

REQUEST FOR APPLICATIONS

Education Research Grants

CFDA Number: 84.305A

<u>COMPETITION ROUND</u>	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 19, 2012	April 19, 2012	June 21, 2012
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PART I OVERVIEW AND GENERAL REQUIREMENTS	5
1. REQUEST FOR APPLICATIONS	5
2. GENERAL REQUIREMENTS.....	6
A. Applying to a Topic	6
B. Applying to a Research Goal	6
C. Resubmissions	9
3. CHANGES IN THE FY 2013 REQUEST FOR APPLICATIONS	9
PART II RESEARCH GRANT TOPICS	11
4. COGNITION AND STUDENT LEARNING	11
A. Purpose.....	11
B. Background and Current Portfolio	11
C. Application Requirements	12
5. EARLY LEARNING PROGRAMS AND POLICIES	13
A. Purpose.....	13
B. Background and Current Portfolio	14
C. Application Requirements	15
6. EDUCATION TECHNOLOGY.....	16
A. Purpose.....	16
B. Background and Current Portfolio	16
C. Application Requirements	17
7. EFFECTIVE TEACHERS AND EFFECTIVE TEACHING.....	18
A. Purpose.....	18
B. Background and Current Portfolio	18
C. Application Requirements	20
8. ENGLISH LEARNERS.....	22
A. Purpose.....	22
B. Background and Current Portfolio	22
C. Application Requirements	23
9. IMPROVING EDUCATION SYSTEMS: POLICIES, ORGANIZATION, MANAGEMENT, AND LEADERSHIP	24
A. Purpose.....	24
B. Background and Current Portfolio	24
C. Application Requirements	26
10. MATHEMATICS AND SCIENCE EDUCATION.....	27
A. Purpose.....	27
B. Background and Current Portfolio	27
C. Application Requirements	28
11. POSTSECONDARY AND ADULT EDUCATION	30
A. Purpose.....	30
B. Background and Current Portfolio	30
C. Application Requirements	32
12. READING AND WRITING	33
A. Purpose.....	33
B. Background and Current Portfolio	33
C. Application Requirements	34
13. SOCIAL AND BEHAVIORAL CONTEXT FOR ACADEMIC LEARNING.....	35
A. Purpose.....	35
B. Background and Current Portfolio	35
C. Application Requirements	36
PART III RESEARCH GOALS.....	38
14. APPLYING TO A PARTICULAR RESEARCH GOAL	38
A. Requirements for Goal One: Exploration.....	38

a. Purpose of Exploration Projects	38
b. The Project Narrative	39
c. Awards	42
B. Requirements for Goal Two: Development and Innovation	44
a. Purpose of Development and Innovation Projects	44
b. The Project Narrative	44
c. Awards	48
C. Requirements for Goal Three: Efficacy and Replication	50
a. Purpose of Efficacy and Replication Projects	50
b. The Project Narrative	51
c. Awards	59
D. Requirements for Goal Four: Effectiveness	61
a. Purpose of Effectiveness Projects	61
b. The Project Narrative	62
c. Data Sharing Plan	66
d. Awards	67
E. Requirements for Goal Five: Measurement	68
a. Purpose of Measurement Projects	68
b. The Project Narrative	69
c. Awards	72
PART IV GENERAL SUBMISSION AND REVIEW INFORMATION	73
15. MECHANISM OF SUPPORT	73
16. FUNDING AVAILABLE	73
17. ELIGIBLE APPLICANTS	73
18. THE PRINCIPAL INVESTIGATOR	73
19. SPECIAL CONSIDERATIONS FOR INDIRECT COST RATES	74
20. DEMONSTRATING ACCESS TO DATA AND EDUCATION DELIVERY SETTINGS	74
21. PUBLIC AVAILABILITY OF RESULTS	75
22. SPECIAL CONDITIONS ON GRANTS	75
23. SUBMITTING A LETTER OF INTENT	75
A. Content	75
B. Format and Page Limitation	76
24. APPLICATION INSTRUCTIONS AND APPLICATION PACKAGE	76
A. Documents Needed to Prepare an Application	76
B. Date Application Package is Available on Grants.gov	76
C. How to Download the Correct Application Package	76
a. CFDA number	76
b. Education Research Application Package	76
25. MANDATORY ELECTRONIC SUBMISSION OF APPLICATIONS AND DEADLINE	77
26. TECHNICAL ASSISTANCE FOR APPLICANTS	77
27. WRITING YOUR APPLICATION: CONTENT AND FORMATTING REQUIREMENTS	77
A. Overview	77
B. General Format Requirements	77
a. Page and margin specifications	78
b. Spacing	78
c. Type size (font size)	78
d. Graphs, diagrams, tables	78
C. Project Summary/Abstract	78
a. Submission	78
b. Page limitations and format requirements	78
c. Content	78
D. Project Narrative	79
a. Submission	79

b. Page limitations and format requirements.....	79
c. Format for citing references in text.....	79
d. Content	79
E. Appendix A (Required for Resubmissions, Optional Otherwise).....	79
a. Submission	79
b. Page limitations and format requirements.....	79
c. Content	80
F. Appendix B (Optional)	80
a. Submission	80
b. Page limitations and format requirements.....	80
c. Content	80
G. Appendix C (Optional).....	80
a. Submission	80
b. Page limitations and format requirements.....	80
c. Content	80
H. Appendix D (required only for applications under the Effectiveness Goal).....	81
a. Submission	81
b. Page limitations and format requirements.....	81
c. Content	81
I. Bibliography and References Cited	81
a. Submission	81
b. Page limitations and format requirements.....	81
c. Content	81
28. APPLICATION PROCESSING.....	81
29. PEER REVIEW PROCESS	81
30. REVIEW CRITERIA FOR SCIENTIFIC MERIT	82
A. Significance	82
B. Research Plan.....	82
C. Personnel	82
D. Resources	82
31. RECEIPT AND START DATE SCHEDULE	82
A. Letter of Intent Receipt Dates.....	82
B. Application Deadline Dates	82
C. Earliest Anticipated Start Date	82
D. Latest Possible Start Date	82
32. AWARD DECISIONS.....	83
33. INQUIRIES MAY BE SENT TO.....	83
A. Cognition and Student Learning	83
B. Early Learning Programs and Policies	83
C. Education Technology	83
D. Effective Teachers and Effective Teaching.....	83
E. English Learners	84
F. Improving Education Systems: Policies, Organization, Management, and Leadership.....	84
G. Mathematics and Science Education.....	84
H. Postsecondary and Adult Education	84
I. Reading and Writing	84
J. Social and Behavioral Context for Academic Learning.....	85
34. PROGRAM AUTHORITY.....	85
35. APPLICABLE REGULATIONS	85
36. REFERENCES	85

PART I OVERVIEW AND GENERAL REQUIREMENTS

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 Grants program. Through the Education Research Grants program, the Institute seeks to improve the quality of education for all students through advancing the understanding of and practices for teaching, learning, and organizing education systems. For the FY 2013 competition, the Institute will consider only applications that meet the requirements outlined in this Request for Applications.

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>.

When you apply to the Education Research Grants program, you must apply to one of the ten research topics and one of the five research goals (discussed below under *2. General Requirements*). The research topic identifies the field you will be working in and the research goal identifies the type of work you will be doing within the field. Within the topic areas, investigators identify factors that may impact student outcomes; develop new and revise existing education interventions; evaluate the efficacy of fully developed interventions; evaluate the effectiveness of fully developed interventions; and develop and validate assessments. The Institute considers "interventions" to encompass curricula, instructional approaches, instructional supports, technology, education practices, programs, and policies whose end purpose is to improve the education outcomes of students (student outcomes). Thus, all research supported under the Education Research Grants program must address student outcomes.

The Institute supports research on a diverse set of student outcomes including: school readiness for prekindergarten; academic outcomes in kindergarten through Grade 12 that include learning, achievement, and higher order thinking in the core academic content areas of reading, writing, mathematics, and science measured by specific assessments (e.g., researcher-developed assessments, standardized tests, grades, end of course exams, exit exams) as well as course completion, grade retention, high school graduation and dropout rates; social skills, dispositions, and behaviors that support academic outcomes for students from prekindergarten through high school; access to, retention in, and completion of postsecondary education; and reading, writing, and mathematics skills for adult learners (i.e., students at least 16 years old and outside of the K-12 system). 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. The Institute supports research on students with disabilities from birth through high school through a different grant program run by 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). The Institute encourages researchers to develop partnerships with education 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.

2. GENERAL REQUIREMENTS

A. Applying to a Topic

For the FY 2013 Education Research Grants program, you must submit your application to only one of the ten research topics (described in *Part II Research Grant Topics*) that include: Cognition and Student Learning; Early Learning Programs and Policies; Education Technology; Effective Teachers and Effective Teaching; English Learners; Improving Education Systems: Policies, Organization, Management, and Leadership; Mathematics and Science Education; Postsecondary and Adult Education; Reading and Writing; or Social and Behavioral Context for Academic Learning. If you do not identify the specific topic under which your application should be considered on the SF-424 Form (Item 4b) of the Application Package, the Institute may reject the application as noncompliant 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, an application to develop technology to support the development of mathematical skills could fit under the Education Technology topic or the Mathematics and Science Education topic. You may choose to submit to any research topic as long as your application meets the specific sample and content requirements listed for that research topic.

You may submit applications to more than one of the Institute's FY 2013 grant programs or topics. In addition, within a particular grant program or topic, you may submit multiple applications. However, you may submit a given application only once (i.e., you may not submit the same application or similar applications to multiple grant programs, multiple topics, or multiple times within the same topic). In addition, if you submit an application for the June 2012 deadline, you may not submit the same or a similar application to the September 2012 deadline. In cases of an applicant submitting the same or similar applications, the Institute will determine whether and which applications will be accepted for review and/or will be eligible for funding.

B. Applying to a Research Goal

For the FY 2013 Education Research Grants program, you must submit your application to one of the five research goals: Exploration; Development and Innovation; Efficacy and Replication; Effectiveness; or Measurement. The specific requirements of each goal are described in *Part III Research Goals*. If you do not identify the specific goal under which your application should be considered on the SF-424 Form (Item 4b) of the Application Package, the Institute may reject the application as noncompliant with the requirements of this Request for Applications.

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 research with practical implications to applied research (the latter includes development of education interventions and assessments, and the evaluation of the impact of interventions when implemented under both ideal conditions and conditions of routine practice).

Project Goal

Exploration

Research supported under the Exploration goal identifies (1) malleable factors that are associated with education outcomes for students (student outcomes) and (2) factors and conditions that may mediate or moderate the relations between malleable factors and student outcomes. This identification is to be done through the analysis of data (collected by the project and/or using a secondary data set) or the meta-analysis of research studies. By *malleable factors*, the Institute means factors that can be changed by the education system such as children's behaviors and skills, teachers' practices, education programs and their components, school or district management practices, or education policies.

Projects under the Exploration goal are to (a) generate hypotheses regarding the potential causal relations between malleable factors and education outcomes, (b) contribute to theories of change for education interventions, (c) contribute to the development of interventions that can improve student outcomes or to identify the conditions that are associated with better implementation of interventions, and (d) identify potentially beneficial interventions.

Since the Institute established the goal structure, approximately 13 percent of the projects funded through the Education Research Grants program have been Exploration projects.¹

Development and Innovation

Research supported under the Development and Innovation goal develops innovative education interventions and improves existing education interventions that are to produce beneficial impacts on student outcomes when implemented in authentic education delivery settings (e.g., classrooms, schools, districts). The Institute considers interventions to encompass curricula, instructional approaches, technology, education practices, programs, and policies.

An iterative development process is expected to be used including a cycle of development, implementation, observation, and revision. The cycle is to continue until the interventions can be shown to be usable by the intended end users and feasible for use within the intended authentic delivery setting. A pilot study is done to determine if there is evidence of the promise of the intervention for achieving its intended student outcomes. The Institute expects that a finding of strong evidence of promise will lead to further research under the Efficacy and Replication goal.

Since the Institute established the goal structure, approximately 46 percent of the projects funded through the Education Research Grants program have been Development and Innovation projects.¹

Efficacy and Replication

Research supported under the Efficacy and Replication goal determines whether or not fully developed interventions produce a beneficial impact on student outcomes (and the practical importance of that impact) relative to a counterfactual when implemented in authentic education delivery settings. Interventions can be implemented under ideal conditions which may include use of greater implementation support or a more homogeneous sample than would be expected under routine practice.

The interventions tested under the Efficacy and Replication goal include newly developed interventions as well as long standing ones in widespread use. The vast majority of the education programs, practices, and policies implemented in U.S. schools have never been rigorously evaluated to determine if they are able to improve student outcomes relative to any other education intervention. Efficacy and Replication projects may provide the first evaluation of an intervention, may evaluate an already evaluated intervention but under a different set of conditions (these conditions can include a change in the sample, or a change in the intervention or how it is implemented), or may follow the longer-term impacts of a previous evaluation. Efficacy and Replication projects are to provide causal analysis, and

¹This 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, grants awarded under the Statistical and Research Methodology in Education program).

randomized controlled trials are the favored research design though strong quasi-experimental designs can also be used.

Efficacy and Replication projects also examine the fidelity of implementation of the intervention both to determine how feasible the use of the intervention is and to identify the organizational supports, tools, and procedures that may be needed for sufficient implementation of the core components of the intervention. Interventions that are difficult to implement with fidelity under ideal conditions are unlikely to be implemented well when the intervention is implemented under conditions of routine practice.

Since the Institute established the goal structure, approximately 26 percent of the projects funded through the Education Research Grants program have been Efficacy and Replication projects.¹

Effectiveness

Research supported under the Effectiveness goal (previously called "Scale-up Evaluation") determines whether or not fully developed interventions with prior evidence of efficacy produce a beneficial impact on education outcomes for students (student outcomes) relative to a counterfactual when they are implemented under routine practice in authentic education delivery settings. "Routine practice" refers to the type of implementation that would occur if a school or district were to implement the intervention on its own without special support from the developer or research team.

Effectiveness projects, like Efficacy and Replication projects, are to provide a causal evaluation of an intervention as well as examine the intervention's fidelity of implementation. Before an Effectiveness project can be proposed, at least two evaluations of the intervention, that meet the requirements under the Efficacy and Replication goal, must show beneficial and practical impacts on student outcomes. In addition, the evaluation team must be independent from the developer/distributor of the intervention.

Since the Institute established the goal structure, approximately 2 percent of the projects funded through the Education Research Grants program have been Effectiveness projects.¹

Measurement

Research supported under the Measurement goal supports (1) the development of new assessments or refinement of existing assessments and the validation of these assessments or (2) the validation of existing assessments for specific purposes, contexts, and populations. Under *refinement*, the Institute includes changing existing assessments or changing the delivery of existing assessments in order to increase efficiency, improve measurement, improve accessibility, or provide accommodation for test takers. Proposed assessments must meet the specific content and sample requirements detailed under the topic to which the application is submitted.

Measurement projects include assessments intended to assess students (e.g., for screening, progress monitoring, formative assessment, outcome assessment), education professionals (e.g., credentialing or evaluation of teachers, principals, and related service providers), and/or education systems (e.g., accountability standards). All assessments developed and/or validated must be either directly or indirectly related to measures of student academic outcomes.

Since the Institute established the goal structure, approximately 13 percent of the projects funded through the Education Research Grants program have been Measurement projects.¹

The goal structure of the Education Research Grants program divides the research process into stages for both theoretical and practical purposes. Individually, the goals are intended to help focus the work of researchers while together they 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. Under the Exploration goal, researchers generate hypotheses about the components and processes involved in learning and instruction and in the operation of education systems and develop models about how they think systems and processes function to bring about education outcomes. Practically, Exploration projects provide the empirical justification for developing or refining an intervention or assessment, or causally evaluating an existing intervention. 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. Practically, researchers not only develop the intervention but also show its usability and its feasibility in a real-world education setting, and collect pilot data on its promise for improving student outcomes that may justify the intervention's evaluation. Efficacy and Replication projects evaluate the impact of specific interventions under ideal conditions. Effectiveness projects assess the impact of specific interventions when implemented under routine practice. Both Efficacy and Replication projects and Effectiveness projects constitute tests of the theory. Results from these studies should inform further theory development and refinement. Practically, evaluations identify which programs and policies actually produce positive effects on student outcomes, which need more work, and which should be discarded.

Education has always produced new ideas, new innovations, and new approaches but only appropriate empirical evaluation can identify those that are in fact improvements. 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.

C. Resubmissions

If you intend to revise and resubmit an application that was submitted to one of the Institute's previous competitions but that was not funded, you must indicate on the SF-424 Form of the Application Package (Items 4a and 8) that the FY 2013 application is a resubmission (Item 8) and include the application number of the previous application (an 11 character alphanumeric identifier beginning "R305" or "R324" entered in Item 4a). The prior reviews will be sent to this year's reviewers along with the resubmitted application. You must describe your response to the prior reviews using no more than 3 pages of Appendix A. Revised and resubmitted applications will be reviewed according to the FY 2013 Request for Applications.

If you submitted a somewhat similar application in the past but are submitting the current application as a new application, you must indicate on the application form that the FY 2013 application is a new application. You must provide a rationale explaining why the FY 2013 application should be considered to be a new application rather than a revision at the beginning of Appendix A using no more than 3 pages. Without such an explanation, if the Institute determines that the current application is similar to a previously unfunded application, the Institute may send the reviews of the prior unfunded application to this year's reviewers along with the current application.

3. CHANGES IN THE FY 2013 REQUEST FOR APPLICATIONS

There are a number of changes to the Education Research Grants program (CFDA 84.305A) in FY 2013. You should carefully read the requirements listed under each topic in *Part II*, each goal in *Part III* and under the general submission requirements in *Part IV*. Major changes include the following:

The writing style has been modified to address federal requirements for the use of plain language (see <http://www.plainlanguage.gov>).

The research topics have been organized alphabetically.

The Education Technology research topic now allows Exploration work.

The content requirements for the Effective Teacher and Effective Teaching topic have been reorganized by the type of research to be done.

The Reading and Writing research topic now allows Development and Innovation work for reading.

The Institute has modified the requirements for each of the research goals.

- For the Exploration goal, the prohibition on proposing studies that are to provide causal evidence of the impacts of an intervention on student outcomes has been made more explicit.
- For the Development and Innovation goal, acceptable research designs for the pilot study have been made more explicit.
- For the Development and Innovation goal, you can request a 4-year award if you are proposing to develop a lengthy intervention (e.g., a year-long curriculum) or an intervention that requires a long pilot study because it is expected to take additional time to affect students (e.g., a principal training program that is intended to improve instruction).
- For the Efficacy and Replication goal, the source for evidence of promise of an intervention's effects has been more closely tied to the acceptable research designs described for the pilot study in the Development and Innovation goal.
- The fourth research goal has been renamed "Effectiveness" (previously it was named "Scale-up Evaluation"). To apply under the Effectiveness goal, you must:
 - have causal evidence of the intervention's efficacy from at least two previous studies and
 - include a data sharing plan in which you detail how you will release the data you collect for other researchers and practitioners to use.
- For the Measurement goal, the distinction between projects developing or refining assessments and then validating them versus projects validating existing assessments has been made more explicit.

The Institute has set maximum awards for each research goal. Applications that propose budgets higher than the allowable maximum will be found nonresponsive to the Request for Applications and will not be accepted for review.

To reiterate, the Institute recommends that you carefully read all of the requirements regarding the research topics and research goals provided in *Part II and Part III* and that you contact the program officer for the appropriate research topic (listed in *Section 33*).

