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REQUEST FOR APPLICATIONS

EDUCATION RESEARCH AND DEVELOPMENT CENTER PROGRAM

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COMPETITION ROUND	**OCTOBER**
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PART I GENERAL OVERVIEW

1. REQUEST FOR APPLICATIONS

In this announcement, the Institute of Education Sciences (Institute) invites applications for research projects that will contribute to its Education Research and Development Center program. For the FY 2010 competition, the Institute will consider only applications that meet the requirements outlined below under Part II Education Research and Development Center Program and Part III Requirements of the Proposed Research.

Separate announcements are available on the Institute's website that pertain to the other research and research training grant programs funded through the Institute's National Center for Education Research and to the discretionary grant competitions funded through the Institute's National Center for Special Education Research (http://ies.ed.gov/funding).

PART II EDUCATION RESEARCH AND DEVELOPMENT CENTER PROGRAM

2. PURPOSE

Under the Education Sciences Reform Act of 2002, the Institute supports national research and development centers (R&D Centers) that are intended to contribute significantly to the solution of education problems in the United States by engaging in research, development, evaluation, and national leadership activities aimed at improving the education system, and ultimately, student achievement. Each of the R&D Centers conducts a focused program of education research in its topic area. In addition, each Center conducts supplemental research within its broad topic area and provides national leadership in advancing evidence-based practice and policy within its topic area. For information on existing Institute centers, please see http://ies.ed.gov/ncer/projects/program.asp?ProgID=13.

For the FY 2010 Education Research and Development Center competition, the Institute invites applications for three National Education Research and Development Center topics. (a) Under the topic of innovation in education reform, the Institute invites applications for a research and development center focused on effective schools – **National Research and Development Center on Scaling Up Effective Schools**. (b) Under the topic of assessment, standards, and accountability research, the Institute invites applications for a research and development center focused on the academic curricular area of mathematics – **National Research and Development Center on Mathematics Standards and Assessment**. (c) For the national goal of improving science, technology, engineering, and mathematics (STEM) education, the Institute invites applications for a research and development center on improving mathematics instruction – **National Research and Development Center on Cognition and Mathematics Instruction**.

3. BACKGROUND

The Institute's R&D Centers grapple with key education issues that face our nation. Through the Institute's R&D program, researchers have greater resources to tackle more complex education problems, create innovative education solutions, and contribute to knowledge and theory in the education sciences. The Institute currently funds 13 national R&D Centers and 2 special education R&D Centers. Here are examples of the types of issues that they are addressing.

- Educators and policymakers argue that the major impediments to increasing college enrollment among low-income students are the complexity of the federal application process for financial aid and the lack of information that families have about financial aid. The *National Center for Postsecondary Research* is testing interventions to determine which combination of services, including direct assistance with completing the FAFSA (Free Application for Federal Student Aid) application process, will improve access to postsecondary education for low-income students.

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- School districts are experimenting with the use of incentives for teachers, administrators, and schools to improve the quality of education in their schools. How should performance incentive programs be structured to achieve desired goals and minimize unintended negative consequences? The *National Center for Teacher Performance Incentives* is conducting a number of studies to test the effects of different parameters for incentive programs.

- Young children who have not had sufficient language and early literacy experiences prior to kindergarten face significant challenges learning to read. These children often continue to experience poor reading skills throughout school. The *Center for Response to Intervention in Early Childhood* is creating a Response to Intervention model including innovative interventions to promote the development of language and early literacy skills and an assessment system for tracking children's progress.

- Despite advances in education technology, many argue that the full potential of electronic media for educational purposes has yet to be reached. Typical products are not ones that students would naturally gravitate to outside of school — lacking high quality graphics and sounds, sophisticated user interface, a reward structure that cultivates a strong sense of motivation, and engaging activities that maintain the user's attention. The Institute is currently funding two R&D Centers in education technology. The Centers are capitalizing on rich multimedia gaming environments to create innovative instructional products: one Center is focusing on teaching mathematics to ninth graders and the other is addressing science content for seventh graders.

- The recent development of state longitudinal data systems offers the opportunity to answer a multitude of education policy-relevant questions, but requires sophisticated methodological expertise to handle complicated datasets and complex analyses. *The Center for the Analysis of Longitudinal Data in Education Research* (CALDER) brings together a group of economists with such expertise to take advantage of comprehensive education databases in Florida, Missouri, New York, North Carolina, Texas and Washington state to examine the relations between teacher workforce and governance policies (e.g., certification, compensation, accountability, and choice) and key education outcomes (e.g., student achievement, graduation rates, teacher retention).

For its FY 2010 R&D Center competition, the Institute is interested in applications that offer the greatest promise for (1) contributing to the solution of a specific education problem within each R&D Center topic described below and to the generation of new knowledge and theories relevant to the focus of the R&D Center; (2) providing relatively rapid research and scholarship on supplemental questions that emerge within the R&D Center's topic area and that are not being addressed adequately elsewhere; and (3) providing national leadership within the R&D Center's topic by developing position papers, hosting meetings, and engaging in dialogue with researchers and practitioners in order to identify promising areas of research, development, and dissemination for the field and to advance evidence-based policy and practice.

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PART III REQUIREMENTS OF THE PROPOSED RESEARCH

4. TOPIC ONE: REQUIREMENTS FOR THE NATIONAL RESEARCH AND DEVELOPMENT CENTER ON SCALING UP EFFECTIVE SCHOOLS

Over the past several decades there has been an increase in the number and intensity of school reform efforts, spurred by growing national concern over the performance of the nation's schools. Evidence supporting these concerns ranges from the persistent gaps in the achievement levels of students by race, ethnicity, and income, high school drop-out rates, the relatively poor performance of the United States on international assessments, and more recently the categorization of schools failing to make Adequate Yearly Progress towards state-set goals under the No Child Left Behind Act of 2001. There is a sense among policymakers that embedded in these trends is a critical subset of U.S. schools that are chronically low-performing. And, that many of these schools are primarily serving student populations that represent the nation's most vulnerable students.

