of postsecondary education. The long-term outcome of this program will be an array of tools and strategies (e.g., practices, assessments, programs, policies) that have been documented to be effective for improving education outcomes of adult learners and postsecondary students at the college level.

B. Background

Adult students include two broad categories: those in adult education and those in postsecondary education. Learners participating in adult education tend to be at or below basic skill levels and do not have a high school diploma or equivalent, whereas those in postsecondary education have a high school diploma or equivalent and are generally housed in colleges or universities. Despite these tendencies, the actual distinction between these two groups is not always clear cut, and the Institute has decided to merge what previously were two topics into one broad research program.

a. Adult Education

Approximately 30 million American adults, or 14 percent of the adult population, have difficulty reading (Kutner et al., 2007). Some of these adults struggle to read because they are nonliterate in English, others because they have some, but not all, of the skills required to read and comprehend connected text. In addition, about 22 percent of the adult population have limited quantitative skills and can use their knowledge of numbers to perform only simple quantitative operations (mostly addition) when the mathematical information is concrete and familiar (Kutner et al., 2007). The need to improve the skills of adults with limited reading and numeracy skills has been addressed, in part, by the provision of adult education. Of the nearly 2.4 million adults who participated in adult education programs in 2008-2009, approximately 42 percent enrolled in adult basic education (ABE), an additional 44 percent participated in English literacy programs (adult EL), and the remaining 14 percent were enrolled in adult secondary education (ASE).[4] Adult learners within each of these program types have widely varying education needs, and the effectiveness of adult education programs in providing learners with the literacy and numeracy skills that they need for workforce success is mostly unknown.

The Institute encourages a broad range of research to improve adult basic education, adult EL programs, and adult secondary education. For example, research is needed to determine the most effective instructional strategies and curricula for adult English learners and to discover how programs can be organized to accommodate the range of adult English learners. An instructional practices example concerns the use of computer tutors that may be an efficient and effective means for teaching certain kinds of skills to adult learners. Research is needed to develop and test the effects of computer tutors on improving outcomes for adult learners. As another example, consider the wide range of organizational differences across adult education providers (e.g., local education agencies, community-based organizations, community colleges). Research to explore the relations between program characteristics (e.g., type of provider, enrollment policies, teacher characteristics) and student outcomes is needed to

[4] U.S. Department of Education, Office of Vocational Education, Reports of Aggregate National Reporting System Data. Table: Participants By Entering Educational Functioning Level, Ethnicity, And Sex; Program Year: 2008-2009; All Regions. Downloaded on December 23, 2009 from http://wdcrobcolp01.ed.gov/CFAPPS/OVAE/NRS/reports/index.cfm.

begin generating hypotheses about what features and components of programs are associated with better outcomes for adult learners.

Theoretically driven and methodologically rigorous research on adult education is limited. Research in adult literary has found substantial variability across adult readers (e.g., Strucker, Yamamoto, & Kirsch, 2007) and that the variable patterns of reading are distinctly different from those of children learning to read (Greenberg, Ehri, & Perin, 2002; Mellard, Fall, & Mark, 2009). However, further work on this topic along with curriculum development and testing needs to be done. Even less research has been conducted on improving adult numeracy skills. A recent review of the literature in adult numeracy (Condelli et al., 2006) indicates that there is "virtually no systematic research in ABE identifying effective mathematics instruction" (pg. 62). Likewise, there is a shortage of materials focused on the needs of adult EL students and on effective strategies for teaching these learners (Hector-Mason et al., 2009). Similarly, there is virtually no research that has applied what has been learned through the cognitive sciences to improving instruction for struggling adult learners in the context of adult education. The Institute is interested in supporting research in all these areas.

Finally, more work is needed on assessment of adult learners. One of the issues educators face is that many of the measures used to evaluate adult learners may not be appropriate for struggling adult learners (Greenberg, Pae, Morris, Calhoon, & Nanda, 2009). Furthermore, the assessments most commonly used, such as the Test of Adult Basic Education (TABE), Comprehensive Adult Student Assessment System (CASAS), Basic English Skills Test (BEST), and the GED test, may not reliably predict whether students have the skills necessary to succeed at subsequent levels (Golfin Jordan, Hull, & Ruffin, 2005; Mellard & Anderson, 2007).

b. Postsecondary Education

The Institute encourages 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 at the undergraduate level. Addressing these concerns is particularly important for at-risk students. According to the National Center for Education Statistics, there are substantial socioeconomic and racial gaps in postsecondary success, starting with enrollment and following through to graduation. For example, only 53 percent of high school students from low-income families and 58 percent from students from middle-income families enter college following high school graduation compared to 80 percent from upper-income families (Horn & Berger, 2004).

A wide range of programs, practices, and policies has been designed to improve postsecondary access and completion. These include programs such as dual enrollment or "early college" high school programs that allow students to earn a high school diploma while progressing toward an associate degree or certificate and dropout recovery programs such as Diploma Plus. Other programs have been designed to address students' and parents' access to information about college and planning ahead for college. The Institute encourages research to evaluate the impact of these programs.

Many postsecondary 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). However, little rigorous research exists to evaluate the impact of these programs. Research is needed to determine which programs are most effective for which students under what conditions. The Institute is also interested in research to improve learning and academic achievement in gateway courses for science and mathematics degrees. By *gateway courses*, the Institute means those beginning science and mathematics courses for undergraduates majoring in mathematics or one of the sciences that are predictive of completion of undergraduate degrees in mathematics and the sciences. In addition, the Institute encourages applications to improve writing outcomes for college students in introductory English composition courses through curricula or instructional approaches.

The Institute invites applications to develop and/or validate assessments of students' college-level reading, writing, mathematics, and critical thinking skills that are intended to provide feedback to institutions 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, the Collegiate Learning Assessment by the Council for Aid to Education, and the Collegiate Assessment of Academic Proficiency by ACT are three commercially available assessments for institutions of higher education. The Institute is interested in applications to examine the validity and utility of widely used assessments like these (e.g., what do these types of assessments predict?).

C. Specific Requirements

a. Submission to a specific goal

For the Postsecondary and Adult Education Research program, applicants must submit under one of five goals: *either* Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Scale-up Evaluation *or* Measurement. 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 and Adult Education Research topic are described.

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

b. Content and sample requirements

- Research on adult education programs must focus on reading, writing, or mathematics skills of adult learners. For the purpose of this Request for Applications, adult education programs includes adult basic education, adult secondary education, programs for adults who are learning English, and programs designed to help under-prepared students acquire the skills to succeed in college.
- For the purpose of this Request for Applications, postsecondary education is defined as college education (i.e., grades 13 through 16). Research on postsecondary education must focus on (a) improving access to, persistence in, or completion of postsecondary education; (b) improving academic achievement in gateway courses for science and mathematics degrees that are predictive of completion of undergraduate degrees in mathematics and the sciences; or (c) improving writing outcomes for college students in introductory English composition courses.
- For the purpose of this Request for Applications, interventions for improving access to or persistence in, or completion of postsecondary education must be those that are 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 help assure the completion of postsecondary education for students at risk of not completing their college degrees. For the purpose of this Request for Applications, gateway courses are beginning science and mathematics courses for undergraduates majoring in mathematics or one of the sciences.
- Under the Measurement goal, assessments for use in adult education programs must be reading, writing, or mathematics assessments appropriate for adult learners. Assessments for use in postsecondary education must be measures of learning (e.g., college-level proficiencies in reading, writing, critical thinking, and mathematics) that could be used broadly across institutions of higher education to assess what students have learned in college.

12. EARLY LEARNING PROGRAMS AND POLICIES

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

A. Purpose

Through its Early Learning Programs and Policies (Early Learning) research program, the Institute intends to contribute to the improvement of school readiness skills (e.g., pre-reading, language, vocabulary, early science and mathematics knowledge, social skills) of prekindergarten children (i.e., three- to five-year-olds). 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 in center-based prekindergarten settings.

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 their academic careers.

Examining how to improve the school readiness of young children has been a focus of the Institute since 2002 when the Institute launched the Preschool Curriculum Evaluation Research (PCER) program. With PCER funding, researchers evaluated the efficacy of 14 preschool curricula for their impact on school readiness outcomes. *DLM Early Childhood Express supplemented with Open Court Reading Pre-K* showed positive effects on reading, phonological awareness, and language outcomes at the end of prekindergarten and in the follow-up year at the end of kindergarten (Preschool Curriculum Evaluation Research Consortium, 2008). *Pre-K Mathematics with DLM Early Childhood Express Math software* had a positive effect on mathematics outcomes at the end of the prekindergarten year. Both *Curiosity Corner* and the *Early Literacy and Learning Model* showed a positive effect in one domain at the end of the kindergarten year. In addition to the PCER program, the Institute has funded early childhood research through a number of its other programs (e.g., Cognition and Student Learning, Mathematics and Science, Reading and Writing, the Teacher Quality programs). In 2008, the Institute established the Early Learning Programs and Policies program to be the primary topic under which early childhood research would be funded.[5] Across all of these programs, the Institute has funded more than 60 research projects that target improving school readiness outcomes of young children. About one third of these projects are focused on developing interventions designed to support children's school readiness skills and the professional development of early childhood educators. Unlike our other program areas, the Institute has supported more efficacy and scale-up evaluation projects of early childhood curricula (30) than projects focused on developing new early childhood interventions.[6] The predominant content area focus of currently funded early childhood research projects is language and literacy skills. However, the Institute has made a substantial investment in developing and evaluating interventions targeting preschoolers'

[5] The program was originally called "Early Childhood Programs and Policies."

[6] The 28 early childhood curricula evaluations include efficacy and scale-up evaluation projects that were funded under the Read/Write or Math/Science program.

mathematical competence. In addition, the Institute has funded projects that focus on self-regulation, social skills, and behavioral competence, including, for example, efficacy evaluations of curricula such as *Tools of the Mind*. However, the Institute sees a need for additional research in the areas of early science development and development of social and behavioral skills that will enable young children to transition more easily into school.

Although the Institute has funded 6 measurement projects to date, there is a substantial need for reliable, valid, and developmentally appropriate measures for use with young children. Under the Early Learning research program, the Institute especially encourages applications to develop and validate measures of kindergarten readiness that can be easily and reliably administered by practitioners and address the variety of skills necessary for success in kindergarten (e.g., cognitive, language, social and emotional, physical, early literacy, early numeracy). Although school readiness measures exist, typical measures often focus on one domain (e.g., language or literacy) and require intensive professional development to be administered reliably. The Institute is interested in measures that will cover multiple domains, reliably predict school success, and yet be reliably and easily administered by practitioners. The Institute especially solicits applications to develop and/or validate measures that are linked to State early learning guidelines and program quality standards. The Institute encourages applicants to collaborate with States to develop standards-based measures of school readiness outcomes for use in state early childhood accountability systems. The Institute also invites applications to support the development and validation of early childhood screening measures that could be used by parents or early childhood educators (e.g., child care workers, Head Start teachers, prekindergarten teachers) to identify young children who might benefit from intervention services and with early screening might be identified in time to make a difference for kindergarten entry. Such screening measures would not be intended for diagnostic purposes but could identify young children who would need in-depth assessment. Applications that would be appropriate for consideration include but are not limited to (a) proposals to develop new assessments; (b) proposals to modify, adapt, or combine existing assessments so that the revised instrument covers multiple domains and is easy for practitioners to use; and (c) proposals to adapt assessments originally designed and used for research purposes for broader use in instructional settings.

In addition to measurement research, the Institute continues to solicit research on curricula, instructional practices, and teacher professional development intended to improve young children's pre-reading, pre-writing, language and vocabulary, early science and mathematics skills, and social and emotional competence. Social and emotional competence covers a broad range of knowledge and skills. The Institute encourages research on those skills that are predictive of later school performance. Under the Early Learning program, the Institute also requests applications for rigorous research on early childhood policies and their relation to improving school readiness and other school-related outcomes for young children.

