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ABSTRACT

Reported is the history of the National Science Foundation's Minority Institutions Science Improvement Program from 1972-1980. Also included are appendices of program data, 1972-1980, including data related to awards by year, by predominant minority group, by state, to two-year institutions, to four-year institutions. (PB)

Minority Institutions Science Improvement Program

A Brief History 1972-1980

NATIONAL SCIENCE FOUNDATION
Division of Science Education Resources Improvement
Directorate for Science and Engineering Education

Cover Illustration: At work on a high pressure liquid chromatograph funded by MISIP in the Department of Chemistry, Xavier University of Louisiana

Minority Institutions Science Improvement Program (MISIP)

A Brief History
1972-1980

April 1981

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MINORITY INSTITUTIONS SCIENCE IMPROVEMENT PROGRAM

A Brief History

1972-1980

I. INTRODUCTION

Minority institutions—colleges and universities in the United States whose student bodies are predominantly composed of ethnic minorities—traditionally have been characterized by a number of similar descriptors that determine institutional health. These institutions have tended to be small, generally unendowed, and clustered in areas of the country that have until recently lagged in economic development. The family income and educational tradition of their students were (and are) additional barriers to institutional development. For decades, however, these institutions were the only realistic avenues to higher education open to minority youth, and as late as 1970 still enrolled nearly 55% of minority undergraduates. More recently large tax-supported institutions with predominantly ethnic minority student bodies have developed, especially in urban areas.

Since 1972 the National Science Foundation has operated, among its institutional development programs, one designated solely for minority institutions. Under the Foundation's broad mandate to develop the science research and education potential of the United States, the Minority Institutions Science Improvement Program has supported long-rang improvement in the teaching of science at these institutions. Maintaining the nation's quality of life depends on having a skilled cadre of scientists backed by a technologically literate citizenry In a system that seeks to provide maximum opportunity for educational growth, minority institutions have served a significant portion of the people in a special way, and they constitute an important resource that must be maintained.

On May 7, 1980, as a result of P.L. 96-88, the Department of Education came into being, built from the former Office of Education in the Department of Health, Education and Welfare and a variety of education-oriented programs transferred from other federal agencies. Included in this transfer was NSF's Minority Institutions Science Improvement Program (MISIP). Under the transition arrangements, NSF's responsibilities for MISIP terminated after FY 1980. During its nine years of formal existence at NSF, MISIP provided $41,488,007 for 207 major grants to minority institutions for development of their science education capabilities, and an additional $2,699,468 for a variety of other activities that relate to the objectives of the program.

In nine years much has been accomplished by MISIP. In its new governmental environment much is yet to be done The purpose of this report is to provide a brief accounting of NSF's stewardship of MISIP, tracing its origins and reviewing its major accomplishments.

II. THE FIRST YEARS

The formal establishment of the Minority Institutions Science Improvement Program, or the College Science Improvement Program—Section D (COSIP-D) as it was called in its first years, came about in 1972 following several years of discussion.

Early in the administration of President Richard Nixon, Black college presidents impressed on high officials in the administration a growing sense of frustration and urgency in the Black colleges. Their influence was subsequently recognized in a general administration policy to increase substantially support available to Black colleges. This effort was coordinated by the Federal Interagency Commission on Education, which reported.[1]

> The current study of black colleges is a response to mounting pressures within and without the Federal Government for it to assist in strengthening and providing additional support for these schools.
>
> The Office of Education estimates 150,000 students are now attending 97 accredited, traditionally black colleges, nearly all of them located in southern states. These institutions include both private and public, among the latter 11 land grant schools.
>
> By any standard the schools are poorly financed, yet they are generally well maintained and show remarkable dedication to their complex task. Their salary scales are low and their resources for supporting needy students are meager. Their future, without massive assistance, appears bleak.

[1] *Federal Interagency Commission on Education, "Progress Report to Task Force on Traditionally Black Colleges", September 17, 1969*

Suffering a century of neglect, they are caught, as an aftermath of the Civil Rights movement, in competition for the best students and for trained faculty with prestigious white schools. They see limited financial assistance coming from their alumni, minimum donations from too few highly placed business and professional graduates, from their churches, or from the state governments Of necessity they tend to view the Federal Government as the only remaining major source of support and, to many, the ultimate power responsible for their survival.

