Federal Register

Friday,
December 21, 2001

Part VI

Department of Education

Office of Educational Research and Improvement (OERI), Cognition and Student Learning (CASL) Research Grant Program; Notice

DEPARTMENT OF EDUCATION

[CFDA No. 84.305H]

Office of Educational Research and Improvement (OERI), Cognition and Student Learning (CASL) Research Grant Program

ACTION: Notice inviting applications for new awards for fiscal year (FY) 2002.

Purpose of Program: The purpose of this program is to improve student learning by supporting a new program of research that brings recent advances in cognitive science and neuroscience to bear on significant educational problems. The overarching goal of this program of research is to establish a scientific foundation for educational practice by supporting research on key processes of attention, memory, and reasoning that are essential for learning and that are likely to produce substantial gains in academic achievement.

Eligible Applicants: Public and private agencies, institutions, and organizations, including for-profit and non-profit organizations; institutions of higher education; State and local educational agencies; and regional educational laboratories.

Deadline for Receipt of Letter of Intent: February 5, 2002.

A Letter of Intent is *optional*, but encouraged, for each application. The Letter of Intent is for OERI planning purposes and will not be used in the evaluation of the application.

Applications Available: December 21, 2001.

Deadline for Transmittal of Applications: April 15, 2002.

Estimated Available Funds: Up to $3,000,000 for the first year of this program.

The estimated amount of funds available for new awards is based on the Administration's request for this program for FY 2002. The actual level of funding, if any, depends on final congressional action. However, we are inviting applications to allow enough time to complete the grant process if Congress appropriates funds for this program.

Estimated Range of Awards: $75,000 to $500,000.

Estimated Size of Awards: The size of the awards will be commensurate with the nature and scope of the work proposed.

Estimated Number of Awards: 10.

Note: The Department is not bound by any estimates in this notice.

Project Period: Up to 36 months.

Page Limits: The application must include the following sections: title page form (ED 424), one-page abstract, research narrative, literature cited, curriculum vitae for principal investigators(s) and other key personnel, budget summary form (ED 524) with budget narrative, appendix, and statement of equitable access (GEPA 427). The research narrative is where you, the applicant, address the selection criteria that reviewers use to evaluate your application. You must limit the research narrative (text plus all figures, charts, tables, and diagrams) to the equivalent of 25 pages and the appendix to 20 pages, using the following standards:

- A ''page'' is 8.5″ x 11″, on one side only, with 1″ margins at the top, bottom, and both sides.
- Double space (no more than three lines per vertical inch) all text in the research narrative, including titles, headings, footnotes, quotations, references, and captions, as well as all text in charts, tables, figures, and graphs.
- Use a font that is either 12-point or larger or no smaller than 10 pitch (characters per inch).

The page limit does not apply to the title page form, the one-page abstract, the budget summary form and narrative budget justification, the curriculum vitae, literature cited, or the assurances and certifications. Our reviewers will not read any pages of your application that—

- Exceed the page limit if you apply these standards; or
- Exceed the equivalent of the page limit if you apply other standards.

We have found that reviewers are able to conduct the highest quality review when applications are concise and easy to read, with pages consecutively numbered.

Applicable Statute and Regulations: (a) 20 U.S.C. 6031; (b) The Education Department General Administrative Regulations (EDGAR) in 34 CFR parts 74, 75 (except as limited in 34 CFR 700.5), 76, 77, 80, 81, 82, 85, 86 (part 86 applies only to Institutions of Higher Education), 97, 98, and 99; and (c) The regulations in 34 CFR part 700.

Selection Criteria: The Secretary selects the following selection criteria in 34 CFR 700.30(e) to evaluate applications for new grants under this competition. The criteria below will receive the following percentage weights.

(a) National Significance (.2)

(b) Quality of the Project Design (.5)

(c) Quality and Potential Contributions of Personnel (.2)

(d) Adequacy of Resources (.1)

Strong applications for CASL grants clearly address each of the applicable selection criteria. They make a well-reasoned and compelling case for the national significance of the problems or issues that will be the subject of the proposed research, and present a research design that is complete, clearly delineated, and incorporates sound research methods. In addition, the personnel descriptions included in strong applications make it apparent that the project director, principal investigator, and other key personnel possess training and experience commensurate with their duties.