Although much effort has been devoted to developing and assessing accountability systems, less work has been done on identifying the types of policies, programs, and practices (hereafter referred to as practices) that appear to hold the most promise for helping chronically low performing schools improve their performance. Furthermore, the majority of practices that have been posited to be the strategies that make schools become more effective schools have not been rigorously evaluated; districts and schools are forced to make choices regarding what to do on the basis of little empirical evidence. As a result, a natural trial-and-error process has evolved. Districts typically try out multiple practices at the same time in order to address multiple needs and to have alternatives in case some practices are not successful. In addition, they often adapt practices to their specific conditions. Through this process, schools have become incubators of new practices – trying out what is available, discarding some, and adopting those practices that seem to lead to improvements. In some cases, they have great success and achieve a combination of practices (including personnel) that lead to better than expected success with their students. All too often, however, they are not successful and return back to square one starting a cycle of identifying practices that appear to be promising and trying them out but ultimately having little solid evidence to help distinguish between those practices that do not contribute to improving performance from those that if modified or better implemented would help to produce the desired outcomes.

The purpose of the National Center on Scaling Up Effective Schools (Effective Schools Center) is to take advantage of the experimentation and innovation regularly occurring in the nation's schools in their efforts to address persistent underachievement among specific student populations (e.g., low income students, minority students, or English language learners). The Effective Schools Center will identify policies, programs, and practices that distinguish between schools that effectively educate students who are from traditionally underachieving populations and schools that do not, and create a system to scale up such practices among schools serving similar student populations. This work is to be done in partnership with a school district or consortium of districts so that it aligns with the district's existing policies and programs, takes advantage of the district's expertise, and, if successful, can be integrated into the district's regular activities.

In addition to its focused program of research, the Effective Schools Center will conduct supplementary studies and engage in national leadership activities relevant to scaling up effective schools.

A. Significance of the Focused program of Research

For its focused program of research, the National Center on Scaling Up Effective Schools is required to (1) identify schools that effectively serve underachieving populations, (2) identify the practices of consistently effective schools serving chronically low-performing student populations, (3) develop these practices into a form that can be transferred to schools less successfully serving similar populations, (4) create a system to support the adoption of these practices at such schools, (5) evaluate the transfer of

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these practices and their impact on student achievement, and (6) where needed, revise both the practices and the transfer process based on these evaluations.

Applicants need to specify the grade range of the schools that the Center's research program will address (e.g., elementary, middle, high school, or a broader range such as K-8). The type of school is restricted to public schools that serve students from kindergarten through Grade 12.

Applicants also need to identify the type(s) of chronically low-performing student population that will be the target of the proposed research. The Institute is most interested in identifying the practices of effective schools that serve low-income students and students from groups that traditionally have not fared well in school.

Applicants should describe the school district/local education agency or consortium of districts that are partners in this project. Also, if desired, the applicant team may include the relevant state education agency. Applicants should document that the districts serve the population to be studied, that their schools need assistance in serving this population, and that the agencies are willing to be active partners in the work. Applicants should describe what the district's standard practices are for supporting chronically low-performing schools, what administrative data are available for establishing trends in school performance, and whether the district has some effective schools whose practices can be studied as part of the process for identifying the practices of effective schools.

By justifying the selection for the type of school (i.e., grade range) and student population, and describing the characteristics of the district (and, if applicable state) partners, applicants are addressing the significance of the focused program of research.

B. Research Plan for the Focused Program of Research

a. <u>Methodological requirements for the identification of effective schools and practices</u>

A major component of the focused program of research is to identify and describe the practices of effective schools. The Institute expects applicants to propose a study or set of studies that allows them (1) to reliably distinguish between persistently more and less effective schools based on direct measures of student learning, including state achievement test results and other relevant education outcomes (e.g., graduation and dropout rates) and (2) to determine the specific practices and characteristics that distinguish between more and less effective schools. As an example, applicants might propose to (a) conduct value-added analyses of state or district longitudinal data to identify schools serving a specific chronically low-performing population that consistently are in a higher or lower quintile of schools in terms of producing student gains in both mathematics and reading; and (b) carry-out detailed observational studies of these more and less effective schools to identify practices that distinguish between the two groups.

Applicants should provide a detailed research plan for the identification of effective schools and the practices that distinguish between effective schools and those that are not. For studies using secondary analyses, applicants should describe clearly the database(s) to be used in the investigation including information on sample characteristics, variables to be used, and ability to ensure access to the database if the applicant does not already have access to it. The database should be described in sufficient detail so that reviewers will be able to judge whether or not the proposed analyses may be conducted with the database. If multiple databases will be linked to conduct analyses, applicants should provide sufficient detail for reviewers to be able to judge the feasibility of the plan.

For primary data collection activities, the applicant should clearly describe the sample and measures (including reliability and validity). Applicants should describe how the data would be collected (e.g., procedures for maintaining inter-observer reliability), coded, and quantified to allow quantitative analyses testing the relation between what was observed and desired outcomes.

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In all cases, the applicant must include detailed descriptions of the proposed data analysis procedures. The relation between hypotheses, measures, and independent and dependent variables should be well specified.

b. Methodological requirements for developing transferable practices and a system to support the transfer of practices

The Institute expects that the identified practices will need more explicit description including materials and exemplars as well as a program to teach new users how to implement them before other schools can decide to make use of them and successfully adopt them. The Effective Schools Center will be responsible for developing these materials, supporting training materials, and a process for the transfer of the practices to other schools.

Applicants should provide a detailed development plan in which they describe the proposed procedures for developing a means through which other schools can review, adopt, and implement the practices identified from effective schools. This work will probably be a combination of materials documenting the practice, illustrating its effective implementation, training materials for how to teach non-users to implement the practice, and a process for helping other schools to successfully adopt the practice. In addition, applicants should design (a) a procedure to determine how well a practice is implemented by other schools (e.g., measure of fidelity of implementation of a practice) using the materials and transfer process and (b) a process for revising the materials or improving the system to support the transfer practices should the adoption prove unsuccessful.

c. Methodological requirements for implementing the identified practices in new schools and evaluating the transfer of practices and their impacts on achievement

The applicant should describe how the Effective Schools Center will work with the district to implement the practices in a set of chronically low-performing schools (i.e., experimental schools).