C. Specific Requirements

a. Submission to a specific goal

For the Early Learning research program, applicants must submit under one of five goals: *either* Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Scale-up Evaluation *or* Measurement. 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 Learning topic are described.

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

b. Content and sample requirements

- Research must focus on prekindergarten children (3- to 5-years old). For research that spans early childhood *and* the early elementary grades, the applicant may choose to submit the application to the Early Learning topic or may choose to submit the application to the appropriate content topic (e.g., English Learners, Read/Write, Math/Science, Effective Teachers).
- Research must address school readiness outcomes, including pre-reading, pre-writing, early mathematics, early science, or social and emotional skills.
- Research must focus on early childhood interventions or assessments. Interventions may include early childhood policies, curricula, teacher professional development programs, and teachers' instructional practices and approaches (including use of technology). Assessments may include direct child assessments of young children, assessments of early childhood teachers, observational measures of instructional practices and approaches, and assessments of early childhood classrooms and programs. This topic does not accept applications on pre-service training of early childhood teachers.
- All applicants must include measures of children's school readiness outcomes.
- The Institute is primarily interested in early childhood interventions – programs, practices, and policies – intended to improve school readiness for children who are at-risk for later school failure. The focus of the Early Learning program is on center-based programs and policies for prekindergarten children.

13. ENGLISH LEARNERS

Program Officer: Dr. Karen Douglas (202-208-3896; Karen.Douglas@ed.gov)

A. Purpose

Through its research program on English Learners (EL), the Institute intends to contribute to improvement of academic achievement in reading, writing, mathematics, or science, as well as other school outcomes (e.g., graduation rates) for students in grades K-12 who are English learners. 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 academic outcomes for EL students.

B. Background

Children who speak a language other than English at home[7] continue to be a rapidly growing segment of the K-12 school-age population in the United States. In the past three decades, the number of these children has increased from 3.8 to 11 million, representing 21 percent of the current school-age population in the United States.[8] These "language minority students" – defined here as those who speak a language other than English at home – vary greatly in terms of their proficiency in the English language and in their primary language. The majority (75%) of these children attending public schools speak Spanish at home, with Vietnamese, Hmong, Korean, and Arabic as the next most frequently occurring language groups (Fry, 2007). In the 2007-2008 school year, approximately 11 percent of public school students received services for English Learners (ELs) (Keigher, 2009)[9].

On the 2009 National Assessment of Educational Progress (NAEP), 71 percent of fourth-graders and 74 percent of eighth-graders identified as ELs scored below the basic level in reading. In contrast, among non-EL students, 30 percent of fourth-graders and 22 percent of eighth-graders were below the basic level in reading. The picture for mathematics achievement is similar. On the 2009 NAEP 43 percent of fourth-graders and 72 percent of eighth-graders identified as ELs scored below the basic level in mathematics, compared to 16 percent of non-EL fourth-graders and 25 percent of non-EL eighth-graders.

Through its research program on English Learners, the Institute supports research on the interventions and assessments that are appropriate for use from kindergarten through grade 12. By English learner, the Institute refers to students whose home language is not English and whose English language proficiency hinders their ability to meet expectations for students at their grade level. Appropriate interventions include curricula and instructional approaches, teacher professional development training, and other programs to support academic learning for English learners. The Institute is interested in the development of innovative programs and practices intended to improve EL students' reading, writing, mathematics, and science achievement, as well as programs and practices to improve graduation rates and promote transition to postsecondary education. The Institute will also support research to evaluate the impact of such programs and practices to determine if they actually improve student outcomes. For applicants interested in developing or evaluating interventions, the Institute encourages researchers to consider how the different conditions under which EL students receive their schooling may affect the

[7] Many different terms have been used to refer to individuals whose home language is one other than English, and these individuals represent a broad spectrum of proficiency in the English language, from *limited English proficient* students (LEP - those making a transition from their home language to English as a new language used in the context of school) to those who are highly proficient in the school language of English. The term *English Learner* is typically used to refer to students who are just beginning to learn English or who have begun to gain some proficiency in English. The Institute uses the term *English Learners* under a broad definition encompassing all students whose home language is one other than English and who must learn English as a school language in order to achieve academically.

[8] Status and Trends in the Education of Racial and Ethnic Minorities 2010, accessed November 19, 2010, at http://nces.ed.gov/pubs2010/2010015/tables/table_8_2a.asp.

[9] Schools and Staffing Survey, accessed November 19, 2010, at http://nces.ed.gov/pubs2009/2009321/tables/sass0708_2009321_s12n_02.asp.

implementation and impact of various strategies. For example, how does the proportion of EL students within a school or district (e.g., majority to small minority of students) affect feasibility and implementation of interventions? How does the number of different primary languages affect the feasibility of program implementation for EL students? In some areas, EL students primarily represent one language group (e.g., Spanish); in other areas, EL students represent a number of different language groups (e.g., Chinese, Hmong, Spanish, and Vietnamese). The Institute especially solicits applications for research on older EL students in middle or high school, including those students who entered the U.S. school system as adolescents and those students who entered in elementary school but who continue to need services for EL students.

In addition to supporting research on interventions, the Institute encourages researchers to conduct exploratory research to identify malleable factors (e.g., instructional practices, policies, teacher skills) that are associated with better school outcomes (achievement, graduation rates, attendance), as well as mediators and moderators of the relations between these factors and child outcomes, for the purpose of identifying potential targets of intervention.

The Institute also encourages research to develop and/or validate assessments for EL students. Such assessments could be used for screening purposes to distinguish, for example, between students who need different types of support for improving their English skills. Also acceptable are assessments to monitor progress. 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.

C. Specific Requirements

a. Submission to a specific goal

For the EL research program, applicants must submit under one of five goals: *either* Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Scale-up Evaluation *or* Measurement. 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 EL topic are described.

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

b. Content and sample requirements

- Research must focus on EL students from kindergarten through Grade 12. For research that spans early childhood and the early elementary grades, the applicant may choose to submit the application to the Early Learning program or to the English Learners program. For research on postsecondary or adult students, applicants should submit the application to the Postsecondary and Adult Education topic.
- Research must address either basic academic outcomes in reading, writing, mathematics, or science or general education outcomes, such as graduation rates, access to postsecondary education, grade retention, and course completion.
- All applicants must include measures of student academic outcomes.
- There are times when an application may fit under the EL topic as well as another topic (e.g., Reading and Writing). As long as the application meets the specific requirements listed for a research topic, the applicant may choose to submit to that topic.

PART III REQUIREMENTS OF THE PROPOSED RESEARCH

14. GENERAL REQUIREMENTS OF THE PROPOSED RESEARCH

A. Basic Requirements

a. Resubmissions

Applicants who intend to revise and resubmit a proposal that was submitted to one of the Institute's previous competitions but that was not funded must indicate on the application form that their FY 2012 proposal is a revised proposal and include the application number of the previous application (an 11 character alphanumeric identifier beginning "R305" or "R324"). The prior reviews will be sent to this year's reviewers along with the resubmitted 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. Applicants who revise and resubmit a proposal should be aware that the FY 2012 application will be reviewed according to the FY 2012 Request for Applications.

Applicants who have submitted a somewhat similar proposal in the past but are submitting the current proposal as a new proposal must indicate on the application form that their FY 2012 proposal is a new proposal. Applicants should provide a rationale explaining why the current proposal should be considered to be a "new" proposal rather than a "revised" proposal at the beginning of Appendix A using no more than 3 pages. Without such an explanation, if the Institute determines that the current proposal is similar to a previously unfunded proposal, the Institute may send the reviews of the prior unfunded proposal to this year's reviewers along with the current proposal.

b. Applying to a topic

Applicants must submit their proposal to one of the specific topics described in *Part II Research Grant Topics*. *If applicants do not identify the specific topic under which their proposal should be considered on the SF-424 Form (Item 4b) of the Application Package*, the Institute may reject the proposal as non-compliant with the requirements of this Request for Applications.

The Institute recognizes that there are times when an application may fit under more than one topic. For example, a proposal to develop technology to support the development of writing skills could fit under Education Technology, as well as under the Reading and Writing topic. As long as the application meets the specific requirements listed for a research topic, the applicant may choose to submit to that topic.

c. Applying to multiple topics

Applicants may submit proposals to more than one of the Institute's FY 2012 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 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 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 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 23, 2011 deadline may not submit the same or a similar proposal to the September 22, 2011 deadline.

d. Applying to a particular goal within a topic

For the FY 2012 Education Research Grants Programs, applicants must submit under one of the five research goals: Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Scale-up

Evaluations *or* Measurement. Each goal has specific requirements that are described in the following section. *If applicants do not identify the specific goal under which their proposal should be considered on the SF-424 Form (Item 4b) of the Application Package*, the Institute may reject the proposal as non-compliant with the requirements of this Request for Applications.

e. Determining which goal is most appropriate for the proposed project
Applicants should read carefully the purpose and requirements for each goal. The Institute strongly encourages potential applicants to contact the relevant program officer listed in *Section 30* if they have any questions regarding the appropriateness of a particular project for submission under a specific goal.

B. Requirements for Goal One: Exploration

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

a. Purpose of Exploration Projects
Through all of its research programs that include the Exploration goal, the Institute is interested in the (a) exploration of the association between education outcomes and malleable factors and (b) exploration of factors and conditions that may mediate or moderate the relations between malleable factors and education outcomes.

By *malleable factors*, the Institute means factors that can be changed such as children's behaviors, teachers' practices, education programs, school or district management practices, or education policies. The Institute is interested in those malleable factors that are under the control of the education system. For example, young children's self-regulation is positively correlated with later academic achievement (Duncan et al., 2007). Self-regulation is malleable and has the potential to be influenced by interventions that are under the control of the education system (e.g., teacher practices or classroom programs designed to enhance children's self-regulation). On the other hand, community health care interventions may be associated with education outcomes and are potentially malleable, but they are not under the control of the education system. Malleable factors such as children's behaviors or teachers' practices are potential targets of interventions. Malleable factors can also be education interventions (e.g., education programs, widely used curricula or instructional approaches, management practices, or policies) intended to achieve desired education outcomes as these can be changed.

One purpose of Exploration projects is to explore the underlying processes that may be operating to enhance or inhibit learning outcomes. To the extent that such processes are malleable, information about the underlying processes gained from Exploration projects could be used to inform the development of interventions in a subsequent Development and Innovation project.

Exploration projects can also be conducted in order to identify various school practices, aspects of school climate, instructional management systems, uses of assessment results, parent and community relationships, organizational characteristics, etc. that are associated with positive education outcomes. These findings could then be used to identify potential components of more systematic, programmatic interventions to be developed in a subsequent Development and Innovation project.

A third purpose of Exploration projects is to examine the relationship between education interventions and education outcomes in order to identify interventions that are associated with better education outcomes. For example, in a state using five different elementary mathematics curricula, a secondary data analysis could be conducted to identify which of the five curricula are associated with better mathematics achievement than the others. This information could inform the selection of curricula to be rigorously tested in a subsequent efficacy evaluation under an Efficacy and Replication project.

Another purpose of Exploration projects is to examine mediators or moderators of education interventions for the purpose of informing the modification of existing education interventions or development of new interventions in a subsequent Development and Innovation project. For example, children's level of competence on a particular skill may moderate the relation between an education program and education outcomes. Examining moderators of education interventions may help identify the conditions under which interventions are associated with better outcomes or the subgroups for which a particular intervention is associated with better outcomes.