FICE believes that the black colleges, radiating remarkable pride in their educational responsibility, can be strengthened through the cooperative effort of the several Federal agencies To this end, FICE has undertaken visits to the colleges and sought directly from the black administrators, teachers, and students the areas of their needs and concerns.

Planning for formal NSF participation in this government-wide effort began shortly afterward, in late 1969. Extensive staff discussion ensued, and NSF's experience with Black colleges was carefully reviewed. By summer 1970, as the final decisions within the Foundation were being made on the FY 1972 budget request, the NSF Executive Council officially approved a proposal for a new "Program of Institutional Grants for Science for Black Colleges".

Contributing to these decisions were a variety of "special" projects suggested by NSF in the late 1960's for the purpose of generating knowledge concerning under-representation of minorities in scientific and technical careers These were characteristically one-time non-continuing activities designed to experiment with promising ideas, or to generate needed information Foundation action was clearly indicated along the following lines.

1 To improve science instruction in minority institutions,

2 To improve the flow of minorities into science careers, and,

3 To improve minority faculty participation in research in the sciences

In anticipation of the initiation of a Black colleges program in FY 1972 (the budget year beginning with July 1971) the Foundation undertook two series of preparatory meetings The first consisted of three regional meetings, one each at Xavier University in New Orleans, Morehouse College in Atlanta, and Hampton Institute in Hampton, Virginia, held in October-November 1970 Attendees were given the task of preparing a proposal according to the existing guidelines of the Undergraduate Research Participation Program and then to act as reviewers for what others had written The meetings were instructive to the Foundation staff and laid the base for the far more fruitful interaction that followed They were also marked by the frustration of dealing with hypothetical problems and not ones directed toward an immediate response to their institutions' needs.

The second series was one of nine small regional conferences held on Black college campuses during the period of April 26 through May 15, 1971. Each participating institution was invited to send at least one administrator, one natural scientist, and one social scientist By this time draft guidelines for the new program were available, and served to focus discussion. This opportunity to provide detailed reaction on each point, that is, to have a hand in establishing the guidelines for the program, created a constructive atmosphere in which a number of useful suggestions were made that strengthened the draft. Representatives of the colleges carried back to their institutions a clear idea of the nature of the program that would soon be implemented.

The decision to implement this new program found an organizational structure in place In the mid-1960's the federal policy toward education placed a strong emphasis on equality of opportunity, especially so as to correct what was perceived as severe geographic imbalance in institutional strength. The Foundation's response, at the college and university level, was to inaugurate a range of programs, backed by substantial funding, to increase the number and improve the geographic distribution of "first rank" colleges and universities with respect to their science education and research capabilities. One element of this effort was the College Science Improvement Program (COSIP), designed for the improvement of undergraduate science education programs in predominantly baccalaureate granting institutions and, later, junior colleges in consortial arrangements

Within this existing framework, the new program began in FY 1972 as the College Science Improvement Program-Section D Initially the new program focused on some 85 four-year colleges that had been established in an era of legal segregation and had traditionally and historically served Blacks The proposed activity was described as:[2]

> (a program) ..to improve the quality of science education programs in selected black colleges and universities. This program will be part of the overall Federal program to assist predominantly black institutions
>
> About 100 predominantly black institutions educate approximately half of the black college students in the United States Science programs offered these students are often extremely limited in scope and quality, reflecting among other factors a lack of financial resources. Students served by these institutions represent a large untapped reservoir of talent with respect to the scientific professions Many come from economically disadvantaged families, have experienced the hardships of living in a deprived environment, and have received inadequate aca-

[2] National Science Foundation Budget Submission to Congress, FY 1972

demic preparation. For these reasons, they are often poorly prepared for the experience of higher education. With improved science education (some of it preprofessional), graduates will be better informed citizens and will be able to make a greater contribution to Society's pool of trained manpower Special attention will be given to the encouragement of regional consortia of institutions and other means of effecting utilization of their resources. This program, designed to be sensitive to the unique requirements of individual institutions, will significantly improve and enhance the science education programs of these institutions and expand the career options available to students attending these institutions

This program will be open to all predominantly black academic institutions (except two-year colleges) with a potential for improving their science programs. This program will not increase the number of Ph D or graduate degree-granting departments The program will provide selective support, based on opportunity for greatest impact, for a variety of science-oriented projects designed to develop better trained faculty, improved course materials and equipment, and other items required to upgrade the science activities of these institutions

