

# NASA-Industry Education Initiative

## Education Programs Report 1991

(NASA-NP-158) NASA INDUSTRY  
EDUCATION INITIATIVE. EDUCATION  
PROGRAMS REPORT, 1991 (NASA) 32 p

N93-13248

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The NASA-Industry Education Initiative is a voluntary cooperative effort involving NASA and a group of private-sector contractors, with the objective of focusing their collective support of American education on accomplishing the national education goals by the year 2000.

This report presents an initial inventory of education programs supported by NASA-Industry Education Initiative participants. It thus provides a baseline for evaluating the collective focus of NASA-industry education activities, and particularly achievement of the national education goals.

### Statement by the NASA Administrator

Since publication of *A Nation at Risk* in 1983, thousands of individuals and groups have analyzed the American education system and recommended a wide range of changes. In 1989, President Bush and the nation's Governors met at an Education Summit in Charlottesville, Virginia. Together, they agreed on *The National Education Goals*, placing education at the forefront of the national agenda.

Early in 1991, President Bush announced *AMERICA 2000*—his strategy to move America towards achieving educational excellence through the national education goals. The President calls this effort “the crusade that counts most—the crusade to prepare our children and ourselves for the exciting future.”

Success requires a concerted effort by all segments of our society, and especially by NASA and other federal agencies working hand in hand with the private sector. The NASA-Industry Education Initiative, which we embarked upon in early 1991, embodies this concept. Together, NASA and industry are supporting the accomplishment of the national education goals by the year 2000.

America's future depends on our developing the skills necessary to maintain our technological competitive edge in the world. The future success of both NASA and its private-sector contractors is heavily dependent upon an assured pipeline of technically qualified workers. Certainly, greater scientific and technical literacy is required for citizens to live in a world of growing complexity.

To those who have devoted their time and attention to producing this *Education Programs Report 1991*, I express my appreciation and gratitude. The report suggests areas where we can do more.

We look forward to working more closely with our industry colleagues to make increasingly significant contributions to achieving national excellence in education.



Daniel S. Goldin

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# Executive Summary

In 1983, the Secretary of Education issued a report chronicling the failure of America's schools to provide high-quality education. The release of this report, *A Nation at Risk: The Imperative for Educational Reform*, ushered in a continuing effort by various government agencies and private organizations to analyze the problem and propose possible means for improvement.

In line with these concerns, President Bush and the nation's 50 Governors in 1989 developed a set of specific education objectives—*The National Education Goals*—to be accomplished in this century. The goals are designed to enhance and improve education and thereby strengthen the United States competitive position in the global community.

The NASA-Industry Education Initiative (NIEI) is the response of the National Aeronautics and Space Administration and its private-sector contractors to the education crisis. It was proposed by NASA Administrator Richard H. Truly in 1991 as a means for developing a coordinated NASA-industry effort to help deal with this concern, with a special focus on addressing the national education goals. The first step was establishment of a Working Group made up of representatives from NASA and 26 of its major contractors.

As an initial task, Working Group members decided to take stock of their own education programs and assess the extent to which these programs are consistent with and supportive of the national goals. Their long-term objective is to seek ways in which NASA and its contractors can build on an already existing education base to help expand and enhance their support of the nation's education reform efforts. In this way, they can satisfy both their own interests and their shared vision for American education.

## Conclusions

The findings from the initial inventory of education programs show that support for NIEI appears to be strong among the organizations surveyed. In addition, the range, depth and historical baselines of NIEI education programs are encouraging. It is also apparent that there is a significant level of cooperation between NIEI members and other organizations in developing and conducting these programs, and that there is a fairly high incidence of NIEI employee involvement in program operations.

Heavily focused towards science, engineering, mathematics and technology achievement, NIEI activities appear to be aligned with the national education goals. They also are consonant with other federal education priorities and objectives.

At the same time, the NIEI findings reveal some areas for improvement.

First, the majority of programs are targeted fairly late in the education cycle (i.e., at the Junior High, High School and Undergraduate levels). NIEI programs may, therefore, be under-emphasizing the formative years (i.e., pre-Kindergarten through Elementary School), where education programs may have the broadest impact.

Second, the number of initiatives geared towards adult literacy and adult skills-enhancement appears to be relatively low. This finding may be somewhat mitigated by in-house skill- and career-development programs, which are not reflected in the reports; however, the shortfall is significant in light of the importance now being placed on the need for continuing education and lifelong learning.

Third, the majority of NIEI activities involve traditional education-assistance programs, but the number of critical assessment and systemic reform initiatives is low. Thus, in the aggregate,

NIEI programs may not be fully aligned with the growing consensus for systemic change (as differentiated from simple reform) in the national education delivery system.

In light of these findings, the Working Group makes the recommendations that follow.

## Recommendations

RECOMMENDATION ONE calls for continuing NIEI Working Group operations for an indefinite period, with participation open to other like-minded private-sector organizations.

RECOMMENDATION TWO suggests that this report be periodically updated to allow sustained assessment of the level and direction of NIEI education programs. It is also recommended that the heads of Working Group organizations ensure maintenance of up-to-date program information in support of future group activities, and participate in an annual review and planning session addressing continuing NIEI operations.

RECOMMENDATION THREE requests Working Group participants and other members of the nation's business community to conduct an analysis of ongoing education programs to determine how they might be better focused on accomplishing the national education goals and other designated education objectives.

RECOMMENDATION FOUR urges American corporations to continue their support of education and to evaluate in-house programs periodically to ensure their alignment with the national education goals and education priorities.



# Preface

This report provides an initial inventory of education activities supported by members of the NASA-Industry Education Initiative Working Group. It is hoped that it will generate a greater awareness of NASA-industry education efforts among the general public, and create a climate for greater sharing of operational information and a more coordinated and integrated approach to planning education activities among NIEI members.

Chapter I describes the NASA-Industry Education Initiative, its first data-collection instrument and the limitations inherent in the data.

Data analyses are presented in Chapter II, where they are classified according to six categories, as follows:

- **General Program Data (Section B).**

Provides information on program start dates and cumulative levels from 1954 to the present, as well as data on the range of program durations.

- **Program Category/Skill Target Data (Section C).**

Provides an analysis of NIEI education initiatives by category and skill target. Program categories identify the general nature of the program and define the type of activities each category is designed to support. Skill targets identify the specific subject or skill area the program is intended to enhance (e.g., science, mathematics, engineering, technology).

- **Program Recipient Data (Section D).**

Includes information on the reported number of program recipients, as well as the education level and geographic scope of NIEI programs. Data on programs directed towards special groups (e.g., minorities, females, people with disabilities) are also provided.

- **Program Financial Support Data (Section E).**

Presents data on the level of NIEI program expenditures for 1990 and 1991 (actual and estimated), and identifies the number of programs in various expenditure ranges. It also provides a distribution of programs according to various types of support (financial, in-kind services, employee involvement, equipment), and addresses the level of employee participation.

- **Cooperative Programs Analysis (Section F).**

Provides information on the number of NIEI cooperative efforts, and a breakdown of the types of cooperative participants.

- **National Goals Assessment (Section G).**

Identifies the number of NIEI programs indicating support for each of the six national education goals.

Chapter III presents the preliminary conclusions and recommendations of the Working Group.

Appendix 1 is a historical perspective on the nature of the education crisis and the federal government response to the crisis. In addition to setting out *The National Education Goals* in somewhat greater detail, this appendix also discusses two Administration approaches to moving the nation towards accomplishing these goals: *AMERICA 2000*, which establishes the overall Administration strategy, and *By the Year 2000: First in the World*, which establishes a priority framework for developing and implementing federal government education programs in science, engineering and technology.

Appendix 2 provides detailed information on the NIEI data collection process. In Appendix 3, NIEI activities are compared with the implementation guidelines in *AMERICA 2000* and *By the Year 2000*. Representatives to the NIEI Working Group and Task Group appear in Appendix 4.





# I. The NASA-Industry Education Initiative

## Background

Since publication of *A Nation at Risk: The Imperative for Educational Reform* by the Secretary of Education in 1983, public and private organizations alike have engaged in extensive self-analysis and reflection in response to deepening concerns regarding our nation's fundamental education infrastructure.

As the debate intensified over the past decade, calls for education "reform" quickly turned to demands for "revolution," with most critics agreeing that the magnitude of the crisis will likely demand radical and systemic change.

In 1989, President Bush and the nation's Governors promulgated *The National Education Goals* as a foundation for sustaining the long-term competitive posture of our nation. In 1991, two additional Administration

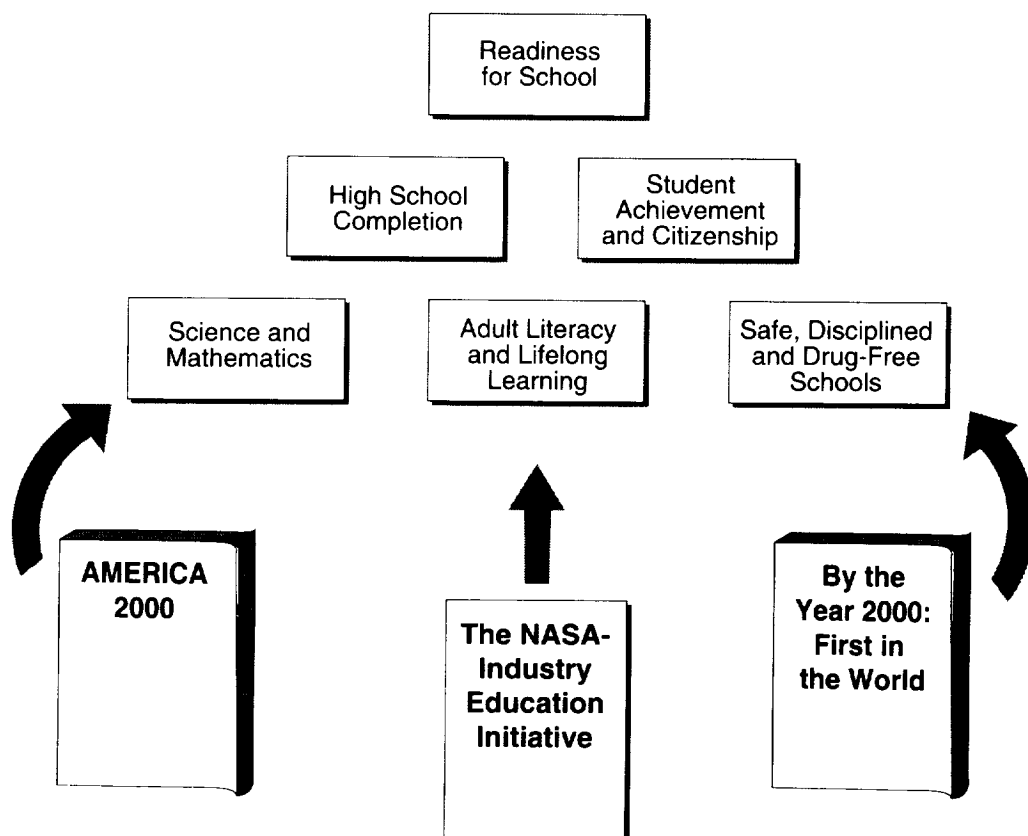
reports were published (*By the Year 2000: First in the World* and *AMERICA 2000*), which defined the Administration's priorities and strategies for addressing our country's education problems. Together, the three documents advocate the following concepts, which have come to be recognized as critical to the national education improvement effort.