Although the Institute recognizes that applicants will not be able to specify a detailed model of change until the specific practices of effective schools have been identified, the Institute believes that a general model of change is important as a framework for guiding the evaluation. By way of illustration, a simple model of change might be something like the following:

Training on identified practices of effective schools	→	Increase in staff activities that are consistent with identified practices Decrease in activities that are not consistent with identified practices	→	Increase in students' behaviors and attitudes toward school that support learning Decrease in students' behaviors that do not support learning	→	Improvement in grades, student achievement, graduation rates, and other valued education outcomes

For the proposed evaluation, applicants should describe (a) how they will assess the degree to which the training on the identified practices occurs as planned (fidelity of the implementation of the intervention or transfer process), (b) how they will measure key staff activities (fidelity of the implementation of the identified practices by the target school), (c) how they will measure students' behaviors and attitudes (i.e., potential mediators of student achievement), and (d) how they will measure the desired education outcomes (i.e., ultimate or distal outcomes of interest). Wherever possible, applicants should describe the proposed measures, provide technical information on the reliability and validity of the measures, and detail procedures for collecting and coding data. Where new measures will need to be developed (e.g.,

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to measure the fidelity of the implementation of the intervention), applicants should describe how they will establish the reliability and validity of the measures.

Applicants should propose a research design that permits drawing causal conclusions about the impact of the intervention on school performance and provide a detailed description of and rationale for the research design. Because of the small number of schools involved in the adoption of the practices, applicants may wish to use a single case experimental design (however, applicants are free to propose another design). Single case experimental design refers to experimental studies using multiple baseline or reversal or interrupted time series designs intended to demonstrate a causal relationship between two variables using a small number of participants or cases (it does not refer to descriptive case studies). Applicants should describe how potential threats to internal and external validity would be addressed. Where baseline data are needed prior to implementation of the intervention, applicants should carefully specify what data will be collected. The Institute anticipates that baseline data collection only on school achievement data is likely not to be sufficient for most evaluation designs.

Applicants must provide a detailed data analysis plan.

Finally, applicants should describe how the results from the evaluation will be used to identify practices that should continue to be used, practices that should be modified for continued use, and practices that could be dropped as ineffective.

5. TOPIC TWO: REQUIREMENTS FOR THE NATIONAL RESEARCH AND DEVELOPMENT CENTER ON MATHEMATICS STANDARDS AND ASSESSMENT

Education decision makers, policymakers, and leaders in the private sector agree that improving mathematics education is a national priority. Current levels of mathematics achievement at the elementary, middle school, and secondary levels suggest that the United States is neither preparing the general population with levels of mathematics knowledge necessary for the 21st century workplace, nor producing an adequate pipeline of future mathematicians, scientists, and engineers.

One component to improving mathematics education is to improve curriculum and instruction. Through its research programs in Mathematics and Science Education, Teacher Quality - Mathematics and Science, Early Childhood Programs and Policies, Cognition and Student Learning, and Education Technology, the Institute supports research to do just that. Another component to improving mathematics education is to develop standards, assessment frameworks, and assessments that reflect the best scientific knowledge on learning mathematics.

Standards typically establish the content and skills to be learned by grade level. Assessment frameworks identify the content and skills to be covered by a particular assessment as well as the types of problems to be included in the assessment. Currently, mathematics standards and assessment frameworks are generally developed by consensus of experts. There is no established research enterprise and little empirical basis to inform both standards and assessment framework decisions. For example, which early skills are most predictive of those mathematics skills that are currently assessed in upper elementary grades, middle school, or high school? What do skills that are currently assessed in elementary, middle, and high school predict in terms of later mathematics achievement? Although there is an emerging consensus among experts as to the content and skills that should be taught and assessed to prepare children for algebra, the empirical evidence to support the predictive validity of these skills is quite limited.

There is scant research available to inform decisions about the types of problems included in mathematics assessments. For example, the types of problems used in most state mathematics assessments, as well as in the National Assessment of Educational Progress and the Trends in International Mathematics and Science Study, tend to be problems that are generally aligned with the content of instruction and the types of problems that are presented to students during

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instruction. In contrast, the types of mathematics problems used in the Program for International Student Assessment are intended to assess the types of mathematics problem solving that emerge in real-world situations. Which types of problems are more predictive of later achievement and other valued education outcomes? As another example of challenges confronting those responsible for state assessments, there is limited scientific evidence to inform decisions about basic item and test design features for high-stakes mathematics assessments, such as research comparing the use of constructed-response formats versus selected-response items such as multiple-choice.

In response to the need to foster an empirical enterprise that will provide an evidence base for setting standards for mathematics and test the predictive validity of mathematics assessments for later achievement, the Institute is establishing the National Research and Development Center on Mathematics Standards and Assessment (Math Assessment Center). The Institute intends for the Math Assessment Center to work with a state or consortium of states to revise and/or develop standards and a framework for mathematics assessments, and to conduct research to improve the development of high-stakes mathematics assessments.

In addition to its focused program of research, the Math Assessment Center will conduct supplementary studies and engage in national leadership activities relevant to improving high-stakes mathematics assessments.

A. Significance of the Focused Program of Research

For its focused program of research, the Math Assessment Center is required to work with a state or consortium of states to revise and/or develop standards and a framework for state mathematics assessments and conduct research to improve standard-setting methods and development of high-stakes assessments. Applicants should describe the theoretical and empirical foundation that will inform the development or revision of state standards and the development of the assessment framework. In addition, applicants should provide a compelling rationale for the proposed research to improve assessments and standard-setting methods.

By presenting the theoretical and empirical rationale for the proposed research, applicants are addressing the *significance of the focused program of research*.

B. Research Plan for the Focused Program of Research

a. <u>Procedure for establishing mathematics standards and assessment framework</u>

For the Math Assessment Center, applicants should clearly describe the proposed process for development of mathematics standards from prekindergarten through Grade 9 and assessment frameworks for state assessments of mathematics achievement. Applicants should provide sufficient detail for reviewers to evaluate the degree to which they are grounding their work on empirical research on mathematics learning.

b. <u>Methodological requirements for proposed research on assessment construction and methods for setting standards</u>

Applicants should describe their research plan clearly and in sufficient detail for reviewers to understand what the applicants are proposing to undertake and to judge the degree to which following the plan will yield answers to the posed hypotheses or research questions. The research plans should provide evidence that the applicant anticipates and has alternative approaches if difficulties are encountered.

