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Interagency Education Research Initiative (IERI)

Program Solicitation

NSF 00-74

DIVISION OF RESEARCH, EVALUATION AND COMMUNICATION

LETTER OF INTENT DEADLINE: April 19, 2000, October 2, 2000, April 20, 2001

PROPOSAL DEADLINE: June 9, 2000, February 2, 2001, June 18, 2001

NATIONAL INSTITUTES OF HEALTH

DEPARTMENT OF EDUCATION

NATIONAL SCIENCE FOUNDATION

Revisions and Updates

Interagency Education Research Initiative (IERI) - NSF 00-74

Effective March 19, 2001, the following changes were made to this program announcement:

1. Deadline dates for the Letter of Intent and the Proposal Deadline:
   Letter of Intent: Added April 20, 2001
   Proposal Deadline: Added June 18, 2001

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SUMMARY OF PROGRAM REQUIREMENTS

GENERAL INFORMATION

Program Title: Interagency Education Research Initiative (IERI)

Synopsis of Program:

The goal of the IERI is to improve preK-12 student learning and achievement in reading, mathematics, and science by supporting rigorous, interdisciplinary research on large-scale implementations of promising educational practices and technologies in complex and varied learning environments. To this end, the Initiative will support an evolving, cumulative, and integrated portfolio of research projects that, when taken together, will provide a substantive corpus of effective instructional practices and a body of knowledge that informs the ways in which these practices can be implemented in real, complex, and varied educational environments and lead to enhanced student learning.

An important feature of the Initiative is that all IERI-supported projects will share common benchmarks that will facilitate the accumulation of reliable and valid data to ensure that the lessons learned can be generalized in an optimal fashion. As such, only those projects that meet high standards of methodological rigor, are of sufficient scale, integrate technology, and are conducted by interdisciplinary teams will be funded.

IERI has two focus areas:

1. Early Learning of Foundational Skills

2. Transition to Increasingly Complex Science and Mathematics Learning

Cognizant Program Officers:

- Nora Sabelli, Acting Program Manager IERI, Research, Evaluation, and Communication, Room 855, telephone: 703-306-1650, e-mail:nsabelli@nsf.gov.

- James Griffin, Program Director, Office of Educational Research and Improvement, Capital Place Room 604C, 555 New Jersey Avenue, NW, Washington, DC 20208. Telephone: 202-219-2168, e-mail:James_Griffin@ed.gov.

- Reid Lyon, Section Chief, National Institute of Child Health and Human Development, 6100 Executive Building, Room 4B05, 9000 Rockville Pike, Bethesda, MD 20892.

Telephone: 301-496-9849, email: rl60a@nsf.gov.

Applicable Catalog of Federal Domestic Assistance (CFDA) Number:

- 47.076 --- Education and Human Resources

ELIGIBILITY INFORMATION

- **Organization Limit:** None
- **PI Eligibility Limit:** None
- **Limit on Number of Proposals:** PIs may only submit one proposal.

AWARD INFORMATION

- **Anticipated Type of Award:** Standard or Continuing Grants, or Cooperative Agreements.
- **Estimated Number of Awards:** 25
- **Anticipated Funding Amount:** $38,000,000 pending availability of funds

PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Guidelines

- ***Proposal Preparation Instructions:*** Supplemental Preparation Guidelines
    - The program contains supplements to the standard GPG proposal preparation guidelines. Please see the full program solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** None
- **Indirect (F&A) limitations:** Not Applicable.
- **Other Budgetary Limitations:** Not Applicable.

C. Deadline/Target Dates

- **Letter of Intent Deadline:** 4/19/00, 10/2/00, 4/20/01
- **Preproposal Deadline:** None
- **Full Proposal Deadline:** 6/09/00, 2/2/01, 6/18/01

D. FastLane Requirements

- **FastLane Submission:** Full Proposal Required

- **Fast Lane Contact:**
    - DeMonica L. Parks, Research, Evaluation and Communication, 855, telephone: 306-1650, e-mail:dparks@nsf.gov.

PROPOSAL REVIEW INFORMATION

- **Merit Review Criteria:** Additional merit review criteria apply. Please see the full program solicitation for further information.

AWARD ADMINISTRATION INFORMATION

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Additional reporting requirements apply. Please see the full program solicitation for further information.