- Progressive and systemic change initiatives
- Broad-based areas of reform (i.e., infancy through adult lifelong learning)
- Balance between elementary and postsecondary emphases

- Science, mathematics, engineering and technology focus
- Enhanced student *and* teacher preparation and performance
- Total national commitment and participation (i.e., all citizens)

NASA Administrator Richard H. Truly proposed the NASA-Industry Education Initiative (NIEI) in February 1991, in an effort to develop a coordinated NASA-industry response to the national education crisis, enhance NASA and industry support for the national education goals, and provide a foundation for continued cooperative efforts in support of national, regional and local education objectives.

## Addressing The National Education Goals



## NIEI Corporate Participants

<b>* Aerojet</b>	<b>EG&amp;G Florida</b>	<b>Johnson Controls</b>	<b>* Rockwell International</b>
<b>Allied-Signal</b>	<b>Fairchild Space</b>	<b>Lockheed</b>	<b>Teledyne Brown</b>
<b>BAMSI</b>	<b>General Electric</b>	<b>Loral</b>	<b>* Thiokol</b>
<b>Boeing</b>	<b>*Grumman</b>	<b>Martin Marietta</b>	<b>* TRW</b>
<b>Computer Sciences</b>	<b>Honeywell</b>	<b>McDonnell Douglas</b>	<b>Unisys</b>
<b>Cray Research</b>	<b>Hughes Aircraft</b>	<b>NSI Technology</b>	<b>United Technologies</b>
	<b>*IBM</b>	<b>Orbital Sciences</b>	

**\* Task Group member**

### Organization

Industry reaction to the concept was favorable, and the NIEI Working Group was subsequently established with initial objectives of (1) conducting an inventory of education programs of NASA and NIEI participants; and (2) evaluating the extent of support these programs provide for the national education goals. For the longer term, the Working Group defined the NASA-Industry Education Initiative as a voluntary cooperative effort involving NASA and a group of its major private-sector contractors, with the objective of focusing their collective support of American education on accomplishing the national education goals by the year 2000. With this foundation, the NIEI is well positioned to capitalize on shared information and intellectual resources in helping resolve our nation's education problems.

In formalizing the NIEI approach, day-to-day management of Working Group activities was assumed by the NASA National Service Office (Code IN), with the Associate Administrator, Office of Policy Coordination and International Relations (Code I), providing overall policy direction. Similarly, the Education Division (Code FE) provides expert advice and assistance, with the Associate Administrator for Human Resources and Education (Code F) overseeing this effort. Private-sector participation was initially made up of 30 of NASA's major contractors, whose chief executives have customarily been invited by the NASA Administrator to an annual meeting to review the agency's activities. Of the 30 NIEI members, 26 responded to the request for program data, which provided the documentation for this report. Six participants also volunteered to serve on the NIEI Task Group, which assumed

the responsibility to plan and prepare this initial NIEI *Education Programs Report*. The corporate participants in the NIEI are listed in the table above; an asterisk indicates membership on the Task Group.

### The NIEI Education Programs Report

#### Purpose

The purpose of this report is to provide a preliminary inventory of NIEI education programs and to assess the level of program support for the national education goals. As such, it is expected to establish a baseline for refining current and planned member activities for maximum alignment with the federal education strategies and objectives. This document is also intended to facilitate enhanced data exchange, program coordination and reform activity among NASA, the NIEI Working Group and industry as a whole.

**Approach**

This report is drawn directly from education program summaries compiled by the Working Group members. During the initial NIEI meetings the nature of desired program data was defined, and an automated questionnaire was developed to capture various types of descriptive information. A depiction of the general types of data requested is provided below.

**Limitations**

This document contains various caveats essential to informed data interpretation. In most cases, these limitations are presented in the notes accompanying the figures in Chapter II. However, there are also a number of overall report limitations, as described below.

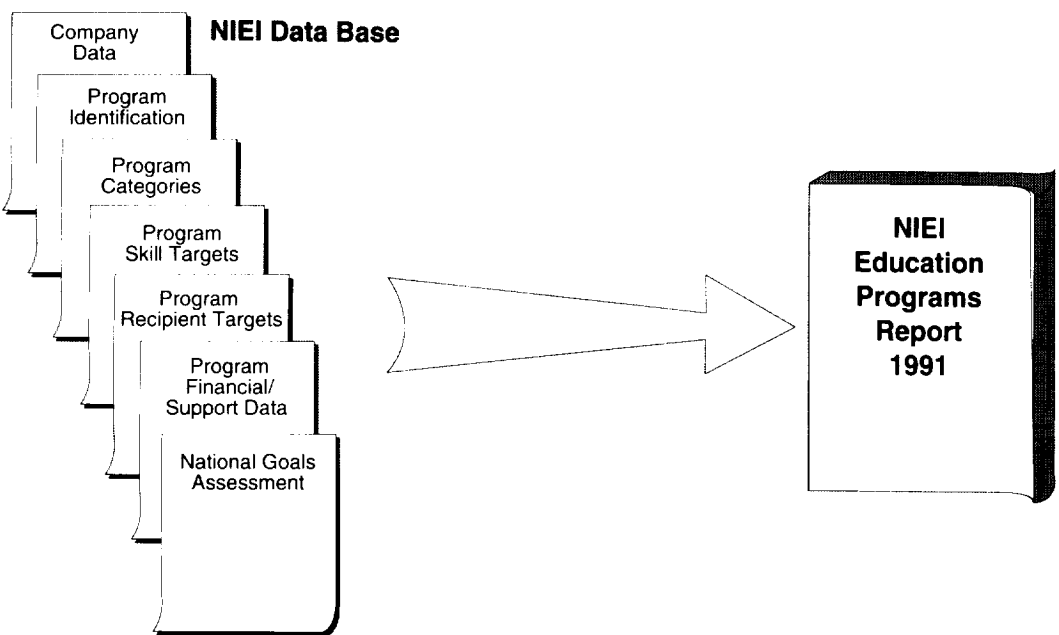
• During collection of program information, a number of inconsistencies were identified in both the data collection vehicle (the program questionnaire)

and the precision of data entry by NIEI participants. This report must therefore be recognized as preliminary, pending refinement of the data collection process to be reported in subsequent versions of this report. It should also be noted that all information received on program questionnaires was accepted "as is," and no attempt was made to verify or edit member responses.

• The term "program" is used throughout this report to identify distinct education activities supported by NIEI members. However, this is not intended to suggest that each program documented herein constitutes a discretely defined enterprise; rather, in some cases, an individual program entry was used as an umbrella for a range of related initiatives. At the same time, it should be noted that some program entries may reflect one-time grants or donations (both large and small), or other relatively minor, intermittent or nonrecurring endeavors.

• Program data are depicted in the aggregate, without NASA or company attribution. This limitation was agreed on in an attempt to avoid company-to-company comparisons and maximize the potential for objective scrutiny of the collected information.

• This report is intended to document only those education programs not specifically geared toward company employees; it therefore does not reflect internal career development programs and organizationally provided, job-specific training. It should nonetheless be recognized that many participating companies have extensive in-house training and employee development programs, including tuition reimbursement initiatives. In this respect, the figures in this document underestimate the total level of education support provided by Working Group members.

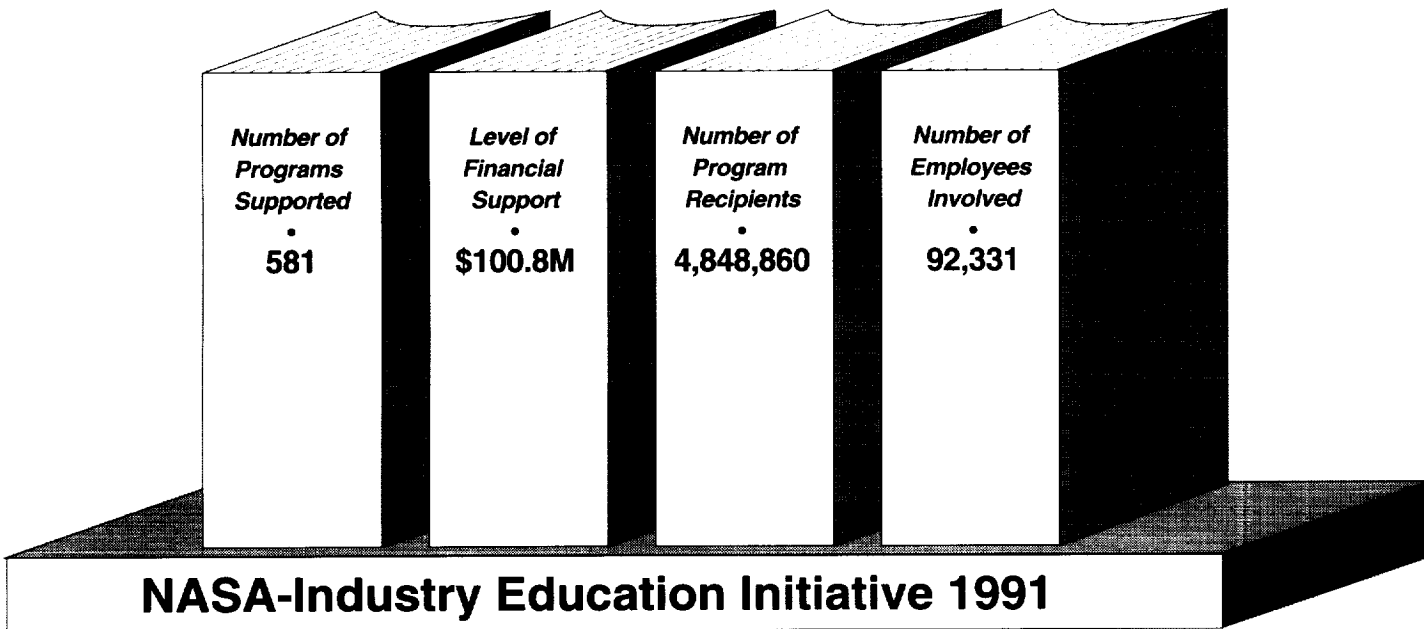


## II. NIEI Program Data

### A. Overview

NIEI participants are supporting a broad range of education programs encompassing all grade levels (as well as adults) and targeting a variety of special groups, including minorities, females and people with disabilities. Although the initial survey was limited to NASA and 26 of its major contractors, the preliminary results are impressive: 581 education programs were reported, with

financial contributions averaging approximately \$100.8 million per year. The levels of employee participation and program recipients are equally encouraging: more than 92,000 employees were identified as contributing various amounts of time and effort towards education programs, and nearly five million individuals were reported as directly benefitting from NIEI activities.