Collaboration: We encourage collaboration in the conduct of research. For example, major research universities and institutions may collaborate with historically underrepresented institutions, such as Historically Black Colleges and Universities, Hispanic-Serving Institutions, and Tribal Colleges and Universities.

Pre-Application Meeting: We will hold a pre-application meeting on February 19, 2002 to discuss the funding priority. You are invited to participate. You will receive technical assistance and information about the funding priority. Participants are also encouraged to use this meeting to engage in substantive discussion about prior empirical research and the nature of high quality research in this new area. The meeting will be held at the U.S. Department of Education, Office of Educational Research and Improvement, 555 New Jersey Avenue, NW., room 101, Washington, DC, between 1 p.m. and 4 p.m. A summary of the meeting will be posted on the Internet at: *http://www.ed.gov/offices/OERI*

Assistance to Individuals With Disabilities at the Meeting

The meeting site is accessible to individuals with disabilities. If you will need an auxiliary aid or service to participate in the meeting (*e.g.,* interpreting service, assistive listening device, or materials in an alternate format), notify the contact person listed under **FOR APPLICATIONS AND FURTHER INFORMATION CONTACT** at least two weeks before the scheduled meeting date. Although we will attempt to meet a request we receive after that date, we may not be able to make available the requested auxiliary aid or service because of insufficient time to arrange it.

SUPPLEMENTARY INFORMATION: Cognitive science and neuroscience have been dynamic areas of research over the past fifteen years, producing breakthroughs in our basic understanding of the brain and behavior. Although this research has identified key processes of

attention, memory, and reasoning that are essential for learning, it has yet to be systematically applied to significant educational problems. Therefore, OERI is interested in funding research that builds on these advances and meaningfully connects them to profound and pervasive problems in learning or academic achievement. In this competition, we focus on cognitive psychology rather than linguistics, artificial intelligence, or other areas of cognitive science. We seek research proposals on both basic information processing (problems in encoding, processing information in working memory, storage, and retrieval of knowledge) and higher order cognition (problems in executive function and monitoring, inferential and critical thinking, and verbal and quantitative reasoning). Ranging from basic to higher order cognition, the following topics are illustrative foci for research:

Attention: Research has identified complex attentional mechanisms at the neural and behavioral level that govern information encoding. Little is known, however, about the encoding of information presented to students, notably, how much information is encoded, how attentional mechanisms are implicated in failures to encode, and the degree to which encoding failure explains academic failure, particularly among students who would not be characterized as having attention deficit disorder. Clearly, the effectiveness of teaching and learning interventions depend on whether students process those interventions, and it may well be that effectiveness can be improved by increasing the quality and degree of student attention. Furthermore, attentional and related information-processing systems undergo significant development with age and experience, and such development interacts with task and contextual variables to affect cognitive performance. Research is needed that bridges the gap between detailed, rigorous models of attention (and its development) and successful academic performance.

Memory: Recent research suggests that memory can be conceived of as a property of brain systems and as an outcome of the brain's processing, rather than as a distinct item stored in a specific brain location. Thus, memory is both a part and a product of information-processing activities that are crucial for learning. For example, in working memory, presented information is both stored and operated on, as when students add a series of numbers in their head (i.e., mental arithmetic). Indeed, thinking, problem solving, comprehension, judgment, and long-term retention are related to operations in working memory; all but the simplest tasks also recruit executive control in managing working memory. Although research has related working memory to individual differences in test performance, few process analyses have been done to either isolate sources of difficulties in school-related tasks or to design process-based interventions to reduce those difficulties. Most recently, research on memory has focused on multiple memory systems and processes in long-term memory, which would be tapped to different degrees in different academic tasks. Although theorists differ about the exact nature of these multiple memories, research has demonstrated that learners harbor memories for presented material that are elicited with varying success in different testing environments. Thus, research might profitably focus on how to improve retrieval of these implicit memories for learned material, how memory systems differ in their support for reasoning and problem solving, and how representations in memory can more accurately reflect what has been taught.