I. INTRODUCTION

The Interagency Education Research Initiative (IERI) was spurred by the 1997 publication of the President's Committee of Advisors for Science and Technology (PCAST*) Report to the President on the Use of Technology to Strengthen K-12 Education in the United States*. The report's key recommendation was:

"..that the federal government dramatically increase its investment in research aimed at discovering what actually works, not only with respect to educational technology, but in the field of elementary and secondary education in general. Less than 0.1 percent of our nation's expenditures for elementary and secondary education in 1995 were invested to determine which educational techniques actually work, and to find ways to improve them"

While educational research has provided some important insights into student learning in reading, mathematics, and science, as well as teacher develoment and teaching strategies and technologies that enhance achievement in these subjects, the research, as a whole, has lacked a convergent knowledge base that can inform systemic reform in a consistent and meaningful way. The limited use of educational R&D for improving practice can be attributed in large part to under-investment in R&D and the consequent fragmentation of the current research effort (see the 1999 National Research Council Report, *How People Learn: Bridging Research and Practice*, http://www.nap.edu). Further, when knowledge has accumulated — as in the case of literacy development in young children — incorporating that knowledge into tangible tools and procedures for those responsible for educating our students in complex classroom situations has proven exceedingly difficult (see the 1998 National Research Council Report, *Preventing Reading Difficulties in Young Children* and the 1999 National Research Council Report, *Improving Student Learning: A Strategic Plan for Education Research and Its Utilization*, http://www.nap.edu)

Advances in education will depend on vigorous and sustained research and development. State and local policymakers, as well as school-level administrators, are clamoring for information on how to implement changes—particularly technology-based ones—that lead to increased and sustained student learning. The intent of the IERI is to enable educators to meet the challenges of educational improvement by providing scientifically-based knowledge and skills that lead to sustainable learning changes across diverse student populations.

IERI was developed by an interagency team that includes the National Science Foundation (NSF), the Department of Education's Office of Educational Research and Improvement (OERI) and the National Institute of Child Health and Human Development (NICHD). The purpose of IERI is to support rigorous, interdisciplinary research in addressing the urgent challenges of educational reform. The Initiative aims to maximize the relevance and integration of education research with practice by encouraging collaborations among researchers and practitioners. The work of this Initiative is intended to benefit all students—those with differing strengths and those from diverse cultural backgrounds.

PROGRAM GOAL

The goal of the IERI is to improve preK-12 student learning and achievement in reading, mathematics, and science by supporting rigorous, interdisciplinary research on large-scale implementations of promising educational practices and technologies in complex and varied learning environments.

IERI supports work that is attentive to the context in which educators do their work, pushing beyond controlled laboratory studies to ensure adaptability to classrooms in complex environments. Research conducted on a scale that allows for a careful examination of how characteristics within a variety of educational systems interact to facilitate learning—under differing conditions and for diverse students – will help accelerate its successful adoption in a wide range of schools. Some research activities will be ready to move to this scale immediately. Others may require a planning grant to set the stage for rigorous research at a larger scale. Both are eligible for IERI support.

An important feature is that all IERI projects will share common characteristics (see section on "Benchmarks") that facilitate the accumulation of reliable and valid data to ensure optimal generalization across diverse educational settings. Therefore, only those projects that meet high standards of methodological rigor, are of sufficient scale, integrate technology, and are conducted by interdisciplinary research teams will be funded.

Although basic research under controlled laboratory conditions or similarly controlled classroom settings will not be supported under the IERI, such research will be considered for funding if: a) it is designed within the larger IERI context of studying innovative approaches to teaching reading, mathematics and science; or b) it has the potential for providing results that directly inform our understanding of student achievement in these domains under IERI classroom conditions. Additionally, applicants are invited to take an existing body of research knowledge to the next level of investigation through efforts to extend such findings to complex educational settings.

Background information on this initiative can be found at the web site: http://www.ehr.nsf.gov/ehr/rec/IERI. Potential applicants are strongly encouraged to review these materials.

II. PROGRAM DESCRIPTION

FOCUS AREAS

Two focus areas supporting the goals of the Initiative have been selected for this Program Solicitation:

(1) Early Learning of Foundational Skills

(2) Transition to Increasingly Complex Science and Mathematics Learning

FOCUS AREA I: Early Learning of Foundational Skills

IERI's Focus Area I is concerned with the acquisition of foundational skills in reading,

mathematics, and science in pre-K through grade school, assessment of readiness for learning in these domains, research on measures for determining the achievement of proficiency, and investigation of the role of teacher learning and performance on student learning and achievement.

Although the specific areas of emphasis (reading, mathematics and science) are treated separately in the following descriptions, applicants should bear in mind that proposals that integrate these domains are acceptable and encouraged under the IERI. The rationale for this integration is that in the early grades, one teacher is frequently responsible for instruction across these three areas for all children in a given classroom. In addition, successful acquisition of foundational mathematical and scientific concepts clearly requires mastery of literacy skills (e.g., reading comprehension). As such, research proposals are invited that illuminate how the integration of instructional strategies in these domains may enhance student achievement.