For work involving secondary data analyses, applicants should describe clearly the database(s) to be used in the investigation including information on sampling design, sample characteristics, variables to be used, structure of the database, and ability to ensure access to the database if the applicant does not already have access to it. The database should be described in sufficient detail to allow reviewers to be able to judge whether or not the proposed analyses may be conducted with the database. If multiple

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databases will be linked to conduct analyses, applicants should provide sufficient detail for reviewers to be able to judge the feasibility of the plan.

Applicants may propose to collect original data. The applicant should carefully describe the sample (including inclusion/exclusion criteria), measures (including reliability and validity), and procedures proposed for the data collection.

The applicant must include detailed descriptions of data analysis procedures. In the description of the data analytic plans, applicants should provide sufficient detail to permit reviewers to judge the appropriateness and adequacy of the plan for addressing the hypotheses or research questions. Where analyses of existing or new datasets are included, strong applications will include an explicit discussion of how exclusion from testing, or missing data, will be handled within the statistical analyses.

6. TOPIC THREE: REQUIREMENTS FOR THE NATIONAL RESEARCH AND DEVELOPMENT CENTER ON COGNITION AND MATHEMATICS INSTRUCTION

Current levels of mathematics achievement at the elementary, middle school, and secondary levels suggest that the United States is neither preparing the general population with levels of mathematics knowledge necessary for the 21st century workplace, nor producing an adequate pipeline of future mathematicians, scientists, and engineers. In the 2005 National Assessment of Educational Progress (NAEP), only two percent of U.S. students attained advanced levels of mathematics achievement by Grade 12. Large numbers of students continue to score below the basic level; 39 percent of Grade 12 students scored below the basic level on the 2005 NAEP. At Grade 12 scoring below the basic level means that the student is unlikely to be able to solve problems such as finding the perimeter of a figure. Despite the fact that levels of mathematics achievement have improved over the past decade, achievement gaps remain wide with low levels of achievement being more likely among minority groups and students from low-income backgrounds.

In the past few years, a number of expert panels have examined the state of mathematics education and achievement in the United States, as well as workplace readiness, and have identified the redesign of mathematics curricula as necessary to improving student achievement and preparing mathematically skilled workers (e.g., National Academy of Education, 2008; National Mathematics Advisory Panel, 2008; National Research Council, 2001). The Institute recognizes that the development of high quality mathematics education curricula and teacher professional development, and the evaluation of these interventions to identify those that improve student learning relative to existing practices, require a substantial investment in mathematics education research and time for the research to bear fruit. Through its research programs in Mathematics and Science Education, Cognition and Student Learning, and Teacher Quality – Math and Science Education, the Institute supports a substantial number of research projects to develop and evaluate innovative approaches to mathematics instruction. To complement its existing research programs that address mathematics education, the Institute is establishing the National Research and Development Center on Cognition and Mathematics Instruction.

The Institute intends for the Center on Cognition and Mathematics Instruction (Math Center) to improve student learning in mathematics by redesigning an existing mathematics curriculum intervention (hereafter referred to as curriculum) in ways that will substantially improve student outcomes. The Math Center will use what is currently known about improving the acquisition, retention, and transfer of knowledge to redesigning a mathematics curriculum. The Institute is particularly interested in revisions that incorporate the teaching and learning principles that are detailed in the Institute's practice guide entitled, *Organizing Instruction and Study to Improve Student Learning*.[1] The Institute advises applicants to carefully review this practice guide.

[1] The practice guide is available at http://ies.ed.gov/ncee/wwc/publications/practiceguides/.

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After following an iterative revise-test-redesign-test process (sometimes called a systems-engineering approach) to revise the curriculum, the Math Center will be responsible for rigorously evaluating the effect of the revised curriculum on student learning by conducting at least two efficacy studies over the course of the award. The Math Center cannot assume that even though they have based their redesign of the curriculum on cognitive principles that their instantiation of those principles results in a substantial improvement in mathematics achievement. The efficacy studies should at least compare the revised curriculum to the original curriculum and may also compare the revised curriculum to other curricula covering comparable mathematics content. As part of the efficacy studies, applicants could also test different versions of the revised curriculum (i.e., a planned variation study).

In addition to its focused program of research on improving and testing a mathematics curriculum, the Math Center will conduct supplementary studies and engage in national leadership activities relevant to improving mathematics achievement.

A. Significance of the Focused Program of Research

For its focused program of research, the Math Center is required to conduct research to revise a mathematics curriculum and evaluate the efficacy of the revised curriculum. By addressing the requirements for the mathematics curriculum and the theoretical and empirical rationale for the proposed revisions to the mathematics curriculum, applicants are providing the rationale for the *significance of the focused program of research*.

a. Requirements for the mathematics curriculum

Applicants must propose to revise an existing mathematics curriculum, and the curriculum must span a three-year sequence for any period from kindergarten through Grade 9. That is, for the Math Center, the Institute is not accepting applications to develop new mathematics curricula. Applicants must begin with an existing mathematics curriculum.

Applicants should provide a compelling rationale for the choice of the curriculum. The rationale should include evidence that the content of the proposed mathematics curriculum covers the grade-appropriate content. In addition, applicants should address the practical importance for revising and refining the selected curriculum (e.g., how widely-used is the selected curriculum).

The Institute encourages researchers to include the developer or publisher of the proposed mathematics curriculum as a partner. A potential contribution of the developer or publisher could be the preparation of revised curriculum materials to be used in the efficacy evaluations of the revised curriculum. Including the developer or publisher should not compromise the objectivity of the research.

b. Rationale for redesign of instructional approach to the chosen mathematics curriculum

The Institute is requesting proposals in which researchers apply what is known about acquiring new knowledge, improving the retention of knowledge, increasing the conceptual understanding of new knowledge, facilitating transfer of knowledge to new domains, and other relevant principles of information processing to the redesign of the chosen mathematics curriculum. The Institute is especially interested in proposals to apply the types of cognitive principles for improving learning and instruction that are described in the Institute's practice guide: *Organizing Instruction and Study to Improve Student Learning*.[2] Current research indicates that mathematics instruction should not be entirely student-centered or teacher-directed (e.g., National Mathematics Advisory Panel, 2008). The Institute does not intend to support a curriculum revision that *results* in a mathematics curriculum that is entirely student-centered or one that results in a mathematics curriculum that is entirely teacher-directed.[3] In all cases,

[2] Available at http://ies.ed.gov/ncee/wwc/publications/practiceguides/

[3] As defined in the Final Report of the National Mathematics Advisory Panel, "teacher-directed instruction [ranges] from highly scripted direct instruction approaches to interactive lecture styles" and "student-centered instruction [ranges] from students having primary responsibility for their own mathematics learning to highly structured cooperative groups" (p. 45).