A variety of methodological approaches are appropriate under the Exploration goal including, but not limited to, original data collection with appropriate statistical analyses and secondary data analyses of existing data sets. Also appropriate are meta-analyses that go beyond a simple identification of the mean effect of interventions and are designed to determine, for example, moderators of the effects, such as teasing apart 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) the intervention for relevant population subgroups (e.g., Wilson et al., 2003). Meta-analyses of correlational relationships can be used to identify mediators that are most strongly associated with outcomes (e.g., Fan & Chen, 2001; La Paro & Pianta, 2000).[10]

Exploration projects are intended to *generate* hypotheses regarding the potential causal relations between malleable factors and education outcomes, contribute to theories of change for education interventions, and contribute to the development and identification of potentially beneficial interventions. In contrast, the purpose of Efficacy and Replication and Scale-up Evaluation projects, as described below, is to *test* causal hypotheses about the effects of fully developed interventions on education outcomes. Applicants interested in determining the effect of an intervention on education outcomes should apply to the Efficacy and Replication or Scale-up Evaluation goal. In addition, applicants seeking to develop or complete the development of an intervention should seek funding under the Development and Innovation goal, as described below, rather than proposing a project to develop and examine an intervention under the Exploration goal. In sum, under the Exploration goal the Institute does not accept applications to (a) examine non-malleable factors, (b) explore malleable factors or interventions that are not under the control of the education system, (c) develop education interventions, or (d) test the effect of education interventions or draw conclusions about their effect beyond noting the presence of associations.

At the end of an Exploration project to examine underlying processes or to explore mediators and moderators of education interventions, the researcher should be able to use the results to generate a well-explicated theory of action that can be used to inform the development or modification of an intervention under the Development and Innovation goal. At the end of an Exploration project to examine associations between school practices, organization, climate, etc. and student outcomes, the researcher should be able to use the results to develop a systematic programmatic approach to implementing the factors identified as strongly associated with positive student outcomes under the Development and Innovation goal. At the end of an Exploration project to examine an intervention, the researcher should be able to use the results, if they show a strong association between the intervention and student outcomes, to support a subsequent application for an efficacy evaluation of the intervention under the Efficacy and Replication goal.

b. Significance of the project

To address the significance of the project, applicants should clearly describe (a) the aims of the research project, including hypotheses and research questions to be addressed; (b) the theoretical and empirical rationale for the study; (c) an explanation of the practical importance of the variables (malleable factors, mediators, moderators) that will be examined; and (d) a compelling rationale justifying the importance of

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

the proposed research, which may include input from education stakeholders such as practitioners and policymakers. For projects examining an education intervention the discussion should also detail the intervention to be studied, explain why an Exploration project is being proposed rather than a rigorous evaluation under an Efficacy and Replication project and justify the potential value of the findings of the study. In essence, applicants should use the Significance section to advance an argument explaining why the proposed research project should be funded.

c. Methodological requirements

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

(i) Research design

Applicants must provide a detailed research design and show how the proposed design is appropriate for fulfilling the aims of project. Applicants examining an education intervention should not propose designs upon which strong causal claims for the impact of the intervention can be based (such designs are appropriate for the Efficacy and Replication and Scale-up Evaluation goals). For example, applicants examining an education intervention should not propose designs that meet the standards of the Institute's What Works Clearinghouse (http://whatworks.ed.gov) for providing strong evidence of an intervention's effectiveness (e.g., well-designed randomized control trials and regression discontinuity designs). Applicants examining an intervention may propose designs that provide "possible" evidence under those standards (e.g., closely matched comparisons) and should refrain from attributing causal inference to these designs.

(ii) Sample

Applicants should give thoughtful consideration to the sample that is chosen and its relation to addressing the overall aims of the project (e.g., what population the sample represents). Applicants should define, as completely as possible, the sample to be selected and sampling procedures for the proposed study, including justification for exclusion and inclusion criteria. Where applicable, applicants should describe strategies to increase the likelihood that participants will remain in the study over the course of the study (i.e., reduce attrition in longitudinal studies). Applicants should demonstrate that with the proposed sample they will have sufficient power to address the proposed research questions.

(iii) Data sources

Applicants proposing secondary data analyses should describe clearly the data set(s) to be used in the investigation including information on sample characteristics, variables to be used, and ability to ensure access to the data set if the applicant does not already have access to it. The data set 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 data set. If multiple data sets will be linked to conduct analyses, applicants should provide sufficient detail for reviewers to be able to judge the feasibility of the linking plan. If the applicant does not currently have access to the data sets 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 their reliability and validity, and the response rate or amount of missing data for these measures. Applicants should provide sufficient information on the construct validity of the proposed measures. For example, if the applicant proposes to use a state data set 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 so that reviewers can judge the adequacy of the measures for addressing the proposed hypotheses or questions.

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 data set 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). The procedures planned for examining and dealing with effect size heterogeneity should be described, especially the approach to be used to conduct moderator analyses. Applicants should indicate the type of statistical models used and provide a rationale for the choice of models.

Applicants may propose an Exploration project in which the primary focus is on the collection and analysis of original data. The applicant should carefully describe the measures (including reliability and validity), procedures proposed for the primary data collection, and the design of the study. 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 the outcomes of interest.

Applicants may also propose to collect original data as a supplement to be used with the analysis of an existing data set 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 data set, 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, investigators should utilize the most appropriate 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, as appropriate. The relation between hypotheses, measures, and 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 and include sensitivity tests to assess the influence of key procedural or analytic decisions on the results.

d. Personnel

Competitive applicants will have research teams that collectively demonstrate expertise in the relevant content domain, the methodological expertise required for conducting this proposed study and, if applicable, for working with schools or other education agencies. In the project narrative, applicants should briefly describe the qualifications, roles, responsibilities, and percent of time to be devoted to the project for key personnel. Reviewers will also consider the applicant's track record for disseminating research findings in peer-reviewed scientific journals.

If aspects of the proposed project will be conducted by another organization (e.g., measurement development, data collection, data analysis), that organization must be included in the application and the personnel responsible for that work should be described in this section.

e. Resources

In competitive proposals, applicants will describe having access to institutional resources that adequately support research activities and, if applicable, access to data sets, schools, or other resources necessary to conduct the proposed research.

f. Additional considerations
Applicants who have received previous research grants from the Institute should describe the results and outcomes of prior or currently held awards (e.g., findings, publications).

g. Awards
For applicants proposing to do primarily secondary data analysis or meta-analysis, typical awards are $100,000 to $300,000 (total cost = direct + indirect costs) per year for up to 2 years. The maximum duration of the award is 2 years and the maximum award for a 2-year project is $700,000 (total cost).

Applicants proposing to do primary data collection may request up to 4 years but must justify the need for the number of years requested. Typical awards for such projects are $100,000 to $400,000 (total cost = direct + indirect costs) per year. The maximum duration of the award is 4 years and the maximum award for a 4-year project is $1,600,000 (total cost).

In all cases, the size of the award depends on the scope of the project.

C. Requirements for Goal Two: Development and Innovation

Because the requirements for Development and Innovation projects are essentially the same across the Institute's standing research grant programs, a generic description is used in the funding announcement. Consequently, the examples provided may not apply to a particular topic.

a. Purpose of Development and Innovation (Development/Innovation) Projects

Through all of its research programs that include the Development/Innovation goal, the Institute intends to support development of and innovation in education interventions—curricula, instructional approaches, technology, school practices, programs, and policies. The Institute stresses that Development/Innovation applications are about development and *not* about demonstrations of the efficacy of an intervention. Under the Development/Innovation goal, the Institute does *not* support applications that propose to allocate substantial resources for testing the effect of the proposed intervention. For example, under Development/Innovation, 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 the Efficacy and Replication goal.

From the Institute's standpoint, a funded development project would be successful if at the end of the development award, the investigators had a well-specified theory of change for the intervention, a detailed description of what it means for the intervention to be operating as intended, 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), fidelity measures to assess the implementation of the intervention, data addressing the feasibility of its implementation in an authentic education delivery setting, and pilot data addressing the promise of the intervention for generating the intended beneficial outcomes.

At the end of a Development/Innovation project, researchers should have a clear detailed description of the intervention and its key components, evidence that the intervention can be successfully implemented in an authentic education delivery setting, and evidence of the promise of the intervention for achieving its intended outcomes, which can be used in support of a subsequent application for an Efficacy/Replication proposal. Feasibility of implementation might be addressed, for example, 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. Applicants are in a stronger position to apply for Efficacy/Replication grants when evidence of the promise of the intervention is addressed by comparing changes in outcomes in the intervention group with changes in outcomes in a comparison group of convenience (i.e., collecting pretest and posttest data in the intervention and comparison groups). Evidence of the promise of the intervention could also be obtained using single-subject experimental designs (for more information on single-subject experimental designs, see the Institute's Special Education Research Grants [84.324A] Request for Applications, http//ies.ed.gov/funding). The Institute anticipates that investigators with successful development projects would submit proposals to subsequent competitions for Efficacy/Replication awards. The data on feasibility of implementation and pilot data on the promise of positive outcomes to be collected under a Development/Innovation award are intended to help the Institute and its reviewers determine whether it would be appropriate to fund a subsequent proposal to examine the efficacy of the intervention.

b. Significance of the project

Under Development/Innovation, 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 two

questions. First, why is the proposed intervention likely to produce better student outcomes relative to current education practices? Second, what is the overall importance of the proposed project?

Applicants address the significance of their proposal by describing (i) the aims of the research project; (ii) the context for the proposed intervention; (iii) the intervention (e.g., features, components), including its theory of change and the theoretical and empirical support for the proposed intervention; (iv) the practical importance of the intervention; and (v) a compelling rationale justifying the importance of the proposed research, which may include input from education stakeholders such as practitioners and policymakers.

(i) Research aims

Applicants should clearly describe the aims of the research project.

(ii) 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. What is the practical problem that the intervention is intended to address? Researchers should also demonstrate an understanding of how or why the shortcomings of current practice contribute to the rationale for the proposed intervention. In addition, researchers should provide some context for understanding how much of a change the proposed intervention is intended to achieve. For example, suppose a researcher proposes to develop an intervention that is intended to improve student learning over the course of a semester for students who are performing one year below grade-level expectations. The researcher might consider (a) how much learning one would typically expect to occur over an academic year and (b) how much learning one would need each quarter or semester to bring the students up to grade-level expectations by the end of the academic year.

(iii) Intervention, theory of change, and theoretical and empirical rationale

Applicants should clearly describe the intervention and the theory of change for the intervention. Applicants should identify the *key* components of the intervention (i.e., the active ingredients that are hypothesized to be critical to achieving the intended results) and describe how they relate to each other temporally (or operationally), pedagogically, and theoretically (e.g., why A leads 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 intervention and its theoretical and empirical foundation (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. Applicants should contrast the proposed intervention to 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 the outcomes of interest.

(iv) 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 and easily implemented by schools (e.g., it would not involve major adjustments to normal school schedules)?

(v) Rationale justifying the importance of the proposed research

As described in *Sections 14.C.b.i* through *14.C.b.iii*, the applicant should describe and justify the development of the proposed intervention. All of this information lends support to the applicant's argument for the importance of the proposed project. In addition, applicants should provide a compelling rationale explaining why the proposed research is important to fund. In essence, why is this project a good idea?

c. Methodological requirements

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

The primary purpose of Development/Innovation projects is the development of interventions. For Development/Innovation projects, applicants must clearly address the sample, the proposed methods for developing the intervention, methods for testing the feasibility of implementation of the prototype in an authentic education delivery setting, and methods for assessing the promise of the intervention for achieving the desired outcomes in a pilot study.

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. Strong applications will include plans to develop a set of fidelity of implementation measures that could be used if the intervention were evaluated in an efficacy trial.