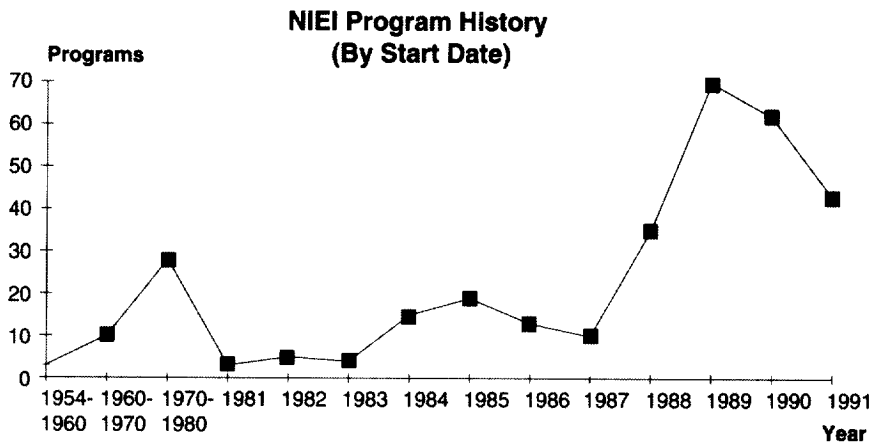


Figure B-1

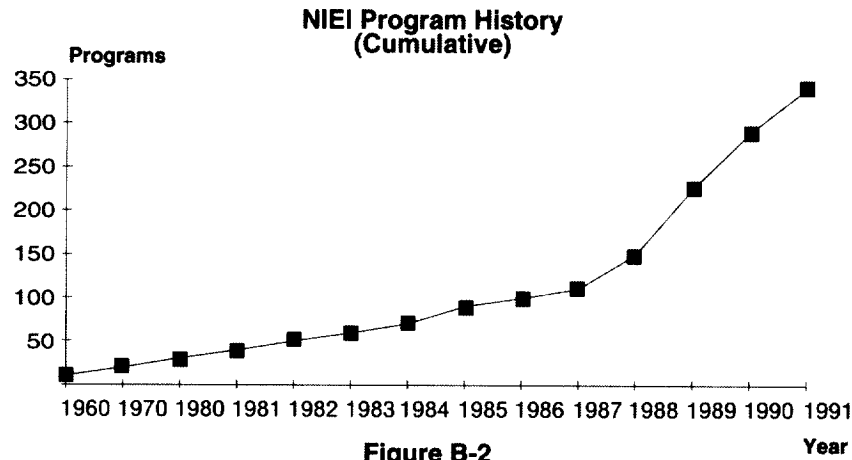


Figure B-2

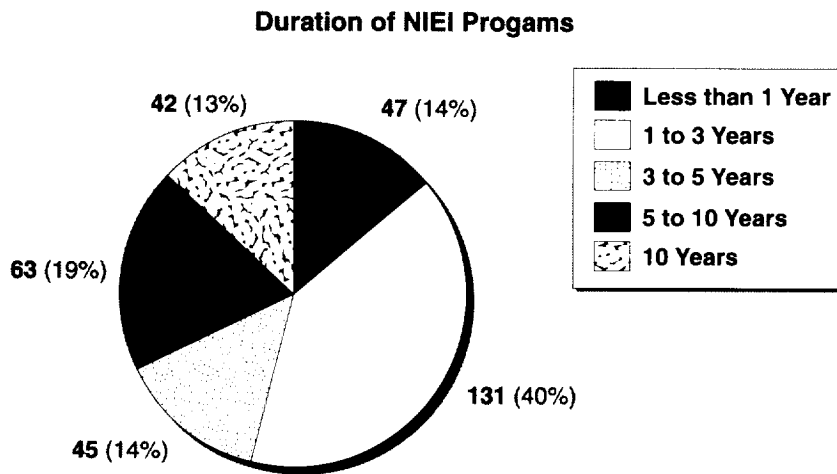


Figure B-3

## B. General Program Data

NIEI members are currently providing support for 581 education programs. Program start dates span the period from 1954 to 1991 (figure B-1); aggregate program totals for this period are presented in figure B-2. Analysis of individual start dates indicates an average program life of 5.2 years. Figure B-3 identifies the number of programs and their duration.

### NOTES

- In some cases individual program data sheets were used to summarize a range of related activities. However, in generating statistics for this report each data sheet was counted as a single program. The total program figure (581) therefore understates the actual number of distinct NIEI education activities.
- Only 328 program descriptions (56%) included start dates. Figures B-1 through B-3 reflect only those programs where such data were provided.

### C. Program Category/Skill Target Data

In the majority of cases, NIEI respondents highlighted multiple program categories and skill targets for individual education programs. Even so, with respect to program categories some significant trends are visible in figure C-1. The majority of programs

(66%) were at least partly characterized as Student Incentives. Teacher/Faculty Preparation and Enhancement and Curriculum Development follow with 36% and 30%, respectively. The remaining “Student” categories, Program Evaluation and Assessment and Organizational and Systemic Reform,

are supported by 17% and 14% of NIEI activities. At the far end of the spectrum, the percentage of “Adult” programs—Skills Enhancement (6%) and Basic Literacy (3%)—suggests even less emphasis in these areas. In figures C-2 through C-4, the number of programs supporting each “Student” category is displayed by general education level (i.e., K-12, Undergraduate and Graduate). Program category descriptions are summarized in the table below.

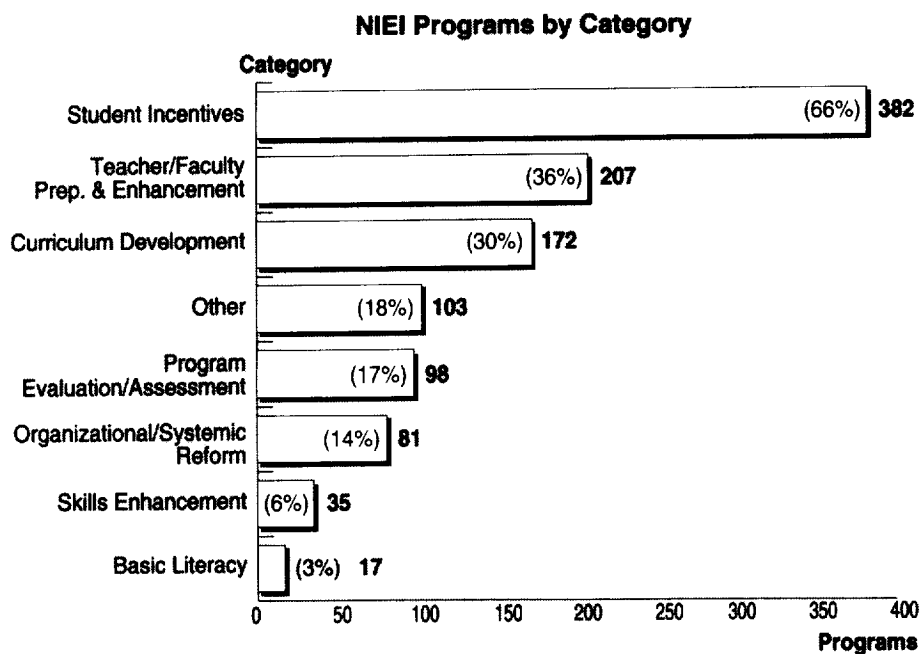


Figure C-1

NOTE

\* In figure C-1, each percentage is based upon the number of total NIEI programs (581). The sum of the percentages therefore exceeds 100% since many program descriptions highlighted numerous categories. Similarly, the number of programs reflects multiple counting where such cross-applications were identified.

NIEI Program Categories at a Glance						
Student Categories				Adult Categories		
<b>Student Incentives</b> Programs that provide direct student financial assistance, including scholarships, assistantships, fellowships.	<b>Teacher/Faculty Preparation and Enhancement</b> Pre-service activities that increase preparation for science, engineering and technology instruction; or in-service programs that strengthen and motivate teacher performance.	<b>Curriculum Development</b> Programs that support development and use of new curricula, materials or educational technologies, or support laboratory and facilities improvement.	<b>Program Evaluation and Assessment</b> Activities that involve program evaluation, student assessment, data collection and research on the learning process.	<b>Organizational and Systemic Reform</b> Programs that are designed to make systemic changes in the educational delivery system and increase the number and quality of students studying science and engineering.	<b>Skills Enhancement</b> Activities designed to develop new skills and build on the present knowledge of individuals.	<b>Basic Literacy</b> Programs designed to enhance the rudimentary knowledge of individuals.

### NIEI K-12 Programs

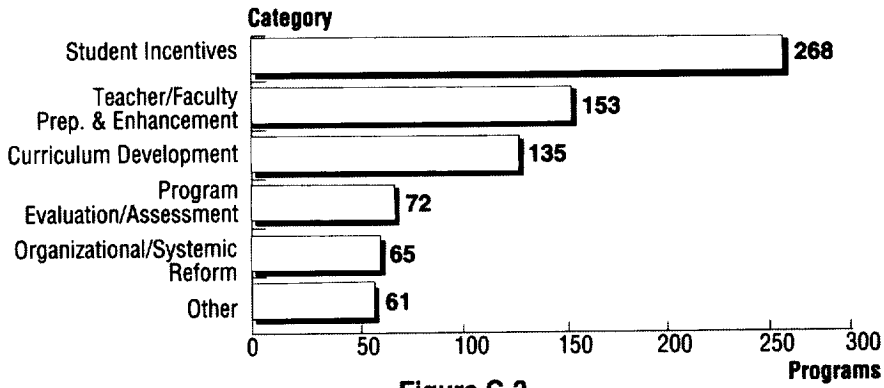


Figure C-2

### NIEI Undergraduate Programs

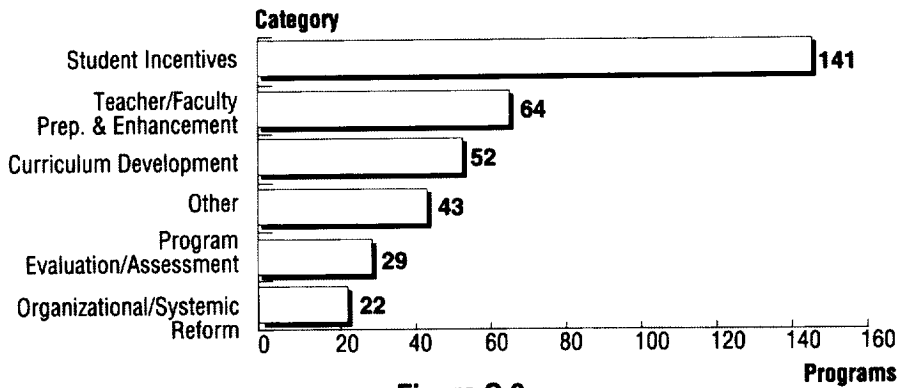


Figure C-3

### NIEI Graduate Programs

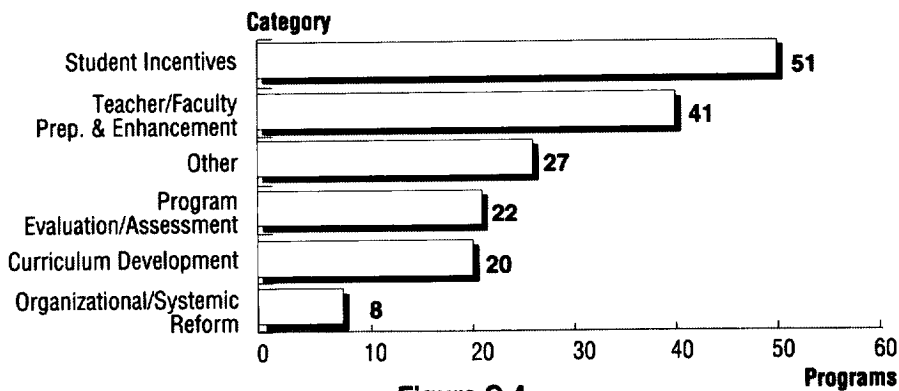


Figure C-4

NOTE:

• In figures C-2 through C-4, the bar totals reflect multiple counting when more than one category was checked for each program.

In analyzing program skill targets (figure C-5), it is clear that the majority of target areas are fairly well represented. Approximately one-third of the

programs also identified emphasis in "Other" skill areas, which are further described in figure C-6.