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applicants should describe the theoretical and empirical rationale underlying the proposed revisions they would make to the design of the chosen mathematics curriculum.

Applicants may choose to conduct a more extensive revision that includes revising the scope and sequence of the chosen mathematics curriculum. Applicants proposing such activities should also include the theoretical and empirical rationale for the proposed revisions.

B. Research Plan for the Focused Program of Research

a. Methodological requirements for curriculum revision studies

For the Math Center, the Institute anticipates applicants will follow an iterative revise-test-redesign-test process in order to determine the organization of the revised curriculum to be evaluated in a formal efficacy study. Using this systems-engineering approach, applicants should propose to conduct a series of studies to test the effects of applying specific strategies for revising the curriculum material on student learning or proposals to conduct several parallel studies with related independent variables. The Institute recognizes that detailing all of the studies in the series may not be possible when later experiments depend on the results of earlier experiments in the series. However, applicants should provide sufficient detail for reviewers to judge the quality of the proposed program of research. Applicants may, for example, describe the overall approach to the focused program of research and provide specific details for two or three exemplar studies.

Strong applications will include clear descriptions of (1) what revisions are planned; (2) the procedures for initial and subsequent revising of the curriculum; and (3) the procedures (including sample, measures, and procedures for collecting and analyzing data) for determining if the revised materials function as intended. It is helpful if applicants explain (a) how they define "operating as intended" for the proposed revised curriculum; (b) what data they will collect to determine how the curriculum (or component) is operating; (c) how they will use the data they collect to make further revisions to the curriculum; and (d) what criteria they will use to determine if the curriculum (or component) operates as intended.

b. Methodological requirements for curriculum evaluation studies

Applicants should provide a detailed research design for evaluating the effect of the revised curriculum intervention. Applicants should describe how potential threats to internal and external validity would be addressed. Studies using randomized assignment to treatment and comparison conditions are strongly preferred. The Institute anticipates that students in the comparison group will be taught using the existing version of the curriculum. *Only in circumstances in which a randomized trial is not possible* may alternatives that substantially minimize selection bias or allow it to be modeled be employed. Acceptable alternatives include appropriately structured regression-discontinuity designs or other well-designed quasi-experimental designs that come close to true experiments in minimizing the effects of selection bias on estimates of effect size.

Applicants should describe the proposed measures, provide technical information on the reliability and validity of the measures, and detail procedures for collecting and coding data. In strong applications, applicants use the proposed theory of change as a framework and make clear how the proposed measures link to the proximal and distal outcomes that the intervention is intended to change. In strong applications, applicants would detail procedures for measuring the fidelity of the implementation of the intervention. Applicants must include a detailed description of their data analysis plan.

7. GENERAL REQUIREMENTS OF THE PROPOSED RESEARCH

A. Basic Requirements

a. Applying to multiple competitions or topics

Applicants may submit proposals to more than one of the Institute's FY 2010 competitions or topics. In addition, within a particular competition, applicants may submit multiple proposals. However, applicants may submit a given proposal only once (i.e., applicants may not submit the same proposal or very similar proposals to multiple competitions or topics). If the Institute determines prior to panel review that an

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applicant has submitted the same proposal or very similar proposals to multiple topics or competitions and the proposal is judged to be compliant and responsive to the submission rules and requirements described in the Request for Applications, the Institute will select one version of the application to be reviewed by the appropriate scientific review panel. If the Institute determines after panel review that an applicant has submitted the same proposal or very similar proposals to multiple research topics or competitions and if the proposal is determined to be worthy of funding, the Institute will select the research program under which the proposal will be funded.

b. Applying to a particular topic

To submit an application to the Institute's Education Research and Development Center grant program, applicants must choose the specific topic under which they are applying. Each topic has specific requirements. The Institute strongly advises potential applicants to contact the relevant program officer listed in Section 23 if they have any questions regarding the appropriateness of a particular project for submission under a specific Center topic.

For the FY 2010 Center competition, applicants must apply *either* under Topic One (National R&D Center on Scaling Up Effective Schools) *or* Topic Two (National R&D Center on Mathematics Standards and Assessment) *or* Topic Three (National R&D Center on Cognition and Mathematics Instruction).

B. Requirements for the Focused Program of Research

The Institute intends for the work of the R&D Center to include a focused program of research that ideally will result in solutions or answers to specific education problems at the end of 5 years. The Institute expects the *focused program of research* to comprise about 50 to 75 percent of a Center's activities depending on the cost and effort required to carry out the focused program of research.

For the FY 2010 R&D Center competition, the Institute expects applicants to propose a focused program of research that consists of a set of tightly linked studies that build on each other and together accomplish the goals specified under the Specific Requirements section for each Center topic. The Institute strongly discourages applications that propose a model in which multiple investigators each conduct separate studies that are only loosely coordinated around the topic.

Although the Centers have much broader functions than conducting a focused program of research, the research program is the only portion of the activities of a Center that can be well-specified in advance, and thus can provide a fair basis for comparing and evaluating applications for funding. Consequently, the majority of the application should be a detailed description of the focused program of research.

a. Significance of the focused program of research

Because review panels typically read applications across a number research programs, it is most helpful if in the first sentence of the project narrative, the applicant identifies the research program to which the application has been submitted (e.g., "This is an application for a National Research and Development Center on Mathematics Standards and Assessment").