(i) Sample

Applicants should give thoughtful consideration to the sample that is chosen and its relation to addressing the overall aims of the project (e.g., do the samples include individuals who represent the intended end-user of the intervention?). The applicant should define, as completely as possible, the samples and settings that will be used to iteratively develop the intervention, assess the feasibility of the intervention when implemented in an authentic education delivery setting, and assess the promise of the intervention in the pilot study.

(ii) Iterative development process

A major objective of Development/Innovation 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. Development requires a systematic process for creating and refining the intervention. Applicants should describe the systematic, 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. Applicants should 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.

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 a helpful way of showing reviewers how research activities will feed into subsequent development (refinement) activities. A variety of methodological strategies may be employed during this phase. For Development/Innovation projects, reviewers need to understand the iterative development process to be used in the design and refinement of the proposed intervention.

(iii) Feasibility of implementation

By the end of a Development/Innovation project, investigators should have a fully developed intervention and data that address the feasibility of implementing the intervention in authentic education delivery settings. 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.

(iv) Pilot study

By the end of a Development/Innovation project, the Institute also expects investigators to have evidence of the promise of the intervention for achieving the intended outcomes. Such data are intended to be used in support of a subsequent proposal to evaluate the effect of the intervention under an Efficacy/Replication grant (see Efficacy/Replication requirements under *Rationale for evaluating interventions that are not in wide use*, *Section 14.D.b.v)*. A number of approaches may be used to assess the promise of the intervention. For example, an applicant might propose a small quasi-experimental study incorporating a comparison group with pretest and posttest data. Evidence of the promise of the intervention could also be obtained using single-subject experimental designs. Demonstration of the promise of the intervention does *not* need to be through a randomized controlled trial. However, applicants should be aware that reviewers are generally more convinced of the promise of the intervention for achieving the desired outcomes when the effect of the intervention on intended outcomes is compared to change in the intended outcomes over a comparable period for some other group.

Whatever pilot study is proposed, applicants should be aware that no more than 30 percent of the funds may be used to support the collection of pilot data regarding the promise of the fully developed intervention and that the pilot study is *not* intended to be a test of the efficacy of the intervention.

(v) Measures

Applicants should clearly describe procedures for collecting data. Applicants should include information on the psychometric properties of the measures that will be used (e.g., where appropriate, information on reliability and validity of instruments). Development/Innovation projects typically include the collection of process data to 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 to determine if the intervention is operating as intended, (b) how those observations will be collected, and (c) how the data will be coded. Observational, survey, or qualitative methodologies are encouraged to enrich understanding of the operation of the intervention.

The Institute recognizes that there may be a need for some measurement development to be conducted in Development/Innovation projects (e.g., fidelity measures, measures of outcomes that may be aligned with the proposed intervention). In such cases, applicants should detail how those measures will be developed and validated.

d. Personnel

Competitive applicants will have research teams that collectively demonstrate expertise in the relevant content domain, the methodological expertise required for conducting the proposed research, and experience working with schools or other education agencies. In the project narrative, applicants should briefly describe the qualifications, roles, responsibilities, and percent of time to be devoted to the project for key personnel. Reviewers will also consider the applicant's track record for disseminating research findings in peer-reviewed scientific journals.

If aspects of the proposed project will be conducted by another organization (e.g., measurement development, data collection, data analysis), that organization must be included in the application and the personnel responsible for that work should be described in this section.

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.

e. Resources
In competitive proposals, applicants will describe having access to institutional resources that adequately support research activities, access to schools in which to conduct the research, and access to school or district data, as appropriate.

f. Additional considerations
Applicants who have received previous research grants from the Institute should describe the results and outcomes of prior or currently held awards (e.g., findings, publications).

In addition, the Institute expects any developed interventions (whether supported by the Institute or other organization) with promise of potential efficacy to move to an efficacy evaluation. However, 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, prior to the intervention being evaluated through an efficacy evaluation. Applicants applying for a second development award to further develop an intervention should (a) justify the need for a second development award, (b) describe the results and outcomes of prior or currently held awards to support the development of the intervention (e.g., evidence that the intervention in its current form shows promise for improving education outcomes), and (c) indicate whether what was developed has been (or is being) evaluated for efficacy (Efficacy/Replication project) and, if results are available, what the results of those efficacy evaluations have been. A stronger argument for a second development award to extend or further develop an intervention can be made when the researcher has data showing that the intervention in its current form has strong potential for improving education outcomes.

Applicants who have previously received a development award and are applying for a grant to develop a *new* intervention should indicate whether the first intervention has been evaluated for efficacy (by themselves or another research team) and describe results, if available. Applications from researchers who have previously received an award to develop an intervention are strengthened when the researchers can demonstrate that their previous intervention improves, or shows promise for improving, education outcomes.

g. Awards
Typical awards for Development and Innovation projects will range from $150,000 to $400,000 (total cost = direct + indirect costs) per year for up to 3 years. The maximum duration of the award is 3 years and the maximum award for a 3-year project is $1,500,000 (total cost). Development costs vary according to the type of intervention that is proposed; the size of the award depends on the scope of the project.

Under Development/Innovation, no more than 30 percent of the total funds may be used for collection of pilot data to demonstrate the promise of the intervention for achieving the desired outcomes.

D. Requirements for Goal Three: Efficacy and Replication

Because the requirements for Efficacy and Replication projects are essentially the same across the Institute's standing research grant programs, a generic description is used in the funding announcement. Consequently, the examples provided may not apply to a particular topic.

Under the Efficacy and Replication (Efficacy/Replication) goal, the Institute requests proposals to test the efficacy of fully developed interventions (i.e., practices, programs, and policies). 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 practice, program, or policy to which it is being compared.

a. Purpose of Efficacy and Replication (Efficacy/Replication) Projects

The Institute's purpose in funding Efficacy/Replication evaluations is to determine whether or not fully developed interventions produce a net positive impact relative to a counterfactual when they are implemented in authentic education delivery settings (e.g., schools) with a limited (homogenous) and specified sample. By *limited and specified*, the Institute means with a specific student or teacher population and with specific types of schools. That is, efficacy studies are not expected to encompass widely diverse samples. The Institute is interested in funding small, well-designed and well-conducted efficacy studies that are adequately powered to test the primary questions of interest.

In efficacy trials, the intervention may be implemented under what is sometimes called "ideal" conditions that include more support than what would be expected under routine practice. For example, for an intervention implemented by the regular classroom teachers, the research team could provide additional support to the teachers to improve the fidelity of implementation of the intervention. The goal of efficacy trials is to determine if an intervention *can work* to improve student outcomes with a limited and specified sample as opposed to if an intervention *will work* when implemented under conditions of routine practice (as expected in Scale-up Evaluation projects). The Institute funds efficacy studies in which implementation is by highly or specially trained teachers as well as studies in which implementation is by regular teachers who may or may not receive additional support from the developer or research team.

The Institute also encourages researchers to examine which organizational supports, tools, and procedures may be needed for sufficient implementation of the core components of the intervention under routine practice. For example, based on observational studies of which supports seem to be linked to the successful adoption of the intervention by all or specific subgroups of those implementing it, the researcher might be able to make recommendations on how best to implement the intervention under a future Scale-up Evaluation project.

The Institute expects to generate evidence that an intervention can work (or to gain information about the limitations of an intervention – where it does not work – and what modifications might be needed) under diverse conditions and for different types of students through replication studies (i.e., replicating the efficacy evaluation with different populations or in different types of schools or districts). 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 might be to replicate these findings in a rural school district. The Institute does not expect a *single* efficacy evaluation to include sufficient diversity in the sample of schools, classrooms, or students to ensure appropriate generalizability of the impact of the intervention to a wide variety of schools in a state or region of the country. Applicants proposing to replicate an efficacy evaluation should give thoughtful regard to the appropriate sample for the proposed replication evaluation considering, for example, the types of students and schools that participated in the previous evaluations.

The key differences between Efficacy/Replication evaluations and Scale-up evaluations, as the Institute uses these terms, have to do with the delivery of the intervention under ideal versus routine conditions (discussed above), the degree of independence of the evaluators (see *Section 14.D.e* below), and the existence of evidence pertaining to the efficacy of the intervention (see *Sections 14.D.b.iv-v* below).

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 policy, program, or practice to which it is being compared. The Institute expects all methodologically successful projects to contribute to our theoretical understanding of education processes and procedures and to the advancement of the education sciences.

Finally, under the Efficacy/Replication goal, applicants may also propose to collect follow-up data to existing efficacy trials. Requirements for follow-up studies are detailed in *Section 14.D.d, Efficacy follow-up studies.*

b. Significance of the project

Interventions appropriate for study under the Efficacy/Replication goal are (a) interventions that are already widely used but have not been rigorously evaluated or (b) interventions that are fully developed, have evidence of their feasibility for use in authentic education delivery settings, and empirical evidence of the promise of the intervention but are not yet widely used. Also appropriate for Efficacy/Replication applications are proposals to *replicate* the efficacy of an intervention in a different setting or with a different population.

Applicants address the significance of their proposal by describing (i) clear aims (hypotheses and/or research questions) for the project, (ii) the fully developed intervention (e.g., features, components), (iii) the theory of change for the intervention, and (iv) a compelling rationale for evaluating the proposed intervention, which may include input from education stakeholders such as practitioners and policymakers.

(i) Research aims

Applicants should clearly describe the aims of the research project, including hypotheses and/or research questions to be addressed.

(ii) Interventions are ready to be evaluated

Applicants must have an intervention that is fully developed and ready to be evaluated. Applicants may devote a short period of time (e.g., 6 months) to develop measures and prepare supporting materials or training manuals for the intervention. However, applicants who intend to devote a longer period of time to developing new components or materials for the intervention or new delivery approaches should apply to Development/Innovation. Efficacy/Replication projects are limited to those interventions that are fully developed. Applicants should clearly describe the intervention and provide evidence that it is fully developed and ready for evaluation.

(iii) Theory of change

Applicants should clearly present the theory of change for the intervention by describing the features or components of the intervention and how they relate to each other and to the intended outcomes both temporally (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 intervention and its theoretical and empirical foundation (e.g., is the proposed intervention a reasonable operationalization of the theory?), as well as 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?).

The Institute recognizes that oftentimes widely used interventions (e.g., published curricula) are not based on a formal theory of change. In such cases, applicants should articulate a general theory of change for the proposed intervention in which they describe what the intervention is expected to change that will ultimately result in improved student outcomes. This general theory

of change should be sufficient for guiding the design of the evaluation (e.g., selecting an appropriate sample, measures, comparison condition).

Some interventions are designed to *directly* 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 proximal outcomes that the intervention is designed to affect (e.g., teacher practices), as well as the more distal student outcomes, that 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 what the comparison group receives 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.

(iv) Rationale for evaluating interventions that are already in wide use

Applicants should 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 intervention because of its relevance to public policy or current education practice as would be judged by practitioners and policymakers. For example, the intervention may already be widely used but has not been rigorously evaluated (e.g., a commercially distributed program that is used in a number of states, a specific state 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. In this section, applicants are, in essence, justifying why the proposed evaluation is important for the Institute to fund.

(v) Rationale for evaluating interventions that are not in wide use

Applicants should provide a compelling rationale that justifies the Institute's investment in the evaluation of the intervention. Applicants should provide evidence that the intervention can be implemented in authentic education delivery settings—that is, evidence of the feasibility and usability of the intervention in authentic education delivery settings. Applicants should provide a strong argument for the promise of the intervention for improving education outcomes by including, for example, information on (a) the theoretical foundation on which the intervention was developed, (b) the practical problem the intervention is intended to address, (c) empirical evidence for the feasibility of the intervention's implementation, and (d) empirical evidence demonstrating the promise of the intervention for achieving the desired outcomes. Demonstration of the promise of the intervention does *not* need to be through a randomized controlled trial. However, applicants should be aware that reviewers are generally more convinced of the promise of the intervention for achieving the desired outcomes when the effect of the intervention on intended outcomes is compared to change in the intended outcomes over a comparable period for some other group.