Reading

One major focus of the IERI is to identify and implement in complex and varied educational environments the instructional conditions under which children develop highly-integrated reading skills resulting in optimal reading accuracy, fluency, and comprehension. While more focused, basic research efforts underscore the importance of several factors in learning to read (e.g., phonemic awareness, word level reading skills, automaticity, comprehension strategies, motivation), how best to foster these attributes and abilities in complex instructional settings and with children who vary in cognitive, linguistic, and academic development is not yet fully understood. Consequently, it is anticipated that planning grant and research study proposals submitted in response to this solicitation will contribute knowledge regarding instructional practices and related educational policy issues, as exemplified by the following illustrative questions:

- How can instructional practices in reading found to be effective in smaller, relatively controlled environments be implemented successfully by a wide variety of teachers in complex educational settings?

- What knowledge about reading processes and instructional strategies must teachers possess in order to promote maximum growth in students' reading skills? How does this knowledge translate into greater student learning? How can these practices be scaled beyond individual teachers or small cohorts of teachers?

- For students at-risk for reading failure, which intervention strategies, alone or in combination, provided in which settings (e.g., one-on-one tutorial, small-group, classroom, computer-based, etc.) and which venues (e.g., in-school, after school, weekend, summer) provide optimal sustainable growth in reading skills?

- How can computer and information technologies be used for enhancing the scalability, implementation, evaluation and sustainability of instructional approaches for improving early reading skills in the context of complex educational environments beyond a single or small numbers of classrooms? What new instructional methods or strategies are made possible with computer and information technologies?

Mathematics and Science

It is generally acknowledged that the existing knowledge bases on students' acquisition of mathematical and scientific concepts is neither as complete nor robust as the corpus of findings in the area of reading. No doubt this is due at least in part to the comparatively wide range of topics encompassed by mathematics curricula in grades pre-K through 6. Furthermore, there is mounting evidence that teachers themselves frequently lack a thorough understanding of the fundamental concepts in these domains that is clearly necessary for being able to apply or design effective instructional strategies.

Planning grant and research study proposals within this area of emphasis should contribute knowledge bearing on relevant instructional practices and related policy issues, as expressed by the following illustrative questions:

- What kinds of assessment techniques are needed to determine the mathematic and scientific knowledge and skills that young children bring to school and acquire in the early grades? What new assessment techniques are now possible due to computer and information technologies (e.g., using simulations) and how effectively do they measure the development of knowledge and skills in mathematics and science?

- What content and pedagogical knowledge must teachers possess about mathematics and science in order to promote and assess maximum growth in student learning and achievement in these areas? How does this knowledge translate into greater student learning? How can these practices be scaled beyond individual teachers or small cohorts of teachers?

- What instructional practices are most effective for helping children to understand foundational mathematical and scientific concepts?

- How can computer and information technologies be used for enhancing the scalability, implementation, evaluation and sustainability of instructional approaches for improving mathematics and science learning in the context of complex educational environments beyond a single or small number of classrooms? What new instructional methods or strategies are made possible with computer and information technologies?

FOCUS AREA II: Transition to Increasingly Complex Science and Mathematics Learning

The Third International Mathematics and Science Study (http://nces.ed.gov/timss/) reveals that students in the United States master fundamental skills and knowledge of mathematics and science during their elementary school years at the same rate as their international peers. These studies, however, point out that U.S. students are less likely to master and/or be taught more complex and conceptually difficult material during their middle and high school years, resulting in a downward trend in achievement as U.S. students move through school relative to students from other countries. More empirical work is needed to develop and scale up educational programs and practices that increase students' understanding of complex ideas in mathematics and science as they move through school. This work is especially important, as higher levels of mathematical and scientific knowledge and problem solving skills are required for both higher education and the workplace.

The quality of the teaching force is at the core of any successful effort to improve student learning in science and mathematics. More needs to be known about how to prepare teachers in mathematics and science education, as well as how to support teachers as they develop and hone their knowledge and skills throughout their careers.

Planning grant and research study proposals within this area of emphasis should contribute knowledge bearing on relevant instructional practices and related policy issues, as expressed by the following illustrative questions:

- What are the learning processes by which students move from basic mathematics to more complex mathematics, such as algebra and geometry? How do students integrate these learning experiences?
- How can students integrate the learning of mathematics and science in order to use mathematics effectively in various scientific domains?
- How do students learn to integrate the subject matter they learn during their school years? How do they learn to think across different subject areas?
- What are successful ways of promoting skills of scientific inquiry for school-age children?
- What content, student cognitive assessment, and pedagogical knowledge do teachers require in order to be effective? What facilitates conceptual change and greater expertise in teachers' own understanding of mathematical and scientific concepts? What are the learning processes by which teachers become experts in scientific areas?
- How can computer and information technologies be used to enhance students'complex learning? Which approaches promote greater depth of understanding in students? How can these technologies be implemented in complex educational environments beyond a single or small number of classrooms? What new instructional methods or strategies are made possible with computer and information technologies?