PART II RESEARCH GRANT TOPICS

4. COGNITION AND STUDENT LEARNING

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

A. Purpose

The Cognition and Student Learning (Cognition) topic supports research that applies recent advances in cognitive science to education practice. The long-term outcome of this research 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 and Current Portfolio

The Cognition and Student Learning topic was first competed in FY 2002. Over the past 10 years, a total of 100 research projects have been supported. Focusing on content domains 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. The Cognition topic 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 are 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 et al. (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 et al. 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 topic, 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. 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 topic, 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 research is intended to inform the development of innovative programs, practices, or products to improve student outcomes. 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. Application Requirements

Applications under the Cognition topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

Goal

Applications under the Cognition topic must be submitted to one of four research goals (the Institute *does not* accept applications to Goal 4: Effectiveness under the Cognition topic) and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication
- 4) Goal 5: Measurement

Setting

Under the Cognition topic, the following requirements regarding the setting of the research for each goal must be met in addition to those described in *Part III Research Goals*.

- Under the Exploration goal and under the Measurement goal, the research may be conducted in laboratory and/or authentic education settings.
- Under the Exploration goal, laboratory research with typically developing college students is allowable provided that you also examine the relation between the malleable factors and outcomes with the student population of interest (i.e., prekindergarten-12 students, adult learners who are at least 16 years old and in adult basic, adult secondary, or adult English literacy programs, or under-prepared college students in (developmental)/bridge programs) within the award period.
- Under the Development and Innovation goal, 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 (see below for Sample requirements).

- Under the Efficacy and Replication goal, you must propose 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.

Sample

Applications under the Cognition topic must meet the following sample requirements:

- Research must focus on students from **prekindergarten through high school** or **adult learners** 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.
- If you are interested in conducting research that addresses the needs of adult learners in adult basic, adult secondary, or adult English literacy programs, or under-prepared college students in (developmental)/bridge programs programs, you may choose to apply to either the Postsecondary and Adult Education topic or to the Cognition topic.

Content

Applications under the Cognition topic must meet the following content requirements:

- For research on prekindergarten-12 students, you must focus on reading, pre-reading, writing, pre-writing, mathematics, early mathematics, science, early science, or study skills.
- For research on adult learners, you must focus on basic reading, basic writing, or basic math skills.

Please contact the program officer listed in the heading for this topic to ensure that your research idea is appropriate for the Cognition topic and the goal you select. Your application must meet both the sample and content requirements for this topic and the methodological requirements for the goal (described in *Part III Research Goals*) to be responsive and sent forward for scientific peer review.

5. EARLY LEARNING PROGRAMS AND POLICIES

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

A. Purpose

The Early Learning Programs and Policies (Early Learning) topic supports research on 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 research 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 and Current Portfolio

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 topics (e.g., Cognition and Student Learning, Mathematics and Science, Reading and Writing, Effective Teachers and Effective Teaching). In 2008, the Institute established the Early Learning Programs and Policies topic to be the primary topic under which early childhood research would be funded.² Across all of these topics, the Institute has funded more than 75 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.

In contrast to the other topic areas, the Institute has supported more efficacy and scale-up (now called effectiveness) evaluation projects of early childhood curricula than projects focused on developing new early childhood interventions.³ 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' 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*. The Institute continues to solicit research on the development and evaluation of curricula and instructional practices and 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. As part of this research, the Institute works to identify skills that are predictive of later school performance.

Although the Institute has funded 9 measurement projects to date, there is a substantial need for reliable, valid, and developmentally appropriate measures for use with young children. Under the Early

² The topic was originally called "Early Childhood Programs and Policies."

³ The early childhood curricula evaluations include efficacy and scale-up (now called effectiveness) evaluation projects that were funded under the Read/Write or Math/Science topics.

Learning topic, 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) applications to develop new assessments; (b) applications to modify, adapt, or combine existing assessments so that the revised instrument covers multiple domains and is easy for practitioners to use; and (c) applications to adapt assessments originally designed and used for research purposes for broader use in instructional settings.

Although the Institute has funded the development and evaluation of a small number of teacher professional development interventions, there is a need for additional research on the training and support of early childhood educators. Recent research suggests that preschool teachers at all educational levels need a substantial amount of training and ongoing support to foster young children's acquisition of pre-academic and social skills (Domitrovich, Gest, Gill, Jones, & DeRousie, 2009; Pianta, Mashburn, Downer, Hamre, & Justice, 2008; Pianta & Hadden, 2008; Powell, Diamond, Burchinal, & Koehler, 2010). The Institute encourages applications for research addressing the professional development needs of prekindergarten teachers, teaching assistants, mentors and coaches. Research is needed to understand the mechanisms and processes by which training and support of early childhood educators leads to improvement in teachers' instructional practices and children's school readiness skills.

Under the Early Learning topic, 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. Many states have considered different early childhood policy initiatives, such as (a) universal prekindergarten versus targeted prekindergarten programs; (b) quality rating systems; (c) the integration of service delivery across different prekindergarten settings (e.g., Head Start, public prekindergarten, and center-based child care); and (d) 1-year prekindergarten programs (i.e., for four- to five-year-olds) versus two-year prekindergarten programs (i.e., for three- to five-year olds). The Institute encourages applications that address these and other important policy and systems level issues.

C. Application Requirements

Applications under the Early Learning topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

Goal

Applications under the Early Learning topic must be submitted to one of the five research goals and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication
- 4) Goal 4: Effectiveness
- 5) Goal 5: Measurement

Sample

Applications under the Early Learning topic must meet the following sample requirements:

- The research must focus on **prekindergarten children** three to five years old.
- For research focused on the development and evaluation of prekindergarten to kindergarten transition programs that are implemented the summer before the start of kindergarten, you should submit the application to the Early Learning topic.
- For research that spans early childhood and the early elementary grades, you may choose to submit the application to the Early Learning topic or to the appropriate content topic (i.e., English Learners, Read/Write, Math/Science, Effective Teachers, or Social/Behavioral).

Content

Applications under the Early Learning topic must meet the following content requirements:

- Your research must address school readiness outcomes, including pre-reading, pre-writing, early science, early mathematics, or social and emotional skills.
- Your research must focus on center-based early childhood interventions or assessments.
 - Interventions may include early childhood policies, curricula, teacher professional development programs, teachers' instructional practices and approaches (including use of technology), and policy initiatives.
 - Assessments may include direct assessments of young children, assessments of early childhood teachers, observational measures of instructional practices and approaches, and assessments of early childhood classrooms and programs.
- The Institute does not accept applications on pre-service training of early childhood teachers.

Please contact the program officer listed in the heading for this topic to ensure that your research idea is appropriate for the Early Learning topic and the goal you select. Your application must meet both the sample and content requirements for this topic and the methodological requirements for the goal (described in *Part III Research Goals*) to be responsive and sent forward for scientific peer review.

6. EDUCATION TECHNOLOGY

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

A. Purpose

The Education Technology topic 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 research 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 and Current Portfolio

Since 2002, the Institute has funded over 100 research projects focused on the use of education technology through the Education Technology topic, other research topics and its research and development centers. The Education Technology topic was first competed in FY 2008 to highlight the Institute's support for research on technology to improve student outcomes and has funded 21 projects to date, covering a broad array of education issues in reading, writing, math and science, tied together by the innovative use of technology. Most projects focus on developing new interventions for students, ranging in age from early childhood to high school, and others are intended to develop new tools for

teachers. Projects focusing directly on student learning include, for example, developing and testing intelligent tutoring systems for mathematics or science instruction, and developing curricula and supplementary modules delivered through computer simulations or game environments. Projects aimed at improving and aiding teacher instruction include a software tool that assists teachers in adapting English texts (e.g., by simplifying complex grammar, providing translation into Spanish), formative and diagnostic assessments that will provide data to teachers in real time through PDAs or online systems, and using technology as the vehicle for delivery of teacher professional development in reading, mathematics, science, and classroom management.

Research on education technology can address issues that fall within many of the other research topics. For example, the Institute supports research on technology products intended to: (a) 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) teach basic reading, writing, mathematics, or study skills at the postsecondary level, including adult education; (c) 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) assess student learning. Researchers can propose to develop and evaluate new products, as well as evaluate the effects of existing products (including commercially available products) on student outcomes. The Institute encourages you to read its report on the evaluation of education technology products.⁴

Applications to Education Technology require 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. Applications submitted to the Education Technology topic often have research teams with strong expertise in advanced technology and the Institute recommends including complementary expertise in instructional design, the targeted content domain (e.g., reading, mathematics), and, if applicable, evaluation design.

C. Application Requirements

Applications under the Education Technology topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

Goal

Applications under the Education Technology topic must be submitted to one of the five research goals and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication
- 4) Goal 4: Effectiveness
- 5) Goal 5: Measurement

Sample

Applications under the Education Technology topic must meet the following sample requirements:

- Research must focus on students from **prekindergarten through high school** or **adult learners**, i.e., students who are at least 16 years old and in adult basic, adult secondary, or adult English literacy programs or are under-prepared college students in (developmental)/bridge programs.

⁴ *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>.

Content

Applications under the Education Technology topic must meet the following content requirements:

- Your research must focus on 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).
- Your research must include measures of student academic outcomes.
- Applications 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.
- Education technology for prekindergarten through high school students must provide or support instruction in reading, pre-reading, writing, pre-writing, mathematics, science, or study skills.
- Education technology for students at the postsecondary and adult education levels must address basic reading skills, basic writing skills, basic mathematics skills, or study skills.
- Education technology to support teacher professional development must be for in-service training for current personnel.
- Education technology assessments must be for reading, pre-reading, writing, pre-writing, mathematics, or science and 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 (adult basic, adult secondary, and adult English literacy), or developmental/bridge programs designed to help under-prepared students acquire the skills to succeed in college.

Research on education technology can be carried out under all the research topics. Please contact the program officer listed in the heading for this topic to ensure that your research idea is appropriate for the Education Technology topic and the goal you select. Your application must meet both the sample and content requirements for this topic and the methodological requirements for the goal (described in *Part III Research Goals*) to be responsive and sent forward for scientific peer review.

7. EFFECTIVE TEACHERS AND EFFECTIVE TEACHING

Program Officer: Dr. Wai-Ying Chow (202-219-0326; Wai-Ying.Chow@ed.gov)

A. Purpose

The Effective Teachers and Effective Teaching (Effective Teachers) topic supports research on 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 high school. The long term outcome of this research 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 and Current Portfolio

Through the Effective Teachers topic, 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. The Institute has funded professional development research through a number of its other topics (e.g., the Teacher Quality topics, the Policies and Systems topics). In 2011, the Institute established the Effective Teachers and Effective Teaching topic to be the primary topic under which research to improve and assess teacher quality would

be funded. Across all of these topics, the Institute has funded more than 60 research projects that target improving teacher effectiveness in ways that are linked to student achievement.

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 research 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 topic, 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 applications to *validate existing measures* of pedagogical knowledge and subject matter knowledge against measures of student learning and achievement as well as applications 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.

The Institute invites research on teacher recruitment, retention, certification, evaluation and their relation to student outcomes (e.g., alternative recruitment and certification programs, incentives for recruiting highly qualified teachers). Many States and districts are developing teacher evaluation systems. IES would be interested in supporting the development and the examination or evaluation of these systems. Such projects can help States and districts decide how to structure their teacher evaluation systems. For example, projects can study which components to include in a teacher evaluation system (e.g., administrator observations, external reviews, peer reviews, student reports, students' academic achievement or growth), whether already developed measures are adequate for a State or district's needs, and how important each component should be in a teacher's evaluation. To this end, an

Exploration project could look for associations between teacher ratings on each component and student outcomes; a Development and Innovation or a Measurement project could include smaller tests of whether each component identified teachers whose students had better outcomes and use these results in developing the evaluation system; a Measurement project could test the validity of an existing teacher evaluation measure, and an Efficacy and Replication project could test the broader impacts of a fully developed teacher evaluation system (and its components) to inform the State or district whether it was validly evaluating teachers (overall and through its components) as to how well their students were doing.

In addition, the Institute is interested in applications to conduct exploratory 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. Application Requirements

Applications under the Effective Teachers topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

Goal

Applications under the Effective Teachers topic must be submitted to one of the five research goals and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication
- 4) Goal 4: Effectiveness
- 5) Goal 5: Measurement

Sample

Applications under the Effective Teachers topic must meet the following sample requirements:

- Applications must address teachers or other instructional personnel (including coaches of teachers) of typically developing students in any grade(s) from **kindergarten through high school**.
- If you are interested in professional development for prekindergarten teachers, you must apply to the Early Learning Programs and Policies topic.
- If you are interested in professional development that spans prekindergarten and kindergarten, you may choose to submit your application to the Early Learning Programs and Policies topic or to the Effective Teachers topic.
- If you are interested in professional development to improve classroom management skills, you must apply under the Social/Behavioral topic.
- If you are interested in professional development for teachers of English learners, you may choose to apply to the English Learners topic or to the Effective Teachers topic.

Content

Applications under the Effective Teachers topic must meet the following content requirements (organized by the type of work proposed):

For research on teacher preparation (pre-service training)

- You must propose work under the Exploration goal. If you submit an application to any other goal, it will be considered nonresponsive to the Request for Applications and will not be reviewed.

- The pre-service training must be relevant to teaching reading, writing, mathematics, or the sciences from kindergarten through high school.
- You must include measures of student academic outcomes important to parents, teachers, and administrators (e.g., grades or achievement test scores in reading, writing, mathematics, or science; attendance; grade retention; high school graduation or dropout rates) as well as measures of the behaviors of the teachers or other instructional personnel that are the target of the pre-service training.

For research on training in-service instructional personnel (e.g., professional development)

- The in-service training must be relevant to teaching reading, writing, mathematics, or the sciences from kindergarten through high school.
- You must include measures of student academic outcomes important to parents, teachers, and administrators (e.g., grades or achievement test scores in reading, writing, mathematics, science, attendance, grade retention, high school graduation or dropout rates) as well as measures of the behaviors of the teachers or other instructional personnel that are the target of the professional development.
- If you are interested in conducting a Measurement project, you must validate 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, mathematics, or the sciences).
- If your research is focused primarily on curricula or instructional practices but also includes a professional development component, you should apply to the Read/Write or Math/Science topics.

For research on teacher effectiveness

- You may conduct research on teacher effectiveness and policies to increase it (e.g., recruitment, retention, certification, teacher evaluation) for teachers from kindergarten through high school.
- You must include measures of student academic outcomes that are important to parents, teachers, and administrators (e.g., grades or achievement test scores in reading, writing, mathematics, science, attendance, grade retention, high school graduation or dropout rates) as well as any measures of teachers' background, skills, and behaviors that are considered to represent teacher effectiveness.
- If you are interested in conducting a Measurement project regarding assessments of teacher effectiveness, you must validate the proposed assessment (new or existing) against direct measures of student outcomes.

Please contact the program officer listed in the heading for this topic to ensure that your research idea is appropriate for the Effective Teachers topic and the goal you select. To ensure that your application is responsive and therefore sent forward for scientific peer review, your application must meet both the methodological requirements for the goal (described in *Part III Research Goals*) and the sample and content requirements for this topic.

8. ENGLISH LEARNERS

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

A. Purpose

The English Learners (EL) topic supports research on the improvement of academic achievement in reading, writing, mathematics, or science, as well as other school outcomes (e.g., graduation rates) for students in kindergarten through high school who are English learners. The long-term outcome of this research 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 and Current Portfolio

Children who speak a language other than English at home⁵ 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.⁶ These “language minority students” – defined here as those who speak a language other than English at home – vary greatly in terms of their oral and written proficiency in the English language as well in their literacy skills 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)⁷.

On the 2011 National Assessment of Educational Progress (NAEP), 69 percent of fourth-graders and 71 percent of eighth-graders identified as ELs scored below the basic level in reading. In contrast, among non-EL students, 28 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 2011 NAEP, 41 percent of fourth-graders and 71 percent of eighth-graders identified as ELs scored below the basic level in mathematics, compared to 15 percent of non-EL fourth-graders and 25 percent of non-EL eighth-graders.

Through the English Learners topic, the Institute supports research on interventions and assessments that are appropriate for use from kindergarten through high school. 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. The Institute encourages researchers to consider how the different conditions under which EL students receive their schooling may affect the implementation and impact of various strategies. For example, how does the

⁵ 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.

⁶ 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.

⁷ Schools and Staffing Survey, accessed November 19, 2010, at http://nces.ed.gov/pubs2009/2009321/tables/sass0708_2009321_s12n_02.asp.

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, among 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) applications to develop new assessments that teachers could use to inform classroom instruction; (b) applications to modify or adapt existing assessments so that teachers can use them to inform daily or weekly instructional plans for specific students; and (c) applications to adapt assessments originally designed and used for research purposes for broader use in instructional settings.

C. Application Requirements

Applications under the EL topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

Goal

Applications under the EL topic must be submitted to one of the five research goals and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication
- 4) Goal 4: Effectiveness
- 5) Goal 5: Measurement

Sample

Applications under the EL topic must meet the following sample requirements:

- Research must focus on EL students from **kindergarten through high school**.
- For research that spans early childhood and the early elementary grades, you may choose to submit your application to the Early Learning Programs and Policies topic or to the English Learners topic.
- If you are interested in conducting research on postsecondary or adult learners (i.e., students at least 16 years old and outside of the K-12 system) who are English learners, you must submit your application to the Postsecondary and Adult Education topic.

Content

Applications under the EL topic must meet the following content requirements:

- You must address student academic outcomes important to parents, teachers, and administrators (e.g., grades or achievement test scores in reading, writing, mathematics, or science; attendance; grade retention; high school graduation or dropout rates).
- If you are interested in conducting research that would fit under the EL topic as well as another topic (e.g., Reading and Writing, Mathematics and Science, Social and Behavioral Context for Academic Learning), you may choose to submit to either topic.

Please contact the program officer listed in the heading for this topic to ensure that your research idea is appropriate for the EL topic and the goal you select. Your application must meet both the sample and content requirements for this topic and the methodological requirements for the goal (described in *Part III Research Goals*) to be responsive and sent forward for scientific peer review.

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

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

A. Purpose

The Improving Education Systems: Policies, Organization, Management, and Leadership (Improving Education Systems) topic supports research 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 research 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 ways in which schools and/or districts operate and, thereby, improving student outcomes.

B. Background and Current Portfolio

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 topic, 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.

Since 2004, the Institute has funded research on the policies, organization, management, and leadership of schools and education systems through a number of its other topics (e.g., Education Policy, Finance and Systems; Education Leadership; Middle and High School Reform). In FY 2012, the Institute established the Improving Education Systems topic to be the primary topic under which this type of research would be funded. Across all of these topics, the Institute has funded more than 55 research projects that target improving schools' organization, management, leadership, and policies in ways that are linked to 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.

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.

In addition, the Institute 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 validation 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. These education administrative data sets can also be combined with administrative data from other agencies (such as social service data) to examine specific at-risk student populations (e.g., homeless children) or complemented by the collection of primary data. 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.

The Institute also encourages the development and validation of systems-level measurement tools or assessments. For example, the Improving Education Systems research program would support the development and/or validation of early warning systems to predict academic success in high school, assessments of school leader effectiveness, and school-level rating systems.

Finally, with a focus on indirect ways of improving student outcomes, research conducted under the Improving Education Systems topic typically is based on theories of action that involve multiple steps before affecting student outcomes. The Institute requires measures of student outcomes that are important to parents, teachers, and administrators (e.g., test scores, grades, graduation rates) in applications to the Improving Education Systems topic. 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 improved academic outcomes.

C. Application Requirements

Applications under the Improving Education Systems topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

Goal

Applications under the Improving Education Systems topic must be submitted to one of the five research goals and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication
- 4) Goal 4: Effectiveness
- 5) Goal 5: Measurement

Sample

Applications under the Improving Education Systems topic must meet the following 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 high school**.

Content

Applications under the Improving Education Systems topic must meet the following content requirements:

- You must include measures of student academic outcomes that are important to parents, teachers, and administrators (e.g., grades or achievement test scores in reading, writing, mathematics, or science; attendance; grade retention; high school graduation or dropout rates).