In short, the applicant needs to address the following questions: Why is this intervention likely to produce better student outcomes relative to current practice? What is the *practical* importance of the intervention (or why should education practitioners or policymaker care about the results of the proposed evaluation)? Why is the proposed evaluation important for the Institute to fund?

c. Methodological requirements

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

(i) Sample

The applicant should give thoughtful consideration to the sample that is chosen and its relation to addressing the overall aims of the project. 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 (including schools, teachers, and students, as appropriate) will remain in the study over the course of the evaluation (i.e., reduce attrition).

(ii) Research design

The applicant must provide a detailed research design. Applicants should describe how potential threats to internal validity would be addressed. For all types of design, including random assignment, applicants should explain how they will document that the intervention and comparison conditions are equivalent at the outset of the study.[11]

Studies using random assignment to intervention and comparison conditions have the strongest internal validity for causal conclusions and, thus, are preferred whenever they are feasible. When a randomized trial is used, the applicant should clearly state and present a convincing rationale for the unit of randomization (e.g., students, classroom, teacher, or school). Applicants should explain the procedures for assignment of groups (e.g., schools) or participants to intervention and comparison conditions and how the integrity of the assignment process will be ensured.[12]

Studies using regression discontinuity designs may also provide unbiased estimates of the effects of education interventions. Applicants proposing regression discontinuity designs should explain the appropriateness of the assignment variable (e.g., show there is a true discontinuity and document that no manipulation of the assignment variable has occurred) and include sensitivity analyses to assess the influence of key procedural or analytic decisions on the results.[13]

Applicants may propose a quasi-experimental design (including a regression discontinuity design) rather than a randomized trial when randomization is not possible. Applicants should justify that the proposed design permits drawing causal conclusions about the effect of the intervention on the intended outcomes. Applicants should discuss how selection bias will be minimized or modeled.[14] To this end, the specific assumptions made by the design should be justified. For example, the covariates used in a propensity score match should be shown capable of explaining selection, and the instrumental variable used in an instrumental variable analysis should be shown to be strongly correlated with the independent variable and correlated with the outcome through that independent variable (but not directly correlated with the outcome or indirectly correlated with the outcome through unobserved variables). Applicants should explicitly discuss the threats to internal validity that are not addressed convincingly by the design and how conclusions from the research will be tempered in light of these threats. Because quasi-experimental designs other than strong regression discontinuity designs can only meet the WWC's standards for evidence with reservations, it is important for applicants to detail how they

[11] Applicants may find the following article useful: Song, M., & Herman, R. (2010). Critical issues and common pitfalls in designing and conducting impact studies in education: Lessons learned from the What Works Clearinghouse (Phase I). *Educational Evaluation and Policy Analysis, 32*(3), 351-371.

[12] What a randomized control trial must do to meet the WWC's evidence standards is described in the WWC Procedures and Standards Handbook (2008) available at http://ies.ed.gov/ncee/wwc/references/library/.

[13] What a regression discontinuity design must do to meet the WWC standards of evidence is described in Standards for Regression Discontinuity Designs (2010) available at http://ies.ed.gov/ncee/wwc/references/library/.

[14] 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, MA: Houghton Mifflin Company.

will ensure that their study meets these standards (e.g., establishing equivalence between treatment and comparison groups, acceptable attrition levels) to prevent the study from being designated by the WWC as not meeting evidence standards.[15]

Efficacy studies can be based solely on secondary data analyses, provided researchers use an appropriate analytical approach for answering causal questions. Applicants proposing to primarily use existing data sets (e.g., state or local student achievement databases) or to incorporate existing data sets in their analyses 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 linking plan.

(iii) Power

Applicants should clearly address the statistical 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., by including the statistical formula) how the effect size was calculated. If a primary research question focuses on subgroups (e.g., boys, children from low-income families), applicants should show that the proposed sample has sufficient power to address the proposed question about specific subgroups.

Many evaluations of education interventions are designed so that clusters or groups of students (e.g., classrooms, schools), rather than individual students, are assigned to intervention and comparison conditions. In such cases, the power of the design depends in part on the degree to which the observations of individuals within clusters 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 minimum effect to be reliably detected, 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 the structure of the design [e.g., if a blocking factor is used], repeated observations, attrition of participants, etc.).[16] Strong applications will include empirical justification for the intraclass correlation, anticipated minimum effect, and other estimation parameters used in the power analysis.

(iv) Measures

Applicants should give careful consideration to the selection of measures and justify the appropriateness of the chosen measures. For example, are measures included that will be sensitive to the change in performance that the intervention is intended to bring about? Measures of student outcomes may include researcher developed measures. However, applicants should also include relevant measures of student outcomes that are of practical interest to educators and measures that are not overly aligned with the intervention. 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 designed 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. 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

[15] What a quasi-experimental designs must do to meet the WWC's evidence standards with reservations is described in the WWC Procedures and Standards Handbook (2008) available at http://ies.ed.gov/ncee/wwc/references/library/.

[16] For more information, see Donner, A., & Klar, N. (2000). *Design and Analysis of Cluster Randomization Trials in Health Research.* New York, NY: Oxford University Press; Murray, D. M., Varnell, S. P., & Blitstein, J. L. (2004). Design and analysis of group-randomized trials: A review of recent methodological developments. *American Journal of Public Health, 94*(3), 423-432; W.T. Grant Foundation & University of Michigan, http://sitemaker.umich.edu/group-based/optimal_design_software.

measures of the proximal outcomes (e.g., teacher behaviors) that are hypothesized to be more directly linked to the intervention.

The applicant should provide information on the reliability and validity of the proposed measures. The Institute recognizes that there may be a need for some measurement development to be conducted in Efficacy/Replication projects (e.g., fidelity measures). In such cases, applicants should detail how those measures will be developed and validated. If measures (including those of fidelity, below) are to be developed and/or collected by another organization, that organization must be included in the application and the measures and the instruments (e.g., surveys of participants) that will be used must be described, as well as the data collection procedures and the timing of the data collection. It is not acceptable to simply propose that grant funds be used to contract with an unspecified organization to develop and/or collect the measures.

Applicants should describe the procedures for and the timing of the data collection and indicate procedures to guard against bias entering into the data collection process (e.g., pretests occurring after the intervention has been implemented or differential timing of assessments for treatment and control groups).

(v) Fidelity of implementation of the intervention

Applicants should have a clear plan for how the intervention will be implemented in education settings and what supports are needed to ensure that the intervention will be implemented as intended (e.g., pre-intervention training for school staff who will deliver the intervention, observations of school staff while they deliver the intervention and feedback on their performance by coaches). Applicants should specify how the implementation of the intervention will be documented and measured. Investigators should make clear how the fidelity measures capture the core components of the intervention. In strong applications, investigators will propose methods that permit the identification and assessment of factors associated with the fidelity of implementation (e.g., additional planning time for teachers); such information may provide insight into what supports are needed within schools or districts to successfully implement the intervention with high fidelity. In strong applications, researchers describe how fidelity data will be incorporated into analyses of the impact of the intervention.[17] Applicants should also collect data on the conditions in the school setting that may affect the fidelity of implementation and that can help the researchers understand why the intervention is or is not implemented with high fidelity.

If the applicant is proposing an efficacy study that relies on secondary data analyses of historical data that does not contain information on the fidelity of the implementation of the intervention, the applicant is *not* required to include fidelity data.

(vi) Comparison group

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

Applicants should give thoughtful consideration to the selection of the counterfactual. 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

[17] See, e.g., Hulleman, C. S., & Cordray, D. S. (2009). Moving from the lab to the field: The role of fidelity and achieved relative intervention strength. *Journal of Research on Educational Effectiveness, 2*, 88-110.

evaluations, the primary question is whether the intervention 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 intervention 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 district or region 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 intervention treatment.

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.

(vii) Moderating and mediating variables

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). Observational, survey, or qualitative methodologies are encouraged as a complement to experimental methodologies to assist in the identification of factors that may explain variation in the effect of the intervention.

The Institute expects efficacy studies to examine relevant moderating factors. 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., teacher experience/time in position). The Institute recognizes that many efficacy studies are not powered to rigorously test the effects of a wide-range of moderators and so expects applicants to focus on a small set of well-justified ones.

The Institute also recognizes that most efficacy studies are not designed or powered to rigorously test the effects of specific mediating variables. However, the Institute encourages applicants to propose exploratory analyses to better understand potential mediators of the intervention.

(viii) Data analysis

All proposals must include detailed descriptions of data analysis procedures. For quantitative data, specific statistical procedures should be described. The relation between research questions/hypotheses, measures, and independent and dependent variables should be clear. For qualitative data, the specific methods used to index, summarize, and interpret data should be delineated. In strong applications, researchers describe how questions or hypotheses related to moderators, subgroups, and fidelity of implementation will be addressed in the data analyses.

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. Strong applications will provide sufficient detail for reviewers to judge the appropriateness of the data analysis strategy.

d. Efficacy follow-up studies

The Institute will support two types of follow-up studies of well-conducted efficacy studies that show robust effects on intended outcomes. Follow-up studies examine the sustainability of the impacts of the intervention after the original project has ended on either (a) students who received the intervention and have entered a new grade or (b) a new group of students who are now entering the grade or place where the intervention took place. Under the first type of follow-up study, students who took part in the original study are followed through additional grades (or places) in which they do not continue to receive the intervention in order to determine if positive effects are maintained in succeeding years. For example, if an efficacy study shows that students in the intervention group do substantially better on third grade reading achievement tests relative to students in the comparison group, researchers could propose to follow those students to determine if the advantage is maintained through elementary school. The Institute will also support a second type of follow-up study that examines the sustainability of the intervention's impacts after the additional resources provided by the original study are withdrawn. Consider, for example, a teacher professional development intervention to improve reading instruction of third grade teachers that was found to produce the desired changes in teachers' behaviors and in student outcomes during the original study. For a follow-up study, researchers could propose to follow the teachers and evaluate whether the treatment teachers continue to engage in the desired practices the year after the professional development intervention ended and whether the students in their new class outperform students of teachers in the comparison group.

(i) Significance of efficacy follow-up studies

The Institute will support the follow-up studies of well-conducted Efficacy/Replication studies that show robust effects on intended outcomes. The data used to support the proposed follow-up study must be data from the study for which the applicant is proposing additional follow-up data collections. The Institute will *not* accept applications for a follow-up study if the application does not present impact results on student outcomes for the original study (i.e., the study that the applicant is proposing to extend).

To address the significance of the project, applicants should clearly describe the aims of the research project (i.e., their hypotheses or research questions). Applicants should clearly describe the existing efficacy study, including the sample, the design, measures, fidelity of implementation of the intervention, and analyses. Reviewers need sufficient information to assess how well the efficacy study was conducted. It is helpful if applicants include a CONSORT flow diagram showing numbers of participants at each stage of the study.[18] Applicants should discuss the participant attrition identified in the flow diagram, the level of attrition expected in the follow-up study and ways it might be reduced, how the analysis will address attrition, and its impact on the interpretation of the results. Second, all applicants should clearly describe the impact of the intervention on all the outcomes measured in the original study, including the impact of the intervention on student outcomes. The Institute intends to support follow-up studies of interventions that produce robust effects. Applicants should provide a compelling rationale justifying the importance of the proposed research.