BENCHMARKS

Research in education is made especially challenging by the complexities of designing experiments that establish cause and effect relationships between educational inputs and student and teacher outputs; difficulties with implementing random assignment protocols in real world educational settings; the small effects that most isolated controllable variables have on outcomes; the challenges of linking scientific principles grounded in biology, neuroscience, developmental science or cognitive science to educational practice; the high costs of large-scale intervention studies; and the general inability to extrapolate from small population studies of educational effectiveness to effectiveness for large populations.

The IERI encourages proposals that address the above challenges in the context of the two focus areas described above. As such, each research study proposal must satisfactorily address all of

the following benchmarks. Proposals that have merit but do not meet these benchmarks may be offered planning grants or recommended for resubmission under other competitions supported by the three partner agencies. Planning grant applications must contain a clear rationale for the proposed work as a necessary step toward the submission of a research study proposal or the advancement of knowledge in a chosen field of study.

Research Methodology: In order to achieve the goal of the IERI, research proposals must address issues of student learning and achievement by employing research and measurement designs that are demonstrably valid and reliable. Experimental and quasi-experimental designs are encouraged, especially those employing random assignment. For applicants examining systemic changes where experimental manipulation is difficult, applicants are encouraged to propose inventive solutions, including using research designs and methodologies from other disciplines and areas of research such as public health.

Longitudinal instructional/intervention studies are clearly relevant to describing the amount and rate of student learning over time and in determining the generalization and maintenance of learning over time and across settings. Valid measurement of change over time is critical to much of the research solicited by this Program Solicitation, as the goal of the IERI is to improve student achievement. If instructional or curricular intervention studies are proposed, applicants should employ robust procedures for separating intervention effects from the effects of development in general. The use of growth curve models and longitudinal data are encouraged, as is the collection of sufficient data prior to, during, and following the intervention study to allow for estimation of change-over-time.

The application of qualitative research methodologies and measures is also encouraged (e.g., interviews with students, teachers, parents and administrators, teacher logs, analysis of teacher's daily plans, videotaping and coding of instructional interactions). Applicants are encouraged to combine quantitative and qualitative methods to optimize the validity and applicability of their findings.

Although different types of research strategies may be proposed for any given application, each supported project must meet the following:

1) the proposed objectives, methodologies, and research settings or contexts must be consistent with the goal of the Initiative. Most importantly, the applicant must articulate how the results of the proposed research can contribute directly to our understanding of efficacious approaches for implementing scalable and sustainable educational interventions;

2) the applicant must make clear how the proposed research program builds upon and integrates existing converging evidence obtained from relevant prior research, including more basic research studies as it seeks to implement scalable and sustainable educational interventions. Although new knowledge of basic learning and instructional processes is not in itself an IERI goal, it is expected that new knowledge of the conditions under which basic research is effectively translated into practice within diverse school systems and classroom environments will evolve from the projects;

3) the applicant must rigorously define the sample selected for study so that complete and independent replication can be accomplished. Specifically, all participants selected for study

should be defined with reference to age, grade level, gender, ethnicity, socioeconomic status, immigrant/migrant status, and any other relevant characteristics. If sampling is employed, both the sampling method and the level of sampling (e.g., student, teacher, school, district, state) must be specified. For studies employing control or comparison group designs, the applicant must specify how participants for this group will be selected, and how comparability with the intervention group will be established and maintained over time. For longitudinal studies, the applicant must make clear how attrition within and across different groups will be handled;

4) the applicant must supply information on the reliability, validity, and appropriateness of proposed measures. If the reliability and validity of the measurement/assessment/observational procedures are initially unknown, the applicant must include specific plans for establishing these measurement properties;

5) the applicant must provide a detailed research design and/or statistical analysis plan, including details on how potential threats to internal and external validity will be addressed and a power analysis demonstrating the adequacy of proposed cell sizes. For intervention studies, the applicant must specify how the implementation of the intervention will be documented and measured, and how the fidelity of the intervention will be maintained across multiple classrooms/schools/sites over time. If applicable, the applicant must specify how individual student and teacher differences will be measured and analyzed over time.

Scalability: In order to be considered for funding under the IERI, the theoretical underpinnings, causal model and any relevant preliminary evidence of effectiveness for a proposed practice, intervention or technological innovation must be established in the proposal. Proposals will need to summarize both the current knowledge base and problems with implementing this knowledge in school settings. Proposals must include explicit justifications for their scaling-up plans, outlining how this line of research will advance efforts to translate knowledge into practice.