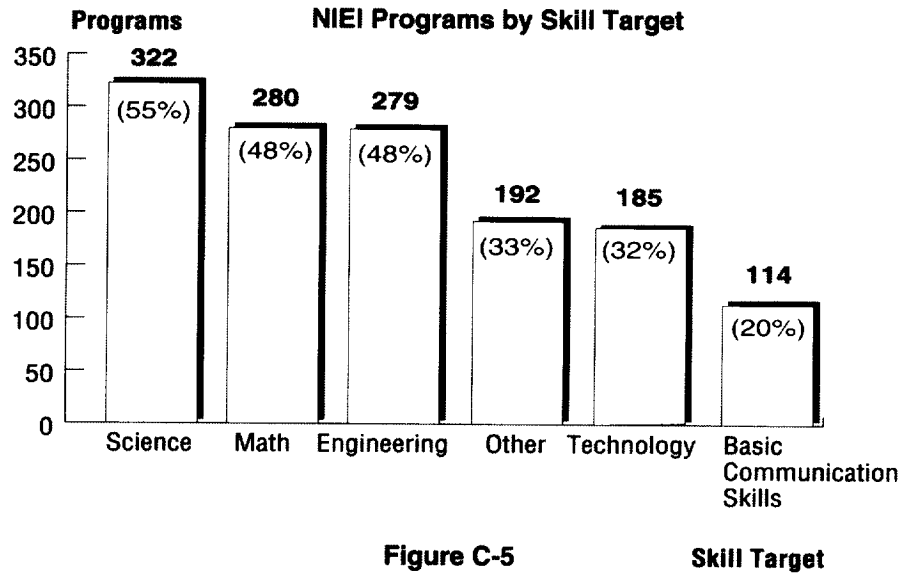


Figure C-5

"Other" Skill Targets of NIEI Programs

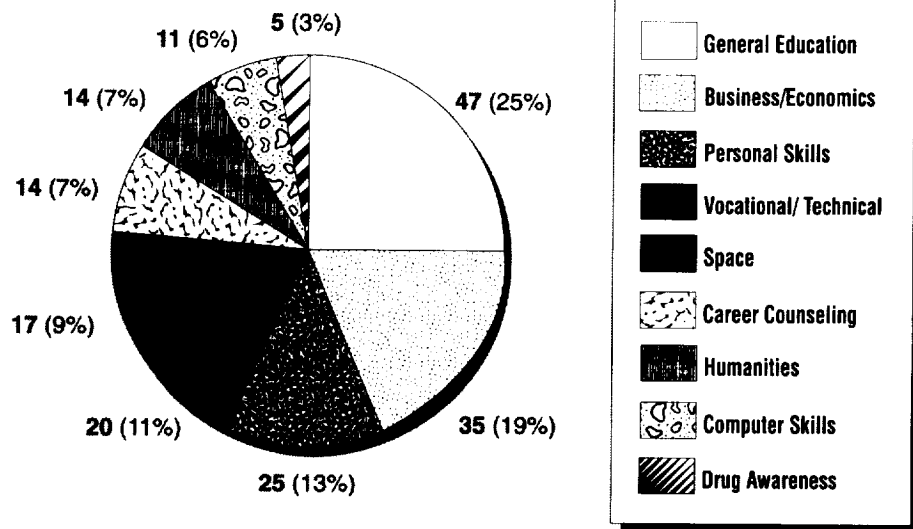


Figure C-6

NOTES

- In figure C-5, each percentage is based upon the number of total NIEI programs (581). The sum of the percentages therefore exceeds 100% since many program descriptions highlighted numerous skill areas. Similarly, the number of programs reflects multiple counting where such cross-applications were identified.
- In both figures C-1 and C-5, an attempt was made to subcategorize entries in the "Other" blocks. In the first case, the diversity and nature of "Other" program category inputs defied such an analysis; however for program skill targets, a breakdown of this block was accomplished (figure C-6). The general skill targets identified in this figure were not necessarily reported as such by company respondents. Rather, NASA conducted a manual review of all "Other" skill entries, defined common or generic target areas, and listed individual programs under those skill areas as appropriate.



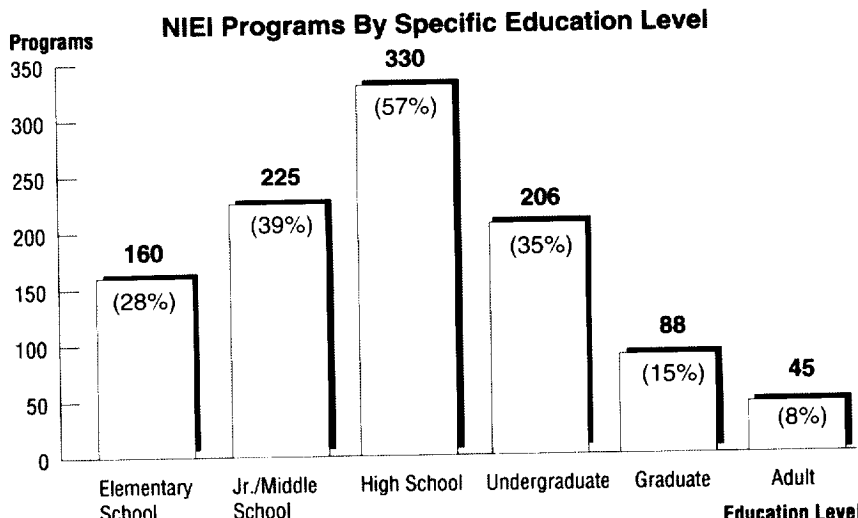
**D. Program Recipient Data**

Although the reported number of NIEI program recipients is 4,848,860, in many cases zeroes were entered in the "Number of Recipients" field on the program questionnaire. This was apparently due to the difficulty some respondents encountered in accurately estimating the impact of their education activities. Therefore, the total recipients figure reflects input from only 219 (38%) of NIEI programs. It is safe to

assume this figure understates the true number of Americans benefiting from NIEI initiatives; however, additional information in this area is not provided due to the lack of more comprehensive data.

The distribution of programs by education level (figure D-1) suggests that the majority (57%) of activities are at least partially focused at the High School level, followed by Junior High/Middle School, Undergraduate, El-

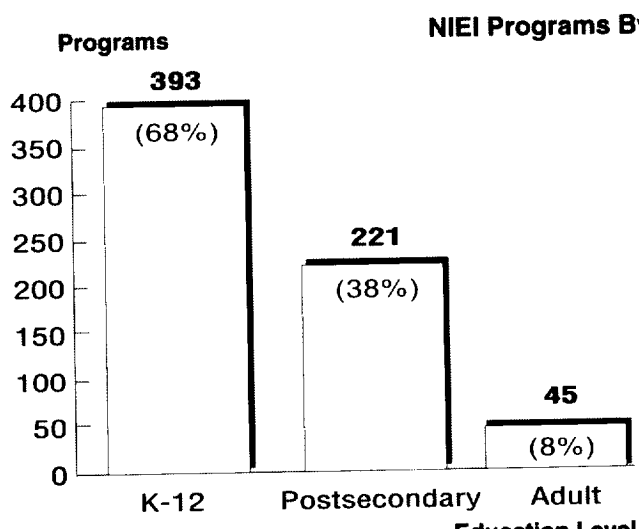
ementary, Graduate and, finally, Adult education. The distribution is presented in a slightly different manner in figure D-2, which shows education levels by K-12, Postsecondary, and Adult categories, with some activities falling into more than one level. Figure D-3 identifies the number of programs with only one education level focus, as well as the remaining programs with multiple education level targets (mix) or no level identified.



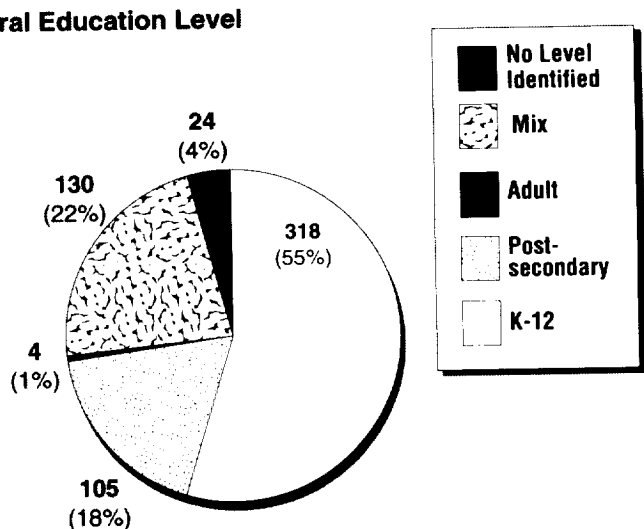
**Figure D-1**

**NOTES**

- In figures D-1 and D-2, each percentage is based upon the total number of NIEI programs (581). The sum of the percentages therefore exceeds 100% since many program descriptions highlighted multiple education levels. Similarly, the number of programs reflects multiple counting where such cross-applications were identified. It should also be noted that the total number of programs will be different in each figure. This is because figure D-1 counts a program once for K-12, Postsecondary and Adult levels; conversely figure D-2 only counts a program once at each of the three levels, irrespective of the number of specific K-12, Postsecondary or Adult applications.
- In figures D-1 through D-3, the "Adult" education level indicates programs geared towards adult literacy and skills enhancement.
- In figure D-3, programs are single counted by specific education level (or combination thereof). The sum of programs at each level (including those with no level identified) therefore equals the total program figure (581).



**Figure D-2**

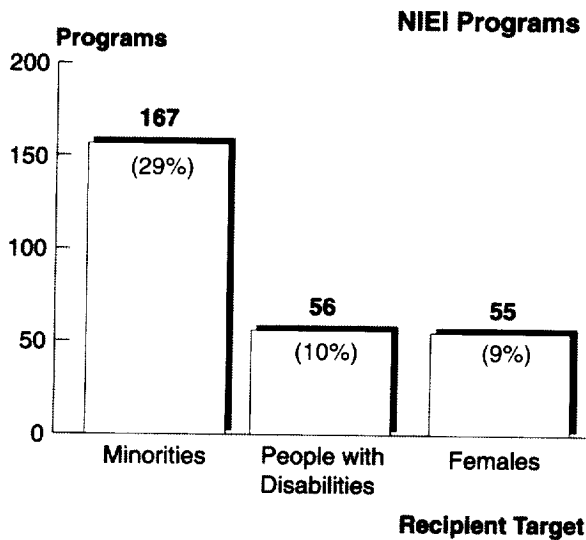


**Figure D-3**

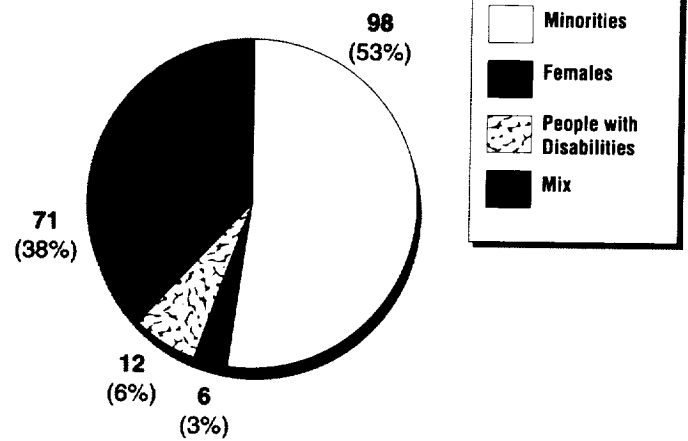
In keeping with the widely recognized need to increase the educational achievement of groups traditionally underrepresented in science and engineering, approximately 32% of NIEI programs are at least partly geared towards bringing and keeping minorities, females or people with disabilities into the educational pipeline serving

these professions. Some of these programs target more than one group, and figure D-4 identifies the number and percentage of such programs. Of those programs geared specifically towards underrepresented groups, the majority are directed solely towards either minorities or some combination of the three groups (figure D-5).