(ii) Methodological requirements for efficacy follow-up studies

Applicants must provide a detailed research design and show how the proposed design is appropriate for answering the proposed research questions. Applicants should describe the

[18] CONSORT, which stands for Consolidated Standards of Reporting Trials, was developed to provide guidance on the tracking and reporting of critical aspects of randomized controlled trials (RCTs). The main initiative of the CONSORT group was the development of a set of recommendations for reporting RCTs, called the CONSORT Statement. The Statement includes a checklist that focuses on study design, analysis, and interpretation of the results, and a flow diagram that provides a structure for tracking participants at each study stage. IES encourages researchers to use these tools in their Efficacy/Replication and Scale-up Evaluation research projects. The CONSORT Statement can be found at http://www.consort-statement.org/consort-statement/overview0/.

sample and strategies to minimize attrition of participants over the course of the study. Applicants should describe what measures will be collected and the procedures for collecting the data. If the applicant is proposing a study regarding the continued implementation of the intervention after the efficacy project has ended, the applicant should describe how fidelity of implementation will be monitored. Applicants must include a detailed data analysis plan and demonstrate that they will have sufficient power to detect the expected effects.

e. Personnel

Competitive applicants will have research teams that collectively demonstrate expertise in the relevant content domain, the methodological expertise required for conducting this proposed study, and experience working with schools or other education agencies. In the project narrative, applicants should briefly describe the qualifications, roles, responsibilities, and percent of time to be devoted to the project for key personnel. Reviewers will also consider the applicant's track record for disseminating research findings in peer-reviewed scientific journals.

If aspects of the proposed project will be conducted by another organization (e.g., measurement development, data collection, data analysis), that organization must be included in the application and the personnel responsible for that work should be described in this section.

The Institute recognizes that the Principal Investigator of an efficacy trial may often have played an important role in the development of the intervention to be evaluated which raises issues of conflict of interest. However, the current education research enterprise does not have sufficient numbers of independent evaluators to conduct all of the efficacy projects that the Institute funds. Further, the involvement of the developer is often critical to implementation of the intervention with the skill and fidelity appropriate for an efficacy trial. Consequently the Institute allows a researcher/developer to be the Principal Investigator of an efficacy evaluation provided that reasonable safeguards are in place to ensure the objectivity and integrity of the evaluation. The Institute recommends the following steps be taken.

- The procedure for assignment of units to condition is conducted by an individual (or team) who is independent of the developer. For example, the person who writes the program to generate random numbers and assigns units (e.g., teachers, schools) to condition is separate from the developer/distributor of the intervention.

- Collection and coding of outcome data should be under the supervision of someone other than those who were or are involved in the development or distribution of the intervention.

- Analysis of data is conducted by individuals who are not involved with the development or distribution of the intervention and have no financial interest in the outcomes of the evaluation.

f. Resources

In competitive proposals, applicants will describe having access to institutional resources that adequately support research activities and access to schools in which to conduct the research. Applicants should 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. These letters should convey that the organizations understand what participation in the evaluation will involve (e.g., if assigned to a wait-list control condition, a school will not receive the intervention for X-number of years).

g. Additional considerations
Applicants who have received previous research grants from the Institute should describe the results and outcomes of prior or currently held awards (e.g., findings, publications).

h. Awards
Typical awards for Efficacy and Replication projects are $250,000 to $650,000 (total cost = direct + indirect costs) per year for up to 4 years. The maximum duration of the award is 4 years and the maximum award for a 4-year project is $3,500,000 (total cost).

Typical awards for Efficacy and Replication follow-up studies are $150,000 to $300,000 (total cost = direct + indirect costs) per year for up to 3 years. The maximum duration of the award is 3 years and the maximum award for a 3-year project is $1,200,000 (total cost).

E. Requirements for Goal Four: Scale-Up Evaluation

Because the requirements for the Scale-up Evaluation goal are essentially the same across the Institute's standing education research grant programs, a generic description is used in the funding announcement. Consequently, the examples provided may not apply to a particular topic.

a. Purpose of Scale-up Evaluation Projects

The Institute's purpose in funding Scale-up evaluations is (i) 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., routine practice; implementation without special support from the developer or the research team) and (ii) when they are evaluated by an independent evaluator, (iii) to generate evidence that an intervention works under different school and population conditions (e.g., urban vs. rural districts; with vs. without high proportions of English learners), and (iv) to understand the organizational supports that are needed to ensure sufficient implementation of the core components (active ingredients) of the intervention. Scale-up evaluations are also employed to determine the effects of theoretically important moderators of the intervention. The key differences between Scale-up evaluations and Efficacy/Replication evaluations, as the Institute uses these terms, have to do with the delivery of the intervention, the conduct and oversight of the evaluation, and the existence of strong prior evidence pertaining to the efficacy of the intervention.

(i) Routine implementation of the intervention

Scale-up evaluations require that the intervention be implemented under conditions of routine practice. That is, *the intervention should 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.* Consider an example in which a curriculum is to be implemented and the developer/distributor designed professional development for teachers who are using the curriculum for the first time. In such cases, the professional development should be delivered in a manner consistent with what would happen if the curriculum were widely distributed. For example, the developer/distributor might plan to use a train-the-trainers model for professional development if the curriculum were widely distributed. Alternatively, the developer/distributor might have manualized the professional development or created online professional development modules to accompany the curriculum. In such cases, the manual or online modules would be what is used in the Scale-up 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 comparison group *under typical conditions?*"

(ii) Independent evaluation of the intervention

Scale-up evaluations require the design and conduct of the evaluation to be independent from the developer/distributor of the intervention. The individuals involved in the design of the evaluation, the determination of random assignment, the data collection, and analysis of data must be individuals who did not and do not participate in the development or distribution of the intervention. The Principal Investigator must be an individual who has not been involved in the development or distribution of the intervention and has no financial interest in it. However, as noted above, it may be appropriate for the developer/distributor to be involved in the implementation of the intervention, if that level of involvement is what is intended under conditions of routine practice.

(iii) Generating evidence that the intervention works under different conditions

The Institute expects to generate evidence about how well an intervention works under diverse conditions and for different types of students through multiple Scale-up evaluations (i.e., replicating the evaluation with different populations or in different types of schools or districts). (This is analogous to a Goal Three Replication study.) The Institute does not expect a *single*

Scale-up evaluation to include sufficient diversity in the sample of schools, classrooms, or students to ensure generalizability of the impact of the intervention to all schools in a state or region. Thus, size of the evaluation (e.g., numbers of districts, schools, students) *is not* the key distinction between Efficacy and Scale-up evaluations. Applicants should give thoughtful regard to the appropriate sample for the proposed Scale-up evaluation considering, for example, prior evidence of the effects of the intervention, as well as the types of students and schools that participated in previous efficacy and scale-up evaluations. (See related discussion of moderators in *Section 14.E.a.v Determining the effects of selected moderators of the intervention*.)

(iv) Understanding the organizational conditions needed to support the intervention

In Efficacy/Replication projects, the Institute encourages researchers to try to identify the conditions, tools, and procedures that are needed to support the implementation of the intervention in order to make recommendations for its successful implementation under the routine conditions within a scale-up evaluation. As part of the preparation for a scale-up evaluation, the project could formalize these recommendations for routine use by teachers and schools. For example, if during an efficacy evaluation researchers noted that implementation went more smoothly in schools that gave teachers time to troubleshoot difficulties together then a common planning period for teachers might be built into the intervention under the Scale-up evaluation to allow all teachers the same opportunity under routine practice. In addition, the Institute encourages researchers to continue to examine which organizational supports, tools, and procedures may be needed for sufficient implementation of the core components of the intervention under routine practice during the Scale-up Evaluation project in order to support successful dissemination of interventions found to have beneficial impacts.

(v) Determining the effects of selected moderators of the intervention

As noted above, the Institute expects to generate evidence on the broad generalizability of an intervention through multiple scale-up evaluations. However, individual scale-up evaluations can contribute evidence to the generalizability of an intervention by testing theory-driven hypotheses about differential effects related to selected setting, school, and student characteristics for which there is reason to believe that such differential effects may occur. The Institute encourages applicants to propose to test selected, theoretically relevant moderators within a Scale-up Evaluation study. Based on a consideration of the prior evidence and theory of change, an applicant might identify key differences in the settings, circumstances, or student populations that such considerations suggest may produce consequential differential effects. For example, based on such considerations, an applicant might decide that a primary research question for a Scale-up evaluation is whether the target intervention has different effects on low-performing native English speakers than it has on low-performing English learners. In such an instance, the applicant would design and power the study to be able to appropriately test a difference in outcomes for these two subgroups.

b. Significance of the project

To be considered for Scale-up Evaluation awards, applicants must propose to evaluate a fully developed intervention that has strong evidence of efficacy of the intervention.[19] Scale-up Evaluation applicants address the significance of their project by (i) posing clear aims (hypotheses or research questions) for the project, (ii) clearly describing the intervention, (iii) describing the intervention's theory of change, (iv) providing strong evidence of the educationally meaningful effects that are expected, (v) detailing the conditions under which the intervention will be implemented, and (vi) providing a compelling rationale for evaluating the proposed intervention, which may include input from education stakeholders such as practitioners and policymakers.

[19] Applicants proposing to evaluate a widely used intervention for which there is little evidence of the efficacy of the intervention should refer to the Efficacy/Replication goal. The Institute encourages applicants to discuss the appropriate goal for a proposal with the relevant program officer listed in *Section 30*.

(i) Research aims

Applicants should clearly describe the aims of the research project (i.e., their hypotheses or research questions).

(ii) Description of the intervention

All applicants should clearly describe the intervention (e.g., features, components). Strong applications will also include detailed descriptions of what the comparison group experiences. When applicants clearly describe the components of the intervention and the comparable treatment that the comparison group will receive, reviewers are better able to judge whether (a) the intervention is sufficiently different from the comparison condition 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.

(iii) Theory of change

Applicants should clearly present the theory of change for the 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 clearly describe the intervention itself, 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?) and to assess the degree to which the applicant has included measures of potential moderators of the intervention.

(iv) Strong evidence of educationally meaningful effects

Applicants should provide strong evidence of the efficacy of the program to justify the proposal to conduct a scale-up 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 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). Evidence of the efficacy of the intervention should be based on the results of rigorous randomized field trials or well-designed quasi-experimental evaluations. To enable reviewers to judge the quality of the efficacy studies, applicants should clearly describe the research design and methodology of the efficacy studies, the results of the studies, and the conditions under which the intervention was implemented. (Note that under efficacy trials, implementation of the intervention may be under "ideal" conditions. That is, implementation of the intervention may have occurred with support from the developer that enables the core elements of the intervention [i.e., active ingredients] to be implemented with a high degree of fidelity.)

Strong applications will include information on the size and statistical significance of the effects that were obtained through efficacy trials. 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.

(v) Conditions of implementation

One objective of scale-up evaluations of interventions is to determine if programs are effective when the developers/distributors 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 – conditions of routine practice. For Scale-up Evaluation studies, the applicant should detail the conditions under which the intervention will be implemented and include a method to document conditions and critical variables that affect the success of a given intervention.

The materials, training procedures, organizational arrangements (e.g., requiring five instructional periods of at least 50 minutes per week for the curriculum or teacher participation in professional development sessions once a month), and all other aspects of the intervention should be developed or specified 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 the tools and procedures exist that will enable schools or districts to achieve, monitor, and maintain adequate fidelity of implementation of the intervention under conditions of routine practice (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).

(vi) Importance of the proposed project

Applicants should provide a succinct but compelling rationale explaining why the proposed research is important to fund.

c. Methodological requirements

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

All of the methodological requirements listed under the Efficacy and Replication goal apply to Scale-up Evaluation goal projects.

In addition to the Efficacy/Replication goal methodological requirements, strong applications for Scale-up Evaluation projects 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.[20]

d. Scale-up follow-up studies

The Institute will support follow-up studies of well-conducted Scale-up Evaluation studies that show robust effects on intended outcomes. The data used to support the follow-up study must be data from the study for which the applicant is proposing additional follow-up data collections. The Institute will *not* accept applications for a follow-up study if the application does not present impact results on student outcomes for the original study (i.e., the study that the applicant is proposing to extend).