It is expected that the scale of the research will allow researchers to address questions regarding implementation and fidelity, effectiveness, individual differences (e.g., students, teachers, schools), and environmental and policy factors (e.g., class size). Research may be done in conjunction with new or ongoing demonstration programs, including those funded by one or more of the three agencies. All applicants must provide evidence (e.g., letters of support, citations from previous collaborative research) that they have the necessary agreements in place to conduct their proposed study.

Empirical evidence regarding the effectiveness of an innovative curriculum or technology means little if these cannot be implemented and sustained in diverse classroom environments. At every level of scalability researchers need to study and document issues regarding training, implementation, and fidelity, as well as conduct follow-up checks to examine how effective educational innovations are sustained or evolve in consistent ways over time and the variables that are necessary for this to occur.

Technology: Technology encompasses a variety of electronic tools, media, and environments that can be used to enhance student learning, foster creativity, stimulate communication and collaboration among teachers and students, and engage in the continuous development and application of knowledge and skills. Technology may be proposed as a tool, device or

environment for implementing and/or evaluating specific learning/instructional approaches and strategies. It may be used for enhancing the effects and efficiency of already proven methods or strategies in traditional settings or to develop new educational methods or strategies that are possible with technology. Technology also may be used as a management tool in implementing proposed studies. Proposals that concentrate solely on technology without addressing educational issues and questions relevant to the basic requirements of this Initiative will not be appropriate for submission.

Interdisciplinary Research Teams: Due to the complexity of the subject matter and the environments in which educational research and practice take place, interdisciplinary research teams will be necessary, bringing a wide variety of knowledge and methodologies to bear on the problems associated with conducting and integrating research in educational settings. Collaborations across disciplines (e.g., information technologists, organizational scientists, economists, psychometricians, mathematicians, statisticians, educational researchers, cognitive scientists, developmental psychologists, disciplinary scientists, and practitioners) are required. Qualitative and quantitative researchers from various fields are expected to enrich both the research designs and the methodologies proposed for applications under this Initiative. Applicants must ensure, in meaningful ways, continual input and interaction with those disciplines that are relevant not only to the immediate program of work but also to its eventual application. Of particular importance to the review process will be the linkage to policy and practice from the earliest stages of the project.

Because the IERI is a long-term initiative oriented toward specific educational issues, the coordination of research projects is particularly important. Principal investigators will be asked to meet at least twice each year with agency staff and consultants to review results within their areas, discuss methodologies, and identify promising avenues for future research efforts. Where interventions are studied, investigators will be asked to develop and use a core of common methodologies, instruments, and data analysis procedures to facilitate the synthesis of research findings across projects.

III. ELIGIBILITY INFORMATION

Proposals may be submitted by individual investigators or by small groups of investigators from colleges, universities or other non-profit organizations including local and state agencies. Proposed interdisciplinary research teams should reflect synergistic collaborations among researchers and practitioners. Collaboration or partnership with industry or government laboratories is encouraged when appropriate. A principal investigator may submit only one proposal and he/she may collaborate in one other proposal. Group and collaborative proposals involving more than one institution must be submitted as a single administrative package from the primary institution. Proposals from new researchers, new interdisciplinary research teams within and across academic departments, universities and other research entities, and new partnerships between research institutions and school systems are encouraged. Prospective applicants are strongly urged to contact one of the program officers listed at the end of this document for guidance.

IV. AWARD INFORMATION

Under this Program Solicitation, the three partner agencies solicit proposals for planning grants and research study grants. Funding for planning grants will be for a maximum of $100,000 for up to 12 months; funding for research study grants will typically be for up to $6 million for the life of the award (up to 60 months). Proposals submitted for research study grants that do not meet one or more of the benchmarks but are judged to have merit may be offered a planning grant so that further development work can be conducted prior to re-submission. Pending the availability of funds for both FY 2000 and FY 2001, the total funds available under this Initiative in FY2000 (the first award date) will be $38 million, with $25 million from NSF, $10 million from OERI, and $3 million from NICHD. The total funds available under this Initiative in FY2001 (the second award date) are projected to be $48 million. Awards will be made for planning grants and research study grants. Awards will be made through one of the three agencies and PIs must be willing to accept the award conditions from whichever of the three agencies makes the award. In particular, the human subjects certifications must conform to all three agencies requirements.