Reasoning: Although the seeds of reasoning competence appear to be planted early in development, logical and other forms of reasoning continue to develop significantly into late adolescence. Rudimentary reasoning is required for students to comprehend textbooks, follow class lectures and discussions, and to write and think effectively on their own. Research has distinguished different kinds of reasoning errors in laboratory tasks, which can be ameliorated in different ways. Furthermore, research has shown that students are not trapped in cognitive stages until they are ''ready to learn,'' but, rather, they can learn to improve their reasoning at each stage of development. Research is needed that links this work on reasoning development and performance to the amelioration of reasoning problems in important academic contexts, such as high-stakes testing. Students who fail to master these higher-order reasoning skills are unlikely to compete effectively in a fast-moving economy in which new learning and problem solving are routinely required.

Applicants must focus on research that has the potential to produce substantial gains in academic achievement. Dependent variables may include: measures of cognitive processes, such as conceptual understanding; performance on problems from textbooks, homework exercises, and other ordinarily and widely assigned school tasks; items such as those customarily given on standardized tests (*e.g.,* SATs, NAEP); and other measures of learning or cognition that are demonstrably relevant to academic achievement.

Priority

This competition focuses on projects designed to meet the following absolute priority. Under 34 CFR 75.105(c)(3) we consider only applications that meet the priority.

Absolute Priority

Despite their relevance to learning, recent advances in cognitive science and neuroscience have remained virtually untapped in education. This program of research on Cognition and Student Learning seeks to establish a scientific foundation for educational practice by building on these theoretical and empirical advances and applying them to significant problems in learning or academic achievement. Specifically, proposals are solicited that address either 1 or 2 below.

1. Mechanisms of basic information processing, such as the following, and their relation to significant problems in learning or academic achievement.

a. Attention.

b. Working memory.

c. Learning processes: Acquisition and retention.

d. Storage in and retrieval from long-term memory.

e. Interference and inhibition.

2. Mechanisms of higher order cognition, such as the following, and their relation to significant problems in learning or academic achievement.

a. Executive function and monitoring.

b. Metamemory/memory strategies.

c. Meaning extraction (literal and figurative) for words, sentences, discourse, and complex events.

d. Inference and critical thinking: derivation of semantic, logical, and pragmatic inferences, situation models, and other mental representations.

e. Similarity, categorization, and analogical reasoning.

f. Non-verbal reasoning (e.g., spatial, scientific, quantitative reasoning).

g. Conceptual development (e.g., biology, music, calculus).

h. Judgment and decision-making.

Proposed research must be motivated by a specific conceptual framework and relevant prior empirical evidence, both of which must be clearly articulated. The research must have the potential to advance fundamental knowledge that bears on solving important problems in learning or academic achievement. The proposal must indicate method and why the approach taken optimally addresses the research question. Any approach

must incorporate a valid process that allows for generalization beyond the study participants. Proposals must indicate which of the following approaches is to be used:

1. Experiment (control group; randomized assignment—both required).
2. Quasi-experiment (comparison group, stratified random assignment, groups comparable at pretest, statistical adjustment for comparability).
3. Correlational study (simple, multiple/logistic regression, structural equation modeling, hierarchical linear modeling).
4. Other quantitative (e.g., simulation).
5. Descriptive study using qualitative techniques (e.g., ethnographic methods; focus groups; classroom observations; case studies; single subject designs).

The design of studies should be clear: Independent and dependent, or predictor and criterion, variables should be distinguished. Proposed research is expected to employ the most sophisticated level of design and analysis that is appropriate to the research question. For research questions that cannot be answered using a randomized assignment experimental design, the proposal should spell out the reasons why such a design is not applicable and why it would not represent a superior approach (compared to the selected design).

Waiver of Proposed Rulemaking

Under the Administrative Procedure Act (5 U.S.C. 553) the Department generally offers interested parties the opportunity to comment on proposed regulations. However, in order to make timely grant awards in FY 2002, the Secretary has decided to issue this application notice without first publishing a proposed priority for public comment. These regulations will apply to the FY 2002 grant competition only. The Secretary takes this action under section 437(d)(1) of the General Education Provisions Act.