Under Scale-up Evaluation, the Institute will fund follow-up studies in which students who took part in the original study are followed to determine if positive effects obtained in the original study are maintained in succeeding years. For example, if a Scale-up Evaluation study shows that students in the intervention group do substantially better on third grade reading achievement tests relative to students in the comparison group, researchers could propose to follow those students in later grades to determine if the advantage is maintained.

The requirements for Scale-up Evaluation follow-up studies are the same as the requirements for Efficacy/Replication follow-up studies.

[20] 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.

e. Personnel
Competitive applicants will have research teams that collectively demonstrate expertise in the relevant content domain, the methodological expertise required for conducting this proposed study, and experience working with schools or other education agencies. In the project narrative, applicants should briefly describe the qualifications, roles, responsibilities, and percent of time to be devoted to the project for key personnel. Reviewers will also consider the applicant's track record for disseminating research findings in peer-reviewed scientific journals.

If aspects of the proposed project will be conducted by another organization (e.g., measurement development, data collection, data analysis), that organization must be included in the application and the personnel responsible for that work should be described in this section.

Scale-up evaluations require the design and conduct of the evaluation to be independent from the developer/distributor of the intervention. The individuals involved in the design of the evaluation, the determination of random assignment, the data collection, and analysis of data should be individuals who did not and do not participate in the development or distribution of the intervention. The Principal Investigator must be an individual who has not been involved in the development or distribution of the intervention. The evaluation team must have no financial interest in the outcomes of the evaluation.

The requirements do not preclude the developer or distributor from having some role in the evaluation. For example, a developer/distributor may use a train-the-trainers model and may conduct a professional development training session for district personnel who will subsequently train the teachers in their schools on the intervention. However, involvement of the developer or distributor must not jeopardize the objectivity or independence of the evaluation. Strong applications will carefully describe the role, if any, of the developer/distributor in the intervention. Note that developers or distributors must not provide any training or support for the implementation that would not normally be available to users of the intervention under conditions of routine implementation.

In all cases, applicants should describe how objectivity in the evaluation would be maintained and declare any potential conflicts of interest (e.g., close relationships with the developer/distributor) that members of the evaluation team may have.

f. Resources
In competitive proposals, applicants will describe having 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. These letters should convey that the organizations understand what participation in the evaluation will involve (e.g., if assigned to a wait-list control condition, a school will not receive the intervention for X-number of years). Applicants should discuss the overall management of the research project and what resources and procedures are available to support the successful completion of this project.

g. Additional considerations
Applicants who have received previous research grants from the Institute should describe the results and outcomes of prior or currently held awards (e.g., findings, publications).

h. Awards
Typical awards for Scale-up Evaluation projects are $350,000 to $900,000 (total cost = direct + indirect costs) per year for up to 5 years. The maximum duration of the award is 5 years and the maximum total award for a 5-year project is $5,000,000 (total cost).

Typical awards for Scale-up Evaluation follow-up projects are $250,000 to $400,000 (total cost = direct + indirect costs) per year for up to 3 years. The maximum duration of the award is 3 years and the maximum total award for a 3-year project is $1,500,000 (total cost).

For Scale-up Evaluation Projects, no more than 25% of the award may be allocated to the cost of the intervention. For purposes of this award, cost of the intervention includes any materials, software, computers, or training required to implement the intervention. Cost of the intervention does not include salaries for school or district staff who implement the intervention as part of their regular duties. Cost of the intervention does not include funds allocated to pay teachers or other participants for time involved in completing questionnaires, surveys, or any other assessments that are part of the evaluation.

F. Requirements for Goal Five: Measurement

The Institute's requirements for Measurement projects are the same for all standing education research programs and are described in this section.

a. Purpose of Measurement Projects

Applications appropriate for consideration under the Measurement goal are (a) proposals to develop and validate new assessments, (b) proposals to validate existing assessments, (c) proposals to adapt and validate assessments originally designed and used for research purposes for broader use in instructional settings, (d) proposals to develop and 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 education professionals (e.g., teachers, education leaders, related service providers) and validate these assessments or existing assessments against student outcomes. Proposed assessments must meet the specific requirements detailed under the topic to which the proposal is submitted.

Measurement development and refinement activities can be supported as part of projects submitted under the other goals (e.g., development of fidelity instruments or development of an outcome measure that is aligned with the intervention). Applications to the Measurement goal are for research that focuses primarily on assessment development and validation.

Under the Measurement goal, the Institute does *not* accept applications to test whether or not the use of an assessment affects student outcomes. Applicants, for example, who are interested in testing whether or not using a progress-monitoring instrument improves student learning must apply under Efficacy/Replication or Scale-up Evaluation. In all cases, the Institute encourages interested researchers to contact the relevant program officer listed in *Section 30* for guidance on the appropriate goal for a particular application.

Under the Measurement goal, the Institute primarily supports research on assessments intended for use in education delivery settings for purposes such as screening, progress monitoring, outcome assessment, assessment of teachers and other education professionals, and assessment of education systems. However, the Institute recognizes that there are circumstances in which an instrument needs to be developed that will primarily be used by researchers whose translational research will ultimately lead to improvements in education practices. The Institute will accept applications to develop and validate such assessments.

b. Significance of the project

Applicants address the significance of their proposal by (i) posing clear aims for the project, (ii) clearly describing the theoretical and empirical rationale for the proposed assessment, (iii) describing the components of the assessment, and (iv) providing a compelling rationale justifying the importance of the

proposed research, which may include input from education stakeholders such as practitioners and policymakers.

(i) Research aims

Applicants should clearly describe the aims of the research project (i.e., their hypotheses or research questions).

(ii) Theoretical and empirical rationale

Applicants should provide a compelling rationale to support the development, refinement, and/or validation of the proposed assessment for a given purpose and population. Applicants should clearly describe the theoretical basis for the construct(s) that are intended to be measured by the 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) the practical need for the proposed work (e.g., whether the proposed assessment duplicates existing assessments). In developing or refining an assessment, 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.

(iii) Description of the assessment

Applications should provide sufficient description of the proposed assessment and how it will be used for reviewers to judge the practicality of the proposed assessment. Applicants should describe the components of the assessment (e.g., specific knowledge and skills that the instrument is designed to measure) 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.

(iv) Overall importance of the proposed research

All applicants should address the practical need for the proposed work (e.g., whether the proposed assessment duplicates existing assessments). For assessments that are intended to be used by practitioners, researchers should explain how the proposed assessment takes into account 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. Applicants proposing research on an assessment that will primarily be used by researchers should provide a strong argument that explains how research using the assessment would ultimately lead to improvements in education.

All applicants should provide a compelling justification arguing the overall importance of the proposed research. In essence, why is this research important to fund?

c. Methodological requirements

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

Applicants proposing to develop a new assessment or refine an existing assessment should clearly address (a) the proposed methods for developing or refining the assessment, and (b) the proposed research methods for obtaining evidence to support the *validity and reliability* of the instrument for the specified purpose(s). Applicants proposing to validate an existing assessment without refining or

modifying the assessment should clearly describe the proposed research methods for obtaining evidence of the *validity and reliability* of the instrument for the specified purpose(s).

Applicants should detail the proposed framework and procedures for developing and/or validating the assessment and provide a clear rationale for the design of the project. The framework should provide detailed operational definitions of the construct(s) of measurement, summarize how the assessment will provide evidence of the construct(s) identified in the rationale, and describe the processes for reasoning from assessment items and scores to making intended inferences regarding the construct(s) of measurement. To enable reviewers to better understand the proposed framework for the assessment, applicants should make clear the purpose(s) for which the assessment results are likely to be used and how the results are likely to be interpreted. Validity arguments and techniques for estimating reliability should be clearly articulated. Strong applications will include descriptions of (a) the procedures for determining adequate representation of the construct(s) that will be measured by the instrument; (b) the procedures for developing and selecting items to be used in the assessment, including assessing difficulty of selected items, and obtaining representative responses to items for overall score and subscores (if applicable); (c) procedures for scoring the assessment, including processes for maximizing the reliability of scoring for open response items; (d) procedures for minimizing the influence of factors that are extraneous to the intended construct(s) (i.e., construct irrelevance); (e) if alternate forms will be developed, the procedures for establishing the equivalency of the forms (i.e., horizontal equating); (f) if the proposed assessment is used to measure growth, the procedures for establishing a developmental scale (e.g., vertical equating); (g) plans for establishing the fairness of the test for all members of the intended population (e.g., differential item functioning); and (h) the process for determining the administrative procedures for conducting the assessment (e.g., mode of administration, inclusion/exclusion of individual test takers, accommodations, and whether make-ups or alternative administrative conditions will be allowed).

The Institute recognizes that the applicability and feasibility of issues identified in (a) through (h) above (e.g., equating of alternate forms of an instrument; vertical equating) will vary based on the purpose of the proposed measurement project. For example, some applicants propose to develop new or novel assessments that one would not reasonably expect to be fully developed within the time and resources allocated for a Measurement grant. Other applicants may propose to conduct activities to further develop an existing assessment. Applicants should describe the expected end product of the proposed measurement project and explain why any items in (a) through (h) are not relevant to the proposed project. *All applicants should describe the iterative development process to be used in the design and/or refinement of the proposed measurement tool.*

Applicants must detail planned analytic methods (e.g., statistical and/or psychometric models). Data analysis plans should include treatment of missing responses and criteria for interpreting results. 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 proposing to use existing data sets (e.g., state or local student achievement databases) to validate an assessment should explicitly address how exclusion from testing, test accommodations, 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 of the linking method 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 for the specified purpose), 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 research on assessments of teachers, education leaders, or education systems must relate the assessments to measures of student outcomes.

d. Personnel
Competitive applicants will have research teams that collectively demonstrate expertise in (a) content area; (b) assessment development and administration; (c) psychometrics; (d) implementation of and analysis of results from the research design that will be employed; and (e) working with teachers, schools, or other education delivery settings in which the proposed assessment might be used. In the project narrative, applicants should briefly describe the qualifications, roles, responsibilities, and percent of time to be devoted to the project for key personnel. Reviewers will also consider the applicant's track record for disseminating research findings in peer-reviewed scientific journals.

If aspects of the proposed project will be conducted by another organization (e.g., data collection, data analysis), that organization must be included in the application and the personnel responsible for that work should be described in this section.

e. Resources
In competitive proposals, applicants will describe having 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.

f. Additional considerations
Applicants who have received previous research grants from the Institute should describe the results and outcomes of prior or currently held awards (e.g., findings, publications).

In addition, applicants who previously held or currently hold Measurement grants to conduct research on the proposed measure should describe the results and outcomes of those grants to date. They should indicate whether what was developed has been (or is being) validated and, if results are available, what the results of those studies have been.

The Institute recognizes that there are situations in which researchers may appropriately apply for a second measurement award to further develop or to continue to validate an assessment that was the focus of a previous measurement project (funded by the Institute or other organizations). In such cases, the applicant should also provide a compelling rationale of the need for a second measurement award.

Finally, the Institute reiterates that the purpose of Measurement goal grants is to develop and validate new instruments, to modify and validate existing assessments, or to validate existing assessments. Applicants who are interested in testing whether or not using an assessment improves student outcomes must apply under the Efficacy/Replication goal or Scale-up Evaluation goal. In all cases, the Institute encourages interested researchers to contact the relevant program officer listed in *Section 30* for guidance on the appropriate goal for a particular application.

g. Awards
Typical awards for Measurement projects are $150,000 to $300,000 (total cost = direct + indirect costs) per year for up to 4 years. The maximum duration of the award is 4 years and the maximum award for a 4-year project is $1,600,000 (total cost). The size of the award depends on the scope of the project.