The rationale for the significance of the focused program of research must address specific requirements detailed in Part III, Section 4.A for the National R&D Center on Scaling Up Effective Schools or in Part III, Section 5.A for the National R&D Center on Mathematics Standards and Assessment or in Part III, Section 6.A for the National R&D Center on Cognition and Mathematics Instruction.

b. Research plan for the focused program of research

The most important consideration in the competitive review of proposals will be the applicant's articulation of the focused program of research. Applications should include well-specified objectives, a detailed research methods and data analysis plan, a plan for coordinating the work of the cooperating scientists, a timetable for accomplishing the research, and the specific outcomes of the program of research.

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The methodological requirements for applications to the National R&D Center on Scaling Up Effective Schools are specified in Part III, Section 4.B. The methodological requirements for applications to the National R&D Center on Mathematics Standards and Assessment are specified in Part III, Section 5.B. The methodological requirements for applications to the National R&D Center on Cognition and Mathematics Instruction are specified in Part III, Section 6.B.

c. Timeline

Along with the description of the focused program of research, applicants should include a clear timeline for the activities in their focused program of research. (The timeline may be included in Appendix A.)

C. Requirements for Other Center Activities

a. Requirements for supplemental research projects

As part of the Center activities, applicants are expected to conduct smaller, quick-response research projects that speak to other issues that are important within the context of the broad topic of the Center. These projects are typically ones that can be completed within 9 to 12 months. Because these studies are expected to be completed in a relatively short period, typical supplemental studies involve secondary analyses of longitudinal data sets.

Because the Center will work cooperatively with the Institute to select and design supplemental studies to respond to pressing policy and practice needs within the topic covered by the Center, the Institute does not expect applicants to provide highly detailed research plans for these studies in the application. **The Institute expects applicants to devote no more than two or three paragraphs to the description of each supplemental study.** The applicant should, however, document capacity to conduct such studies (e.g., knowledge of the field and research experience of key personnel) and provide **two** examples of supplemental studies the applicant believes might be useful to undertake, including a short rationale explaining the need for the proposed study and a short description of the type of research approach that would be used. Applicants should bear in mind that, although this section of the proposal does not need to be long, capacity for conducting quick-response research projects will carry weight in the scoring of the application.

b. Requirements for national leadership activities

As part of the Center activities, applicants are expected to provide national leadership within the Center's topic area by developing position papers, hosting meetings, and engaging in dialogue with researchers and practitioners to identify promising areas of research, development, and dissemination for the field.

Because the Center will work cooperatively with the Institute in the development and planning of such activities, the Institute does not expect applicants to provide highly detailed plans for the leadership activities. It is sufficient to provide information on why the proposed Center staff are qualified to fulfill this leadership role if awarded a Center, as well as two examples of the types of activities the applicant believes might be useful to undertake, including a short rationale justifying the need for the proposed activity and a description of the applicant's capacity for conducting such projects. Although this section of the application does not need to be long, applicants should bear in mind that capacity for carrying out leadership and national activities will carry weight in the scoring of the application.

D. Management and Institutional Resources

The Institute anticipates that the focused program of research, as well as the supplemental studies, and national leadership activities will require the coordination of multiple scientists and other partners. Applicants should describe plans and procedures for the overall management of the Center. These plans should include details of procedures for coordinating with schools and districts or other education delivery settings involved in the projects of the Center.

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Competitive applicants will have access to institutional resources that adequately support research activities and access to schools or other education delivery settings in which to conduct the research.

When the proposed focus program of research includes conducting research activities in schools, applicants should document that they have the capacity and experience to obtain such cooperation and to describe the steps they have taken or will take to obtain it. If the plans for the **first year** of grant activities include substantial work to be conducted in schools or other education delivery settings, strong applications will include documentation of the availability and cooperation of the schools or other education delivery settings that will be required to carry out that work via a letter of support from the education organization(s).

An applicant may involve curriculum or assessment developers or distributors (*including for-profit entities*) in the project, from having the developers as full partners in its proposal to using off-the-shelf curriculum or assessment materials without involvement of the developer or publisher. However, involvement of the developer or distributor should not jeopardize the objectivity of the research. Strong applications will carefully describe the role, if any, of the developer/distributor in the project. Applicants should describe how objectivity in the research would be maintained.

E. Personnel

Competitive applicants to the National R&D Center on Scaling Up Effective Schools will have leadership and staff that collectively demonstrate (a) expertise in the proposed grade levels, student population of concern, and education practices of relevance to both; (b) the methodological expertise to carry out the proposed projects; (c) sufficient experience working with education delivery settings to carry out the proposed projects; and (d) experience that is relevant to national leadership activities. In addition, a representative from each local education agency (and, if applicable, state education agency) must be included as a member of the research team.

Competitive applicants to the National R&D Center on Mathematics Standards and Assessment will have leadership and staff that collectively demonstrate (a) expertise in mathematics content, learning mathematics content (e.g., cognitive psychology or cognitive development), and testing (including psychometrics); (b) the methodological expertise to carry out the proposed projects; (c) sufficient experience working with education delivery settings to carry out the proposed projects; and (d) experience that is relevant to national leadership activities. In addition, a representative from the state education agency must be included as a member of the research team.

Competitive applicants to the National R&D Center on Cognition and Mathematics Instruction will have leadership and staff that collectively demonstrate (a) expertise in mathematics content, cognitive science, and curriculum development or redesign; (b) the methodological expertise to carry out the proposed projects; (c) sufficient experience working with education delivery settings to carry out the proposed projects; and (d) experience that is relevant to national leadership activities.

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PART IV GENERAL SUBMISSION AND REVIEW INFORMATION

8. MECHANISM OF SUPPORT

The Institute intends to award cooperative agreements pursuant to this request for applications. The maximum award length is five years.

9. FUNDING AVAILABLE

Typical awards will be in the range of $1,000,000 to $2,000,0000 (total cost = direct + indirect) per year for 5 years. Larger awards will be considered; the size of the award depends on the scope of the activities.

The Institute expects the *focused program of research* to comprise about 50 to 75 percent of a Center's activities depending on the cost and effort required to carry out the focused program of research, with the remainder of the budget devoted to supplemental studies, leadership activities, and any administrative activities not included in the focused program of research.

Although the plans of the Institute include the Education Research and Development Center program, awards pursuant to this request for applications are contingent upon the availability of funds and the receipt of a sufficient number of meritorious applications. The Institute anticipates funding at least one Center under each topic. However, because the Institute is committed to funding only high quality work, the Institute will make an award for a Center only if at least one application is deemed meritorious under peer review.