- Research on measures of the organization, leadership, and management of schools or school systems must validate the proposed assessment against student academic outcomes that are important to parents, teachers, and administrators (e.g., grades or achievement test scores in reading, writing, mathematics, science, attendance, grade retention, high school graduation or dropout rates).
- Research on developing cost-accounting tools (under the Measurement goal) should include student cost estimates in relation to specific instructional approaches. In addition, you 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.

Please contact either program officer listed in the heading for this topic to ensure that your research idea is appropriate for the Improving Education Systems topic and the goal you select. Your application must meet both the sample and content requirements for this topic and the methodological requirements for the goal (described in *Part III Research Goals*) to be responsive and sent forward for scientific peer review.

10. MATHEMATICS AND SCIENCE EDUCATION

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

A. Purpose

The Mathematics and Science Education (Math/Science) topic supports research on the improvement of mathematics and science knowledge and skills of students from kindergarten through high school. The long-term outcome of this research will be an array of tools and strategies (e.g., curricula, programs, assessments) that are documented to be effective for improving or assessing mathematics and science learning and achievement.

B. Background and Current Portfolio

The Mathematics and Science Education Research topic was first competed in 2003 and is one of the longest running topics in the Institute. Through this topic, the Institute has supported 43 mathematics education research grants, 25 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 24 evaluations of the effects of specific interventions on student outcomes, with 17 of the evaluations focusing on mathematics outcomes, six on science outcomes, and one addressing both types. 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*. In science education, most of the projects are developing science curricula or instructional approaches, with only a few being evaluated for efficacy. For example, one team of researchers is evaluating the efficacy of the *Science Writing Heuristic* approach. The Institute continues to encourage applications to evaluate the effects of mathematics and/or science curricula or instructional approaches on student achievement from K-12.

Research on mathematics and science interventions is also supported through some of the Institute's other research topics (e.g., Effective Teachers and Effective Teaching, Education Technology, Early Learning Programs and Policies, and Cognition and Student Learning). Currently, there are about 200 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 curricula and 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.

Under the Math/Science topic, the Institute welcomes research applications focusing on science, technology, engineering, or mathematics (STEM); however, the intervention must address student outcomes in mathematics and/or science (e.g., Math: addition/subtraction, fractions, algebra, geometry, trigonometry, calculus; Science: physical science, earth science, life science). The purpose of the Math/Science topic is to support research on curricula and instructional approaches aimed at improving students' mathematics and science proficiency from kindergarten through high school. Learning progressions or trajectories are believed to be an important tool for reforming and improving the teaching and learning of mathematics and science across the K-12 grade span by providing better alignment between curriculum, instruction, and assessment. The Institute encourages research focusing on learning progressions or trajectories in mathematics and science from kindergarten through high school.

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.⁸ Under the Math/Science research topic, the Institute invites applications to develop and validate new assessments of, as well as applications to validate existing measures of, mathematics or science learning to be used for instructional purposes (e.g., progress monitoring measures, diagnostic assessments) or for research purposes.

C. Application Requirements

Applications under the Math/Science topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

⁸ See, for example, <http://ies.ed.gov/ncer/projects/grant.asp?ProqID=12&year=2010&grantid=1015> and <http://ies.ed.gov/ncer/projects/grant.asp?ProqID=12&grantid=602&InvID=480>.

Goal

Applications under the Math/Science topic must be submitted to one of the five research goals and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication
- 4) Goal 4: Effectiveness
- 5) Goal 5: Measurement

Sample

Applications under the Math/Science topic must meet the following sample requirements:

- Research must focus on mathematics and/or science education for students at any level from **kindergarten through high school**.
- 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.
- If you are interested in conducting mathematics and/or science education research that spans early childhood and the early elementary grades, you may choose to apply to the Early Learning Programs and Policies topic or to the Math/Science topic.
- If you are interested in conducting mathematics and/or science education research that addresses the needs of English learners, you may choose to apply to the English Learners topic or the Math/Science topic.
- If you are interested in conducting research on mathematics and science education for either postsecondary students or adult education students, you must apply to the Postsecondary and Adult Education topic.

Content

Applications under the Math/Science topic must meet the following content requirements:

- 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 by the No Child Left Behind Act of 2001.
- Your proposed research must address mathematics and/or science outcomes.
- You may do research on STEM (science, technology, engineering, and mathematics) education but student learning in mathematics and/or science must specifically be addressed and measured.
- If you are interested in teacher professional development in mathematics and/or science education, you should apply to the Effective Teachers and Effective Teaching topic.
- If you are interested in conducting research on education technology interventions for mathematics and/or science, you may choose to apply to the Education Technology topic or the Math/Science topic.

Please contact the program officer listed in the heading for this topic to ensure that your research idea is appropriate for the Math/Science topic and the goal you select. Your application must meet both the sample and content requirements for this topic and the methodological requirements for the goal (described in *Part III Research Goals*) to be responsive and sent forward for scientific peer review.

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 Postsecondary and Adult Education topic supports research to improve the 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 research 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 (i.e., students at least 16 years old and outside of the K-12 system) and postsecondary students at the college level.

B. Background and Current Portfolio

Adult learners include two broad categories of learners: 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 generally attend colleges or universities. The actual distinction between these two groups is not always so clear cut. For example, students may have their diplomas but may demonstrate skills at or below basic levels, hence, end up in remedial courses in postsecondary institutions. Thus, the Institute has decided to merge what previously were two topics (the Adult Education topic and the Postsecondary Education topic) into one broad topical area of research.

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).⁹

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. To further complicate the landscape, adult education occurs in a variety of educational settings (e.g., local education agencies, community-based organizations, community colleges, correctional institutions). Similarly, adult education instructors come from a variety of backgrounds, the majority of them being part-time, many being volunteers, and few having adult education teaching credentials. The Institute is interested in supporting research that explores the relations between program characteristics (e.g., type of program, type of provider, enrollment policies, teacher characteristics) and student outcomes to begin generating hypotheses about what features and components of programs are associated with better outcomes for different types of adult learners.

⁹ 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>.

The Institute is interested in establishing a strong research base upon which to develop effective adult education programs. Adult literacy researchers have found substantial variability across adult readers (e.g., Strucker, Yamamoto, & Kirsch, 2007) and that the variable patterns of adult reading are distinctly different from those of children learning to read (Greenberg, Ehri, & Perin, 2002; Mellard, Fall, & Mark, 2009). However, theoretically driven and methodologically rigorous research on adult education remains limited. The National Reading Council's recent review of adult literacy research concludes that the research to date is largely descriptive and has not generated "a body of reliable and interpretable findings that could provide a reliable basis for understanding the process of literacy acquisition in low-skilled adults or the design and delivery of instruction for this population" (2011, p 1-7). Even less research exists on improving adult numeracy. A 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 research on or materials for adult EL students, and there is insufficient work on effective strategies for teaching these learners (Hector-Mason et al., 2009). In addition, there is virtually no research that has applied advances in the cognitive sciences to improving instruction for struggling adult learners in the context of adult education.

Because every year millions of adult learners receive instruction in adult education programs whose effectiveness in providing learners with the literacy and numeracy skills they need is mostly unknown, the Institute is interested in supporting evaluations of existing adult education programs both to identify those programs that benefit their students (or do not benefit them) and to contribute to the research base on how to best support adult learners.

More research is also needed on assessment of adult learners. Many of the measures used to evaluate adult learners may not be appropriate for struggling adult learners (Greenberg, Pae, Morris, Calhoun, & 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). The Institute is interested in supporting research in all these areas.

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 of 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. Application Requirements

Applications under the Postsecondary and Adult Education topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

Goal

Applications under the Postsecondary and Adult Education topic must be submitted to one of the five research goals and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication
- 4) Goal 4: Effectiveness
- 5) Goal 5: Measurement

Sample

Applications under the Postsecondary and Adult Education topic must meet the following sample requirements:

- Adult education is defined as 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. A subset of these programs seeks to transition learners from adult basic or adult secondary classes to vocational training programs or college-level coursework.
- Postsecondary education is defined as college education (i.e., grades 13 through 16).

Content

Applications under the Postsecondary and Adult Education topic must meet the following content requirements:

- Research on adult education programs must focus on reading, writing, or mathematics skills of adult learners.
- Research on postsecondary education must focus on one of the following:
 - 1) Improving access to, persistence in, or completion of postsecondary education. Interventions for improving access to, persistence in, or completion of postsecondary education must be implemented at the high school or postsecondary level, or in adult education programs and intended to increase access to postsecondary education, support the transition from high school or adult education programs 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.

- 2) Improving academic achievement in gateway courses for mathematics and science degrees that are predictive of completion of undergraduate degrees in mathematics and the sciences. For the purpose of this Request for Applications, gateway courses are beginning mathematics and science courses for undergraduates majoring in mathematics or one of the sciences.
 - 3) Improving writing outcomes for college students in introductory English composition courses.
- 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.

Please contact either program officer listed in the heading for this topic to ensure that your research idea is appropriate for the Postsecondary and Adult Education topic and the goal you select. Your application must meet both the sample and content requirements for this topic and the methodological requirements for the goal (described in *Part III Research Goals*) to be responsive and sent forward for scientific peer review.

12. READING AND WRITING

Program Officer: Dr. Rebecca Kang McGill (202-208-0638; Rebecca.McGill@ed.gov)

A. Purpose

The Reading and Writing (Read/Write) topic supports research on the improvement of reading and writing skills of students from kindergarten through high school. The long-term outcome of this research will be an array of tools and strategies (e.g., assessments, instructional approaches) that are documented to be effective for improving or assessing reading and writing.

B. Background and Current Portfolio

The Institute began funding research on reading and writing in FY 2002. Since that time 69 grants have been awarded under the Read/Write topic with an additional 12 projects funded under the Interventions for Struggling Adolescent and Adult Readers and Writers topic (the Adolescent/Adult Readers research topic has subsequently been subsumed by the Read/Write and Postsecondary and Adult Education research topics). 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, 27 percent are Efficacy and Replication or Scale-up Evaluation (now called Effectiveness) 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. An additional 86 research projects addressing reading and writing are supported through several of the Institute's other research topics (e.g., Cognition and Student Learning; Effective Teachers and Effective Teaching; Education Technology; English Learners; and Early Learning Programs and Policies) and through the Reading for Understanding Research Initiative.

The vast majority of projects to date in the Read/Write portfolio 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, 2011), and teaching middle school readers to apply comprehension strategies as they work in collaborative groups (Vaughn et al., 2011) – 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 Read/Write topic, 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 develop or evaluate reading and/or writing interventions.

C. Application Requirements

Applications under the Read/Write topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

Goal

Applications under the Read/Write topic must be submitted to one of the five research goals and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication
- 4) Goal 4: Effectiveness
- 5) Goal 5: Measurement

Sample

Applications under the Read/Write topic must meet the following sample requirements:

- Research must focus on students from **kindergarten through high school**.
- 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.
- If you are interested in conducting reading and/or writing research that spans early childhood and the early elementary grades, you may choose to submit your application to the Early Learning Programs and Policies topic or to the Read/Write topic.
- If you are interested in conducting reading and/or writing research that addresses the needs of English learners, you may choose to apply to the English Learners topic or the Read/Write topic.

- If you are interested in conducting reading and/or writing research that addresses the needs of postsecondary and adult learners (i.e., students at least 16 years old and outside of the K-12 system), you must apply to the Postsecondary and Adult Education topic.

Content

Applications under the Read/Write topic must meet the following content requirements:

- Your proposed research must address reading and/or writing outcomes.
- 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 by the No Child Left Behind Act of 2001.
- If you are interested in teacher professional development in reading and/or writing, you must apply to the Effective Teachers and Effective Teaching topic.

Please contact the program officer listed in the heading for this topic to ensure that your research idea is appropriate for the Read/Write topic and the goal you select. Your application must meet both the sample and content requirements for this topic and the methodological requirements for the goal (described in *Part III Research Goals*) to be responsive and sent forward for scientific peer review.

13. SOCIAL AND BEHAVIORAL CONTEXT FOR ACADEMIC LEARNING

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

A. Purpose

The Social and Behavioral Context for Academic Learning (Social/Behavioral) topic supports research on social skills, dispositions, and behaviors to improve student outcomes (e.g., grades, standardized test scores, attendance, high school graduation rates) in typically developing students from kindergarten through high school. The long-term outcome of this research 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 and Current Portfolio

Under the Social/Behavioral topic, 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. For example, behavior problems in schools continue to be a pressing concern for school staff and parents. Of particular concern are disciplinary policies and practices that may push students out of school and the persistent disproportionate representation of minority students in disciplinary referrals and behavioral suspensions (Krezmien, Leone, & Achilles, 2006; Wallace, Goodkind, Wallace, & Bachman, 2008). Through the Social/Behavioral topic, the Institute accepts applications to conduct research on the types of programs, practices, and policies in schools that support academic learning by keeping students in schools and engaged in learning.¹⁰ Through the Social/Behavioral topic, the Institute also encourages research on the role of school-based service learning in supporting students' academic achievement and civic engagement. In a recent national survey of principals of K-12 public schools, 68% report that their students participate in community activities that are recognized by the school and 24% report that the school actively integrates service-learning into the curriculum (Corporation for National and Community Service, 2008). While service-learning is theorized to afford opportunities for applied learning of academic content and to foster civic values by engaging students in community problem solving, additional research is needed to better understand the critical features of

¹⁰ A recent collaboration between the Departments of Justice and Education (the Supportive School Discipline Initiative announced in July 2011) seeks to focus on positive disciplinary options that both keep kids in school and improve the climate for learning.

service learning programs and the mechanisms by which such programs might improve student outcomes.

Interventions appropriate for development or evaluation under the Social/Behavioral topic 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 (38%) or evaluating fully developed interventions to determine their impact on students' social skills, behaviors, and academic achievement (41%). 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 topic, 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 five Exploration projects under the Social/Behavioral topic to explore malleable factors that are associated with better social skills, dispositions, or 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 intervention¹¹.

C. Application Requirements

Applications under the Social/Behavioral topic must be submitted to and meet the requirements for a single research goal and meet the sample and content requirements for the topic.

Goal

Applications under the Social/Behavioral topic must be submitted to one of the five research goals and meet all methodological requirements for that goal (see *Part III Research Goals*):

- 1) Goal 1: Exploration
- 2) Goal 2: Development and Innovation
- 3) Goal 3: Efficacy and Replication

¹¹ The Institute encourages 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 5 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/ncerp/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>).

- 4) Goal 4: Effectiveness
- 5) Goal 5: Measurement

Sample

Applications under the Social/Behavioral topic must meet the following sample requirements:

- Research must focus on typically developing students at any level from **kindergarten through high school**.
- For research that spans early childhood and the early elementary grades, you may choose to submit your application to the Social/Behavioral topic or to the Early Learning Programs and Policies topic.

Content

Applications under the Social/Behavioral topic must meet the following content requirements:

- Your research must address social skills, dispositions, or behaviors that are correlated with student outcomes (e.g., grades or achievement test scores in reading, writing, mathematics, or science; attendance; grade retention; high school graduation or dropout rates).
- Your research must include student academic outcomes that are important to parents, teachers, and administrators (e.g., grades or achievement test scores in reading, writing, mathematics, or science; attendance; grade retention; high school graduation or dropout rates).
- Research that addresses interventions for students must be 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).
- Research that addresses professional development training programs for teachers and other school staff must be designed to provide in-service staff with skills to improve the social and behavioral context for academic learning.

Please contact the program officer listed in the heading for this topic to ensure that your research idea is appropriate for the Social/Behavioral topic and the goal you select. Your application must meet both the sample and content requirements for this topic and the methodological requirements for the goal (described in *Part III Research Goals*) to be responsive and sent forward for scientific peer review.

PART III RESEARCH GOALS

14. APPLYING TO A PARTICULAR RESEARCH GOAL

For the FY 2013 Education Research Grants program, you must submit under one of the five research goals: Exploration *or* Development and Innovation *or* Efficacy and Replication *or* Effectiveness *or* Measurement.

The Institute strongly encourages you to contact the relevant program officer listed in Section 33 if you have questions regarding the appropriateness of a particular project for submission under a specific goal.

A. Requirements for Goal One: Exploration

a. Purpose of Exploration Projects

The Exploration goal is intended to identify (1) malleable factors that are associated with education outcomes for students (student outcomes) and (2) factors and conditions that may mediate or moderate the relations between malleable factors and student outcomes. This identification is to be done through the analysis of data (collected by the project and/or using a secondary data set) or the meta-analysis of research studies. By *malleable factors*, the Institute means factors that can be changed by the education system such as children's skills and behaviors, teachers' practices, education programs and their components, school or district management practices, or education policies.

Projects under the Exploration goal will (a) generate hypotheses regarding the potential causal relations between malleable factors and education outcomes, (b) contribute to theories of change for education interventions, and (c) contribute to the development and identification of potentially beneficial interventions or assessments.

The Institute expects the grantee to provide the following at the *end* of a funded Exploration project:

- 1) A clear description of the malleable factors and/or the moderators and mediators that were examined including how the factors and/or the moderators and mediators were identified and measured.
- 2) Evidence regarding the malleable factors' association with student outcomes and/or evidence on whether the factors and conditions moderate and/or mediate the relations between the malleable factors and the student outcomes.
- 3) A well-specified conceptual framework that provides a theoretical explanation for the link between the malleable factors and the student outcomes and/or a theoretical explanation for the factors' and conditions' moderation and/or mediation of the relations between the malleable factors and the student outcomes.
- 4) A determination, based on the empirical evidence and conceptual framework, whether the project's findings could lead to further research under another of the Institute's goals including:
 - a. The development or refinement of an intervention under the Development and Innovation goal. The Institute considers "interventions" to encompass curricula, instructional approaches, technology, and education practices, programs, and policies. For example, if you found a strong beneficial association between a student behavior and student academic success, you would present your findings in enough detail so that you, another researcher, or a practitioner could use them in the development of an intervention to foster that behavior. Conversely, if you found a weak or even a detrimental association, you would present your results so that they could be used to re-examine or revise existing interventions that have a focus on the behavior.

- b. The rigorous evaluation of an intervention under the Efficacy and Replication goal. For example, if you found a strong positive association between an ongoing education program and high school graduation, you would discuss whether your results were strong enough (both statistically and practically) to support a causal evaluation of the program to determine whether it should be disseminated more widely. Alternately, if you found a weak or no association and the program was widely used, you would discuss whether your results justified a causal evaluation of the program to determine whether the intervention was worth continuing.
- c. The development of a conceptual framework to be used in the development or revision of an assessment under the Measurement goal. For example, you might be interested in a current classroom observational instrument used to collect the amount of time students spend on specific math activities because there is a known association between the time spent on these activities and student understanding of fractions. If under an Exploration project, you found that the quality of the implementation of the activities was also linked to student understanding of fractions, your results would inform a revision of the classroom instrument.

Malleable factors include both potential targets of interventions (e.g., student behaviors) and existing interventions (e.g., education programs and their components) that are under control of the education system. Under the Exploration goal, the Institute *does not* accept applications to examine malleable factors that cannot be changed or applications to examine malleable factors that are not under the control of the education system. In addition, under the Exploration goal, the Institute does not support work to develop an intervention or to test the causal impact of an intervention. If you intend to examine an intervention that first requires further development, you should apply under the Development and Innovation goal. Similarly, if you intend to bundle existing interventions (or components from different interventions) into a single new intervention and examine that new intervention, you should apply under the Development and Innovation goal. If you intend to determine the causal impact of an intervention, you should apply under the Efficacy and Replication goal.

b. The Project Narrative

In your 25-page project narrative, use the **Significance** section to explain why it is important to study these malleable factors and their potential association with better education outcomes. Use the **Research Plan** section to detail the methodology you will use to explore these associations and mediators and/or moderators of those relationships. Use the **Personnel** section to describe the relevant expertise of your research team and their responsibilities within and time commitments to the project. Use the **Resources** section to describe both your access to institutional resources, schools, and relevant data sources.