OERI is conducting this grant competition under the national research institutes authority for the purpose of funding projects that will establish a new stream of research bridging basic cognitive science and educational application. Cognitive science, including studies of learning, memory, decision making, language acquisition, higher order thinking skills, as well as the brain mechanisms underlying these abilities, has shown explosive growth in the last 25 years. Indeed, along with genomic science, many believe that the cognitive and brain sciences have generated the greatest scientific progress of the late 20th century. Basic research within the disciplines of psychology, linguistics, and neuroscience has generated new and important fundamental knowledge on how people learn. However, most of this research has been conducted in laboratory settings, with samples of convenience, and with tasks that are artificial. Translations of this research into educational practice have either not occurred or have not gotten further than abstract statements of principles.

The new program of research sponsored by OERI is intended to move research in the cognitive and brain sciences into schools, expanding the knowledge base to school settings, and to develop new programs and interventions that take advantage of that knowledge base.

Thus for the first time OERI is soliciting applications that will address the lack of substantial interplay between the applied problems of schools and learners, and the cognitive and brain sciences.

In a separate **Federal Register** notice to be published in the near future, the Assistant Secretary will ask for public comment on this priority for the purpose of designing and conducting future grant competitions for this research.

Pilot Project for Electronic Submission of Applications

In FY 2002, the U.S. Department of Education is continuing to expand its pilot project of electronic submission of applications to include additional formula grant programs and additional discretionary grant competitions. The Cognition and Student Learning Research Grant Program (CFDA 84.305H) is one of the programs included in the pilot project. If you are an applicant under the CASL program, you may submit your application to us in either electronic or paper format.

The pilot project involves the use of the Electronic Grant Application System (e-APPLICATION, formerly e-GAPS) portion of the Grant Administration and Payment System (GAPS). We request your participation in this pilot project. We shall continue to evaluate its success and solicit suggestions for improvement.

If you participate in this e-APPLICATION pilot, please note the following:

- Your participation is voluntary.
- You will not receive any additional point value or penalty because you submit a grant application in electronic or paper format.
- You can submit all documents electronically, including the Application for Federal Assistance (ED 424), Budget Information—Non-Construction Programs (ED 524), and all necessary assurances and certifications.
- Within three working days of submitting your electronic application, fax a signed copy of the Application for Federal Assistance (ED 424) to the Application Control Center after following these steps:

1. Print ED 424 from the e-APPLICATION system.
2. Make sure that the institution's Authorizing Representative signs this form.
3. Before faxing this form, submit your electronic application via the e-APPLICATION system. You will receive an automatic acknowledgement, which will include a PR/Award number (an identifying number unique to your application).
4. Place the PR/Award number in the upper right hand corner of ED 424.
5. Fax ED 424 to the Application Control Center at (202) 260–1349.

We may request that you give us original signatures on all other forms at a later date.

You may access the electronic grant application for the CASL Program at: *http://e-grants.ed.gov.*

Due to software upgrades, it is anticipated that the e-Application software will be unavailable for several days in mid-January. The tentative dates for this system down time are January 11–21, 2002. Please check this site for future updates on system availability.

We have included additional information about the e-APPLICATION pilot project (see Parity Guidelines between Paper and Electronic Applications) in the application package.

FOR APPLICATIONS AND FURTHER INFORMATION CONTACT: Valerie Reyna, Office of Educational Research and Improvement, U.S. Department of Education, 555 New Jersey Avenue, room 600, Washington, DC 20208. Telephone: (202) 219–1385 or via Internet: *Valerie.Reyna@ed.gov.*

If you use a telecommunications device for the deaf (TDD), you may call the Federal Information Relay Service (FIRS) at 1–800–877–8339.

Individuals with disabilities may obtain this document in an alternative format (e.g., Braille, large print, audiotape, or computer diskette) on request to the program contact person listed under **FOR APPLICATIONS AND FURTHER INFORMATION CONTACT**.

Individuals with disabilities may obtain a copy of the application package in an alternative format by contacting Valerie Reyna. However, the

Department is not able to reproduce in an alternative format the standard forms included in the application package.

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Program Authority: 20 U.S.C. 6031.

Dated: December 18, 2001.

Grover J. Whitehurst,

Assistant Secretary for Educational, Research and Improvement.

[FR Doc. 01–31503 Filed 12–20–01; 8:45 am]

BILLING CODE 4000–01–U