10. 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.

11. SPECIAL REQUIREMENTS

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

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

Applicants must budget for one meeting each year in Washington, D.C., with other grantees and Institute staff for a duration of up to three days of meetings. At least one Center representative must attend the three-day meeting.

Research applicants may collaborate with, or be, for-profit entities that develop, distribute, or otherwise market products or services that can be used as interventions or components of interventions in the proposed research activities. Involvement of the developer or distributor must not jeopardize the objectivity of the evaluation.

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

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

Through the terms of the cooperative agreement, grantees will work with the Institute to plan activities related to supplemental research and leadership activities.

12. DESIGNATION OF PRINCIPAL INVESTIGATOR

The applicant institution is responsible for identifying the Principal Investigator. The Principal Investigator is the individual who has the authority and responsibility for the proper conduct of the research, including the appropriate use of federal funds and the submission of required scientific progress reports. An applicant institution may elect to designate more than one principal investigator. In so doing, the applicant institution identifies them as individuals who share the authority and responsibility for leading and directing the research center 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 center. The role of this person is primarily for communication purposes on the scientific and related budgetary aspects of the Center and should be listed as the Principal Investigator. All other principal investigators should be listed as Co-Principal Investigators.

13. LETTER OF INTENT

The Institute asks all applicants to submit a Letter of Intent by 4:30 p.m. Washington D.C. time on the relevant due date for the competition to which they plan to submit. The information in the Letters of Intent enable Institute staff to identify the expertise needed for the scientific peer review panels and secure sufficient reviewers to handle the anticipated number of applications. The Institute encourages all interested applicants to submit a Letter of Intent, even if they think that they might later decide not to submit an application. The letter of intent is not binding and does not enter into the review of a subsequent application.

The letter of intent form must be submitted electronically using the instructions provided at: https://ies.constellagroup.com. Receipt of the letter of intent will be acknowledged via email.

A. Content

The letter of intent should include:

a. Descriptive title
b. Center topic to which the applicant intends to submit a proposal
c. Brief description of the proposed focused program of research
d. Name, institutional affiliation, address, telephone number and e-mail address of the principal investigator(s)
e. Name and institutional affiliation of any key Center personnel, including collaborators and contractors
f. Duration of the proposed project
g. Estimated total budget request (The estimate need only be a rough approximation.)

B. Format and Page Limitation

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

14. MANDATORY SUBMISSION OF ELECTRONIC APPLICATIONS

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

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Applications submitted in paper format will be rejected unless the applicant (a) qualifies for one of the allowable exceptions to the electronic submission requirement described in the Federal Register notice announcing the Education Research and Development Center Program (CFDA Number 84.305C) competitions described in this Request for Applications and (b) submits, no later than two weeks before the application deadline date, a written statement to the Institute that documents that the applicant qualifies for one of these exceptions.

For more information on using Grants.gov, applicants should visit the Grants.gov web site.

15. APPLICATION INSTRUCTIONS AND APPLICATION PACKAGE

A. Documents Needed to Prepare Applications

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

- The *Request for Applications* for the Education Research and Development Center Program (CFDA 84.305C) describes the substantive requirements for a research application.

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

- The *IES Grants.gov Application Submission Guide* provides the instructions for completing and submitting the forms.

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

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

  ✓ Grants.gov User Guide http://www.grants.gov/help/user_guides.jsp

- The *Application Package* provides all of the forms that need to be completed and submitted. The application form approved for use in the competitions specified in this RFA is the government-wide SF424 Research and Related (R&R) Form (OMB Number 4040-0001). The applicant must follow the directions in section C below to download the Application Package from Grants.gov.

B. Date Application Package is Available on Grants.gov

The application package will be available on http://www.Grants.gov/ beginning on the following date:

Application Package Available on August 3, 2009

C. Download Correct Application Package

a. CFDA number

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

b. Education Research Application Package

The Grants.gov search on CFDA 84.305 will yield more than one application package. For the Education Research and Development Center Grants Request for Applications, applicants must download the package for the appropriate deadline marked:

Application Package: **CFDA 84.305C-October Education Research and Development Center Application Package**

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In order for the application to be submitted to the correct grant competition, applicants must download the Application Package that is designated for the grant competition and competition deadline. Using a different Application Package, even if that package is for an Institute competition, will result in the application being submitted to the wrong competition.

16. SUBMISSION PROCESS AND DEADLINE

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

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

17. 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) bibliography and references cited, (d) Appendix A, and (e) Appendix B. Instructions for all other documents to be included in the application (e.g., forms, budget narrative, 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 Center project summary/abstract, Center project narrative, bibliography and references cited, Appendix A, and Appendix B are described in this section. To ensure that the text is easy for reviewers to read and that all applicants have the same amount of available space in which to describe their projects, applicants must adhere to the type size and format specifications for the entire narrative including footnotes.

a. Page and margin specifications

For the purposes of applications submitted under this RFA, a "page" is 8.5 in. x 11 in., on one side only, with 1 inch margins at the top, bottom, and both sides.

b. Spacing

Text must be single spaced in the narrative.

c. Type size (font size)

Type must conform to the following three requirements:

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

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

Adherence to type size and line spacing requirements is necessary so that no applicant will have an unfair advantage, by using small type or by providing more text in their applications. **Note, these requirements apply to the PDF file as submitted**. As a practical matter, applicants who use a 12-

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point Times New Roman font without compressing, kerning, condensing or other alterations typically meet these requirements.

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

d. Graphs, diagrams, tables

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

C. Project Summary/Abstract

a. Submission

The Center project summary/abstract will be submitted as a .PDF attachment.

b. Page limitations and format requirements

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

c. Content

The Center project summary/abstract should include:

(1) Title of the proposed Center
(2) The topic under which the applicant is applying (i.e., National Education Research and Development Center on Mathematics Standards and Assessments)
(3) Brief description of the focused program of research
(4) A list of the key Center personnel

D. Project Narrative

a. Submission

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

b. Page limitations and format requirements

The Center project narrative is limited to **35 single-spaced pages** for all applicants. The 35-page limit for the project narrative does not include any of the SF 424 forms, the one-page summary/abstract, the appendices, research on human subjects information, bibliography and references cited, biographical sketches of senior/key personnel, narrative budget justification, subaward budget information or certifications and assurances.