(i) Significance

In the Significance section of the project narrative, you must clearly describe your research aims and provide a compelling rationale for the proposed work. In this section, you should:

- 1) Pose clear aims (hypotheses or research questions) for the research project. You should include a description of the malleable factor(s) and/or mediators and moderators you will be studying and the relationships you expect them to have with specific student outcomes.
- 2) Present both a theoretical and an empirical rationale for the study. You should include your theory for and evidence that the malleable factor(s) may be associated with beneficial student outcomes or that the mediators and moderators may influence such an association.
 - a. For projects examining an existing education intervention (or a major component of an intervention), you must explain why you are proposing an Exploration study rather than a rigorous evaluation of impact under the Efficacy and Replication goal.

- 3) Explain why it is practically important to study these particular malleable factors and/or mediators and moderators. You should discuss how the results will go beyond what is already known and how the results will be important both to the field of education research, and to education practice and education stakeholders (e.g., practitioners and policymakers). If you are studying an existing intervention, you should discuss:
 - a. how widely the intervention is used and
 - b. why an Exploration study, in contrast to an Efficacy/Replication evaluation, will have practical importance.
- 4) Discuss how the results of this work will inform the future development of an intervention or assessment, or the future decision to evaluate an intervention.

It can be helpful to end the Significance section with a summary paragraph justifying the importance of the proposed work. From the reviewers' perspective, such a paragraph organizes the arguments made throughout the Significance section and better prepares them to read the Research Plan.

(ii) Research Plan

In the Research Plan, you must clearly describe the methodological approach you will use to examine the malleable factors and their association with student outcomes and/or the links between mediators and moderators and this association. A variety of methodological approaches are appropriate under the Exploration goal including, but not limited to the following:

- 1) Primary data collection with appropriate analyses, or
- 2) Appropriate secondary data analyses of existing data sets, or
- 3) Primary data collection and analysis of a combination of primary and secondary data, or
- 4) Meta-analyses that go beyond a simple identification of the mean effect of interventions and are designed to determine, for example, the effects of individual interventions within a broad category, variations of a specific intervention or moderators of the intervention's effects, or to identify mediators of the intervention's effects.¹²

In your Research Plan, you should clearly identify the methodological approach you will use and describe your research design, sample, measures, and analysis procedures.

Research Design

You must provide a detailed research design and show how it is appropriate for determining whether the malleable factors are associated with students (student outcomes) and/or whether there are factors and conditions that may mediate or moderate the relations between the malleable factors and student outcomes.

A variety of approaches are appropriate for this work. For example, you could propose an observational study in an authentic education delivery setting (e.g., classrooms and schools) to identify malleable factors that predict student outcomes. Or you could propose an analysis of data from a previous study to identify potential moderators (for example, how the relationship between a predictor and student outcomes varies by student type). You may also propose to conduct small-scale, tightly controlled experimental studies under the Exploration goal to test hypotheses about causal relations between malleable factors and student outcomes. However, experimental or quasi-experimental studies are not appropriate under the Exploration goal if you intend to test the impact of a fully developed intervention on student outcomes. You must apply under Goal 3: Efficacy and Replication if you are interested in determining whether or not fully developed interventions (e.g.,

¹² 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.

education practices, programs, and policies) produce a beneficial impact on student outcomes relative to a counterfactual when they are implemented in authentic education delivery settings.

Sample

You 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).

If you will be collecting primary data, you should define, as completely as possible, the population you will be drawing the sample from, the sample to be selected, and the sampling procedures for the proposed study, including justification for exclusion and inclusion criteria. You 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). For all quantitative inferential analyses, you should demonstrate that the proposed sample provides sufficient power to address the proposed research questions.

If you will be performing secondary analysis of data, you should provide the information described above for the data sets you will be analyzing. If you intend to link multiple data sets, you should provide sufficient detail for reviewers to be able to judge the feasibility of the linking plan.

If you will be combining primary and secondary data, you should provide the information for both requested above. In addition, you should discuss how you will link the separate sources of data.

If you will be performing a meta-analysis, you should clearly describe 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. You 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.

Measures

You should describe the key variables you will be using in the study. For the outcome measures, you should also discuss their validity and reliability for the intended purpose and population and the response rate or amount of missing data for these measures.

If you are proposing to collect original data, you should carefully describe the data to be collected, the procedures for data collection, and the measures to be developed from the data (including their reliability and validity). If observational data are to be collected, you should describe how the data will be collected (including the procedures for monitoring and maintaining inter-observer reliability) and coded. If the observational data are to be analyzed statistically, then you should also describe the mechanism for quantifying the data.

If you are proposing a meta-analysis, you should clearly define the effect size statistics to be used, along with the associated weighting function, procedures for handling outliers, any adjustments to be applied (e.g., reliability corrections), and the procedures planned for examining and dealing with effect size heterogeneity.

Data Analysis

You must include detailed descriptions of all data analysis procedures. You should provide detailed information on the statistical models to be used and provide a rationale for the choice of models, addressing such issues as how these models best test your hypotheses, how they address the multilevel nature of education data, and how well they control for selection bias. In strong applications, you would also discuss analyses to explore alternative hypotheses. In addition, you

should discuss how you will address exclusion from testing and missing data and conduct sensitivity tests to assess the influence of key procedural or analytic decisions on the results. You should provide separate descriptions for any mediator or moderator analyses. For qualitative data, you should describe the intended approach to data analysis, including any software that will be used.

(iii) Personnel

For your application to be competitive, you will need a research team that collectively demonstrates expertise in the relevant content domain(s), the methodology required, and working with schools or other education agencies as needed.

This section should identify all key personnel on the project team including those from other organizations. You should briefly describe the following for all key personnel:

- 1) qualifications,
- 2) roles and responsibilities within the project,
- 3) percent of time and calendar months per year (academic plus summer) to be devoted to the project, and
- 4) past success at 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 key personnel responsible for that work should be described in this section.

(iv) Resources

You should describe the institutional resources of all the institutions involved in the proposed research that will be used to support your Exploration study. You should discuss the overall management of the research project and what resources and procedures are available to support the successful completion of this project. You should describe your access to the schools (or other education delivery settings) in which the research will take place and to any data sets that you require. In addition, you should include letters of support in Appendix C documenting the participation and cooperation of the schools and/or the organizations holding the data. These letters should convey that the organizations understand what their participation in the study will involve (e.g., annual student and teacher surveys, student assessments, providing specific data sets).

If you have previously received an Exploration award, you should indicate whether your work under that grant has contributed to (a) the development of a new or refinement of an existing intervention, (b) the rigorous evaluation of an intervention, or (c) the development, refinement and/or validation of an assessment. In addition, you should discuss any theoretical contributions made by your previous work. By demonstrating that your previous work has made these contributions, you provide a stronger case for engaging in another Exploration study.

c. Awards

For an Exploration project that solely involves **secondary data analysis or meta-analysis, the maximum duration of an Exploration award is 2 years**. An application of this type proposing a project length of greater than 2 years will be deemed nonresponsive to the Request for Applications and will not be accepted for review. Costs vary according to the data to be analyzed. Your budget should reflect the scope of the work to be done. **The maximum award for an Exploration project solely involving secondary data analysis or meta-analysis is \$700,000 (total cost = direct + indirect costs)**. An application proposing a budget higher than the maximum award will be deemed nonresponsive to the Request for Applications and will not be accepted for review.

For an Exploration project that involves **primary data collection, the maximum duration of an Exploration award is 4 years**. An application of this type proposing a project length of greater than 4 years will be deemed nonresponsive to the Request for Applications and will not be accepted for review.

Costs vary according to the type of data to be collected. Your budget should reflect the scope of the work to be done. **The maximum award for an Exploration project involving primary data collection is \$1,600,000 (total cost = direct + indirect costs).** An application proposing a budget higher than the maximum award will be deemed nonresponsive to the Request for Applications and will not be accepted for review.

B. Requirements for Goal Two: Development and Innovation

a. Purpose of Development and Innovation Projects

The Development and Innovation goal (Development/Innovation) is intended to support innovation in education through the development of new interventions and the further development of existing interventions that are to produce beneficial impacts on education outcomes for students (student outcomes) when implemented in authentic education delivery settings (e.g., classrooms, schools, districts). The Institute considers "interventions" to encompass curricula, instructional approaches, technology, and education practices, programs, and policies.

The Institute expects the grantee to provide the following at the *end* of a funded Development and Innovation project:

- 1) A fully developed version of the proposed intervention (including all materials and products necessary for implementation of the intervention in authentic education delivery settings) along with:
 - a well-specified theory of change for the intervention and
 - evidence that the intended end users understand and can use the intervention.
- 2) Data that demonstrate end users can feasibly implement the intervention in an authentic education delivery setting.
- 3) Pilot data regarding the intervention's promise for generating the intended beneficial student outcomes, along with:
 - a fidelity measure or measures to assess whether the intervention is delivered as it was designed to be by the end users in an authentic education delivery setting and
 - evidence regarding the fidelity of implementation during the pilot study.

Development/Innovation projects must focus on the development of interventions for use in authentic education delivery settings. Projects that produce pilot data showing the intervention's promise for generating beneficial student outcomes are expected to lead to subsequent applications to test the efficacy of the intervention under the Efficacy and Replication goal. Under Development/Innovation, you may test the efficacy of aspects of your intervention (e.g., viable components) in order to support the development of your intervention. However, the Institute will not accept applications under Development/Innovation that propose only minor development activities followed by substantial tests of the overall intervention's impacts. For example, the Institute would not support an application in which a researcher proposes to spend one year developing the intervention and two years testing the impact of the intervention in a large number of classes or schools. Instead, if you have an intervention that is ready to be tested for efficacy you should apply to the Efficacy and Replication goal.

b. The Project Narrative

In your 25-page project narrative, use the **Significance** section to explain why it is important to develop this intervention. Use the **Research Plan** section to detail the methodology you will use to develop your intervention, document its feasibility, and determine its promise for improving the targeted student outcomes. Use the **Personnel** section to describe the relevant expertise of your research team and their responsibilities within and time commitments to the project. Use the **Resources** section to describe your access to institutional resources, schools, and relevant data sources.

(i) Significance

In the Significance section of the project narrative, you should clearly describe the new or existing intervention you intend to develop or revise and provide a compelling rationale for this work. The Significance section should answer three questions: (a) *What is the specific intervention to be*

developed/revised?, (b) *Why is this intervention expected to produce better student outcomes than current education practice?*, and (c) *What is the overall importance of the proposed project?* In answering these questions, you should do the following.

- 1) Describe the specific issue or problem your work will address including the overall importance of this issue/problem and how its resolution will contribute to the improvement of student outcomes. The importance of the issue or problem to education stakeholders, such as practitioners and policymakers, should be included in your discussion.
- 2) Describe current typical practice to address this issue or problem and why current practice is not satisfactory.
- 3) Describe your proposed intervention, its key components, and how it is to be implemented. Contrast these with current typical practice and its identified shortcomings. Your description of the proposed intervention should show that it has the potential to produce substantially better student outcomes because (a) it is sufficiently different from current practice and does not suffer from the same shortcomings, (b) it has key components that can be justified, using theoretical or empirical reasons, as powerful agents for improving the outcomes of interest, and (c) its implementation appears feasible for teachers, other education personnel, and/or schools given their resource constraints (e.g., time, funds, personnel, schedules).
- 4) Describe the initial theory of change for your proposed intervention (you may need to revise your theory over the course of the project). The theory of change details the process through which the key components of the intervention are expected to lead to the desired student outcomes. When you clearly describe the theory of change that guides the intervention and its components, reviewers are better able to evaluate (a) the proposed intervention's grounding in its theoretical and empirical foundation and (b) the relation between the intervention and the outcome measures (i.e., the proposed measures tap the constructs that the intervention is intended to address). For interventions designed to *directly* affect the teaching and learning environment and, thereby, *indirectly* affect student outcomes, you should be clear in your theory of change to identify the proximal outcomes that the intervention is designed to affect (e.g., teacher practices) and how these proximal outcomes are to impact the more distal student outcomes intended to be improved.
- 5) Describe the theoretical justifications supporting the theory of change (e.g., to show that the proposed intervention is a reasonable operationalization of the theory) and provide empirical evidence supporting the theory of change (e.g., to show that the proposed intervention or its components can be expected to have the intended outcomes).
- 6) Discuss the expected practical importance of the intervention including how great a contribution it can make to resolving the issue or problem that forms the basis of the project. You could also note the level of resources expected for the implementation of the intervention (e.g., teacher training, classroom time, materials).
- 7) If you are applying for a Development/Innovation award to further develop an intervention that was the focus of a previous Development/Innovation project or an Efficacy/Replication project you should (a) justify the need for another award, (b) describe the results and outcomes of prior or currently held awards to support the further development of the intervention (e.g., evidence that the intervention in its current form shows promise for improving education outcomes for students), and (c) indicate whether what was developed has been (or is being) evaluated for efficacy and describe any available results from those efficacy evaluations and their implications for the proposed project.

It can be helpful to end the Significance section with a summary paragraph justifying the importance of the proposed work. From the reviewers' perspective, such a paragraph organizes the arguments made throughout the Significance section and better prepares them to read the Research Plan.

(ii) Research Plan

In the Research Plan, you must clearly describe the method for developing the intervention to the point where it can be used by the intended end users (development process), the method for collecting evidence on the feasibility of end users implementing the intervention in an authentic education delivery setting (evidence of feasibility of implementation), and the method for assessing the promise of the intervention for achieving the expected outcomes (pilot study). For each of these, you should describe the sample, setting, and measures and show them to be appropriate for meeting the research aims of the project.

Your measures should address: (a) usability, (b) feasibility, (c) fidelity of implementation, and (d) final student outcomes and expected intermediate outcomes. Usability of the intervention includes whether the intended user is physically able to use the intervention, understands how to use it, and is willing to use it. Feasibility of the intervention shows that the end user can use the intervention within the requirements and constraints of an authentic education delivery setting (e.g., classroom, school, district). There may be overlap between usability and feasibility but the primary distinction between them is that usability addresses the individual abilities of the user while feasibility addresses the supports and constraints of the user's setting. Fidelity of implementation determines if the intervention is being delivered as it was designed to be by the end users in an authentic education delivery setting. The final student outcomes are what are to be changed by the intervention which may be expected to directly affect these outcomes or indirectly affect them through intermediate student or instructional personnel outcomes. You should discuss the procedures for collecting the data that are used in these four types of measures. For student outcome measures and existing fidelity measures, you should also discuss the measures' psychometric properties (e.g., reliability and validity). If you need to develop a measure, you should describe what will be developed, why it is necessary, how it will be developed, and, as appropriate, the process for checking its reliability and validity. As the primary purpose of Development/Innovation projects is the development of interventions, the majority of the project's time and resources should focus on the development process.

The Development Process

In describing the development process, you should make clear (a) what will be developed, (b) how it will be developed to ensure usability, and (d) the chronological order of development.

In the Significance section you described your proposed intervention and its key components. When describing your development process, you should discuss how you will develop the initial version of the intervention. You should then discuss how you will refine and improve upon the initial version of the intervention by implementing it (or components of it), observing its functioning, and making necessary adjustments to ensure usability. You must describe your plan for carrying out such a systematic, **iterative, development process**. This process often includes small-scale studies in which different components of or approaches to using the intervention are tried out in order to obtain feedback useful for revision. The Institute does not require or endorse any specific model of iterative development but recommends that you review models that have been used to develop interventions (e.g., Fuchs & Fuchs, 2001; Diamond & Powell, 2011) in order to identify processes appropriate for your work. Similarly, as there is no preset number of iterations (revise, implement, observe, and revise), you should identify and justify your proposed number of iterations based on the complexity of the intervention and its implementation. The iterative development process should continue until you determine that the intervention can be successfully used by the intended end users. Providing a timeline (either in the Project Narrative or Appendix A) delineating the iterative development process can help the reviewers understand the ordering of the steps in your development process.

Evidence of Feasibility of Implementation

You must discuss how you will collect evidence demonstrating that the intervention can be successfully implemented in an authentic education delivery setting. You can collect this evidence late in the development process, as a separate study, and/or early in the pilot study. Your data collection can be done on a small scale; however, it should be conducted both in the type of setting (e.g., classroom or school) and with the types of users (e.g., principals, teachers, students) for which the intervention is intended.

The Pilot Study

You must provide a detailed plan for a pilot study that will provide evidence of the promise of the intervention for achieving its intended outcomes (including student outcomes) when it is implemented in an authentic education delivery setting. To ensure that Development/Innovation projects focus on the development process, a maximum of 30% of project funds should be used for the pilot study (e.g., its implementation, data collection, and analysis of pilot data).

Because the quality of the pilot study is key to providing the evidence necessary to apply for a grant to test the efficacy of the intervention under Efficacy/Replication, reviewers will evaluate the technical merit of your plan. However, the Institute does not expect the pilot study to be an efficacy study and reviewers are not expected to evaluate your pilot study plan for the same rigor as they would for an Efficacy/Replication project. The only exception to this is that the Institute does allow you to propose an efficacy pilot study if it can be accomplished within the requirements of the Development/Innovation goal. If you propose an efficacy study as your pilot study, the reviewers will apply the methodological requirements under the Efficacy/Replication goal.

The type of pilot study you propose will depend upon the complexity of the intervention, the level at which the intervention is implemented (i.e., student, classroom, school), and the need to stay within the maximum 30% of grant funds that can be used for the pilot study. As a result, pilot studies may range along a continuum of rigor and be

- a) efficacy studies (e.g., randomized controlled studies are possible especially when randomization occurs at the student level),
- b) underpowered efficacy studies (e.g., randomized controlled studies with a small number of classrooms or schools that provide unbiased effect size estimates of practical consequence which can stand as evidence of promise while not statistically significant),
- c) single-case studies that adhere to the criteria for single-case designs that meet the design standards set by the What Works Clearinghouse,¹³ and
- d) quasi-experimental studies based on the use of comparison groups with additional adjustments to address potential differences between groups (i.e., use of pretests, control variables, matching procedures).

Your plan should detail the design of the pilot study, the data to be collected, the analyses to be done, and how you will conclude whether any change in student outcomes is consistent with your underlying theory of change and is large enough to be considered a sign of promise of the intervention's success. You should give careful consideration to the measures of student outcomes used to determine the intervention's promise and consider the inclusion of both those sensitive to the intervention as well as those of practical interest to education practitioners and policymakers. You should make sure to identify the measures to be used for all proximal and distal outcomes identified in your theory of change. In addition, you should discuss how you will develop the fidelity of implementation measures you will use to monitor the implementation of the intervention during the pilot study and your possible responses for increasing fidelity if needed. Although a range of methodological rigor is allowed in the

¹³ Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M. & Shadish, W. R. (2010). Single-case designs technical documentation, pp. 14-16. Retrieved from What Works Clearinghouse website: http://ies.ed.gov/ncee/wwc/pdf/wwc_scd.pdf.

design of pilot studies, the Institute notes the more rigorous the pilot study, the stronger the evidence will be to support a future application for an Efficacy/Replication study of an intervention showing promise.

(iii) Personnel

For your application to be competitive, you will need a research team that collectively demonstrates expertise in the relevant content domain(s), the methodology required to iteratively develop the proposed intervention and assess its feasibility and promise for changing student outcomes, and working with schools or other education agencies. If you intend to develop measures, you should also include personnel with the skills for measurement development and testing.

This section should identify all key personnel on the project team including those from other organizations. You should briefly describe the following for all key personnel:

- 1) qualifications,
- 2) roles and responsibilities within the project,
- 3) percent of time and calendar months per year (academic plus summer) to be devoted to the project, and
- 4) past success at disseminating research findings in peer-reviewed scientific journals.