PART IV GENERAL SUBMISSION AND REVIEW INFORMATION

15. 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 length of the award period for each goal ranges from two to five years. Please see details for each goal in *Part III Requirements of the Proposed Research* of the announcement.

16. FUNDING AVAILABLE

The size of the award depends on the goal and scope of the project. Please see specific details in *Part III Requirements of the Proposed Research* 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.

17. 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.

18. SPECIAL REQUIREMENTS

Research supported through this program must be relevant to education in the United States.

Recipients of awards are expected to publish or otherwise make publicly available the results of the work supported through this program. Institute-funded investigators must submit final, peer-reviewed manuscripts resulting from research supported in whole or in part by the Institute to the Educational Resources Information Center (ERIC, http://eric.ed.gov) upon acceptance for publication. An author's final manuscript is defined as the final version accepted for journal publication and includes all graphics and supplemental materials that are associated with the article. The Institute will make the manuscript available to the public through ERIC no later than 12 months after the official date of publication. Institutions and investigators are responsible for ensuring that any publishing or copyright agreements concerning submitted articles fully comply with this requirement.

Applicants must budget for one meeting each year (for up to 3 days) in Washington, D.C. with other grantees and Institute staff. At least one project representative must attend the meeting.

Applicants are reminded to apply their negotiated off-campus indirect cost rate, as directed by the terms of the applicant's negotiated agreement with the federal government, when conducting research in field settings.

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 research.

Applicants may propose studies that piggyback onto an existing study (i.e., that require 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.

If an application is being considered for funding based on the technical merit scores from the scientific peer review panel and the research relies on access to secondary data sets, the applicant will need to

provide documentation that they have access to the necessary data sets in order to receive the grant. This means that if an applicant does not have permission to use the proposed data sets at the time of application, the applicant will need to provide documentation to the Institute from the entity controlling the data set(s) indicating that the applicant has permission to use the data for the proposed research for the time period discussed in the proposal before the grant will be awarded. Similarly, applicants who had permission to use a proposed data set prior to the application may be asked to provide documentation that they continue to have permission to use the data set to conduct the proposed research during the project period.

If an application is being considered for funding based on the technical merit scores from the scientific peer review panel and the research relies on access to education delivery settings (e.g., schools), the applicant will need to provide documentation that they have access to the necessary schools in order to receive the grant. This means that if an applicant does not have permission to conduct the proposed project in the necessary number of schools at the time of application, the applicant will need to provide documentation to the Institute indicating that the applicant has successfully recruited the necessary number of schools for the proposed research before the full first-year costs will be awarded. Similarly, applicants who recruited sufficient numbers of schools prior to the application may be asked to provide documentation that the schools originally recruited for the application continue to be willing partners in the research.

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.

19. 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.

20. LETTER OF INTENT

The Institute asks all applicants to submit a letter of intent by 4:30 p.m. Washington D.C. time on the relevant due date for the competition to which they plan to submit. The information in the letters of intent enable Institute staff to identify the expertise needed for the scientific peer review panels and secure sufficient reviewers to handle the anticipated number of applications. The Institute encourages all interested applicants to submit a letter of intent, even if they think that they might later decide not to submit an application. The letter of intent is not binding and does not enter into the review of a subsequent application. The letter of intent must be submitted electronically using the instructions provided at: https://iesreview.ed.gov. Receipt of the letter of intent will be acknowledged via email.

A. Content

The letter of intent should include:

a. Descriptive title
b. Topic and goal that the applicant will address
c. Brief description of the proposed project
d. Name, institutional affiliation, address, telephone number and e-mail address of the Principal Investigator and any co-Principal Investigators

e. Name and institutional affiliation of any key collaborators and contractors
f. Duration of the proposed project
g. Estimated total budget request (the estimate need only be a rough approximation)

B. Format and Page Limitation
Fields are provided in the letter of intent for each of the content areas described above. The project description should be single-spaced and should not exceed one page (about 3,500 characters).

21. MANDATORY SUBMISSION OF ELECTRONIC APPLICATIONS

Grant applications must be submitted electronically through the Internet using the software and application package provided on the Grants.gov web site: http://www.grants.gov/. Applicants must follow the application procedures and submission requirements described in the Institute's Grants.gov Application Submission Guide and the instructions in the User Guides provided by Grants.gov.

Applications submitted in paper format will be rejected unless the applicant (a) qualifies for one of the allowable exceptions to the electronic submission requirement described in the Federal Register notice announcing the Education Research Grant (CFDA Number 84.305A) competitions described in this Request for Applications and (b) submits, no later than two weeks before the application deadline date, a written statement to the Institute that documents that the applicant qualifies for one of these exceptions. For more information on using Grants.gov, applicants should visit the Grants.gov web site.

22. APPLICATION INSTRUCTIONS AND APPLICATION PACKAGE

A. Documents Needed to Prepare Applications
To complete and submit an application, applicants need to review and use three documents: the Request for Applications, the IES Grants.gov Application Submission Guide, and the Application Package.

1) The *Request for Applications* for the Education Research Grant Program (CFDA 84.305A) describes the substantive requirements for a research application.

- ✓ Request for Applications http://ies.ed.gov/funding/

2) The *IES Grants.gov Application Submission Guide* provides the instructions for completing and submitting the forms included in the Application Package.

- ✓ IES Grants.gov Application Submission Guide http://ies.ed.gov/funding/

Additional help navigating Grants.gov is available in the Grants.gov User Guides:

- ✓ Grants.gov User Guides http://grants.gov/applicants/resources.jsp

3) The *Application Package* provides all of the forms that need to be completed and submitted. The application form approved for use in the competitions specified in this RFA is the government-wide SF-424 Research and Related (R&R) Form (OMB Number 4040-0001). The applicant must follow the directions in *Section C* below to download the Application Package from Grants.gov.

B. Date Application Package is Available on Grants.gov
The Application Package will be available on http://www.grants.gov/ by the following date:

June Application Package Available by	April 21, 2011
September Application Package Available by	July 21, 2011

C. 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 Package. For the Education Research Request for Applications, applicants must search on: **CFDA 84.305**.

b. Education Research 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 must download the package for the appropriate deadline marked:

June Education Research Application Package:	**Education Research CFDA 84.305A-1**
September Education Research Application Package:	**Education Research CFDA 84.305A-2**

In order for the application to be submitted to the correct grant competition, applicants must download the Application Package that is designated for the grant competition and competition deadline. Using a different Application Package, even if that package is for an Institute competition, will result in the application being submitted to the wrong competition; applications submitted to the wrong competition may not be reviewed for the Education Research competition.

23. SUBMISSION PROCESS AND DEADLINE

Applications must be **submitted electronically and received by 4:30:00 p.m.**, **Washington, DC time** on the application deadline date, using the standard forms in the Application Package and the instructions provided on the Grants.gov web site.

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

24. APPLICATION CONTENT AND FORMATTING REQUIREMENTS

A. Overview

In this section, the Institute provides instructions regarding the content of the (a) project summary/abstract, (b) project narrative, (c) Appendix A, (d) Appendix B, (e) Appendix C, and (f) bibliography and references cited. Instructions for all other documents to be included in the application (i.e., the SF-424 forms, biographical sketches, narrative budget justification, and human subjects narrative) are provided in the IES Grants.gov Application Submission Guide.

B. General Format Requirements

Margin, format, and font size requirements for the project summary/abstract, project narrative, Appendix A, Appendix B, Appendix C, and bibliography are described in this section. 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.

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.
- The 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.
- The 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 are encouraged to use black and white in graphs, diagrams, tables, and charts. If color is used, the applicant must ensure that the material reproduces well when photocopied in black and white.

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

b. Page limitations and format requirements
The project summary/abstract is limited to one 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., Mathematics and Science Education, Development and Innovation goal)
(3) A brief description of the purpose (e.g., to develop and document the feasibility of an intervention)
(4) A brief description of the setting in which the research will be conducted (e.g., rural school districts in Alabama)
(5) A brief description of the population(s) from which the participants of the study(ies) will be sampled (age or grade level, race/ethnicity, SES)
(6) If applicable, a brief description of the intervention or assessment to be developed or evaluated or validated
(7) If applicable, a brief description of the control or comparison condition (e.g., what participants in the control condition will experience)
(8) A brief description of the primary research method
(9) A brief description of measures and key outcomes
(10) A brief description of the data analytic strategy

Please see the web site 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, biographical sketches of senior/key personnel, narrative budget justification, subaward budget information or certifications and assurances. If the narrative is determined to exceed the 25 single-spaced page limit, the Institute will remove any pages after the twenty-fifth page of the narrative.

Reviewers are able to conduct the highest quality review when applications are concise and easy to read, with pages numbered consecutively using the top or bottom right-hand corner.

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, 6th Ed.* (American Psychological Association, 2009).

d. Content

To be compliant with the requirements of the Request for Applications, 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*. Incorporating the requirements outlined in these sections provides the majority of the information on which reviewers will evaluate the proposal.

E. Appendix A (Optional)

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 24.B General Format Requirements*.

c. Content

The purpose of Appendix A is to allow the applicant to include any figures, charts, or tables that supplement the research text and examples of measures to be used in the project. 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. Similarly, applicants who have submitted a somewhat similar proposal in the past but are submitting the current proposal as a new proposal may use up to 3 pages in Appendix A to provide a rationale explaining why the current proposal should be considered to be a "new" proposal rather than a "revised" proposal. 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, the analysis plan, or previous research conducted by the applicant) must be included in the 25-page project narrative.

F. Appendix B (Optional)

a. Submission

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

Appendix B is limited to 10 pages. It must adhere to the margin, format, and font size requirements described in *Section 24.B General Format Requirements*.

c. Content

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, assessment items, or other materials used in an intervention or assessment that are pertinent to the proposed project. 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 regarding these materials (e.g., descriptions of research that supports the use of the intervention/assessment, the theoretical rationale for the intervention/assessment, details regarding the implementation or use of the intervention/assessment, or rationale for choosing a particular instrument) must be included in the 25-page project narrative.

G. Appendix C (Optional)

a. Submission

Appendix C should be included at the end of the Project Narrative, following Appendix B (or if no Appendix B is included, then Appendix C should follow Appendix A) and submitted as part of the same .PDF attachment.

b. Page limitations and format requirements

Appendix C does not have a page limit. Appendix C contains letters of agreement from research partners (e.g., schools, districts, consultants). Applicants must ensure that the letters reproduce well so that reviewers can easily read them. Applicants should not reduce the size of the letters.

c. Content

The purpose of Appendix C is to allow the applicant to include letters of agreement from partners (e.g., schools and districts) and consultants.

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 most common reason for projects to fail is loss of participating schools and districts.

H. Bibliography and References Cited

a. Submission

The section will be submitted as a separate .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 24.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.

25. APPLICATION PROCESSING

Applications must be **submitted electronically and received by 4:30:00 p.m., Washington, D.C. time** on the application deadline date listed in the heading of this request for applications. Following 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.

26. 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.

27. REVIEW CRITERIA FOR SCIENTIFIC MERIT

The purpose of Institute-supported research is to contribute to solving 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 describing 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 the 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 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?

28. RECEIPT AND START DATE SCHEDULE

A. Letter of Intent Receipt Dates

June Application Letter of Intent	April 21, 2011
September Application Letter of Intent	July 21, 2011

B. Application Deadline Dates

June Application Deadline Date	June 23, 2011
September Application Deadline Date	September 22, 2011

C. Earliest Anticipated Start Date

For June Application	March 1, 2012
For September Application	July 1, 2012

D. Latest Possible Start Date

For June Application	September 1, 2012
For September Application	September 1, 2012

The grant review and award process takes approximately eight months from the time of submission of the application. Applicants will be notified about funding decisions via email *no later than* the earliest anticipated start date (March 1, 2012 or July 1, 2012).

29. 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

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31. 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.

32. 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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