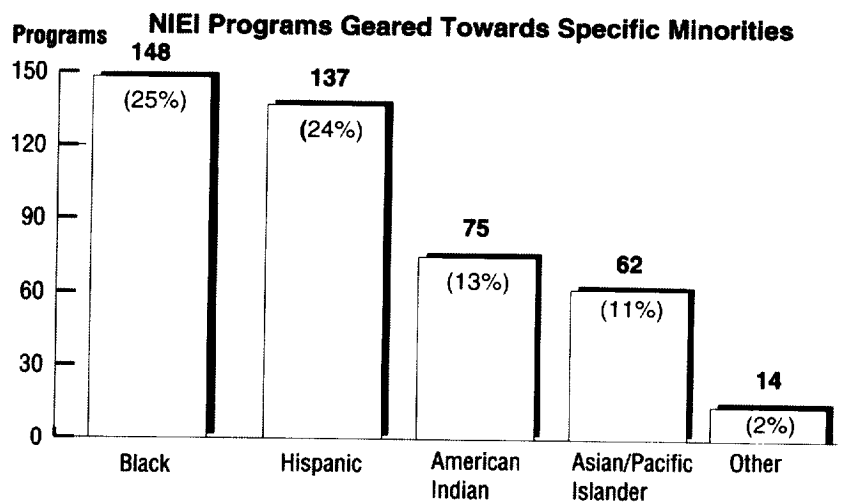
Finally, figure D-6 provides a breakdown of program support within the minority category. It should be noted that other NIEI programs may be targeted towards groups not listed (e.g., gifted and talented students). The information in this section therefore provides only a partial view of the range of specially designated program recipients.



**Figure D-4**



**Figure D-5**



**Figure D-6**

**Minority Group**

**NOTES**

- With respect to activities targeted towards minorities, females or people with disabilities, it should be noted that this designation does not necessarily indicate the program applies *exclusively* to the stated recipient category. In some cases, programs were identified which were only partially directed towards special groups; however, these will appear as single entries in figures D-4 through D-6.
- In figures D-4 and D-6, each percentage is based on the total number of programs (581). In addition, the number of programs reflects multiple counting in cases where more than one group was highlighted. In figure D-5, programs are single counted by individual or multiple (mix) group application, and therefore add up to the total number of special group activities (187).

### Geographic Scope of NIEI Programs

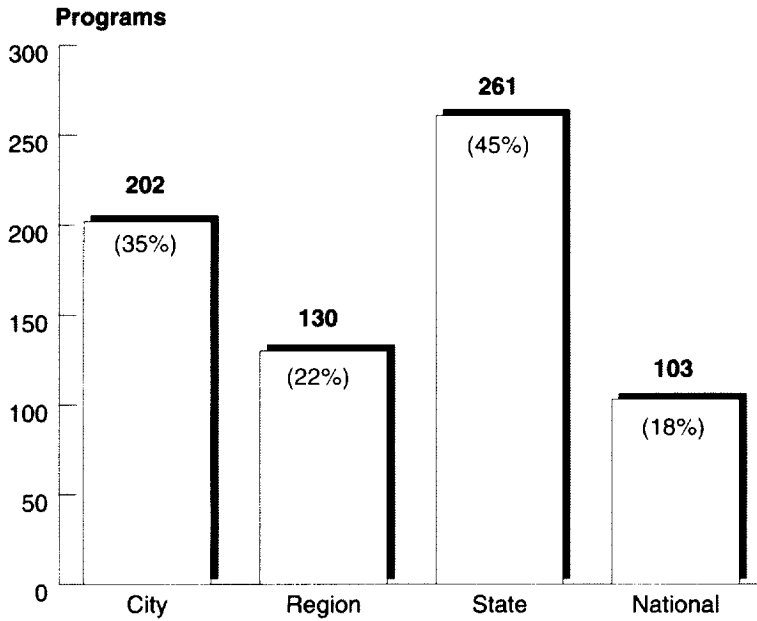


Figure D-7

As shown in figure D-7, NIEI education programs are state, city, regional and national in scope (in that order). In figure D-8, the number of programs specifically targeted towards individual states are identified.

### NIEI Programs by State



Figure D-8

#### NOTES

- Only 409 program descriptions (70%) identified geographic scope; figure D-7 therefore reflects only those activities where such information was provided. It should also be noted that programs designated as "city," "state" or "regional" do not necessarily have only one geographic application; in some cases multiple cities, states or regions were listed under an individual geographic target entry.
- In figure D-7, each percentage is based on the total number of programs (581), and therefore add up to more than 100% since various descriptions highlighted multiple geographic target areas. In addition, the number of programs reflects multiple counting in cases where more than one group was highlighted.

### E. Program Financial/Support Data

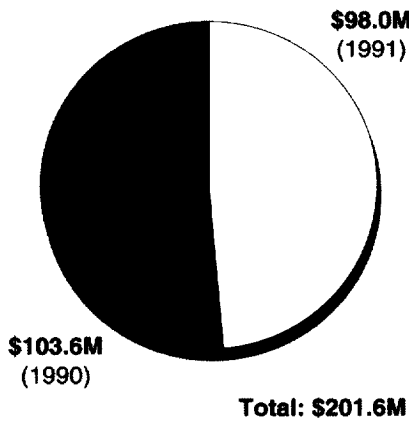
The level of program expenditures (figure E-1) reflects the extent of combined NASA-industry support for American education. In requesting program financial data, the NIEI questionnaire allowed for either estimated or actual dollar values during 1991, the first year of NIEI's life, and the year immediately preceding, in

recognition of the potential difficulty in obtaining precise information and the sensitivity of such data. Figure E-2 provides a breakdown of actual versus estimated expenditures over the two-year period. In evaluating the range of expenditures (figure E-3), it should be emphasized that the expenditure levels generally reflect only actual *financial* contributions, and not the value of

other types of program support. Finally, figure E-4 provides a distribution of the primary types of program assistance. The majority of activities are supported at least partially with financial contributions, with employee involvement, in-kind services and equipment following in that order.

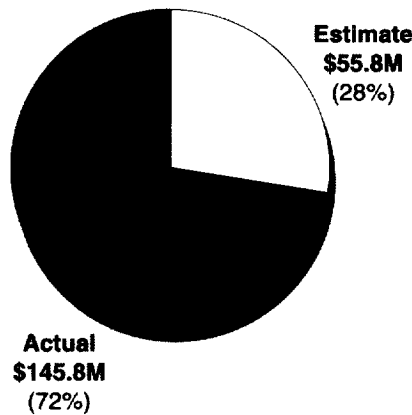
Analysis of employee participation levels may provide an alternative indication of the strength of program support. Over 92,000 government and industry personnel were reported as participating in NIEI-sponsored activities; however, this number reflects input from only those programs with an entry in the employee involvement field (207, or 36%). Although it is safe to assume this number understates the true level of employee participation, additional information in this area is not provided due to the lack of more comprehensive data.

**NIEI Program Expenditures  
1990-1991**



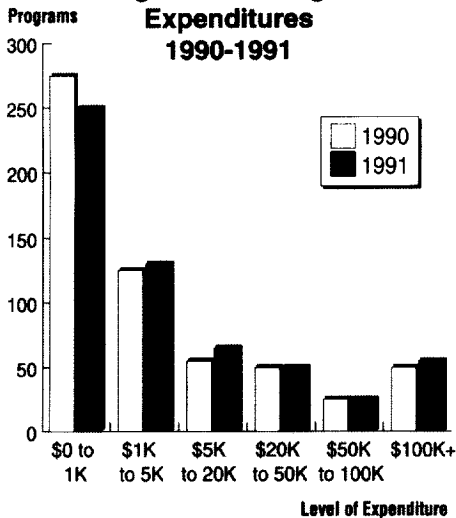
**Figure E-1**

**Actual vs Estimated  
NIEI Program Expenditures  
1990-1991**



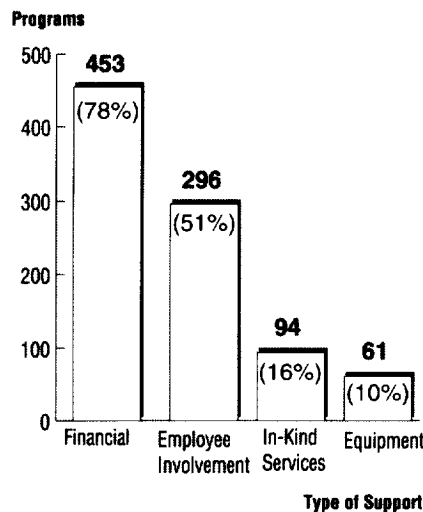
**Figure E-2**

**Range of NIEI Program  
Expenditures  
1990-1991**



**Figure E-3**

**Nature of NIEI Program Support**



**Figure E-4**

#### NOTES

- Financial data for 1990 and 1991 are based on individual corporate fiscal years.
- The total value of program expenditures (figure E-1) may be understated for a number of reasons. First, in most cases funding estimates for all types of nonfinancial involvement (i.e., in-kind services, equipment, employee volunteers) were not provided (only 26 programs included specific funding projections in these areas). The associated undervaluation of corporate contributions is therefore probably rather significant, especially considering the potential value of equipment donations and employee volunteer hours expended. Second, during the data collection process it was reported that many companies had difficulty accurately estimating education program outlays. This fact may also have contributed to reducing the total expenditures figure to some degree; specifically, approximately 5.5% of programs with financial support indicated had zero in the funding field.
- Figures E-1 and E-2 reflect only those programs which have positive entries in the funding field (385 programs in 1990 and 403 in 1991). In figure E-3, programs with \$0.00 in the funding block are included in the \$0 to \$1K range.
- Figures E-1 and E-3 reflect both actual and estimated expenditures.
- Figure E-2 includes both 1990 and 1991 dollars.
- In figure E-4, each percentage is based upon the total number of NIEI programs (581). The sum of the percentages therefore exceeds 100% since many program descriptions highlighted multiple types of support. Similarly, the number of programs reflects multiple counting where such cross-applications were identified.

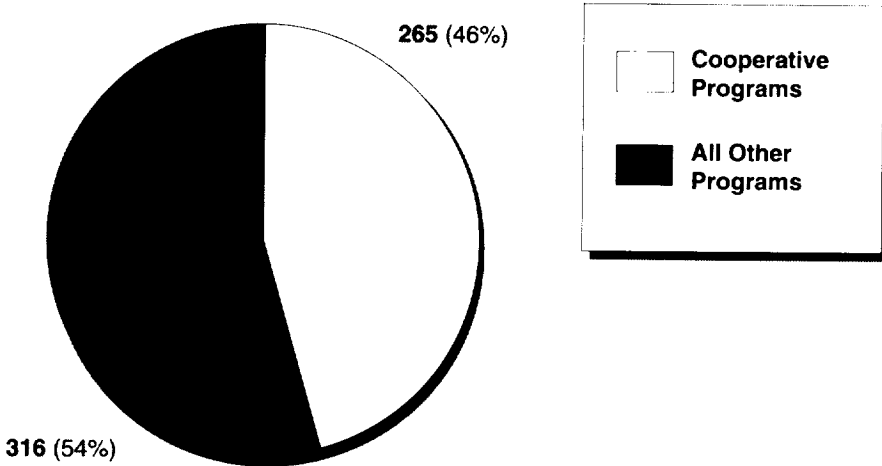
**F. Cooperative Programs Analysis**

Many NIEI members sponsor education programs in concert with other organizations in an attempt to maximize human and financial resources and generate the synergy associated with coordinated efforts. This is clearly reflected in the program

statistics; almost half of the activities documented in this report are cooperative ventures (figure F-1). In addition, a review of individual program descriptions indicates that the majority of these involve multiple partners. Even with significant variances in the level of detail used to identify cooperative members—in many

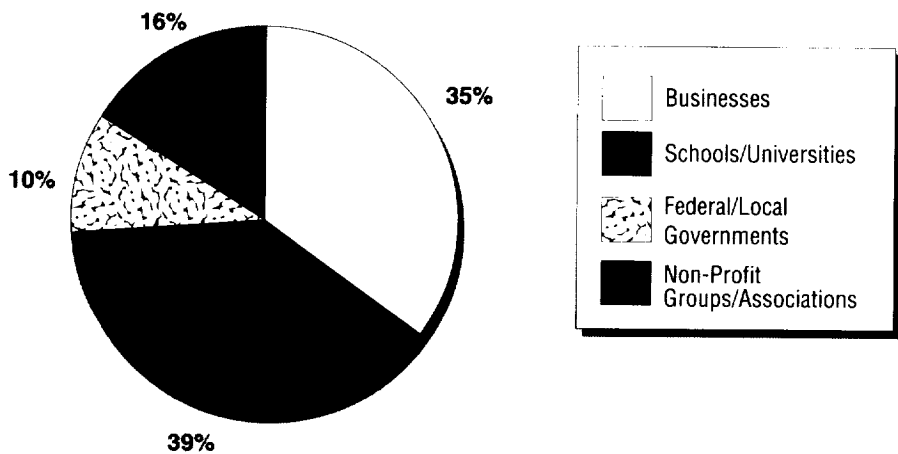
cases participants were either omitted altogether or were incorporated under summary headings such as “various other companies”—over 350 cooperative participants were identified. The breakdown of participants (figure F-2) suggests that most are businesses or educational institutions.