Key personnel may be from for-profit entities. However, if these entities are to be involved in the commercial production or distribution of the intervention to be developed, you must include a plan for how their involvement will not jeopardize the objectivity of the research.

(iv) Resources

You should describe the institutional resources of all the institutions involved in the proposed research that will be used to support your Development/Innovation study. You should discuss the overall management of the research project and what resources and procedures are available to support the successful completion of this project. You should describe your access to the schools (or other education delivery settings) in which the research will take place and to any data sets that you require. In addition, you should include letters of support in Appendix C documenting the participation and cooperation of the schools and/or the organizations holding the data. These letters should convey that the organizations understand what their participation in the study will involve (e.g., annual student and teacher surveys, student assessments, providing specific data sets).

If you have previously received an award from any source to develop an intervention and are applying for a grant to develop a new intervention, you should indicate whether the previous intervention has been evaluated for its efficacy (by yourself or another research team) and describe the results, if available. In addition, you should discuss any theoretical contributions made by your previous work. By demonstrating that your previous intervention was successfully developed and is being or has been evaluated, you provide a stronger case for your development of a new intervention (the case is further strengthened if evidence of efficacy was found for your previous intervention).

c. Awards

The development and piloting of an intervention may vary in time due to the complexity of the intervention, the length of its implementation period, and the time expected for its implementation to result in changed student outcomes. Your proposed length of project should reflect these factors. Typical awards last 3 years. If you are proposing to develop a lengthy intervention (e.g., a year-long curriculum) or an intervention that requires a long pilot study because it is expected to take additional time to affect students (e.g., a principal training program that is intended to improve instruction), you can request a 4-year award. **Therefore, the maximum duration of a Development/Innovation project is 4 years.** An application proposing a project length of greater than 4 years will be deemed nonresponsive to the Request for Applications and will not be accepted for review.

Development costs vary according to the type of intervention proposed. Your budget should reflect the scope of the work to be done. **The maximum award is \$1,500,000 (total cost = direct costs + indirect costs)**. An application proposing a budget higher than the maximum award will be deemed nonresponsive to the Request for Applications and will not be accepted for review.

Under the Development/Innovation goal, no more than 30% of the total funds may be used for the pilot study that is to demonstrate the promise of the intervention for achieving the desired outcomes. You should note the budgeted cost of the pilot study and the percentage of the project's total funding represented by the cost of the pilot study in your budget narrative.

C. Requirements for Goal Three: Efficacy and Replication

a. Purpose of Efficacy and Replication Projects

The Efficacy and Replication goal (Efficacy/Replication) is intended to determine whether or not fully developed interventions (e.g., education practices, programs, and policies) produce a beneficial impact on education outcomes for students (student outcomes) relative to a counterfactual when they are implemented under ideal conditions in authentic education delivery settings (e.g., classrooms, schools, districts).

You may apply to conduct **one of three types of studies** under the Efficacy/Replication goal:

- 1) **Efficacy** - a study that tests an intervention's impacts by determining the degree to which the intervention has a beneficial impact on the student outcomes of interest in comparison to an alternative practice, program, or policy.
- 2) **Replication** – an efficacy study that tests an intervention, for which there is already evidence of a beneficial impact, under conditions that differ from those of previous efficacy studies.
- 3) **Efficacy Follow-Up** – an efficacy study that tests an intervention, for which there is already evidence of a beneficial impact, for its longer-term impacts.

Efficacy/Replication projects are to determine if an intervention *can work* to improve student outcomes as opposed to if an intervention *will work* when implemented under conditions of routine practice (as expected in an Effectiveness project). To this end, you may (but are not required to) implement the intervention under what is sometimes called "ideal" conditions that can include more implementation support or more highly trained personnel than would be expected under routine practice. Under "ideal" conditions you may also implement the intervention among a more homogeneous sample of students, teachers, schools, and/or districts than would be typically found in practice.

The Institute expects the grantee to provide the following at the *end* of a funded Efficacy/Replication project:

- 1) Evidence of the impact of a clearly specified intervention on relevant student outcomes relative to a comparison condition using a research design that meets (with or without reservation) the Institute's What Works Clearinghouse evidence standards (<http://ies.ed.gov/ncee/wwc/>).
- 2) Conclusions on and revisions to the theory of change that guides the intervention and a discussion of the broader contributions the study makes to our theoretical understanding of education processes and procedures.
- 3) If a beneficial impact is found, then the identification of the organizational supports, tools, and procedures that may be needed for sufficient implementation of the core components of the intervention under a future Replication study or Effectiveness study.
- 4) If a beneficial impact is not found, then a determination of whether and what type of further research would be useful to revise the intervention and/or its implementation under a future Development and Innovation grant.

If the intervention you wish to test is not yet fully developed, you should apply under Development/Innovation to complete it. If you are determining whether to submit to Efficacy/Replication or to Effectiveness, consider whether: (a) you intend to implement the intervention under "ideal" or routine conditions (Effectiveness requires routine conditions), (b) you have evidence of the intervention's efficacy (at least two previous efficacy studies are needed to submit to Effectiveness), and (c) you would be considered an independent evaluator under the Effectiveness criteria.

b. The Project Narrative

In your 25-page project narrative, use the **Significance** section to explain why it is important to test the impact of the intervention under the proposed conditions and sample. Use the **Research Plan** section to detail the evaluation of the intervention. Use the **Personnel** section to describe the relevant expertise of your research team and their responsibilities within and time commitments to the project. Use the **Resources** section to describe your access to institutional resources, schools, and relevant data sources.

(i) Significance

In the Significance section of the project narrative you should clearly describe (a) your research questions, (b) the fully developed intervention, (c) the theory of change for the intervention, and (d) a compelling rationale for testing the impact of the intervention in the proposed manner.

Research Questions

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

The Intervention

You should clearly describe the intervention, including its individual components. In addition, you should describe the processes and materials (e.g., manuals, websites, training, coaching) that will be used to support its implementation. You should provide evidence that the intervention is fully developed and that all materials required for its implementation are readily available for use in authentic education delivery settings. Also, you should note the fidelity measure(s) that you will use to assess the implementation of the intervention as well as the means that you will use to determine what the comparison group is receiving. If a fidelity measure or an implementation support (e.g., a website or training manual) needs to be developed, you can propose devoting a short period of time (e.g., 2-6 months) to its development. However, the intervention itself must be fully developed before applying to Efficacy/Replication. If you need additional time to complete development of the intervention, develop a new component, or develop a new delivery approach you should apply under Development/Innovation.

Theory of Change

You should clearly present the theory of change for the intervention by describing how the features or components of the intervention relate to each other and to the intended student outcomes both temporally (operationally) and theoretically (e.g., why A leads to B). When you clearly describe the model that guides the intervention and its individual components, 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?). For interventions designed to *directly* affect the teaching and learning environment and, thereby, *indirectly* affect student outcomes, you should be clear in your theory of change to identify the proximal outcomes that the intervention is designed to affect (e.g., teacher practices) and how these proximal outcomes are to impact the more distal student outcomes intended to be improved.

Certain widely used interventions (e.g., published curricula) may not be based on a formal theory of change. In such cases, you should articulate a general theory of change for the proposed intervention in which you describe what the intervention is expected to change and how this will ultimately result in improved student outcomes. This theory of change should be specific enough for both guiding the design of the evaluation (e.g., selecting an appropriate sample, measures, comparison condition) and using the results of the study to contribute to our theoretical understanding of education processes and procedures.

Rationale

In justifying your evaluation, you should address why the intervention is likely to produce better student outcomes relative to current practice (or argue that the intervention is current practice if widely used) and the overall practical importance of the intervention (why education practitioners or policymakers should care about the results of the proposed evaluation).

The rationale will vary by the type of project proposed: (a) an efficacy evaluation of an intervention that is currently widely used but has not been rigorously evaluated, (b) an efficacy evaluation of a fully developed intervention that is not currently widely used and has not been rigorously evaluated but has evidence regarding its feasibility of implementation and promise for improving student outcomes (this type of intervention could have been developed during a Development/Innovation project), (c) a replication study, or (d) a follow-up study.

- a) Evaluation of a widely used intervention: For the evaluation of an intervention that is already in wide use but has not been rigorously evaluated (e.g., a commercially distributed program, a specific state education policy), you should provide both evidence of its widespread use and conceptual arguments for the importance of evaluating the intervention. Such arguments should consider the intervention's relevance to current education practice and policy as would be judged by practitioners and policymakers. By *widespread use*, the Institute means used across multiple states, in the majority of districts in a single state, or in the majority of schools in two or more large districts. Widespread use of the intervention provides empirical evidence for the practical importance of its evaluation. You should also point out any broader conceptual importance your evaluation may have, for example, if the intervention is the primary approach currently used, or if it is representative of the most commonly used approaches, or, if it offers an alternative approach to the most commonly used approaches. In addition, you should describe studies that have attempted to evaluate the intervention, note their findings, and discuss why your proposed study would be an important improvement on past work.
- b) Evaluation of an intervention not widely used: For interventions not yet widely used or evaluated, your justification will focus more on the intervention's potential (versus current) practical importance, readiness for implementation, feasibility of implementation, and initial evidence of promise for improving student outcomes (as described under Development/Innovation). You should describe and justify the importance of the problem the intervention was developed to address and how the theory of change theoretically supports the intervention's ability to improve this problem. In the Significance section you will have addressed its readiness for implementation by showing that the intervention is fully developed and ready to implement and that you have fidelity of implementation measures. Regarding initial evidence, you should provide empirical evidence on the intervention's feasibility of implementation in an authentic education delivery setting and promise for generating the intended beneficial student outcomes. As discussed under Development/Innovation, evidence of promise can be derived from studies that fall along a continuum of rigor: randomized controlled trials (though these are not a prerequisite for an efficacy study of this type), underpowered randomized controlled studies, single-case experimental designs that adhere to the criteria for meeting the design standards set by the What Works Clearinghouse, and quasi-experimental studies based on the use of comparison groups with additional adjustments to address potential differences between groups (i.e., use of pretests, control variables, matching procedures).
- c) Replication Study: For replication studies, you should describe the existing evidence of the intervention's beneficial impact on student outcomes from at least one prior study that would meet the requirements of the Institute's Efficacy/Replication goal. To this end, you should clearly describe the prior efficacy study (or studies), including the sample, the design, measures, fidelity of implementation of the intervention, analyses, and the results so that

reviewers have sufficient information to judge its quality. Also, you should justify why the impact found in the prior study would be considered of practical importance. Second, you should describe the practical and theoretical importance of carrying out another efficacy study on the intervention. Replication studies are intended to generate evidence that an intervention can work (or to gain information about the limitations of an intervention – where or how it does not work – and what modifications might be needed) under diverse conditions. These diverse conditions may include different populations of students (e.g., differences in socio-economic status, race/ethnicity, prior achievement level), teachers (e.g., specialists versus generalists), and schools (e.g., those in state improvement programs vs. those not, rural vs. urban). In addition, replication studies may also evaluate changes in the composition of the intervention (e.g., use different components, vary the emphases among the components, change the ordering of the components) or the way in which its implementation is supported (e.g., changing the level of support, providing support in alternative ways such as in-person versus online). This type of research can identify ways to increase the impact of the intervention, improve its efficiency, or reduce its cost in comparison to what was done in the prior efficacy study. You should clearly distinguish your study from prior efficacy studies and describe the additional contribution it will make.

- d) **Follow-up study:** For a follow-up study, you should describe the existing evidence of the intervention’s beneficial impact on student outcomes from a previous efficacy study (either completed or ongoing) that would meet the requirements of the Institute’s Efficacy and Replication goal. To this end, you should clearly describe the completed or ongoing efficacy study, including the sample, the design, measures, fidelity of implementation of the intervention, analyses, and the results so that reviewers have sufficient information to judge its quality. You should also justify why the impact found would be considered of practical importance. In addition, you must provide evidence that you have access to research participants for successful follow up (e.g., letters of commitment from schools or districts to be included in Appendix C). Also, you should discuss why the original impacts would be expected to continue into the future (this may require revising the theory of change). Follow-up studies take one of two forms and the rationale you provide will differ by whether you intend to follow the students who received the intervention or the education personnel who implemented the intervention.

Following Students: Under this first type of follow-up study, you would follow students who took part in the original study as they enter later grades (or different places) where they do not continue to receive the intervention in order to determine if the beneficial effects are maintained in succeeding time periods (often grades). These studies examine the sustainability of the impacts of the intervention on students after it has ended. Student attrition during the prior study and the ability to follow students into later grades (especially at key transition points that entail moving schools) are key factors in the success of such follow-up studies. You should include a CONSORT flow diagram showing the numbers of participants at each stage of the prior study and discuss expected levels of attrition in the follow-up study, how it will be reduced, and its impact on the interpretation of the results.¹⁴

Following Education Personnel: Under the second type of follow-up study, you would determine the impact on a new group of students who are now entering the grade or setting

¹⁴ 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. The Institute encourages researchers to use these tools in their Efficacy/Replication and Effectiveness research projects. The CONSORT Statement can be found at <http://www.consort-statement.org/consort-statement/overview0/>.

where the intervention took place. These studies examine the sustainability of the intervention's implementation and impacts after the additional resources provided by the original study are withdrawn. For example, after an intensive third grade teacher professional development program that had beneficial results on student reading comprehension ends, a follow-up study could determine whether the next year's 3rd grade class continued to receive similar benefits from having the trained teachers in comparison to the students having the control teachers. Attrition of the education personnel is a key factor in these follow-up studies, and you should show that enough treatment teachers (or other education personnel) remain to maintain the intervention's fidelity of implementation and that the make-up of the control teachers does not change in a way that would differentially impact student outcomes. In addition, you should discuss how you will determine whether the incoming cohort of students is similar to the one in the original study, whether the treatment and control students are similar enough to compare (e.g., schools or parents aren't selecting specific students to receive the treatment in a manner that could impact the student outcomes), and what you will do should they not be similar in either way.

It can be helpful to end the Significance section with a summary paragraph justifying the importance of the proposed work. From the reviewers' perspective, such a paragraph organizes the arguments made throughout the Significance section and better prepares them to read the Research Plan.

(ii) Research Plan

Your Research Plan must clearly describe: (a) the sample and setting; (b) an appropriate research design that meets WWC evidence standards (with or without reservations); (c) a detailed power analysis; (d) the measures that will be used to assess proximal and distal outcomes, fidelity of implementation, and comparison group practices; (e) key moderators or mediators; and (e) the data analyses.

Sample and Setting

You 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. You should show how this sample addresses the overall aims of the project. Additionally, you should describe strategies to increase the likelihood that participants (e.g., schools, teachers, and/or students) will join the study and remain in the study over the course of the evaluation.

Research Design

You must provide a detailed description of the research design. Efficacy/Replication projects are to provide causal analysis, and you must show how you will be able to make causal inferences based on the results from your design. You should describe how potential threats to internal validity would be addressed.¹⁵ For all types of research designs, including those using random assignment, you should explain how you will document that the intervention and comparison conditions are equivalent at the outset of the study and how you will document the level of bias occurring from overall and differential attrition rates.¹⁶

In the Significance section you described the intervention, how it would be implemented, and what supports are expected to be necessary for a successful implementation. In addition to discussing how your Research Design will be used to evaluate the impact of the intervention, you should also address how it identifies and assesses the factors associated with successful implementation of the intervention. You should collect data on the conditions in the school setting that may affect the fidelity of implementation and that can help you to understand why the intervention is or is not

¹⁵ 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.

¹⁶ See pages 11-16 of the WWC Procedures and Standards Handbook: Version 2.1 (September 2011) available at http://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_procedures_v2_1_standards_handbook.pdf.

implemented with high fidelity. If your proposed efficacy study relies on secondary data analyses of historical data that does not contain this information, you are not required to include this type of analysis or the collection of fidelity data in your application.

In describing your design, you should give a thoughtful justification for 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 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 practical 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*. 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*. For either type of business-as-usual, you should detail as much as possible the treatment or treatments received in the comparison group. When you clearly describe 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, you should describe strategies for reducing potential contamination between treatment and comparison groups. You do not necessarily need to randomize at the school level to avoid contamination between groups especially if you identify conditions and processes that are likely to reduce the likelihood of contamination.

Typical designs for Efficacy/Replication projects include randomized controlled trials, regression discontinuity designs, and strong quasi-experimental designs.

- a) Randomized Controlled Trials: 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, you should clearly state and present a convincing rationale for the unit of randomization (e.g., student, classroom, teacher, or school). You should explain the procedures for random assignment of groups (e.g., schools) or participants to intervention and comparison conditions and how the integrity of the assignment process will be ensured.¹⁷
- b) Regression Discontinuity Designs: Studies using regression discontinuity designs may also provide unbiased estimates of the effects of education interventions. If you propose to use a regression discontinuity design you should explain the appropriateness of the assignment variable, show that there is a true discontinuity, document that no manipulation of the assignment variable has occurred and that the composition of the treatment and comparison group does not differ in ways that would indicate selection

¹⁷ What a randomized controlled trial must do to meet the WWC’s evidence standards is described in the WWC Procedures and Standards Handbook: Version 2.1 (September 2011) available at http://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_procedures_v2_1_standards_handbook.pdf.

bias, and include sensitivity analyses to assess the influence of key procedural or analytic decisions on the results.¹⁸

- c) **Quasi-Experimental Designs:** You may propose a quasi-experimental design (other than a regression discontinuity design) when randomization is not possible. You should justify that the proposed design permits drawing causal conclusions about the effect of the intervention on the intended outcomes. You should discuss how selection bias will be minimized or modeled.¹⁹ 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. Similarly, 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). You 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 can only meet the WWC's standards for evidence *with* reservations, it is important to detail how you will ensure that the study meets these standards (e.g., by establishing equivalence between treatment and comparison groups) to prevent the study from being designated by the WWC as not meeting evidence standards.²⁰

Power

You should clearly address the statistical power of the research design to detect a reasonably expected and minimally important effect. You should address the clustering of participants (e.g., students in classrooms and/or schools) in your power analysis. A strong discussion of power will include the following:²¹

- a) The minimum effect of the intervention you will be able to detect, and a justification as to
- why this level of effect would be expected from the intervention and
 - why this would be a practically important effect.
- b) A description of how either the power for detecting the minimum effect or the minimum detectable effect size was calculated for the sample in answering the primary research questions. You should provide the statistical formula used and also
- describe the parameters with known values used in the formula (e.g., number of clusters, number of participants within the clusters),
 - describe the parameters whose values are estimated and how those estimates were made (e.g., intraclass correlations, role of covariates)
 - describe other aspects of the design and how they may affect power (e.g., stratified sampling/blocking, repeated observations), and
 - describe predicted attrition and how it was addressed in the power analysis.

¹⁸ What a regression discontinuity design must do to meet the WWC standards of evidence is described in the WWC Procedures and Standards Handbook: Version 2.1 (September 2011) available at

http://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_procedures_v2_1_standards_handbook.pdf.

¹⁹ 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.

²⁰ 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: Version 2.1 (September 2011) available at

http://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_procedures_v2_1_standards_handbook.pdf.

²¹ 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.

- c) A similar discussion of the points made in sections a and b above should be provided for any causal analyses to be done using subgroups of the proposed sample.

Measures

You should give careful consideration to the selection of measures and justify the appropriateness of the chosen measures concerning: (a) outcomes, (b) fidelity of implementation of the intervention, and (c) what the comparison group receives. You should provide information on the reliability and validity of your measures. The Institute recognizes that there may be a need for some measurement development to be conducted in Efficacy/Replication projects (e.g., measures closely aligned to the treatment, fidelity of implementation measures). In such cases, you should detail how those measures will be developed and validated.

You should describe the procedures for and the timing of the collection of data that will be used as measures 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).