The Foundation has already held meetings with representatives of the black college community to explore their science education needs Further meetings are planned before establishment of the final guidelines of the program In addition, NSF—through its staff and consultants—plans to conduct site visits and provide other assistance to the institutions when requested

This will be a continuing program to be coordinated with the interested Federal and state agencies with funding in the amount of $5,000,000 for FY 1972

There is one final element in the early years of the MISIP program that should be noted The record indicates that staff members in both the Foundation and elsewhere in the administration debated what they perceived to be a serious problem Could funding be restricted to a set of institutions based upon the ethnic origins of the people who attended them? Eventually, in Congressional hearings, the General Counsel for the Foundation reasoned that it was indeed proper for the Federal government to support a program targeted at colleges which had traditionally and historically served a minority that had been systematically disadvantaged since these colleges themselves remain open to people of all races and ethnic origins

The record of this time also shows that neither the minority community nor the Foundation staff initially agreed among themselves about the desirability of a sheltered program Some equated this with a kind of second class status indicative of something other than equal access to federal funds. In the end, however, proponents of this new activity prevailed. The National Science Board gave official sanction to COSIP-D in a resolution passed at its 138th meeting on April 15-16, 1971 The proposed program was subsequently approved by Congress as submitted and funded at a level of $5,000,000 for FY 1972.

III. PROGRAM DEVELOPMENT

In the early discussions leading to the establishment of the new program, COSIP-D in concept had been closely associated with the Black colleges After considerable debate at levels up to and including the National Science Board, COSIP-D was introduced in the 1972 NSF budget to the Congress as an experimental program to improve the quality of science education in selected Black colleges and universities. However, the breadth of the civil rights movement made it clear that other minority groups were similarly disadvantaged as to educational opportunity and federal support Following Congressional action on the 1972 budget the National Science Foundation announced a new program of aid to four-year colleges and universities that historically have served disadvantaged ethnic minorities By this device, the program was established to serve Black institutions and subsequently broadened to include institutions enrolling predominant numbers of students of Spanish-speaking and Native American heritage as well

This targeting has essentially continued unchanged over the years, although institutional eligibility has evolved from colleges that have historically and traditionally served disadvantaged ethnic minorities to those with current enrollments predominantly composed of disadvantaged ethnic minorities Since 1977 this eligibility criterion has been stated as at least 50% enrollment of students from disadvantaged ethnic groups that are underrepresented in science. Each of these eligibility changes had the effect of increasing the number of institutions in the eligibility pool An even more significant change occurred in 1974 when two-year institutions were first permitted to apply This action was part of a more general attempt in the NSF Science Education Directorate to respond to the needs of two-year colleges, needs which the Foundation had not been able to address in its earlier years Following a slightly restrictive condition first imposed in 1978 that limited eligibility to accredited institutions or those actively seeking accreditation, the eligibility pool stood at 214 accredited institutions plus a small number actively seeking accreditation Through these changes, the Foundation has been able to keep its main focus on the strengthening of the U S scientific potential and to accommodate changing minority enrollment patterns

A significant change in the program was introduced in 1977, and completed the following year. Prior to 1977 any eligible institution could submit two proposals per year This was reduced to one in 1977, with the additional limit of two active awards By 1978 this restriction was further expanded to prohibit application from any

institution with two or more previous COSIP-D or MISIP awards until three years following the termination of its most recent grant. By the end of the 1980 competition this restriction would, if continued, reduce the pool of institutions actually eligible for the 1981 competition to 158. The purpose of this restriction was to enable MISIP to reach as many of the eligible institutions as possible. Indeed, by the end of 1980, 140 of these 214 eligible institutions had received major MISIP support

Since the funding level for COSIP-D and then MISIP has remained at $5.0M per year since its inception, beginning in 1977 a funding limit on individual awards has had to be strictly maintained at $300,000 Prior to 1977 a number of awards over $300,000 were made where the necessary special justification was determined to be satisfactory