Planning grants will be funded for a variety of activities, including, but not limited to one or more of the following:

- development of an interdisciplinary research team across academic departments, universities and/or other research institutions;

- development of partnerships with school systems, school boards, teacher unions, local, county or state offices or other entities that are necessary to implement school-based large scale intervention studies;

- development of interdisciplinary meetings or workshops to review research methodologies and findings within a given subject area or field to produce a coherent distillation and synthesis of knowledge for that area of study;

- development of plans for a data collection center (DCC) that would coordinate measurement instruments, facilitate research design planning and problem-solving, and coordinate the analysis of data from multiple projects within a designated subject area; and provide assistance in dissemination and utilization of research project results;

- the collection of pilot/preliminary data to: (a) assess the feasibility of sampling strategies to ensure that sufficient sample sizes and sample characteristics can be ascertained; (b) establish the necessary reliability and validity estimates for psychometric measures, observational protocols, interview schedules, and other measurement strategies; and, (c) assess the appropriateness of experimental design models and/or data analysis strategies.

Research study grants will be made for projects that address one of the focus areas and meet the benchmarks outlined in this Program Solicitation. Additionally, PIs may submit collaborative proposals (see the NSF Grant Policy Guide, NSF 00-2) for research involving collaborations between institutions.

Standard, continuation, and cooperative agreement grant award mechanisms may be utilized under this Program Solicitation.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG) (NSF 00-2). The complete text of the GPG (including electronic forms) is available electronically on the NSF Web Site at: http://www.nsf.gov/pubs/2000/nsf002/start.htm. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone 301.947.2722 or by e-mail from pubs@nsf.gov.

Prospective applicants are required to submit a Letter of Intent (LOI). The LOI should be submitted by email to by April 19, 2000 or October 2, 2000 or April 20, 2001 to ieri@nsf.gov. The letter should be one page in length and must identify the PI and known co-PIs, the institution affiliations of the PI and the co-PIs, expected budget request, and a brief description of the proposed project. Program staff from the three agencies will review the Letters of Intent. Although LOIs are required, they are not binding, and will not be used in proposal evaluation. Information contained in the Letters will allow staff from the three agencies to provide preliminary feedback regarding the appropriateness of the proposed research for the IERI, to estimate the potential review workload, and to avoid conflict of interest in the review process. The Letters of Intent will be acknowledged by email and/or telephone calls from federal project officers from one or more of the three participating agencies. Review of the LOIs and communication back to the applicant may take as long as three weeks.

Proposers are reminded to identify the program solicitation number (NSF-00-74) in the program solicitation/solicitation block on the proposal Cover Sheet (NSF Form 1207). Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Deadline/Target Dates

Letters of Intent submitted in response to this solicitation must be submitted by 5:00 PM, local time, 4/19/00 or 10/02/01 or 4/20/01

Proposals submitted in response to this solicitation must be submitted by 5:00 PM, local time, 6/09/00 or 2/2/01 or 6/18/01.

C. FastLane Requirements

Proposers are required to prepare and submit all proposals for this Program Solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: https://www.fastlane.nsf.gov/a1/newstan.htm.

Submission of Signed Cover Sheets. The signed copy of the proposal Cover Sheet (NSF Form 1207) must be postmarked (or contain a legible proof of mailing date assigned by the carrier) within five working days following proposal submission and be forwarded to the following address:

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

Proposals will be reviewed against the following general review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Principal Investigators should address the following elements in their proposal to provide reviewers with the information necessary to respond fully to both of the above-described NSF merit review criteria. NSF staff will give these elements careful consideration in making funding decisions.

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens - women and men, underrepresented minorities, and persons with disabilities - is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Criteria Specific to IERI

The IERI is intended to foster synergistic research that addresses the goal of developing an empirical knowledge base for enhancing student achievement through improved educational practices. Towards that end, priority will be given to IERI applications that:

- Meaningfully address one of the two focus areas.
- Propose a research methodology that satisfies the criteria for rigor outlined in the first benchmark.
- Propose a project of sufficient scale to meet the criteria for scalability outlined in the second benchmark. Applicants must demonstrate that the academic partnerships and partnerships with participating school systems are sufficently developed to carry out the proposed research activities.
- Propose a usage or usages of educational technology that satisfies the criteria outlined in the third benchmark.
- Propose an interdisciplinary research team that meets the criteria outlined in the fourth benchmark. Applicants must provide sufficient evidence that the individuals proposed are qualified for their specified roles.

A summary rating and accompanying narrative will be completed and signed by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are mailed to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside the funding agencies who are experts in the particular field represented by the proposal. Proposals submitted in

response to this solicitation will be reviewed by mail and/or panel review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

NSF will be able to tell applicants whether their proposals have been declined or recommended for funding within six months for 95 percent of proposals. The time interval begins on the proposal deadline or target date or from the date of receipt, if deadlines or target dates are not used by the program. The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at its own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program or Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI. A, for additional information on the review process).