- a) Outcomes: You should include student outcome measures that will be sensitive to the change in performance that the intervention is intended to bring about (e.g., researcher developed measures that are aligned with the experiences of the treatment group), outcome measures that are not strictly aligned with the intervention and are, therefore, fair to the control group, and measures of student outcomes that are of practical interest to educators. For example, applications to evaluate interventions to improve academic outcomes should include measures such as grades, standardized measures of student achievement, or state end-of-course exams. Applications 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. For interventions designed to directly change the teaching and learning environment and, in doing so, indirectly affect student outcomes, you must provide measures of student outcomes, as well as measures of the proximal outcomes (e.g., teacher or leader behaviors) that are hypothesized to be directly linked to the intervention.
- b) Measures of Implementation Fidelity: You should specify how the implementation of the intervention will be documented and measured. This will include describing your fidelity measure(s) to assess the implementation of the intervention. You should make clear how the fidelity measures capture the core components of the intervention. Your description of the fidelity measures and the measures of what is occurring in the comparison group (see below) should show that the two sets of measures are sufficiently comprehensive and sensitive to identify and document critical differences between what the intervention and comparison groups receive. You should also discuss how you will identify and assess factors associated with the fidelity of implementation; such information may provide insight into what supports are needed within schools or districts to successfully implement the intervention with high fidelity.
- c) Measures of Comparison Group Practices: Comparisons of interventions against other conditions are only meaningful to the extent that you describe what the comparison group receives or experiences. You should identify the measure(s) you will use to measure the comparison group's experience so that you can compare intervention and comparison groups on the implementation of critical features of the intervention. Such a comparison will allow you to determine whether there was clear distinction in what the groups received or whether both groups received key elements of the intervention. You can then use this determination

for *post hoc* explanations of why the intervention does or does not improve student learning relative to the counterfactual.

Moderators and Mediators

The Institute expects Efficacy/Replication studies to examine relevant moderating factors but recognizes that many efficacy studies are not powered to rigorously test the effects of a wide-range of moderators. Therefore, you should focus on a small set of moderators for which there is a strong theoretical and/or empirical base to expect they will moderate the impact of the intervention on the student outcomes measured. Moderating variables that are also likely to affect outcomes in the comparison condition should be measured in both the treatment and the comparison groups. The Institute encourages your use of observational, survey, and qualitative methodologies to assist in the identification of factors that may explain the variation in the effect of the intervention. The Institute also encourages you to consider the use of single-case experimental designs as a complement to randomized controlled trials to understand factors or variables that affect the response to the intervention (e.g., to manipulate components of an intervention to determine which are most important to responsiveness).

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

Data Analysis

You must include a detailed description of your data analysis procedures. You should make clear how the data analysis directly answers your research questions/hypotheses. You should include your data analysis plans for evaluating the impact of the intervention and for additional analyses such as subgroup impacts, the roles of moderators and mediators, and fidelity of implementation (including identifying what is needed for sufficient implementation of the intervention). For quantitative data, specific statistical procedures, including the equations for the models to be estimated, should be described. Your analysis procedures should address any clustering of students in classes and schools, even when individuals are randomly assigned to condition, which generally requires specialized multilevel statistical analyses. In addition, you should discuss how exclusion from testing and missing data will be handled in your analysis. Also, if you intend to link multiple data sets, you should provide sufficient detail for reviewers to judge the feasibility of the linking plan.

For qualitative data, you should delineate the specific methods used to index, summarize, and interpret the data. You should show how the qualitative data will be used in the quantitative analysis (e.g., incorporating fidelity of intervention data into the impact analysis²²) and/or how the qualitative analyses will complement and help explain the findings from the quantitative analysis.

(iii) Personnel

For your application to be competitive, you will need a research team that collectively demonstrates expertise in the relevant content domain(s), the implementation of the intervention if that is part of the project, the methodology required to test the impact of the intervention, and working with schools or other education agencies.

This section should identify all key personnel on the project team including those from other organizations. You should briefly describe the following for all key personnel:

- 1) qualifications,
- 2) roles and responsibilities within the project,

²² 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.

- 3) percent of time and calendar months per year (academic plus summer) to be devoted to the project, and
- 4) past success at disseminating research findings in peer-reviewed scientific journals.

If any part of the study is to be conducted by another organization (e.g., development of measures, data collection, analysis of data), that organization and their personnel involved must be included in the application. It is not acceptable to simply propose that grant funds be used to contract with an unspecified organization to develop, collect, and/or analyze measures or data.

Key personnel may be from for-profit entities. However, if these entities are to be involved in the commercial production or distribution of the intervention to be developed, you must include a plan for how their involvement will not jeopardize the objectivity of the research.

The Institute allows a researcher who has been involved in the development of an intervention to be the Principal Investigator of an Efficacy/Replication project to evaluate that intervention provided that reasonable safeguards are in place to ensure the objectivity and integrity of the evaluation. If you are both the Principal Investigator and a developer of the intervention to be evaluated, you should describe the steps you will take to avoid any appearance of conflict of interest. The Institute recommends the following steps be taken:

- The assignment of units to condition is conducted by individuals 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.
- The collection and coding of outcome data are under the supervision of someone other than those who were or are involved in the development or distribution of the intervention.
- The data analysis is conducted by individuals who are not involved with the development or distribution of the intervention and who have no financial interest in the outcome of the evaluation.

(iv) Resources

You should describe the institutional resources of all institutions involved in the proposed research that will be used to support your Efficacy/Replication study. You should discuss the overall management of the research project and what resources and procedures are available to support the successful completion of this project. You should describe your access to the schools (or other education delivery settings) in which the research will take place and to any data sets that you require. In addition, you should include letters of support in Appendix C documenting the participation and cooperation of the schools and/or the organizations holding the data. These letters should convey that the organizations understand what their participation in the evaluation will involve (e.g., annual student and teacher surveys, implementing all components of the intervention if placed into the treatment group, not receiving the intervention for X-number of years if placed on a wait-list control, providing specific data sets).

c. Awards

Efficacy and Replication Projects

Your proposed length of project should reflect the scope of work to be accomplished. **The maximum duration of an Efficacy project or a Replication project is 4 years.** Your budget should reflect the scope of the work to be done and will vary according to the type of intervention being evaluated. **The maximum award for an Efficacy/Replication project is \$3,500,000 (total costs = direct + indirect costs).**

Efficacy Follow-Up Projects

The maximum duration for an Efficacy Follow-Up project is 3 years. Your budget should reflect the scope of the work to be done and will vary according to the type of follow-up assessments being collected. **The maximum award for an Efficacy Follow-Up project is \$1,200,000 (total costs = direct + indirect costs).**

Please note that any application proposing a project length longer than the maximum duration will be deemed nonresponsive to the Request for Applications and will not be accepted for review. Similarly, an application proposing a budget higher than the maximum award will be deemed nonresponsive to the Request for Applications and will not be accepted for review.

D. Requirements for Goal Four: Effectiveness

a. Purpose of Effectiveness Projects

The Effectiveness goal is intended to determine whether or not fully developed interventions (e.g., practices, programs, and policies) with prior evidence of efficacy produce a beneficial impact on education outcomes for students (student outcomes) relative to a counterfactual when they are **implemented under routine practice** in authentic education delivery settings (e.g., classrooms, schools, districts). The individuals involved in the evaluation must be individuals who did not and do not participate in the development or distribution of the intervention.

Effectiveness projects are to determine if an intervention to improve student outcomes *will work* when implemented under conditions of routine practice as opposed to whether it *can work* under “ideal” conditions (as expected in an Efficacy/Replication project). To this end, you must implement the intervention under what would be considered routine practice that is similar to how the user (e.g., student, teacher, school, district) would implement the intervention on their own and outside of a research study. Routine practice would not include the extra implementation support, involvement of more highly trained personnel, or focus on a homogeneous sample that is allowed under Efficacy/Replication.

Under the Effectiveness goal, you may also apply for an Effectiveness Follow-Up project whose purpose is to follow students after they have participated in an Effectiveness study that found beneficial impacts of the intervention to determine if those impacts continue over time.

The Institute expects the grantee to provide the following at the *end* of a funded Effectiveness project:

- 1) Evidence of the impact of a clearly specified intervention implemented under routine conditions on relevant student outcomes relative to a comparison condition using a research design that meets (with or without reservation) the Institute’s What Works Clearinghouse evidence standards (<http://ies.ed.gov/ncee/wwc/>).
- 2) Conclusions on and revisions to the theory of change that guides the intervention and a discussion of the broader contributions the study makes to our theoretical understanding of education processes and procedures.
- 3) If a beneficial impact is found, then the identification of the organizational supports, tools, and procedures that are needed for sufficient implementation of the core components of the intervention under routine practice.
- 4) If a beneficial impact is not found, then an examination of why the findings differed from those of the previous efficacy studies on the intervention and a determination of whether and what type of further research would be useful to revise the intervention and/or its implementation.

If you are determining whether to submit to Efficacy/Replication or to Effectiveness, consider whether: (a) you intend to implement the intervention under “ideal” or routine conditions (Effectiveness requires routine conditions), (b) you have evidence of the intervention’s efficacy (evidence from at least two previous efficacy studies are needed to submit to Effectiveness), and (c) you would be considered an independent evaluator under the Effectiveness criteria (see Personnel).

If an intervention has undergone an Effectiveness study, you may apply to do an additional Effectiveness study if the routine conditions under which you proposed to implement the intervention differ from those of the prior study. For example, if an intervention has been evaluated for its effectiveness in urban schools, the routine conditions in rural schools arguably are different enough to justify a second Effectiveness study. Similar arguments can be made for other populations or for changes in the routine

implementation of the intervention (e.g., if the intervention's in-person coaching model switched to an on-line model). In such cases, you should show how an additional Effectiveness study will contribute to evidence for the generalizability of the intervention's impact and should cite the evidence from the previous Effectiveness study in support of the proposed one.

b. The Project Narrative

In your 25-page project narrative, use the **Significance** section to explain why it is important to evaluate this intervention under conditions of routine implementation and to describe the evidence of the intervention's beneficial impacts on student outcomes from at least two separate studies that meet the requirements of the Institute's Efficacy/Replication goal. Use the **Research Plan** section to detail the evaluation of the intervention. Use the **Personnel** section to describe the relevant expertise of your research team, their responsibilities within and time commitments to the project, and the independence of the evaluators from the developers/distributors of the intervention. Use the **Resources** section to describe your access to institutional resources, schools, and relevant data sources.

(i) Significance

In the Significance section of the project narrative you should clearly describe (a) your research aims, (b) the fully developed intervention, (c) the theory of change for the intervention, (d) strong evidence of the intervention's impact from at least two prior efficacy studies, (e) implementation under routine practice, and (f) a compelling rationale for testing the impact of the intervention in the proposed manner.

Research Questions

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

The Intervention

You should clearly describe the intervention, including its individual components. In addition, you should describe the processes and materials (e.g., manuals, websites, training, coaching) that will be used to support its implementation. You should provide evidence that the intervention is fully developed and that all materials required for its implementation are readily available for use in authentic education delivery settings.

Also, you should describe the fidelity measure(s) that you will use to assess the implementation of the intervention as well as the measures you will use to determine what the comparison group is receiving.

Because implementation is to take place under routine conditions, the intervention users (e.g., students, teachers, schools, districts) are to directly monitor and adjust their fidelity of implementation rather than rely upon the evaluation team's monitoring of fidelity. Therefore, you should also describe any tools or procedures that will be provided to the intervention users to enable them 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).

Theory of Change

You should clearly present the theory of change for the intervention by describing how the features or components of the intervention relate to each other and to the intended student outcomes both temporally (operationally) and theoretically (e.g., why A leads to B). When you clearly describe the model that guides the intervention and its individual components, 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?). For interventions designed to *directly* affect the teaching and learning environment and, thereby, *indirectly* affect student outcomes, you should be clear in your theory of change to identify the proximal outcomes that the intervention is designed to affect (e.g., teacher practices) and how these proximal outcomes are to impact the more distal student outcomes intended to be improved.

Strong Evidence of Educationally Meaningful Effects

You should provide strong evidence of the efficacy of the intervention to justify your application to conduct an Effectiveness study. Specifically, you must describe the results of two or more rigorously conducted evaluations that would meet the criteria of Efficacy/Replication studies (e.g., a research design that meets WWC evidence standards with or without reservations). As noted under the Efficacy/Replication goal, such studies may have taken place under “ideal” conditions (i.e., with more implementation support or more highly trained personnel than would be expected under routine practice, or with a homogeneous sample). To enable reviewers to judge the quality of the efficacy studies, you should clearly describe the conditions under which the intervention was implemented, the research design and methodology of the efficacy studies, and the results of the studies. When discussing the results you should describe the size and statistical significance of the effects that were found and indicate (e.g., including the statistical formula) how any reported effect sizes were calculated. In addition, you should discuss how the results show a practically important impact on student outcomes large enough to justify an Effectiveness study.

For an Effectiveness Follow-Up study, you should describe the existing evidence of the intervention’s beneficial impact on student outcomes from the previous study (either completed or ongoing) that would meet the requirements of the Institute’s Effectiveness goal. To this end, you should clearly describe the prior study, including the sample, the design, measures, fidelity of implementation of the intervention, analyses, and the results so that reviewers have sufficient information to judge its quality. You should also justify why the impact found would be considered of practical importance. In addition, you must provide evidence that you have access to research participants for successful follow up (e.g., letters of commitment from schools or districts to be included in Appendix C). In your Follow-Up study, you will be following students who took part in the original study as they enter later grades (or different places) where they do not continue to receive the intervention in order to determine if the beneficial effects are maintained in succeeding time periods. Student attrition during the prior study and the ability to follow students into later grades (especially at key transition points that entail moving schools) are key factors in the success of such follow-up studies. You should include a CONSORT flow diagram showing the numbers of participants at each stage of the prior study and discuss expected levels of attrition in the follow-up study, how it will be reduced, and its impact on the interpretation of the results.²³

Routine Practice

Effectiveness studies are to determine if interventions are effective when the developers/distributors of the program do not provide any more support than would be available under routine practice. Therefore, the intervention should be implemented in schools and districts as it would be if a school and/or district had chosen to use the intervention on its own apart from its participation in a research and evaluation study (e.g., with only the implementation support that would normally be provided by the developer or distributor).

²³ 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 Efficacy study research projects. The CONSORT Statement can be found at <http://www.consort-statement.org/consort-statement/overview0/>.

You should clearly describe the routine conditions under which the evaluation will take place. Also, you should describe in detail the routine practices through which the intervention will be implemented, making clear that they would be the same as for any school or district intending to use the intervention. You should contrast these implementation supports to those used under the previous efficacy evaluations of the intervention. In this way, you will identify any implementation differences between the previous efficacy evaluations and this effectiveness evaluation (i.e., any differences between "ideal implementation" and "routine practice").

Rationale

In justifying your study, you should address why the intervention is likely to produce better student outcomes relative to current practice when implemented under routine practice. Your justification should show that a combination of theory of change and evidence from the previous evaluations of the intervention lead to the expectations of a successful implementation of the intervention and a beneficial impact on students under the routine conditions of implementation.

In addition, you should address the overall practical importance of the intervention (why education practitioners or policymakers should care about the results of the proposed evaluation).

For Effectiveness Follow-Up studies, you should also discuss why those students who received the intervention would be expected to continue having beneficial impacts in future grades when they no longer receive it (this may require revising the theory of change).

It can be helpful to end the Significance section with a summary paragraph justifying the importance of the proposed work. From the reviewers' perspective, such a paragraph organizes the arguments made throughout the Significance section and better prepares them to read the Research Plan.

(ii) Research Plan

The requirements for your Research Plan are the same as those for Efficacy/Replication with three exceptions:

- a) Under Efficacy/Replication a purposefully homogeneous sample could be selected. Under Effectiveness, selection of a more heterogeneous sample of the type that would be found under routine use of the intervention is expected. The sample does not need to be generalizable across a state, region, or the nation but it is expected to be generalizable within the target of the intervention and the scope of the Effectiveness study. For example, a study of an intervention to support low-performing schools within a large urban district would be expected to select its sample from all low-performing schools in the district not only those schools most likely to successfully implement the intervention.
- b) As noted under the Significance section, the users of the intervention are to self-monitor and improve the fidelity of implementation of the intervention as they would be expected to if there was no ongoing research study. You should discuss how the research team will evaluate the success of this self-monitoring and adjustment of fidelity of implementation.
- c) A Cost-Feasibility analysis must be included. This analysis is to assess the financial costs of program implementation and assist schools in understanding whether implementation of the program is practicable given their available resources. You should collect data 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 you to conduct an economic evaluation of the program (e.g., cost-

benefit, cost-utility, or cost-effectiveness analyses), although you may propose such evaluation activities if desired.²⁴

(iii) Personnel

For your application to be competitive, you will need a research team that collectively demonstrates expertise in the relevant content domain(s), the implementation of the intervention if that is part of the project (e.g., if the developer is providing routine implementation support within the project), the methodology required to test the impact of the intervention, and experience working with schools or other education agencies.

If any part of the study is to be conducted by another organization (e.g., development of measures, data collection, analysis of data), that organization and their personnel involved must be included in the application. It is not acceptable to simply propose that grant funds be used to contract with an unspecified organization to develop, collect, and/or analyze measures or data.

This section should identify all key personnel on the project team including those from other organizations. You should briefly describe the following for all key personnel:

- 1) qualifications,
- 2) roles and responsibilities within the project,
- 3) percent of time and calendar months per year (academic plus summer) to be devoted to the project, and
- 4) past success at disseminating research findings in peer-reviewed scientific journals.

Effectiveness studies 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. You as 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.

These requirements do not preclude the developer or distributor from having some role in the evaluation. For example, an intervention may routinely require a teacher professional development course or a train-the-trainers course provided by the developer/distributor. These may be provided in their routine manner (i.e., with nothing more than the routine training provided). However, involvement of the developer or distributor must not jeopardize the objectivity or independence of the evaluation. You should carefully describe the role, if any, of the developer/distributor in the intervention.

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

(iv) Resources

You should describe the institutional resources of all the institutions involved in the proposed research that will be used to support your Effectiveness study. You should describe your access to the schools (or other education delivery settings) in which the research will take place and to any data sets that you require. In addition, you should include letters of support in Appendix C documenting the participation and cooperation of the schools and/or the organizations holding the data. These letters should convey that the organizations understand what their participation in the evaluation will involve (e.g., annual student and teacher surveys, implementing all components of the intervention if placed into the

²⁴ 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.

treatment group, not receiving the intervention for X-number of years if placed on a wait-list control, providing specific data sets).

c. Data Sharing Plan

If you are applying under the Effectiveness goal, you must include a plan for data sharing. The Data Sharing Plan (DSP) should address the data to be generated by the research, how the data will be managed, how confidentiality of private information will be ensured, and how the data will be shared with others. Your DSP should be a maximum of 5 pages long and placed in Appendix D.

Background

The Institute released a policy statement on data sharing in June 2011 (<http://ies.ed.gov/funding/datasharing.asp>), expressing its commitment to advancing education research through the sharing of scientific data collected through its grant-funded research programs. The Institute then published a Data Sharing Implementation Guide in September 2011 (http://ies.ed.gov/funding/datasharing_implementation.asp) to describe how the policy will be implemented and to provide guidance to grant applicants. You should review these documents to familiarize yourself with the intent of the policy and the specific implementation requirements.

Data Sharing Plan

Your DSP should address the requirements as set forth in the policy statement and Implementation Guide including a comprehensive overview of how the final research data will be shared. DSPs are expected to differ, depending on the nature of the project and the data collected. However, you should address the following in the DSP:

- Type of data to be shared;
- Procedures for managing and for maintaining the confidentiality of the data to be shared;
- Roles and responsibilities of project or institutional staff in the management and retention of research data (this section should include the procedure should the Principal Investigator and/or the Co-principal investigator leave the project or their institution);
- Expected schedule for data sharing;
- Format of the final dataset;
- Documentation to be provided;
- Method of data sharing (e.g., provided by the Principal Investigator, through a data archive);
- Whether or not a data sharing agreement that specifies conditions under which the data will be shared is required; and
- Any circumstances which prevent all or some of the data from being shared. This includes data that may fall under multiple statutes and hence must meet the confidentiality requirements for each applicable statute (e.g., data covered by Common Rule for Protection of Human Subjects, FERPA and HIPAA).

