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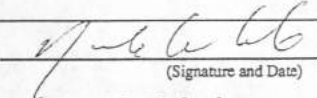
SOUTHWEST CENTER FOR ENVIRONMENTAL  
RESEARCH AND POLICY  
FY 1993 Research and Development Program

Environmental Thrust Areas Addressed:

- Air Quality       Water Quality       Hazardous Wastes/Soils  
 Environmental Health, Education, Training and Policy

Project Title: Enhancing Environmental Education by Direct Interaction  
with Elementary Teachers

Date Submitted: 9/11/92

Principal Investigator:  9/11/92  
(Signature and Date)

J.D. Andrade  
(Typed Name)

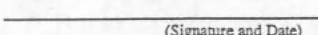
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II. Summary:

The environmental and health problems along the U.S.-Mexican border region can be in part alleviated and corrected by insuring that the resident population is aware, informed, and educated on regional environmental and health issues.

One way to help accomplish such education is through elementary students and their teachers. Since most of the border population lives in relatively urban environments, and since most of the young children in the region participate in some sort of elementary education, we feel it is very efficient and effective to target the elementary teacher and student populations.

We propose a unique and novel program by which the Center for Integrated Science Education (CISE) at the University of Utah would communicate directly with individual elementary teachers throughout the border regions in both the U.S. and Mexico via a bilingual newsletter presenting ideas, information, and projects related to local environmental and ecological issues. The professionally written and illustrated newsletter will contain tips, examples, and suggestions for classroom science and technology activities on topics that would be derived from current problems and issues which face the border region. We will particularly target air and water quality issues as well as air, water, and solid waste pollution, its monitoring, and its correction. Topics will in general be derived from stories and controversies in the local urban newspapers. Selection of the stories will be based on suggestions from educators, scientists, and engineers throughout the border region, and by CISE staff at the University of Utah, who will regularly monitor the key newspapers from the major urban areas in the border region. Stories will be selected on the basis of their relevance to the region, and their suitability for connecting to core curricula in the various border states.

III. Problem Statement:

Although elementary students in most of the urban United States tend to be very interested in environmental issues, and tend to respond very positively to environmental topics and activities in the classroom, most elementary teachers tend to have some difficulty and insecurity with science and technological subjects. They sometimes begin

projects (topics related to the environment and ecosystems, for example) but then abandon them. The further development of the topics often requires scientific background or depth which they simply do not have. Also many teachers in more traditional schools and districts tend to teach only material which is specified in the core curriculum for that particular district or state. The teachers generally have difficulty in seeing the relationship between the required topics in the core curriculum and the local environmental and ecological issues which tend to stimulate and motivate their students.

We propose a unique and novel program by which the Center for Integrated Science Education (CISE) at the University of Utah would communicate directly with individual elementary teachers throughout the border regions in both the U.S. and Mexico via a bilingual newsletter presenting ideas, information, and projects related to local environmental and ecological issues. The professionally written and illustrated newsletter will contain tips, examples, and suggestions for classroom science and technology activities on topics that would be derived from current problems and issues which face the border region. We will particularly target air and water quality issues as well as air, water, and solid waste pollution, its monitoring, and its correction. Topics will in general be derived from stories and controversies in the local urban newspapers. Selection of the stories will be based on suggestions from educators, scientists, and engineers throughout the border region, and by CISE staff, who will regularly monitor the key newspapers from the major urban areas in the border region. Stories will be selected on the basis of their relevance to the region, and their suitability for connecting to core curricula in the various border states. Due to personnel, time, and resource limitations, only those stories and activities will be selected which are more or less generic to the entire border region, and which can satisfy curriculum requirements and guidelines for all of the states involved. As the project evolves, however, it is reasonable to anticipate that the stories and activities can be customized for particular state, and even particular city, needs and characteristics.

CISE will work closely with colleagues in major higher education institutions in the various states, and expects to perhaps eventually transfer the elementary network activity directly to appropriate science education centers in local border institutions.

This project is based on ELEM-NET, a network now under development by CISE for every elementary school, and every elementary teacher, in the state of Utah. The Utah activity involves general science, math, and technology topics and activities. The project

proposed here will focus more exclusively on environmentally related topics of importance and relevance to the border region.