**Number of NIEI Cooperative Programs**



**Figure F-1**

**Participants in NIEI Cooperative Programs**



**Figure F-2**

NOTE:

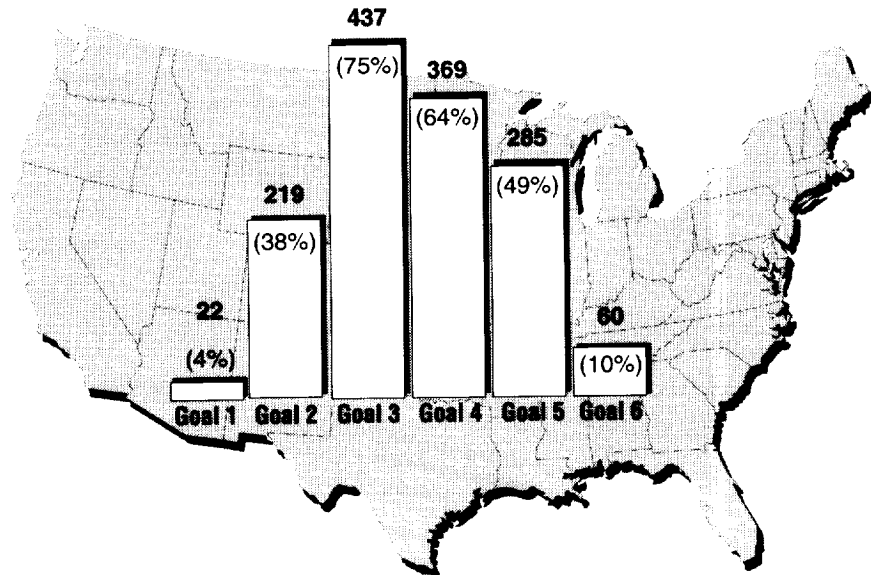
• The cooperative participants breakdown in figure F-2 was not drawn directly from NIEI questionnaire inputs. Rather, NASA conducted a manual review of cooperative member entries and placed them within the designated categories as appropriate.

**G. Assessment Against the National Goals**

One of the primary objectives of the NIEI program inventory was to assess the extent of support NIEI programs are currently providing towards accomplishing the national education goals established by President Bush and the nation's Governors. As

such, questionnaires asked respondents to identify all of the goals they felt were directly served by each of their education activities. The result of this assessment, figure G-1, provides a preliminary baseline for measuring current NIEI activities against the national education goals.

**NIEI Programs Supporting National Goals**



**Figure G-1**

**The National Education Goals**

1	2	3	4	5	6
Readiness for School	High School Completion	Student Achievement and Citizenship	Science and Mathematics	Adult Literacy and Lifelong Learning	Safe, Disciplined and Drug-Free Schools

**NOTES**

• In figure G-1, each percentage is based upon the total number of NIEI programs (581). The sum of the percentages therefore exceeds 100% since many program descriptions identified support for multiple national goals. Similarly, the number of programs reflects multiple counting where such cross-applications were identified.

• The level of support for goals 1 and 6 may be understated. In some cases NIEI members neglected to report social and cultural initiatives (including community service and drug awareness efforts) which they did not consider to be education programs *per se*.

# III. Preliminary Conclusions and Recommendations

The extent of corporate participation and input to this report suggests that support for the NASA-Industry Education Initiative is strong. The NIEI Working Group is generally recognized as providing a unique forum for enhancing government-industry cooperation, raising interest and activism in the education arena and aligning education programs with commonly shared objectives. However, in light of the incomplete nature of selected program information, the following conclusions and recommendations are preliminary.

## Conclusions

a. The NIEI programs documented in this report span all education levels, program categories and skill targets, and thus reflect an extensive range and depth of education activity.

b. With some NIEI programs ranging as far back as 1954, it is clear that in many cases there exists a fairly long-standing institutional foundation upon which future education activities may be based.

c. The level of NIEI support for national and regional programs is encouraging, especially when we take into account the challenges inherent in administering national activities, and the difficulties in quantifying (as well as reaping) benefits from programs outside local areas.

d. The percentage of NIEI cooperative education efforts is fairly significant, and the range of cooperative participants indicates an extensive education support base beyond the 27 NIEI participants.

e. The percentage of NIEI programs indicating employee involvement—51%—suggests a substantial amount of grassroots participation in local, regional and national education activities.

f. The aggregate number of NIEI programs has shown a steady increase over the past decades, and the annual level of program inceptions seems to indicate a positive correlation with establishment of the national education goals. There was a marked spike in program initiations in 1989, the year the national goals were promulgated, and program inceptions continue at an accelerated rate in comparison with the period before the national goals were set.

g. The distribution of NIEI program skill targets shows a consistently heavy emphasis in science, mathematics, engineering and technology. There is also relatively strong support for basic communications skills and “other” target areas, including general education, business/economics, personal skills and vocational/technical training.

h. NIEI programs appear to be fairly well aligned with the national education goals, with the exception of goals 1 (“Readiness for School”) and 6 (“Safe, Disciplined and Drug-Free Schools”). However, in some cases social and cultural support activities (including community service and drug awareness), which were not considered *education* programs by NIEI members, were not included in the report statistics. This fact may have contributed to an understatement in the level of support identified for these two goals.

i. NIEI activities also appear to provide a baseline for pursuit of other federal education strategies and objectives, including those contained in *By the Year 2000: First in the World and AMERICA 2000*.

j. The majority of NIEI education programs appear to be focused at the Junior High/Middle School, High School and Undergraduate education levels.

k. The number of NIEI programs geared towards Basic Literacy, Skills Enhancement and other adult education categories is significantly lower than the number of activities supporting K-12 and Postsecondary levels. This discrepancy may be somewhat offset by internal corporate skill and career development programs, which are not reflected in this report.

l. The majority of NIEI activities emphasize traditional education-assistance programs, and the level of support for systemic reform is relatively low. Specifically, two of the least-represented categories (Program Evaluation and Assessment and Organizational and Systemic Reform) are perhaps most in line with the current emphasis on critical analysis and fundamental change in our nation’s education system.

## Recommendations

ONE: It is recommended that NIEI participants continue to support Working Group activities in order to maximize government-industry coordination and synergy in pursuit of mutual education objectives. The Working Group should also expand its liaison with businesses, schools and universities, professional and civic groups, and other appropriate organizations to increase cooperative educational assistance efforts and total resources directed towards national education reform.

TWO: It is recommended that this report be periodically updated to allow continued evaluation of the level and direction of NIEI education programs, with the first iteration scheduled within one year after publication of this document. It is also recommended that the heads of Working Group corporations ensure maintenance of comprehensive in-house education program data to support future Working Group initiatives, and participate in

an annual review of current and planned NIEI activities.

THREE: It is recommended that NIEI Working Group participants and members of the nation's business community conduct a critical analysis of current and planned education programs in light of the federal education guidelines, private-sector requirements, and the information detailed in this report. In addition, it is recommended that both government and private organizations consider taking the following steps:

- Further aligning education programs with current federal education strategies and goals.

- Devoting greater attention and resources to the development of programs targeting Teacher Preparation/Enhancement, Organizational and Systemic Reform and Curriculum Development.

- Continuing support in traditional program categories, particularly precollege Teacher Enhancement, while expanding activities geared towards critical evaluation, analysis and support of fundamental reform of our nation's education system.

- Increasing the number of programs supporting adult literacy and lifelong learning, as required, to reflect the enhanced attention and priority accorded to continuing education efforts.

- Increasing participation of those population groups that are traditionally underrepresented in math, science, engineering and technology.

FOUR: Finally, it is recommended that the nation's businesses continue to provide support for education activities, and conduct periodic assessments of in-house program characteristics and emphases to ensure alignment with the national education goals and other federal strategies and priorities.



# Appendix 1. The National Education Crisis: Background and Federal Response

## The Nature of the Education Crisis: Historical Perspective

The National Commission on Excellence in Education, established in August 1981, was tasked by the Secretary of Education to examine the quality of education in the United States and report its findings to the nation. The resulting study, *A Nation At Risk: The Imperative for Educational Reform* (1983), was the catalyst for intensive introspection and analysis on a local, regional and national level regarding the beleaguered state of educational achievement in this country. A fundamental premise of the report is that our educational foundation is being eroded by a "rising tide of mediocrity" threatening the nation and the people. The magnitude and scope of the crisis were

supported by a number of sobering facts, many of which remain largely unchanged to this day: American student achievement falls well short of international student achievements in many subject areas; millions of American adults are functionally illiterate; average scores on standardized tests and college board exams have steadily declined over the past 25 years or so; and millions of dollars are spent by business and the military for remedial education and training programs.

*A Nation at Risk* goes on to project dire ramifications from the U.S. education crisis, particularly in light of the burgeoning technological sophistication of the workplace and the intensified demands of the global market. Specifically, the report emphasizes our

steadily eroding foothold among "determined, well-educated, and strongly motivated competitors," and states that enhanced education for all of our workers is fundamental to maintaining our position in the dawning era of information and technology. It is not just our nation's industrial and commercial position that is at stake, suggests the report, but also the intellectual, moral and spiritual fiber of our citizens and the foundations of our democratic society. At the heart of *A Nation at Risk* are specific findings and recommendations regarding current educational content, expectations, time requirements, teaching, and leadership and fiscal support; a summary of the more salient points in each category is provided below.

	Findings	Recommendations
Content	Secondary school curricula have been homogenized, diluted and diffused, with too many credits taken outside essential subject areas.	Increase graduation requirements to encompass "The New Basics": 4 years English, 3 years Math, 3 years Science, 3 years Social Studies, 1/2 year Computer Science and 2 years Foreign Language (for college bound). Enhance curricula in other areas to support personal, educational and occupational goals as appropriate.
Expectations	Institutional requirements for the volume, diversity and difficulty of student course work have declined, and standards for supporting and measuring student progress have been downgraded.	Adapt more rigorous requirements/standards for student admission and performance at all educational levels.
Time	The amount of time spent in the classroom and studying is relatively limited, and is often used ineffectively.	Increase time spent both in the classroom and studying, with significantly more emphasis on the New Basics.
Teaching	There is a shortage of both current and prospective teachers in many subject areas, and programs supporting teacher preparation and professional enhancement need to be vastly improved.	Establish higher educational standards for teachers; offer greater incentives to enter the field; improve salaries and professional conditions; and ensure more intensive oversight and evaluation of teacher performance and career paths.
Leadership and Fiscal Support		Ensure that the general public, parents, educators, school and public officials, and the federal government provide requisite levels of support, financial resources and/or leadership in their respective areas to bring about recommended education reforms.