Inclusion of Data Sharing in Other Sections of Your Application.

In the Personnel section of the Project Narrative, you should identify which personnel will be responsible for implementing the DSP. In the budget and budget justification sections of the application, you should include and describe the costs of data sharing. Costs can include those associated with preparing the data set and documentation, and storing the data. Costs related to the use of data archives or data enclaves should specifically note the activities associated with the costs (e.g., training on the use of the data). For the Human Subjects section of the application, you should discuss the potential risks to research participants posed by data sharing and steps taken to address those risks.

Review of Data Sharing Plan.

The peer review process will not include the DSP in the scoring of the scientific merit of the application. The Institute's Program Officers will be responsible for reviewing the completeness of the proposed DSP. If your application is being considered for funding based on the scores received during the peer review process but your DSP is determined incomplete, you will have to complete your DSP before an award will be made. Once an award is made, the Institute's program officers will be responsible for monitoring the DSP over the course of the grant period.

d. Awards

Effectiveness Projects

Your proposed length of project should reflect the scope of work to be accomplished. **The maximum duration of an Effectiveness project is 5 years.** Your budget should reflect the scope of the work to be done and will vary according to the type of intervention being evaluated. **The maximum award for an Effectiveness project is \$5,000,000 (total costs = direct + indirect costs).**

Under the Effectiveness goal, no more than 25% of the award may be allocated to the cost of the intervention. The cost of the intervention includes any materials, textbooks, software, computers, or training required to implement the intervention. When calculating the cost of the intervention you should not include salaries for school or district staff who implement the intervention as part of their regular duties or 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. You should note the budgeted cost of the intervention and the percentage of the project's total funding represented by the cost of the intervention in your budget narrative.

Effectiveness Follow-Up Projects

Your proposed length of project should reflect the scope of work to be accomplished. **The maximum duration for an Effectiveness Follow-Up project is 3 years.** Your budget should reflect the scope of the work to be done and will vary according to the type of follow-up assessments being collected. **The maximum award for an Effectiveness Follow-Up project is \$1,500,000 (total costs = direct + indirect costs).**

Please note that any application proposing a project length longer than the maximum duration will be deemed nonresponsive to the Request for Applications and will not be accepted for review. Similarly, an application proposing a budget higher than the maximum award will be deemed nonresponsive to the Request for Applications and will not be accepted for review.

E. Requirements for Goal Five: Measurement

a. Purpose of Measurement Projects

The Measurement goal is intended to support (1) the development of new assessments or refinement of existing assessments (develop/refine) and the validation of these assessments or (2) the validation of existing assessments for specific purposes, contexts, and populations. Under *refinement*, the Institute includes changing existing assessments or changing the delivery of existing assessments in order to increase efficiency, improve measurement, improve accessibility, or provide accommodation for test takers. Proposed assessments must meet the specific content and sample requirements detailed under the research topic to which the application is submitted.

The Institute expects the grantee to provide the following at the *end* of a funded Measurement project to **develop/refine and validate an assessment**:

- 1) A detailed description of the assessment and its intended use.
- 2) A detailed description of the iterative development processes used to develop or refine the assessment, including field testing procedures and processes for item revision.
- 3) A well-specified conceptual framework that provides the theoretical basis for the assessment and its validation activities.
- 4) A detailed description of the validation activities.
- 5) Evidence on the reliability and validity of the assessment for the specified purpose(s), populations, and contexts.

The Institute expects the grantee to provide the following at the *end* of a funded Measurement project to **validate an existing assessment**:

- 1) A well-specified conceptual framework that provides the theoretical basis for the assessment and its validation activities.
- 2) A detailed description of the validation activities.
- 3) Evidence on the reliability and validity of the assessment for the specified purpose(s), populations, and contexts.

The Institute supports research on assessments intended to assess students (e.g., for screening, progress monitoring, formative assessment, outcome assessment), education professionals (e.g., credentialing or evaluation of teachers, principals, and related services providers), and education systems (e.g., accountability standards).

All assessments developed and/or validated must be either directly or indirectly related to measures of student academic outcomes. Applicants proposing research on measures of constructs that support student academic learning (e.g., motivation) must describe a theoretical rationale and validation activities that relate the construct to student academic outcomes. Applicants proposing research on assessments of education professionals or education systems must relate the assessments to measures of student academic outcomes (e.g., a measure of a specific teacher instructional practice must also show that the instructional technique is related to an improved student academic outcome).

Applications to the Measurement goal are for research in which the primary focus is on assessment development and/or validation. Applications for other types of research on assessment may fit better under other research goals. If you need additional information before you can fully develop the conceptual framework that will provide the theoretical basis for your assessment development and validation, you should first apply to obtain this information under the Exploration goal. For example, if you wanted to create a new assessment of teacher competencies for which there is not an established theoretical or empirical basis you could first apply to Exploration to identify the actual competencies

linked to the student outcomes then apply to Measurement to develop and validate an assessment of those competencies. Applications that focus on developing an intervention but also include assessment development in support of the intervention (e.g., development of fidelity instruments or of an outcome measure that is closely aligned with the intervention) must be submitted to Development/Innovation. Applications to rigorously test whether or not the use of an already developed assessment impacts student outcomes (e.g., exit exams, formative assessments) must be submitted to Efficacy/Replication or Effectiveness.

b. The Project Narrative

In your 25-page project narrative, use the **Significance** section to explain why it is important to develop/refine and/or validate the assessment for the stated use. Use the **Research Plan** section to detail the methodology you will use to develop/refine and/or validate the assessment. Use the **Personnel** section to describe the relevant expertise of your research team and their responsibilities within and time commitments to the project. Use the **Resources** section to describe both your access to institutional resources, schools, and relevant data sources and your past work supported by the Institute's grants. You are encouraged to refer to the most recent edition of *Standards for Educational and Psychological Testing*²⁵ for best practices in assessment development and validation.

(i) Significance

In the Significance section you should clearly describe the goals and end products of your project, the theoretical and empirical rationale for the assessment being studied or developed, and a compelling rationale justifying the importance of the proposed research.

In presenting the significance of your project **to develop/refine and validate an assessment**, you should do the following.

- 1) Describe the specific need for developing and validating a new assessment or refining and validating an existing assessment. Discuss how the results of this work will be important both to the field of education research and to education practice and education stakeholders (e.g., practitioners and policymakers).
- 2) Describe any current assessments that address this need and why they are not satisfactory.
- 3) Describe your proposed assessment, its key components, and how it is to be used. Contrast these with current typical assessment practice and its identified shortcomings. A detailed description of the assessment will clearly show that it has the potential to provide a better measure of the intended construct(s) because (a) it is sufficiently different from current assessments practice and does not suffer from the same shortcomings, (b) it has a strong theoretical or empirical basis, and (c) its implementation appears feasible for researchers, teachers and schools given their resource constraints (e.g., time, funds, personnel, schedules).
- 4) Describe the **conceptual framework**. The conceptual framework describes how the construct(s) to be measured is/are represented in relationship to relevant theory and the evidence that will be collected to support adequate representation of the construct(s). The conceptual framework provides operational definitions of the construct(s) of measurement, summarizes how the assessment will provide evidence of the construct(s) identified in the rationale, and describes the processes for reasoning from assessment items and scores to making intended inferences regarding the construct(s) of measurement. The framework also describes the intended population for which the assessment is meant to provide valid inferences. Appropriate evidence will vary based on the construct to be measured and the proposed use(s) of the assessment. For example, if the purpose of a new algebra assessment is to predict readiness for the study of higher mathematics, evidence of both content coverage and prediction of future performance in advanced mathematics classes would be convincing. Similarly, validity

²⁵ The standards are under revision and the currently available version is: American Educational Research Association (1999). *Standards for Educational and Psychological Testing*. AERA: Washington, DC.

evidence for a new assessment of mathematical reasoning would prioritize documentation of the processes students use in responding to items.

- 5) Discuss how your validation activities fit within the conceptual framework and will provide convincing evidence of the validity of the assessment scores for specific purposes and populations.
- 6) Note if you are applying for a second Measurement award to further develop or validate an assessment that was the focus of a previous Measurement award, and, justify the need for a second award, and describe the results and outcomes of the previous award (e.g., the status of the assessment and its validation).

In presenting the significance of your project to **validate an existing assessment**, you should do the following.

- 1) Describe the specific need for validating an existing assessment. Discuss how the results of this work will be important both to the field of education research, and to education practice and education stakeholders (e.g., practitioners and policymakers).
- 2) Describe the current assessment you propose to validate.
- 3) Describe current validation evidence for this assessment and why it is not satisfactory for the proposed purpose(s).
- 4) Describe the **conceptual framework** for the assessment. The conceptual framework provides operational definitions of the construct(s) of measurement, summarizes how the assessment provides evidence of the construct(s) identified in the rationale, and describes the processes for reasoning from assessment items and scores to making intended inferences regarding the construct(s) of measurement. The framework also describes the intended population for which the assessment is meant to provide valid inferences.
- 5) Discuss how your validation activities fit within the conceptual framework and will provide convincing evidence of the validity of the assessment scores for specific purposes and populations.

It can be helpful to end the Significance section with a summary paragraph justifying the importance of the proposed work. From the reviewers' perspective, such a paragraph organizes the arguments made throughout the Significance section and better prepares them to read the Research Plan.

(ii) Research Plan

The Research Plan must clearly describe the methods for developing/refining and/or validating the assessment and how psychometric evidence will be gathered to support the utility of the assessment for the prescribed purpose. The sample and setting for each of these must be defined and shown to be appropriate for meeting the research aims of the project. Data analysis plans must include plans for treatment of missing responses and criteria for interpreting results. You must describe the characteristics, size, and analytic adequacy of samples to be used in each study, including justification for exclusion and inclusion criteria.

If you are proposing to use existing data sets (e.g., state or local student achievement databases) to validate an assessment, you must 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, provide sufficient detail of the linking method for reviewers to judge the feasibility of the plan.

If you are proposing to collect original data you must carefully describe the sample, measures (including reliability and validity for the specified purpose), and procedures proposed for the primary data collection.

If observational data will be collected, you must describe how the data will be collected (e.g., procedures for maintaining inter-observer reliability), coded, and analyzed.

Projects to Develop/Refine and Validate Assessments

Your application should describe the iterative process that will be used in designing and/or refining the assessment. This description should include detail on plans for field testing and revising items. In addition, you should describe how you will address the following aspects in assessment design to increase the assessment's capacity to provide valid inferences:

- a) Iterative procedures for developing, field testing, and selecting items to be used in the assessment and obtaining representative responses to items.
- b) Procedures for scoring the assessment, including justification for the scaling model that will be used to create scores. For example, if item response theory will be used to create scores describe the model that will be applied.
- c) Procedures for determining the reliability of the assessment for the intended purpose and population.
- d) Procedures for determining the validity of the assessment for the intended population, including:
 - procedures for demonstrating adequate coverage of the construct,
 - procedures for minimizing the influence of factors that are irrelevant to the construct,
 - justification for the types of convergent and divergent validity evidence that will be used (e.g., expert review, prediction of related outcomes, relationship to other outcomes), and
 - description of the statistical models and analyses that will be used (e.g., structural equation modeling).
- e) Plans for establishing the fairness of the test for all members of the intended population (e.g., differential item functioning).
- f) Processes 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).
- g) *If alternate forms will be developed*, the procedures for establishing the equivalency of the forms (i.e., horizontal equating).
- h) *If the proposed assessment is used to measure growth*, the procedures for establishing a developmental scale (e.g., vertical equating).

Projects to Validate an Assessment

Your application should describe the theoretical and analytic steps that you will undertake to provide evidence that an assessment measures the intended construct for a given purpose and population. You should address the following issues in assessment validation:

- a) Procedures for determining the reliability of the assessment for the intended purpose and population.
- b) Procedures for demonstrating adequate coverage of the construct.
- c) Procedures for minimizing the influence of factors that are irrelevant to the construct.
- d) Justification for the types of convergent and divergent validity evidence that will be used (e.g., expert review, prediction of related outcomes, relationship to other outcomes).
- e) Description of the statistical models and analyses that will be used (e.g., structural equation modeling).

Your description should include information on the types of validity evidence that will be used and justification for the adequacy of the evidence to support use of the assessment. For example, review by content experts may be an important component in supporting the validity of a science assessment, whereas analysis of how well the assessment predicts academic outcomes may be most appropriate for a behavioral measure. You should describe the rationale for the types of validity arguments that are most appropriate for the assessment and also provide details on the statistical models and analyses that will be conducted.

(iii) Personnel

For your application to be competitive, you will need a research team that collectively demonstrates the expertise in content domain(s), assessment development and administration, psychometrics, and statistical analysis to support your scope of work. In many projects it will be also be important to include staff with expertise working with teachers, in schools, or in other education delivery settings in which the proposed assessment is intended to be used.

This section should identify all key personnel on the project team including those from other organizations. You should briefly describe the following for all key personnel:

- 1) qualifications,
- 2) roles and responsibilities within the project,
- 3) percent of time and calendar months per year (academic plus summer) to be devoted to the project, and
- 4) past success at disseminating research findings in peer-reviewed scientific journals.

(iv) Resources

You should describe the institutional resources of all the institutions involved in the proposed research that will be used to support your Measurement study. You should describe your access to the schools (or other education delivery settings) in which the research will take place and to any data sets that you require. In addition, you should include letters of support in Appendix C documenting the participation and cooperation of the schools and/or the organizations holding the data. These letters should convey that the organizations understand what their participation in the study will involve (e.g., annual student and teacher surveys, student assessments, providing specific data sets).

If you have previously received a Measurement award and are applying for a grant to develop/refine and/or validate a new assessment, you should indicate the status of the previous assessment, its current use in education research, and/or the citing of your validation work in studies that use the assessment. In addition, you should discuss any theoretical contributions made by your previous work. By demonstrating that the results from your previous project are being used in education research, you provide a stronger case for your new application.

c. Awards

Measurement grants may vary in time and cost due to the nature of the proposed work. For example, the development of a new assessment may require more time than refinement of an existing assessment or validation of an existing assessment. Projects using existing data may require less time than projects that require new data collection. Your proposed length of project should reflect the scope of work to be accomplished. **The maximum duration of a Measurement project is 4 years.** An application proposing a project length of greater than 4 years will be deemed nonresponsive to the Request for Applications and will not be accepted for review.

Development and validation costs vary according to the type of assessment proposed. Your budget should reflect the scope of the work to be done. **The maximum award for a Measurement project is \$1,600,000 (total cost = direct costs + indirect costs).** An application proposing a budget higher than the maximum award will be deemed nonresponsive to the Request for Applications and will not be accepted for review.

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, ranging from two to five years. Please see details for each goal in *Part III Research Goals*.

16. FUNDING AVAILABLE

Although the Institute intends to support the research topics described in this announcement, all awards pursuant to this request for applications are contingent upon the availability of funds and the receipt of meritorious applications. The Institute does not plan to award a specific number of grants under a particular topic or goal. Rather, the number of projects funded under a specific topic or goal depends upon the number of high quality applications submitted to that topic or goal.

The size of the award depends on the goal and scope of the project. Please attend to the maximums set for project length and budget for each goal in *Part III Research Goals*. **If you request a project length longer than the maximum or a budget higher than the maximum, your application will be deemed nonresponsive and will not be reviewed.**

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.

Can I apply if I work at a for-profit developer or distributor of an intervention?

Yes, you may apply if you or your collaborators develop, distribute, or otherwise market products or services (for-profit or nonprofit) that can be used as interventions or components of interventions in the proposed research activities. However, the involvement of the developer or distributor **must not jeopardize the objectivity of the research**. In cases where the developer or distributor is part of the proposed research team, you should discuss how you will ensure the objectivity of the research in the project narrative.

Can I apply if I am not located in the United States or if I want to collaborate with researchers located outside of the United States?

You may submit an application if your institution is not located in the territorial United States. You may also propose working with sub-awardees who are not located in the territorial United States. In both cases, your proposed work must be relevant to education in the United States. Also, institutions not located in the territorial U.S. (both primary grantees and sub-awardees) **cannot charge indirect costs**.

Can I apply to do research on non-U.S. topics or using non-U.S. data?

All research supported by the Institute **must be relevant to education in the United States**.

18. 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.

Your institution is responsible for identifying the Principal Investigator. Your institution may elect to designate more than one Principal Investigator. In so doing, the 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.

The Principal Investigator is expected to attend one meeting each year (for up to 3 days) in Washington, D.C. with other grantees and Institute staff. The project's budget should include this meeting. Should the Principal Investigator not be able to attend the meeting, he/she can designate another member of the research team to attend.

19. SPECIAL CONSIDERATIONS FOR INDIRECT COST RATES

When calculating your expenses for research conducted in field settings, you should apply your institution's negotiated off-campus indirect cost rate, as directed by the terms of your institution's negotiated agreement with the federal government.

Institutions, both primary grantees and sub-awardees, not located in the territorial US cannot charge indirect costs.

20. DEMONSTRATING ACCESS TO DATA AND EDUCATION DELIVERY SETTINGS

You may propose to conduct research that requires access to studies currently under way, secondary data sets, or education delivery settings (e.g., classrooms, schools, districts). In such cases, you will need to provide evidence that you have access to these resources prior to receiving funding. Whenever possible, you should include letters of support from those who have responsibility for or access to the data or settings you wish to incorporate when you submit your application. Even in circumstances where you have included such letters with your application, the Institute may require additional supporting evidence prior to the release of funds. If you cannot provide such documentation, **the Institute may not award the grant or may withhold funds.**

You will need supporting evidence of partnership or access if you are:

Building off of existing studies

You may propose studies that piggyback onto an ongoing 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.

Using secondary data sets

If your application is being considered for funding based on scientific merit scores from the peer review panel and your research relies on access to secondary data sets (such as federally-collected data sets, state or district administrative data, or data collected by you or other researchers), you will need to provide documentation that you have access to the necessary data sets in order to receive the grant. This means that if you do not have permission to use the proposed data sets at the time of application, you must provide documentation to the Institute from the entity controlling the data set(s) before the grant will be awarded. This documentation must indicate that you have permission to use the data for the proposed research for the time period discussed in the application. If you obtained permission to use a proposed data set prior to submitting your application, the Institute may ask you to provide updated documentation indicating that you still have permission to use the data set to conduct the proposed research during the project period.

Conducting research in or with education delivery settings

If your application is being considered for funding based on scientific merit scores from the peer review panel and your research relies on access to education delivery settings (e.g., schools), you will need to provide documentation that you have access to the necessary settings in order to

receive the grant. This means that if you do not have permission to conduct the proposed project in the necessary number of settings at the time of application, you will need to provide documentation to the Institute indicating that you have successfully recruited the necessary number of settings for the proposed research before the full first-year costs will be awarded. If you recruited sufficient numbers of settings prior to the application, the Institute may ask you to provide documentation that the schools originally recruited for the application are still willing to partner in the research.

In addition to obtaining evidence of access, the Institute strongly advises applicants to establish a written agreement, within three months of receipt of an award, 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.

21. PUBLIC AVAILABILITY OF RESULTS

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. Investigators and their institutions are responsible for ensuring that any publishing or copyright agreements concerning submitted articles fully comply with this requirement.

22. SPECIAL CONDITIONS ON GRANTS

The Institute may impose special conditions on a grant if the applicant or grantee is not financially stable; has a history of unsatisfactory performance; has an unsatisfactory financial or other management system; has not fulfilled the conditions of a prior grant; or is otherwise not responsible.