A major portion of the budget proposed is simply the costs involved in printing and mailing the newsletter directly to every elementary teacher in the border region. This direct communication and interaction has a number of major benefits which are discussed in the proposal. The most important is that the teacher no longer feels isolated in his/her classroom, but knows that someone, some group, is indeed interested in helping him improve his science and technology background and the environmental awareness in their classroom. We will encourage feedback from the teachers. We will encourage suggestions and input. We will encourage class projects and a variety of other activities which will get the students directly involved in the topics of interest. We will particularly encourage activities in which the students can take home some of their excitement and background, and thereby begin to educate the adult parent population. A very effective way to reach this population is through its children. Although ELEM-NET is initially an interaction between CISE and the individual teachers, as the project evolves a network will expand to include interactions between and among the teachers themselves, and between the teachers and the various scientific and technical professionals in their local community.

#### IV. Objectives and Tasks:

Objective 1: We propose to become familiar with the major urban newspapers in the U.S.-Mexico region, including the major daily newspapers of each of the 14 urban areas in the region. In some cases a daily newspaper may not be available locally, but there will be a predominant daily that is distributed in that area. We will also become familiar with the reporters and writers in each of those regions who focus on environmental science and technological issues.

Objective 2: We propose to become thoroughly familiar with the elementary education system in the same fourteen border city pairs. The children of the 9.2 million people who live in this region are enrolled in various elementary schools in various school districts. We propose to become thoroughly familiar the organization of public education in each of the states in both the United States and Mexico.

Objective 3: By study of the local press, and by thorough discussions with SCERP personnel and grantees, we will become informed as to the major environmental issues in the border region, and develop priorities with respect to the environmental education needs of the general population.

Objective 4: It is expected that general science and technology education in many of the schools, both in the U.S. and Mexico, is limited at best, as is the case for much of elementary education in the United States. By communication with the school districts involved, and with the State Offices of Education, we will assess and learn of the various state and regional initiatives for improving science, math, and technology education in the elementary environment in the respective areas.

Objective 5: We will thoroughly survey elementary science, technology, and environmental education curricula, materials, and modules now becoming available at the elementary level; including the very recent initiatives of the National Science Foundation, the National Science Teacher's Association, and other groups, and become thoroughly familiar with these curricula.

Objective 6: Topics, methods, and suggestions incorporated in the newsletters will be carefully tied to state and regional curriculum guidelines and assessment methodologies so that the teacher feels that these topics and activities are worthy of his/her effort, attention, and class involvement.

Objective 7: By combining the information learned in Objectives 1-6 above, we will then define a set of key issues and problems specific to the border region, which we can then address in the ELEM-NET newsletters.

Objective 8: We will include activities and projects which can involve parents and guardians, and by this means educate and inform the parents as well as the students and the teachers.

Objective 9: We will encourage the students and teachers to directly communicate with the CISE project office at the University of Utah, to have feedback and input regarding the level of activity, interest, and commitment.

Objective 10: We will assess the results of the project by random surveys of the teachers and schools involved, and by random polling of various school officials, including principals, science curriculum supervisors, and PTA's or related organizations, as well as via the reporters of the local press.

#### V. Methodology:

As soon as the project is initiated, we will obtain mail subscriptions to the major newspapers in the 14 urban areas noted above. By reading and studying the papers for a month, we will become aware of the major science and environmental writers for these papers, and of many of the major issues. By direct contact with the key writers, we will then work backwards in time so they can help identify what they feel are the major local issues. We will then continue our subscriptions for a limited number of publications which appear to thoroughly represent the region and the issues involved. We will also have a contact list of the major science and environmental writers upon which we can draw. In addition to newspapers, we will address regional weekly and possibly monthly magazines as well as appropriate government publications.

We will become aware of the organization of the educational establishment in each of the regions, initially by contacting the State Office of Education. From them we will obtain maps of school districts, as well as directories with the names of the principals of every elementary teacher in each of the districts in the state. We have already done this for our Elem-Net project in Utah, the pilot project upon which this proposed project is modeled.

We will immediately begin to put together the mailing and distribution lists, initially via the principal at each elementary school. Within the first several months we will have the names of each individual elementary teacher in each of the elementary schools. By directing our correspondence and newsletter directly to the elementary teacher, and to his/her classroom, we can insure that each individual teacher and classroom will feel personally involved and in contact with this project and with CISE.

Much of this information will also be provided via interactions and discussions with the appropriate colleges and schools of education in the major universities in the border region. Each of these schools of education has internship and apprenticeship

programs with the local school districts; through this vehicle we can begin to develop knowledge of the teachers and the schools and to develop a personal rapport with them.