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1)* or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any NSF brochure, program guide, solicitation or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's web site at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone 301.947.2722 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, (NSF 95-26) available electronically on the NSF web site at http://www.nsf.gov/cgi-bin/getpub?gpm. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is 202.512.1800. The GPM may be ordered through the GPO web site at http://www.gpo.gov.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual progress report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Grantees will be required to participate in bi-annual PI meetings. Proposal budgets should reflect travel costs for two or three participants to travel to Washington, DC for two meetings a year.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented an electronic project reporting system, available through FastLane. This system permits electronic submission and updating of project reports, including information on: project participants (individual and organizational); activities and findings; publications; and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries should be made to the Interagency Education Research Initiative Program. The addresses of NSF program officers are all NSF, 4201 Wilson Blvd, Arlington, VA 22230.

- Nora Sabelli, Acting Program Manager IERI, Education and Human Resources Directorate, Room 855, telephone: 703-306-1650, e-mail:nsabelli@nsf.gov.
- John Cherniavsky, Senior Advisor for Research, Education and Human Resources Directorate, Room 855, telephone: 703-306-1650, e-mail:jchernia@nsf.gov.
- Janice Earle, Program Director, Education and Human Resources Directorate, Room 885, telephone: 703-306-1613x6808, e-mail:jearle@nsf.gov.
- Rodney Cocking, Program Director, Social, Behaviorial, and Economic Sciences Directorate, Room 995, telephone: 703-306-1732, e-mail:rcocking@nsf.gov.

- Steve Breckler, Program Director, Social, Behaviorial, and Economic Science Directorate, Room 995, telephone: 703-306-1728, e-mail:sbreckle@nsf.gov.

- Diane Scott-Jones, Program Director, Social, Behaviorial, and Economic Sciences Directorate, Room 980, telephone: 703-306-1732, e-mail:dscott@nsf.gov.

- Paul Werbos, Program Director, Engineering Directorate, Room 668, telephone: 703-306-1339, e-mail:pwerbos@nsf.gov.

- Anthony Maddox, Program Director, Computer and Information Sciences and Engineering Directorate, Room 1160, telephone: 703 306-1981, e-mail: amaddox@nsf.gov.

- Henry Blount, Office Head, Mathematical and Physical Sciences Directorate, Room 1005, telephone: 306-1946, e-mail:hblount@nsf.gov.

- Chris Platt, Acting Deputy Director, Biological Sciences Directorate, 685, telephone: 703-306-1420, e-mail:cplatt@nsf.gov.

Department of Education Contacts (all at Office of Educational Research and Improvement, Capital Place, 555 New Jersey Avenue, NW, Washington, DC 20208.)

- James Griffin, Program Director, Room 604C, telephone: 202-219-2168, e-mail: James_Griffin@ed.gov.

- Daniel Berch, Office of the Assistant Secretary, Room 602C, 202-219-2215, e-mail: Daniel_Berch@ed.gov.

- Wanda Chambers, Program Officer, Room 515, 202-219-2035, Wanda_Chambers@ed.gov.

- Stephanie Dalton, Program Officer, Room 600, 202-208-2497, Stephanie_Dalton@ed.gov.

- OK-Choon Park, Program Officer, Room 608H, 202-208-3951, OK-Choon_Park@ed.gov.

- Pat O'Connell Ross, Program Officer, Room 602D, 202-219-2169, Patricia_Ross@ed.gov.

- Judith Segal, Program Officer, Room 510D, 202-219-2040, Judith_Segal@ed.gov.

- Anne Sweet, Program Officer, Room 513A, 202-219-2043, Anne_Sweet@ed.gov.

- Joseph Teresa, Program Officer, Room 620, 202-219-2046, Joseph_Teresa@ed.gov.

National Institute of Health Contact

- Reid Lyon, Section Chief, National Institute of Child Health and Human Development, 6100 Executive Building, Room 4B05, 9000 Rockville Pike, Bethesda, MD 20892. Telephone: 301-496-9849, email: rl60a@nsf.gov.

For questions related to the use of FastLane, contact, DeMonica L. Parks, National Science Foundation, Research, Evaluation and Communication Division, Room 855, telephone: 306-1650, e-mail:dparks@nsf.gov.

IX. OTHER PROGRAMS OF INTEREST

The NSF Guide to Programs is a compilation of funding for research and education in science, mathematics, and engineering. The NSF Guide to Programs is available electronically at http://www.nsf.gov/cgi-bin/getpub?gp. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices listed in Appendix A of the GPG. Any changes in NSF's fiscal year programs occurring after press time for the Guide to Programs will be announced in the NSF Bulletin, available monthly (except July and August), and in individual program solicitations. The Bulletin is available electronically via the NSF web site at http://www.nsf.gov. Subscribers can also sign up for NSF's Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

The following programs may be of interest to potential IERI proposers. Information on NSF guidelines can be obtained from http://www.nsf.gov.