## A Nation at Risk

Hailed as a landmark document, *A Nation at Risk* ushered in a vibrant period of education analyses, critiques, and reform proposals that continues to this day. As the level of interest and commitment to resolving the crisis increased, the scope of the dialogue expanded to address essential counterparts to pure education reforms, including family support systems, health and social services and other basic human resource programs for both the young and old. The subsequent maturation of the debate spawned by *A Nation at Risk* has left us with a much broader perspective on the true nature of the dilemma. The United States education crisis is no longer viewed as a matter for schools alone, but is perceived to range from prenatal care and early childhood development issues all the way to general literacy, workforce training, and lifelong adult learning.

### **The Critical Issues**

Critical indicators of the education crisis are apparent not only in student/teacher preparation and performance statistics and American literacy levels, but also in overall educational and demographic trends. The following factors are widely recognized as being primary contributors to the deterioration of the United States educational posture.

- **Student achievement:** A wealth of studies and reports have documented the decline in U.S. student performance compared to other industrialized nations. At the same time, internal indicators of student prowess (e.g., SAT and College Board Achievement Test scores) have shown marked decreases in recent years. In both of these cases the declines are not limited to math and science, but are visible in a distressing range of subject areas.

- **Teacher availability, preparation and performance:** It is anticipated that

significant numbers of new teachers will be needed by the year 2000; however, the number of recruits is falling, departures from the profession are rising and associated shortages (especially in mathematics and science) are expected to be severe. Problems with teacher preparation and performance have also received increased attention. Some studies have suggested that an alarming percentage of teachers are not adequately prepared to instruct in selected subject areas, most notably math and science. This problem is exacerbated by the large number of teachers required to teach outside their fields or forced to use inadequate instructional materials. Finally, the overall quality of many teaching candidates has been called into question as some studies show that many new teachers are drawn from the bottom quarter of their graduating class.

- **Educational field/degree selection:** A classic supply and demand crisis is threatening the U.S. science and engineering workforce. The World War II generation of science/engineering graduates is retiring, just as current and projected requirements for these types of workers are reaching record levels. At the same time, the extent of the pipeline carrying students interested in or pursuing science and engineering careers remains uncertain.

- **Minority representation:** Minorities, women, people with disabilities and foreign nationals are expected to comprise the vast majority of new entrants in the nation's workforce by the year 2000. However, the relative percentage of technical degrees earned by these groups is disproportionately small. As an example, recent statistics show that only 8% of bachelor's degrees and 4% of Ph.D.s in science and engineering are awarded to Blacks and Hispanics, even though they comprise

approximately 20.2% of the population. The challenge will be to ensure sufficient minority representation in science and engineering fields to maintain an adequate flow of talent through the education pipeline to meet future requirements.

- **Science literacy:** As the workplace and the world market become increasingly technology-oriented, existing workers must be conversant with science, engineering and technology issues if this nation is to remain competitive both domestically and globally. However, various studies have shown science literacy to be at dismally low levels. Without adequate employee training and lifelong learning initiatives in these areas, the competitive posture of the U.S. workforce will remain in a state of perpetual decline.

### **The Federal Response to the Education Crisis**

#### **The National Education Goals**

President Bush and the state Governors convened in Charlottesville, Virginia, in 1989 to formally address the national education crisis. In the course of this summit some familiar sentiments were echoed concerning the importance of education to the national welfare: "The President and the nation's governors agree that a better educated citizenry is the key to the continued growth and prosperity of the United States. . . as a nation we must have an educated work force, second to none, in order to succeed in an increasingly competitive world economy." However, the conferees went beyond rhetoric to establish, for the first time in history, a set of concise national education goals intended to sustain the long-term competitive posture of our country.

**GOAL 1: Readiness for School.** By the year 2000, all children in America will start school ready to learn.

**GOAL 2: High School Completion.** By the year 2000, the high school graduation rate will increase to at least 90 percent.

**GOAL 3: Student Achievement and Citizenship.** By the year 2000, American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter, including English, mathematics, science, history and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning and productive employment in our modern economy.

**GOAL 4: Science and Mathematics.** By the year 2000, U.S. students will be

first in the world in science and mathematics achievement.

**GOAL 5: Adult Literacy and Lifelong Learning.** By the year 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

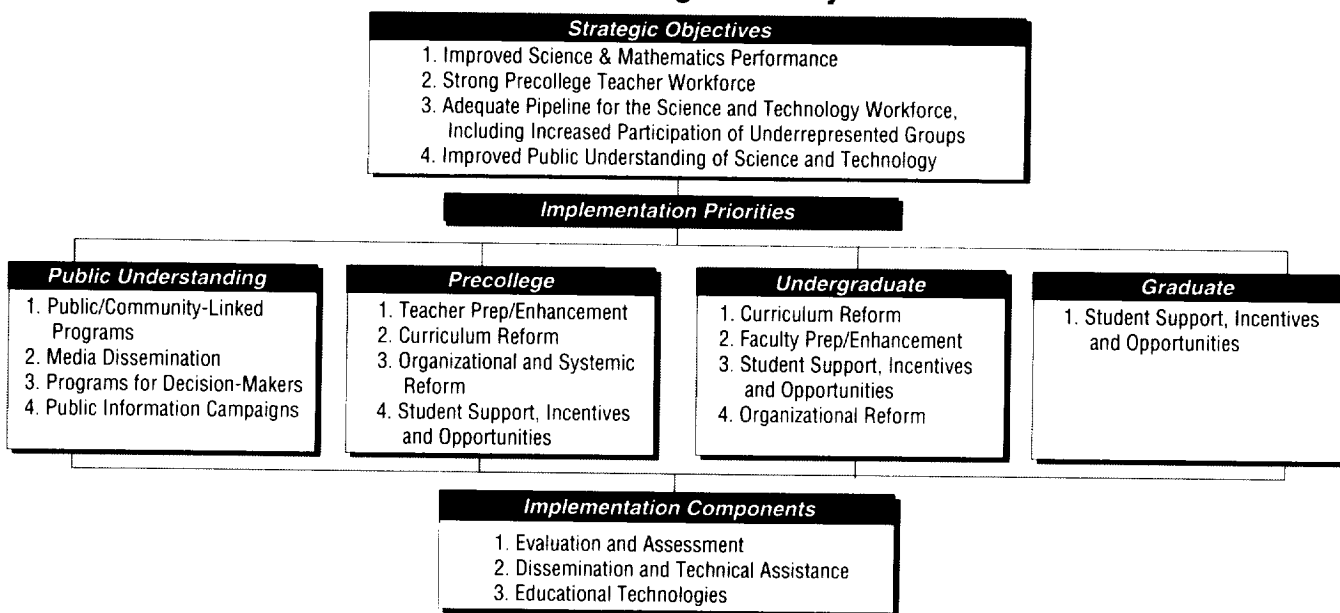
**GOAL 6: Safe, Disciplined and Drug-Free Schools.** By the year 2000, every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.

Each of the goals is supported by specific objectives, which identify more detailed expectations necessary to ensure overall goal attainment. Together they provide the foundation for accelerated education reform efforts at the federal, state and local levels.

**By the Year 2000: First in the World**

In February 1991 the Committee on Education and Human Resources (CEHR), convened by Dr. D. Allan Bromley, Assistant to the President for Science and Technology, released *By the Year 2000: First in the World*. The CEHR operates under the Federal Coordinating Council for Science, Engineering and Technology (FCCSET), which is an Executive Branch policy organization located within the White House Office of Science and Technology Policy. The CEHR was established to coordinate planning and execution of federal activities to enhance student-workforce science education and training, and maintain U.S. leadership in science and technology fields. Promulgated to accompany the President's Fiscal Year 1992 budget, *By the Year 2000: First in the World* provides an inventory of federal science, engineering and technology education initiatives. It also

**FCCSET/CEHR Program Priority Areas**



presents the first coordinated inter-agency budget for this mission; highlights ongoing and new education program elements; lists criteria for program evaluation; and provides points of contact in each participating agency. Perhaps most important, the report identifies the strategic objectives, budget planning priorities and implementation components established by CEHR to guide application of federal resources in support of the national education goals.

### AMERICA 2000

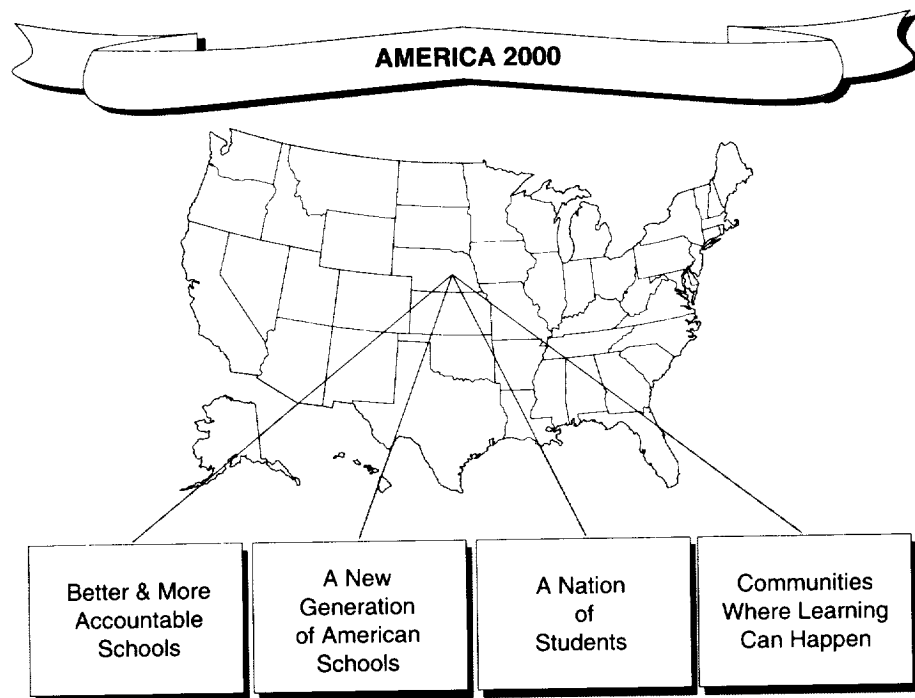
With the federal commitment and objectives clearly defined, President Bush promulgated *AMERICA 2000* in April 1991 as a plan to move every community in the United States towards the national education goals. The document details a four-pronged strategy for implementing systemic changes within the schools and workplace and among the population at large.

- **For Today's Students: Better and More Accountable Schools.**

Strategy: Through a 15-point accountability package, parents, teachers, schools and communities will be encouraged to measure results, compare results and insist on change when the results aren't good enough.

- **For Tomorrow's Students: A New Generation of American Schools.**

Strategy: A new generation of American schools will be invented and established. . . These will be the best schools in the world, schools that enable their students to reach the national education goals, to achieve a quantum leap in learning and to help make America all that it should be.



- **For the Rest of Us (Yesterday's Students/Today's Workforce): A Nation of Students.**

Strategy: Adult Americans will be challenged to "go back to school" and make this a "Nation of Students" . . . Every American will be urged to continue learning throughout his or her life, using the myriad formal and informal means available to gain further knowledge and skills.