Reviewers are able to conduct the highest quality review when applications are concise and easy to read, with pages numbered consecutively 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 Center in the project narrative, applicants should use the author-date style of citation (e.g., James, 2004), such as that described in the *Publication Manual of the American Psychological Association, 5th Ed.* (American Psychological Association, 2001).

d. Content

By incorporating the requirements outlined in **Part III Requirements of the Proposed Research**, the *project narrative* provides the majority of the information on which reviewers will evaluate the proposal.

The Center project narrative must include five sections: (a) Significance of the Focused Program of Research, (b) Research Plan for the Focused Program of Research, (c) Other Center Activities, (d) Management and Institutional Resources, and (e) Personnel. Information to be included in each of these sections is detailed in **Part III Requirements of the Proposed Research**.

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E. Bibliography and References Cited

a. Submission

The section will be submitted as a .PDF attachment.

b. Page limitations and format requirements

There are no limitations to the number of pages in the bibliography. The bibliography must adhere to the margin, format, and font size requirements described in section 17.B. General Format Requirements.

c. Content

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

F. Appendix A

a. Submission

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

b. Page limitations and format requirements

Appendix A is limited to 15 pages. It must adhere to the margin, format, and font size requirements described in section 17.B. General Format Requirements.

c. Content

(i) Purpose.

The purpose of Appendix A is to allow the applicant to include any figures, charts, or tables that supplement the research text, examples of measures to be used in the project, and letters of agreement from partners (e.g., schools) and consultants. These are the only materials that may be included in Appendix A; all other materials will be removed prior to review of the application. Narrative text related to any aspect of the project (e.g., descriptions of the proposed sample, the design of the study, or previous research conducted by the applicant) must be included in the research narrative.

(ii) Letters of agreement.

Letters of agreement from state education agencies and other institutions integral to the proposed work should include enough information to make it clear that the author of the letter understands the nature of the commitment of time, space, and resources to the research project that will be required if the application is funded. The Institute recognizes that some applicants may have more letters of agreement than will be accommodated by the 15-page limit. In such instances, applicants should include the most important letters of agreement and may list the letters of agreement that are not included in the application due to page limitations.

G. Appendix B (Optional)

a. Submission

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

b. Page limitations and format requirements

The appendix is limited to 10 pages. The Appendix B must adhere to the margin, format, and font size requirements described in section 17.B. General Format Requirements.

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c. Content

The purpose of Appendix B is to allow applicants to include examples of curriculum materials, assessment items, computer screens, or other materials used in an assessment or as part of an intervention. These are the only materials that may be included in Appendix B; all other materials will be removed prior to review of the application. Narrative text related to the intervention or assessment (e.g., descriptions of research that supports the use of the revised curriculum components, the theoretical rationale for specific types of assessment items, or details regarding the implementation or use of the intervention) must be included in the 35-page center project narrative.

18. APPLICATION PROCESSING

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

19. PEER REVIEW PROCESS

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

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

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

20. REVIEW CRITERIA FOR SCIENTIFIC MERIT

The purpose of Institute-supported research is to contribute to the solution of education problems and to provide reliable information about the education practices that support learning and improve academic achievement and access to education for all students. Reviewers for all applications will be expected to assess the following aspects of an application in order to judge the likelihood that the proposed research will have a substantial impact on the pursuit of that goal. Information pertinent to each of these criteria is also described in Part III Requirements of the Proposed Research.

A. Significance of the Focused Program of Research

Does the applicant provide a compelling rationale for the significance of the project as defined in the sections on the significance of the focused program of research?

B. Research Plan for the Focused Program of Research

Does the applicant meet the requirements described in the sections detailing the methodological requirements for the focused program of research?

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C. Plans for Other Center Activities

Do the content of the examples of proposed supplemental studies and leadership activities and the description of the applicant's capacity to conduct such projects demonstrate that the applicant has the ideas, experience, and capability to successfully carry-out such projects in cooperation with the Institute?

D. Management and Institutional Resources

Do the plans and procedures for the overall management of the Center indicate that the applicant has the capacity to efficiently and successfully complete the proposed research, dissemination, and leadership activities? 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 proposed Center activities?

E. Personnel

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

21. RECEIPT AND START DATE SCHEDULE

A. Letter of Intent Receipt Date: **August 3, 2009**

B. Application Deadline Date: **October 1, 2009**

C. Earliest Anticipated Start Date: **July 1, 2010**

22. AWARD DECISIONS

The following will be considered in making award decisions:

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

23. INQUIRIES MAY BE SENT TO:

A. National R&D Center on Scaling Up Effective Schools

Dr. David Sweet
Institute of Education Sciences
555 New Jersey Avenue, NW
Washington, DC 20208
Email: David.Sweet@ed.gov
Telephone: (202) 219-1748

Dr. Allen Ruby
Institute of Education Sciences
555 New Jersey Avenue, NW
Washington, DC 20208
Telephone: (202) 219-1591
Email: Allen.Ruby@ed.gov

B. National R&D Center on Mathematics Standards and Assessment

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

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

C. National R&D Center on Cognition and Mathematics Instruction

Dr. Elizabeth Albro
Institute of Education Sciences
555 New Jersey Avenue, NW
Washington, DC 20208
Email: Elizabeth.Albro@ed.gov
Telephone: (202) 219-2148

24. 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.

25. 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.

26. REFERENCES

American Psychological Association (2001). *Publications Manual of the American Psychological Association* (5th ed.). Washington, DC: Author.

National Academy of Education. (2008). Science and Mathematics Education. Education Policy Briefing Sheet. Available at http://www.naeducation.org/White_Papers_Project_Science_and_Mathematics_Briefing_Sheet.pdf.

National Mathematics Advisory Panel (2008). *Foundations for Success: Final Report of the National Mathematics Advisory Panel.* U.S. Department of Education: Washington, DC

National Research Council. (2001). *Adding it up: Helping children learn mathematics*. J.Kilpatrick, J. Swafford, and B.Findell (Eds.). Mathematics Learning Study Committee, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

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