- Research on Learning and Education (ROLE), NSF 00-17.
- Child Learning and Development Program, NSF 99-42.
- National SMETE Digital Library Program, NSF 00-42.
- Information Technology Research, NSF 99-167.
- Elemenary, Secondary, and Informal Education, NSF 99-92.

Department of Education programs particularly

- Field-Initiated Studies (FIS) Education Research Grant Program, Department of Education, http://www.ed.gov/offices/OERI/funding.html.

National Institutes of Health programs at NICHD

- National Institutes of Health Extramural Funding, http://www.nichd.nih.gov/funding/funding-opps.htm.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program solicitation or contact the program coordinator at (703) 306-1636.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 306-0090, FIRS at 1-800-877-8339.

The National Science Foundation is committed to making all of the information we publish easy to understand. If you have a suggestion about how to improve the clarity of this document or other NSF-published materials, please contact us at plainlanguage@nsf.gov.

ABOUT THE DEPARTMENT OF EDUCATION

The U.S. Department of Education's mission is to:

- Strengthen the Federal commitment to assuring access to equal educational opportunity for every individual;
- Supplement and complement the efforts of states, the local school systems and other instrumentalities of the states, the private sector, public and private nonprofit educational research institutions, community-based organizations, parents, and students to improve the quality of education;
- Encourage the increased involvement in the quality and usefulness of education through Federally supported research, evaluation, and sharing of information;
- Improve the coordination of Federal education programs;
- Improve the management of Federal education activities; and
- Increase the accountability of Federal education programs to the President, the Congress, and the public.

Additional information can be found on the Department web site: http://www.ed.gov

Within the Department of Education, the Office of Educational Research and Improvement (OERI) provides national leadership for educational research and statistics. OERI strives to promote excellence and equity in American education by:

- Conducting research and demonstration projects funded through grants to help improve education;
- Collecting statistics on the status and progress of schools and education throughout the nation; and
- Distributing information and providing technical assistance to those working to improve education.

Additional information can be found on OERI's web site: http://www.ed.gov/offices/OERI/

ABOUT THE NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT

The National Institute of Child Health and Human Development (NICHD) seeks to assure that every individual is born healthy, is born wanted, and has the opportunity to fulfill his or her potential for a healthy and productive life unhampered by disease or disability. In pursuit of this mission, the NICHD conducts and supports laboratory, clinical, and epidemiological research on the reproductive, neurobiologic, developmental, and behavioral processes that determine and maintain the health of children, adults, families, and populations.

The NICHD Administers a multidisciplinary program of research, research training, and public information, nationally and within its own facilities, on reproductive biology and population issues; on prenatal development as well as maternal, child and family health; and on medical rehabilitation. Institute Programs are based on the concepts that adult health and well-being are determined in large part by episodes early in life, that human development is continuous throughout life, and that the reproductive processes and the management of fertility are of major concern, not only to the individual, but to society.

NICHD research is also directed toward restoring or maximizing individual potential and functional capacity when disease, injury, or a chronic disorder intervenes in the developmental process.

The Institute supports and conducts basic, clinical, and epidemiological research in the reproductive sciences to develop knowledge enabling men and women to regulate their fertility in ways that are safe, effective and acceptable to various population groups, and to overcome problems of infertility.

The purposes of Institute sponsored behavioral and social sciences research in the population field are to understand the causes and consequences of reproductive behavior and population change. Research for mothers, children, and families is designed to advance knowledge of

pregnancy, fetal development, and birth; to develop strategies to prevent infant and child mortality; to identify and promote the prerequisites of optimal physical, mental, and behavioral growth and development through infancy, childhood, and adolescence; and to contribute to the prevention and amelioration of mental retardation and developmental disabilities. Much of this research focuses on the disciplines of cellular, molecular, and developmental biology to elucidate the mechanisms and interactions that guide a single fertilized egg cell through its development into a multicellular, highly organized adult organism. Research in medical rehabilitation is designed to develop improved techniques and technologies with respect to the rehabilitation of individuals with physical disabilities resulting from diseases, disorders, injuries, or birth defects.

Research training is an area supported across all NICHD research programs, with the intent of adding to the cadre of trained professionals available to conduct research in areas of critical public health concern. An overarching responsibility of the NICHD is to disseminate information emanating from the Institute research programs to researchers, practitioners and other health professionals, and to the general public.

Additional information can be obtained at http://www.nichd.nih.gov/.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Pursuant to 5 CFR 1320.5(b), an agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Information Dissemination Branch, Division of Administrative Services, National Science Foundation, Arlington, VA 22230, or to Office of Information and Regulatory Affairs of OMB, Attention: Desk Officer for National Science Foundation (3145-0058), 725 - 17th Street, N.W. Room 10235, Washington, D.C. 20503.

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NSF 00-74 Replaces NSF 99-84