- **Communities Where Learning Can Happen.**

Strategy: Communities will be urged to adopt the six national education goals as their own, set a community strategy to

meet them, produce a report card to measure results and agree to create and support a new American school.

In addition to the top-level strategies identified here, the document provides detailed implementation plans for each of the four major objectives. Undoubtedly an ambitious program, it is anticipated that *AMERICA 2000* will require coordinated effort between the President, the Department of Education, the Cabinet, Congress, the nation's Governors, the business community, and the community at large (all Americans).

## Appendix 2. NIEI Data Collection Process

This appendix summarizes the types of education program data collected from NIEI participants.

### Company Data

The name of the company and the designated NIEI point of contact.

### Program Identification

The title and start date of each particular program; a detailed program description; indication of whether the program is a cooperative effort with other companies or organizations; and identification of the cooperative members.

### Program Categories

The general category or area of program emphasis, describing the nature of activities the program is designed to support. The categories are divided into “Adult” and “Student” programs, and are broken down into the following subsections where appropriate.

#### Adult Programs

- *Basic Literacy* - Activities designed to enhance the rudimentary knowledge of individuals such as the ability to read and write and do basic math.

- *Skills Enhancement* - Activities designed to develop new skills and to build on the present knowledge of individuals to enable them to perform a variety of complex jobs.

- *Other* - Any other major program categories that may exist.

#### Student Programs

- *Curriculum Development*

Curriculum/Materials Development - Activities that encourage the use of recent advances in science, engineering and technology in subject matter content (course and curriculum); support research in teaching and

learning science, engineering and technology skills; equip students with knowledge and skills to handle problems from other disciplines; reduce barriers to participation in science, engineering and technology fields; and lead to new and improved materials and strategies that support science, engineering and technology instruction, including print materials, computer software, video materials and laboratory equipment.

Educational Technologies - Activities that increase the efficiency and effectiveness of science, engineering and technology instruction through the widespread use of advanced technologies, particularly the computer. Examples include innovative educational systems, interactive computer-videodisc systems, CD-ROM, intelligent tutors, authoring systems, problem-solving tools, and expert systems.

Laboratory/Facilities Improvement - Activities that generate effective and efficient approaches to laboratory and field-based instruction or provide direct support for construction and renovation of laboratory and classroom facilities used primarily for science, engineering and technology instruction.

- *Organizational and Systemic Reform* - Activities that are designed to make systemic changes in the education delivery system and to increase both the number and quality of students studying science, engineering and “other” technologies. Examples include administrative reform, community involvement and formation of coalitions among institutions and between educational institutions and other sectors.

- *Program Evaluation/Assessment* - Activities that involve program evaluation; student assessment; data collection; research on the learning process; and projections of science, engineering and technology human-resources supply and demand.

- *Student Incentives*

Bridging Programs - Activities that assist in the transition from one educational level or institutional setting to another. These include academic, career awareness and development activities.

Direct Student Support - Activities that provide direct student financial assistance (e.g., scholarships, research assistantships, stipends and cooperative education). (NOTE: Activities providing financial assistance to future science, engineering and technology educators are categorized under teacher or faculty preparation/enhancement.)

Fellowships - Activities that provide support to graduate students and postdoctoral fellows for research in science and engineering.

Traineeships - Activities that provide funds for support of talented and deserving graduate students and postdoctoral trainees.

- *Teacher and Faculty Preparation* - Pre-service activities that increase preparation for science, engineering and technology instruction. This excludes activities that are purely pedagogical in nature or that replicate courses normally available through graduate departments. (NOTE: The term “teacher” refers to an educator at the precollege level; “faculty” refers to the postsecondary level.)

- *Teacher and Faculty Enhancement* - In-service activities that enrich and strengthen the theoretical and practical bases for teaching the most up-to-date courses; provide experience with state-of-the-art laboratory equipment; or provide incentives through the reward of excellence in science, engineering and technology instruction. These activities should not primarily enhance research ability, be purely pedagogical in nature, or replicate courses normally available in graduate departments.

- *Other* - Any other major program categories that may exist.

**Program Skill Targets**

Identification of the specific subject or skill area that the program is geared towards (e.g., Basic Communications, Science, Engineering, Mathematics, Technology, Other).

**Program Recipient Targets**

The estimated number of recipients for each program, and the education level(s) the activity is targeted towards (i.e., Elementary School, Junior

High/Middle School, High School, Undergraduate, Graduate, Adult); identification of whether programs are geared towards specific recipient groups (e.g., minorities, people with disabilities or females) or geographic areas (city, state, regional or national). (NOTE: Minorities are further broken down into Black, Hispanic, American Indian, Asian/Pacific Islander and Other.)

**Program Financial/Support Data**

The actual or estimated resources expended on each program for fiscal years 1990 and 1991, along with the

primary nature of support (i.e., direct financial support, in-kind services, equipment, employee involvement). Also, the estimated number of employees involved with each program.

**National Goals Assessment**

Identification of the national education goals supported by each program.

# Appendix 3. Assessment Of NIEI Activities Against Other Selected Federal Education Guidelines

## By the Year 2000: First in the World

The information in this report provides a substantive baseline for assessing the correlation of NIEI activities with the goals outlined in *By the Year 2000: First in the World*. In this section, NIEI information is evaluated in light of FCCSET/CEHR strategic objectives and implementation priorities; in the majority of cases, it is clear that NIEI programs are supportive of the overall federal strategies.

a. **Strategic Objectives.** NIEI activities (both by nature and design) appear to be fairly well aligned with the CEHR strategic objectives.

(1) *Improved Science and Mathematics Performance.* NIEI programs are inherently consistent with the first CEHR objective, given the nature of NASA and contractor operations and business lines. The program skill target analysis (figure C-5) also clearly demonstrates this commitment, with strong emphasis in science, engineering, mathematics and technology.

(2) *Strong Precollege Teacher Workforce.* Section II-C indicates that programs

geared towards Teacher/Faculty Preparation and Enhancement are strongly represented on a total basis (figure C-1), as well as at all general education levels (figures C-2 through C-4). In each case, these initiatives are second only to Student Incentives in levels of program support.

(3) *Adequate Pipeline for the Science and Technology Workforce, Including Increased Participation of Underrepresented Groups.* In this area, NIEI statistics provide somewhat less conclusive results. With regard to keeping such students coming through the education pipeline objective, the most common focus of programs documented in this report appears to be at the late secondary or postsecondary education levels. As such, NIEI members may not be fully attuned to the nature or gravity of this issue. At the same time, Section II-D seems to indicate relatively strong program support for underrepresented groups. The question is whether such programs are instituted at a sufficiently early phase to impact the historically high attrition levels towards the end of the pipeline.

(4) *Improved Public Understanding of Science and Technology.* This is the only area where NIEI programs may appear minimally supportive of CEHR objectives. As shown in Section II-D, the number of programs geared toward the "Adult" (or, in this case, general public) sector is quite low from both a relative and absolute standpoint. However, the exclusion of internal corporate skill and career development programs from this report may contribute substantially to the low representation in the "Adult" category.

b. **Implementation Priorities.** Assessment of NIEI programs against the CEHR implementation priorities is fairly straightforward. In the table below, the CEHR priorities for each education level are listed in order of precedence, and the corresponding emphasis accorded each priority per Section II-C of this report is also identified. The "NIEI Emphasis" should not be construed as a deliberate prioritization by Working Group participants; rather, the ranking is drawn directly from the statistical data contained in Section II-C.

**Comparison of NIEI Programs With FCCSET Priorities**

Precollege (FCCSET Priority 1)	NIEI Emphasis	Undergraduate (FCCSET Priority 2)	NIEI Emphasis	Graduate (FCCSET Priority 3)	NIEI Emphasis
1. Teacher Preparation/ Enhancement	2	1. Curriculum Reform	3	1. Student Support, Incentives and Opportunities	1
2. Curriculum Reform	3	2. Faculty Preparation/ Enhancement	2		
3. Organizational and Systemic Reform	4	3. Student Support, Incentives and Opportunities	1		
4. Student Support, Incentives and Opportunities	1	4. Organizational Reform	4		

## **AMERICA 2000**

Both the complexity and overall focus of *AMERICA 2000* strategies make an assessment vis-a-vis the NIEI statistics somewhat difficult; this is compounded by the fact that data collection was not structured to support a comparison of this nature. Nonetheless, as the summary below indicates, NIEI programs appear to provide a beginning foundation for pursuit of *AMERICA 2000* objectives.

a. **For Today's Students: Better and More Accountable Schools.** This objective centers on the need for accountability in the education process, and for measurement and comparison of the results of education reform efforts (both at the student and institutional level). Analysis of NIEI program categories indicates that activities in the Program Evaluation/Assessment arena appear to be the most closely aligned with this strategy. Although the total level of support for such programs (17%) is low in comparison with other categories, Program Evaluation/Assessment initiatives may constitute a somewhat progressive departure from traditional education support efforts. Therefore, the fact that approximately one in five NIEI programs is concentrated in this area is encouraging, and indicates a substantial foundation for expansion of this type of activity.

b. **For Tomorrow's Students: A New Generation of American Schools.** This objective is geared towards radical reform in our nation's education system, with an emphasis on discarding traditional assumptions and constraints

regarding "schooling" and establishing new perspectives, approaches and methodologies. Once again, a fairly close correlation with NIEI program categories is evident; specifically, programs supporting both Curriculum Development and Organizational and Systemic Reform have the potential to contribute substantially to this objective. Section II-C suggests that Curriculum Development initiatives are fairly well represented, with nearly a third of programs indicating at least partial emphasis in this area. However, it is apparent that program support for Organizational and Systemic Reform is relatively low (14%). As with Program Evaluation/Assessment, these activities represent a departure from traditional assistance efforts and have only recently been recognized as essential to comprehensive education reform. The level of support therefore suggests a positive baseline for continued initiatives in this area.

c. **For the Rest of Us (Yesterday's Students/Today's Workforce): A Nation of Students.** With a fundamental focus on adult education and lifelong learning, this objective appears to receive relatively minor support from current NIEI activities. The total number of programs with an adult focus is relatively small, and levels of programs supporting Basic Literacy and Skills Enhancement discussed in Section II-C are the lowest among all the NIEI program types. It should again be stressed that internal corporate skill- and career-development programs, which are not reflected in this report, may have the potential to mitigate shortcomings identified in adult education.

d. **Communities Where Learning Can Happen.** This objective places at least partial responsibility for reform efforts on communities, and on the organizations, groups, families and individuals in each community. The overall focus is on reemphasizing proven values and reestablishing strong social and cultural support systems. Although NIEI initiatives are primarily concentrated in math, science, engineering and other technical fields, a fundamental baseline of support for this objective does exist. Specifically, the national goals assessment (Section II-G) appears to indicate relatively minor support for goals 1 and 6 ("Readiness for School" and "Safe, Disciplined and Drug-Free Schools"). However, NIEI community service, drug awareness and related social programs (many of which are not reflected in this report) have the potential to offset the minimal support identified for these two goals. Moreover, the breakdown of program skill targets (figure C-5) indicates a substantial emphasis in both "Basic Communication Skills" and "Other" areas. In the former case, it is clear that enhanced communications skills are essential to orderly and smoothly functioning communities. In the latter, a review of "Other" skill targets (figure C-6) identifies a range of personal development programs, with emphasis on general education, personal skills, career counseling, the humanities and drug awareness (among other areas). In both cases, a significant level of support for broad social and cultural activities may be discerned.



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