23. SUBMITTING A LETTER OF INTENT

The Institute asks that you submit a letter of intent by **4:30 p.m.** Washington D.C. time on the relevant due date for the competition to which you plan to submit. Institute staff use the information in the letters of intent to identify the expertise needed for the scientific peer review panels, secure a sufficient number of reviewers to handle the anticipated number of applications, and provide feedback to you on your research idea. The Institute encourages you to submit a letter of intent even if you think you 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. Should you miss the deadline for submitting a letter of intent, you still may submit an application. If you miss the deadline, the Institute asks that you inform the relevant program officer of your intention to submit an application.

A. Content

The letter of intent should include:

- 1) Descriptive title
- 2) Topic and goal that you will address
- 3) Brief description of the proposed project
- 4) Name, institutional affiliation, address, telephone number and e-mail address of the Principal Investigator and any Co-Principal Investigators
- 5) Name and institutional affiliation of any key collaborators and contractors
- 6) Duration of the proposed project
- 7) Estimated total budget request (the estimate need only be a rough approximation)

B. Format and Page Limitation

Begin by selecting the letter of intent form for the research topic that you plan to submit your application under (<http://iesreview.ed.gov>). The online submission form contains fields for each of the seven content areas listed above. Use these fields to provide the requested information. The project description should be single-spaced and should not exceed one page (about 3,500 characters).

24. APPLICATION INSTRUCTIONS AND APPLICATION PACKAGE

A. Documents Needed to Prepare an Application

To complete and submit an application, you 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://www.grants.gov/applicants/app_help_reso.jsp
- 3) The *Application Package* provides all of the forms that you must complete and submit. 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). *Section C* below explains how 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 dates:

June Application Package	April 19, 2012
September Application Package	July 19, 2012

C. How to Download the Correct Application Package

a. CFDA number

To find the correct downloadable Application Package, you must first search by the CFDA number for the research competition *without* the alpha suffix. To submit an application to the Education Research Grants program, you 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. There are two Application Packages for Education Research: one must be used for applications submitted under the June Application Deadline and the other must be used for the September Application Deadline. The Application Packages are differentiated by a numeric suffix, -1 or -2, added to the CFDA number 84.305A.

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

You must download the Application Package that is designated for the grant competition and competition deadline. If you use a different Application Package, even if it is for an Institute competition, the

application will be submitted to the wrong competition. Applications submitted using the incorrect application package may not be reviewed for the Education Research competition.

25. MANDATORY ELECTRONIC SUBMISSION OF APPLICATIONS AND DEADLINE

Applications must be **submitted electronically and received by 4:30:00 p.m., Washington, DC time** on the application deadline date.

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/>. You 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.

Please note that to submit an electronic application through Grants.gov, your institution must be registered with Grants.gov (http://www.grants.gov/applicants/organization_registration.jsp).

To register with Grants.gov, your institution must have

- a valid Dun and Bradstreet Data Universal Numbering Systems (DUNS) number, and
- an active registration with the Central Contractor Registry (CCR).

Your institution is strongly encouraged to start the Grants.gov registration process *at least four weeks* prior to the application due date.

Applications submitted in paper format will be rejected unless you (a) qualify 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) submit, no later than two weeks before the application deadline date, a written statement to the Institute that documents that you qualify for one of these exceptions. For more information on using Grants.gov, you should visit the Grants.gov web site.

26. TECHNICAL ASSISTANCE FOR APPLICANTS

The Institute encourages you to contact the Institute's program officers as you develop your application. Program officers can offer advice on choosing the appropriate research topic and goal to apply under and preparing applications, as well as substantive advice on your research idea and draft project narrative. To identify the appropriate program officer for your research idea, see *Section 33. Inquiries Can Be Sent To* below or the relevant topic area in *Part II Research Grant Topics*.

In addition, you are encouraged to sign up for the Institute's funding opportunities webinars for advice on choosing the correct research competition, grant writing, or submitting your application. For more information regarding webinar topics, dates, and registration process, see <http://ies.ed.gov/funding/webinars/index.asp>.

27. WRITING YOUR 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, (f) Appendix D and (g) 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, Appendix D and bibliography are described in this section. You must adhere to the type size and format specifications for the entire narrative, including footnotes, to ensure that your

text is easy for reviewers to read and that all applicants have the same amount of available space in which to describe their projects.

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.

To ensure your font meets these requirements, you 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. **These requirements apply to the PDF file as submitted.**

When applicants use small type size, it difficult for reviewers to read the application and applicants may receive an unfair advantage by allowing for more text in their applications. **Consequently, the use of small type font is grounds for the Institute to not accept an application for review.**

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

The Institute encourages applicants to use black and white in graphs, diagrams, tables, and charts. If you choose to use color, you must ensure that the material reproduces well when photocopied in black and white.

C. Project Summary/Abstract

a. Submission

You must submit the project summary/abstract 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 described in *Section 27.B General Format Requirements*.

c. Content

The project summary/abstract should include:

- 1) Title of the project
- 2) The RFA topic and goal under which you are applying (e.g., Mathematics and Science Education, Development and Innovation goal)
- 3) A brief description of the purpose of the project (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 sample that will be involved in the study (e.g., age or grade level, race/ethnicity, SES)
- 6) If applicable, a brief description of the intervention or assessment to be developed, evaluated or validated
- 7) If applicable, a brief description of the control or comparison condition (i.e., who the participants in the control condition are and what they 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 <http://ies.ed.gov/ncer/projects> for examples of project summaries/abstracts.

D. Project Narrative

a. Submission

You must submit the project narrative as a separate .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 1-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 Institute determines that the narrative exceeds the 25 single-spaced page limit, the Institute will remove any pages after the twenty-fifth page of the narrative.

To help the reviewers locate information and conduct the highest quality review, you should write a concise and easy to read application, 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, you 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

Your project narrative must include **four sections** in order to be compliant with the requirements of the Request for Applications: (a) **Significance**, (b) **Research Plan**, (c) **Personnel**, and (d) **Resources**. Information to be included in each of these sections is detailed in *Part III Research Goals* and in the specific sample and content requirements for each research topic in *Part II Research Grant Topics*. The information you include in each of these four sections will provide the majority of the information on which reviewers will evaluate the application.

E. Appendix A (Required for Resubmissions, Optional Otherwise)

a. Submission

If you have an Appendix A, you must include it at the end of the project narrative and submit it 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 27.B General Format Requirements*.

c. Content

(i) Required Content for Resubmissions

Appendix A is required if you are resubmitting an application or are submitting an application that is similar to an application you submitted previously. If you are resubmitting an application, you must provide a description (up to 3 pages in length) of how the revision is responsive to prior reviewer comments. If you have submitted a somewhat similar application in the past but are submitting the current application as a new application, you must provide a rationale (up to 3 pages in length) explaining why the current application should be considered a “new” application rather than a “resubmitted” application.

(ii) Optional Content for All Applications

You may also include figures, charts, or tables that supplement the project narrative as well as examples of measures (e.g., tests, surveys, observation and interview protocols) to be used in the project in Appendix A. These are the only materials that may be included in Appendix A; all other materials will be removed prior to review of the application. You should include narrative text in the 25-page project narrative, not in Appendix A.

F. Appendix B (Optional)

a. Submission

If you choose to have an Appendix B, you must include it at the end of the project narrative, following Appendix A (if included), and submit it 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 27.B General Format Requirements*.

c. Content

In Appendix B, if you are proposing to study, develop, evaluate, or validate an intervention or assessment you may include examples of curriculum material, computer screen shots, assessment items, or other materials used in the intervention or assessment to be developed, evaluated, or validated. These are the only materials that may be included in Appendix B; all other materials will be removed prior to review of the application. You should include narrative text describing these materials in the 25-page project narrative, not in Appendix B.

G. Appendix C (Optional)

a. Submission

If you choose to have an Appendix C, you must include it at the end of the project narrative, following Appendix B (or if no Appendix B is included, then Appendix C should follow Appendix A if it is included) and submit it 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, states, consultants). You must ensure that the letters reproduce well so that reviewers can easily read them. Do not reduce the size of the letters.

c. Content

You should include in Appendix C the letters of agreement from partners (e.g., schools and districts), data sources (e.g., state agencies holding administrative data), 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. A common reason for projects to fail is loss of participating schools and districts. Letters of agreement regarding the provision of data should make it clear that the

author of the letter will provide the data described in the application for use in the proposed research and in time to meet the proposed schedule.

H. Appendix D (required only for applications under the Effectiveness Goal)

a. Submission

If you are applying under the Effectiveness goal, you must include Appendix D at the end of the project narrative, following the other Appendices included, and submit it as part of the same .PDF attachment. If you are applying under any other research goal, you should not include Appendix D.

b. Page limitations and format requirements

Appendix D is limited to 5 pages. It must adhere to the margin, format, and font size requirements described in *Section 27.B General Format Requirements*.

c. Content

You should include in Appendix D your Data Sharing Plan (DSP). The requirements for the DSP are discussed under *Requirements for Goal Four: Effectiveness, Section c. Data Sharing Plan*.

I. Bibliography and References Cited

a. Submission

You must submit this section 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 27.B General Format Requirements*.

c. Content

You 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 project narrative.

28. 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. After receiving the applications, Institute staff will review each application 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.

Once you formally submit an application, Institute personnel will not comment on its status until the award decisions are announced except with respect to issues of completeness and eligibility.

29. PEER REVIEW PROCESS

The Institute will forward all applications that are compliant and responsive to this request to be evaluated for scientific and technical merit. Reviews are conducted in accordance with the review criteria stated below, and the review procedures posted on the Institute's website http://ies.ed.gov/director/sro/peer_review/application_review.asp, by a panel of scientists who have substantive and methodological expertise appropriate to the program of research and request for applications.

Each compliant and responsive application is 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, the Institutes calculates an average overall score for each

application and prepares a preliminary rank order of applications 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 application that he or she believes merits full panel review but that would not have been included in the full panel meeting based on its preliminary rank order.

30. 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. The Institute expects reviewers for all applications 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 Research Goals* and in the section describing the relevant research grant topic within *Part II Research Grant Topics*.

A. Significance

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

B. Research Plan

Does the applicant meet the methodological requirements described in the Research Plan section for the goal under which the applicant is submitting the application?

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?

31. RECEIPT AND START DATE SCHEDULE

A. Letter of Intent Receipt Dates

June Application Letter of Intent	April 19, 2012
September Application Letter of Intent	July 19, 2012

B. Application Deadline Dates

June Application Deadline Date	June 21, 2012
September Application Deadline Date	September 20, 2012

C. Earliest Anticipated Start Date

For June Application	March 1, 2013
For September Application	July 1, 2013

D. Latest Possible Start Date

For June Application	September 1, 2013
For September Application	September 1, 2013

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, 2013 or July 1, 2013).

32. 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, and
- Availability of funds.

33. INQUIRIES MAY BE SENT TO

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34. 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.

35. 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.

36. REFERENCES

- American Psychological Association, Research Office (2009). *Publications Manual of the American Psychological Association (6th ed.)*. Washington, D.C.: American Psychological Association.
- Anderson, J.R., Reder, L.M., & Simon, H.A. (2000, Summer). Applications and Misapplications of Cognitive Psychology to Mathematics Education. *Texas Educational Review*. Downloaded from <http://act-r.psy.cmu.edu/publications/pubinfo.php?id=146> on March 6, 2006.
- Blackwell, L.S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development, 78*, 246-263.
- Carver, S. M. and Klahr D. (Eds.) (2001). *Cognition and Instruction: 25 years of Progress*. Mahwah , NJ : Erlbaum.
- Condelli, L., Safford-Ramus, K., Sherman, R., Coben, D., Gal, I., & Hector-Mason, A. (2006). *A Review of the Literature in Adult Numeracy: Research and Conceptual Issues*. Washington, D.C.: American Institutes for Research.
- Connor, C.M., Morrison, F.J., Fishman, B.J., Schatschneider, C., & Underwood, P. (2007). The EARLY YEARS: Algorithm-guided individualized reading instruction. *Science, 315*, 464–465.
- Corporation for National and Community Service, Office of Research and Policy Development, Community Service and Service-Learning in America's Schools, 2008. Washington DC, 2008.
- Diamond, K.E. & Powell, D.R. (2011). An iterative approach to the development of a professional development intervention for Head Start Teachers. *Journal of Early Intervention, 1*, 75-93.
- Domitrovich, C.E., Gest, S.D., Gill, S., Jones, D. & Sanford DeRousie, R. (2009). Individual factors associated with professional development training outcomes of the Head Start REDI Program. *Early Education and Development, 20*, 402-430.

- Dweck, C. S. & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95, 256-273
- Fry, R. (2007, June). *How Far Behind in Math and Reading are English Language Learners?* Washington, D.C.: Pew Hispanic Center.
- Fuchs, L.S. & Fuchs, D. (2001). Principles for sustaining research-based practices in the schools: A case study. *Focus on Exceptional Children*, 6, 1-14.
- Garet, M. S., Cronen, S., Eaton, M., Kurki, A., Ludwig, M., Jones, W., Uekawa, K., Falk, A., Bloom, H., Doolittle, F., Zhu, P., & Szejnberg, L. (2008). *The Impact of Two Professional Development Interventions on Early Reading Instruction and Achievement* (NCEE 2008-4030). Washington, D.C.: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Garet, M., Wayne, A., Stancavage, F., Taylor, J., Walters, K., Song, M., Brown, S., Hurlburt, S., Zhu, P., Sepanik, S., & Doolittle, F. (2010). *Middle School Mathematics Professional Development Impact Study: Findings After the First Year of Implementation* (NCEE 2010-4009). Washington, D.C.: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Golfin, P., Jordan, W., Hull, D., & Ruffin, M. (2005). Strengthening mathematics skills at the postsecondary level: Literature review and analysis. Retrieved from <http://www.eric.ed.gov/PDFS/ED494241.pdf>.
- Greenberg, D., Ehri, L. C., & Perin, D. (2002). Do Adult Literacy Students Make the Same Word-Reading and Spelling Errors as Children Matched for Word-Reading Age? *Scientific Studies of Reading*, 6, 221-243.
- Greenberg, D., Pae, H., Morris, R., Calhoon, M.B., Nanda, A. (2009). Measuring Adult Literacy Students' Reading Skills Using the Gray Oral Reading Test. *Annals of Dyslexia*, 59, 133-149. <http://www.springerlink.com/content/u03324342128r316/>
- Hector-Mason, A., Shaewitz, D., Sherman, R., Brown, D., Salomon, E., Bauman, E., Mendieta, Y., & Corley, M.A. (2009). *Transitioning English Language Learners: Annotated Bibliography*. Washington, D.C.: American Institutes for Research. Downloaded on January 5, 2010 from http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/44/1a/b0.pdf.
- Horn, L., & Berger, R. (2004). *College Persistence on the Rise? Changes in 5-Year Degree Completion and Postsecondary Persistence Rates between 1994 and 2000* (NCES 2005-156). U.S. Department of Education, National Center for Education Statistics. Washington, D.C.: U.S. Government Printing Office.
- Justice, L.M., Kaderavek, J.N., Xitao F., Sofka, A., & Hunt, A. (2009). Accelerating preschoolers' early literacy development through classroom-based teacher-child storybook reading and explicit print referencing. *Language, Speech, and Hearing Services in Schools*, 40, 67-85.
- Keigher, A. (2009). *Characteristics of Public, Private, and Bureau of Indian Education Elementary and Secondary Schools in the United States: Results from the 2007-08 Schools and Staffing Survey*. Washington, D.C.: National Center for Education Statistics. Retrieved on January 12, 2011 at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2009321>.

- Kellman, P.J., Massey, C.M., Roth, Z., Burke, T., Zucker, J., Saw, A., Agüero, K.E., & Wise, J.A. (2008). Perceptual learning and the technology of expertise: Studies in fraction learning and algebra. *Learning Technologies and Cognition: Special Issue of Pragmatics and Cognition*, 16, 356–405.
- Kutner, M., Greenberg, E., Jin, Y., Boyle, B., Hsu, Y., & Dunleavy, E. (2007). *Literacy in Everyday Life: Results From the 2003 National Assessment of Adult Literacy* (NCES 2007–480). U.S. Department of Education. Washington, D.C.: National Center for Education Statistics.
- McNeil, N.M. (2008). Limitations to Teaching Children $2 + 2 = 4$: Typical Arithmetic Problems Can Hinder Learning of Mathematical Equivalence. *Child Development*, 79, 1524–1537.
- Mellard, D., & Anderson, G. (2007, November). Challenges in Assessing for Postsecondary Readiness (Policy brief). Owensboro, KY: National Commission on Adult Literacy, Council for Advancement of Adult Literacy. <http://www.nationalcommissiononadultliteracy.org/content/assessmentmellard.pdf>
- Mellard, D., Fall, E., & Mark, C. (2009). Reading profiles for adults with low-literacy: Rate-based measures of reading component skills. *Reading & Writing*, 22(8), 975-992. DOI 10.1007/s11145-008-9136-8.
- National Research Council. (2011). *Improving Adult Literacy Instruction: Options for Practice and Research*. Committee on Learning Sciences: Foundations and Applications to Adolescent and Adult Literacy, Alan M. Lesgold and Melissa Welch-Ross, Editors. Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press
- National Research Council. (1999). *Improving student learning: A strategic plan for education Research and its utilization*. Committee on a Feasibility Study for a Strategic Education Research Program. Commission on Behavioral and Social Sciences and Education. Washington, D.C.: National Academy Press.
- Nelson, J.R., Vadasy, P.F., & Sanders, E. L. (2011). Efficacy of a Tier 2 supplemental root word vocabulary and decoding intervention with kindergarten Spanish-speaking English learners. *Journal of Literacy Research*.
- O'Connor, R. E., Swanson, H.S., & Geraghty, C. (2010). Improvement in reading rate under independent and difficult text levels: Influences on word and comprehension skills. *Journal of Educational Psychology*, 102, 1-19.
- Pianta, R.C. and Hadden, D.S. (2008). What We Know about the Quality of Early Education Settings: Implications for Research on Teacher Preparation and Professional Development. *National Association of State Boards of Education*: Alexandria, VA: State Education Standard.
- Pianta, R.C., Mashburn, A.J., Downer, J.T., Hamre, B.K., & Justice, L. (2008). Effects of web-mediated PD resources on teacher-child interactions in pre-kindergarten classrooms. *Early Childhood Research Quarterly*, 23, 431-451.
- Powell, D. R., Diamond, K. E., Burchinal, M. R., & Koehler, M. J. (2010). Effects of an early literacy professional development intervention on Head Start teachers and children. *Journal of Educational Psychology*, 102, 299-312.
- Preschool Curriculum Evaluation Research Consortium. (2008). *Effects of Preschool Curriculum Programs on School Readiness* (NCER 2008-2009). Washington, D.C.: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education.

- Princiotta, D., Flanagan, K. D., and Germino Hausken, E. (2006). *Fifth Grade: Findings From The Fifth-Grade Follow-up of the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K)*. (NCES 2006-038) U.S. Department of Education. Washington, D.C.: U.S. Government Printing Office.
- Strucker, J., Yamamoto, K., & Kirsch, I. (2007). *The relationship of the component skills of reading to IALS* (NCSALL Reports #29). Cambridge, MA: National Center for the Study of Adult Learning and Literacy.
- Vadasy, P. F., & Sanders, E. A. (2008). Repeated reading intervention: Outcomes and interactions with readers' skills and classroom instruction. *Journal of Educational Psychology, 100*, 272-290.
- Vaughn, S., Klingner, J. K., Boardman, A. G., Swanson, E. A., Roberts, G., Mohammed, S. S., & Stillman, S.J. (2011). Efficacy of collaborative strategic reading with middle school students. *American Educational Research Journal*.