After study of the printed media, after discussion with the key reporters and writers, and after careful discussion with the SCERP staff and grantees, a set of key issues and topics will be identified. We will then look at these in light of the core curricula and curricula guidelines in each of the states and districts involved. We will examine those topics which are normally covered in elementary science, particularly in light of the modern science and environmental education curricula which are now becoming available (see section IX). We will enlist the advice and input of our own local science, environment, and elementary education professionals, and develop a prototype set of topics, science content, and pedagogical approaches which are appropriate to, and relevant to, the border region. These draft approaches will then be discussed in some detail with educators in the major institutions, as well as in the local school districts.

We certainly do not want to reinvent the wheel. We will carefully assess those activities and projects related to environmental education which are now ongoing. One often finds a particular classroom or indeed a particular school which has innovative, unique, and often highly effective and successful science and environmental activities. As we learn of these successful initiatives, we will, with permission, incorporate that into this project, and do what we can to multiply and disseminate those successful activities.

The strategy for optimizing relevance of the topics to the border region is that the tips and suggestions in the newsletter will be tied to current events, particularly issues in the press which are of relevance and interest to the adult population.

Given that the budgets for curricula materials and supplies in most of the schools involved are likely to be marginal at best, the tips and activities developed will be consistent and compatible with those constraints.

We will produce a pilot newsletter during the summer of 1993. Distribution will be limited to those educators, teachers, and school administrators with which we have been in contact, and which have shown some genuine interest in the project, as well as the science reporters and writers and the SCERP staff and contractors. Input and critique will be solicited.

By careful critique and input from the teachers, from the education administrators and supervisors, and from technical people with knowledge of the issues and problems in the border region, we will then produce a series of bimonthly newsletters which will go to each teacher in the region.

Each newsletter will include a response section which will encourage the class and the teacher to contact CISE with information on their activities and their suggestions for future activities. These responses will then be provided to the science and environmental writers in each of the districts in the area, with the hope and goal of encouraging them to do local stories on the various classrooms and schools, in this way greatly magnifying the activity into the local community and thereby interesting parents, adults, and other teachers and encouraging their own participation in related activities. We will also do what we can, given the resources available, to encourage participating teachers and administrators to inform their local associations and other professional groups of these activities, thereby further encouraging and enhancing the dissemination of these topics and projects.

The results of this first year of activity will begin to be presented nationally at meetings, such as the National Science Teachers Association, and submitted to national publications involved with elementary science education.

This is an enormous project. We think we can carry it off mainly because:

- 1) we already have a head start and a model, the ELEM-NET project now being implemented in the state of Utah; and
- 2) because of the unusual commitment and focus of the Center for Integrated Science Education at the University of Utah to the area of elementary science, technology, and environmental education.

SOUTHWEST CENTER FOR ENVIRONMENTAL  
RESEARCH AND POLICY

VI. Activity Schedule  
Fiscal Year 1993

Project Title Enhancing Environmental Education by Direct Interaction with  
Elementary Teachers.  
Project No. \_\_\_\_\_ Principal Investigator J.D. Andrade

<u>Objective(s)/Activities</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>Objective 1:</u> Analysis of the elementary education system in each of the states in the region.	02/01/93	04/01/93
<u>Objective 2:</u> Elementary education system.	02/01/93	04/01/93
<u>Objective 3:</u> Selection of key environmental issues and topics.	02/15/93	07/01/93
<u>Objective 4:</u> Local science and technology education initiatives.	03/01/93	06/01/93
<u>Objective 5:</u> Available elementary education curricula.	02/01/93	05/01/93
<u>Objective 6:</u> Local core curriculum guidelines.	02/01/93	05/01/93
<u>Objective 7:</u> Identification of key issues and approaches.	03/15/93	06/15/93
<u>Objective 8:</u> Involvement of parents.	04/01/93	01/30/94
<u>Objective 9:</u> Direct communication with CISE.	04/01/93	01/30/94
<u>Objective 10:</u> Project assessment.	12/01/93	01/30/94
Pilot Newsletter	-----	07/15/93
Newsletter Distribution Dates	<u>1993:</u> 09/15; 10/15; 04/01; 12/01 <u>1994:</u> 01/01; 01/15; 02/01	
Dissemination of Information on Project	11/01/93	02/01/94