Institutional and Cooperative Awards

The overriding objective of MISIP has always been to effect long-range improvement in science education at predominantly minority institutions. The principal mechanism for achieving this objective is the "institutional proposal", a document that is expected to be prepared by the submitting institution following a careful assessment of its achievements current status and problems, needs, and future goals. A MISIP proposal must embody a relatively comprehensive plan for institutional development that can employ a variety of approaches and involve available faculty and other resources from several departments In the past nine years there have been 207 such awards to 140 different institutions (three institutions have received three awards and 61 have received two) with a total expenditure of $41 6M Those totals include two awards given in support of cooperative proposals which are similar in objectives and strategy to institutional proposals but which involve two or more institutions working together in a consortial arrangement

These two types of MISIP awards, institutional and cooperative, may be considered the mainstream activity of the program At an average of over $200,000 per grant and extending mostly for three years, they were, in scope and duration, a continuation, now applied to minority institutions, of the approach successfully embodied in the COSIP and (after 1976) the Foundation's Comprehensive Assistance to Undergraduate Science Education program Collectively these projects account for about 93% of MISIP funds awarded during 1972-80 Capsule reviews of some typical institutional awards are given in Section IV

Alternative Approaches

Throughout its history MISIP has supported a variety of alternative approaches in recognition of the heterogeneity of institutional needs In total there have been 58 awards for such alternative approaches amounting to $2 8M in grants These can be grouped in seven categories: impact studies, system-wide projects, briefing conferences, design grants, curriculum exchange conferences, proposal development workshops, and special projects, with the preceding order reflecting the chronological order in which these categories were introduced into the program Each of these projects or group of projects has contributed important ideas in the development of the program.

Impact Study

In 1973 the Foundation awarded a grant to the Institute for Service to Education for $57,100 to study the impact of COSIP-D supported activities on its grantees during the first two years of the program It was considered important to conduct such an impact study to help position the program for future development. Visits to eight institutions with 11 projects, along with follow-up contacts and responses, were carried out

The study reported that carefully crafted federal support of such projects in these institutions significantly improves the educational environment in which learning takes place, resulting in heightened student motivation and greater opportunity by minority youth for advancement in the economic system.

System-Wide Projects

Since 1974 MISIP has supported 9 quite disparate activities which can be grouped together as system-wide projects in that they directly and immediately involve most or all MISIP institutions

A grant to Knoxville College in 1974 supported a workshop and related activities designed to assist participating faculty in introducing instructional technology in their classrooms Grants in 1974 and 1975 to Lincoln University supported conferences on educational computing in minority institutions, and workshops for courseware preparation

Talladega College received a grant in 1979 to administer a Visiting Scientists Program which sponsored brief visits to colleges by distinguished scientists to give lectures, seminars, mini-courses, and career information to students Also in 1979 an award to Atlanta Junior College supported the establishment of a clearinghouse for computer-assisted instructional science materials, and an award was made to the Human Resources Research Organization to prepare and disseminate case studies on academic computing at minority institutions. The latter project is intended to assist administrators and faculty in identifying academic computing needs, establishing goals, organizing computer activities, improving computer science curricula, and preparing long-range plans

Note The six 1979 and 1980 projects named in this section were described in program announcements at the time of the awards as "special projects" the mechanism described on page 00 but are included in this section since the impact has been system wide rather than on the respective grantee institutions

Another 1979 system-wide project went to Bennett College. In this project Bennett College and North Carolina A&T University serve as lead institutions engaged in training science faculty in computer assisted instruction at 30 minority institutions.

Two final system-wide awards were made in 1980 to the Inter American University of Puerto Rico and Jackson State University. IAU intends to complete a series of activities designed to examine the reason for the low level of proficiency in science and mathematics among Puerto Rican students. Jackson State will conduct a workshop for faculty from all minority institutions that have made major computer hardware purchases. Attendees will investigate ways to make more effective use of their computer systems

Briefing Conferences

During 1975 and 1976 MISIP funded 10 small grants to colleges geographically distributed around the nation The recipients conducted briefing conferences for representatives of minority institutions to introduce them to the opportunities presented by the MISIP Program. These conferences are one approach among many employed by MISIP over the years to exchange information with minority institutions and their staffs

Design Grants

Up to 1977 the major thrust of the MISIP program was to provide regular institutional awards, typically up to and beyond $250,000 over 3 years, to support broad strengthening of science education programs In that year, however, recognizing that among the wide variety of eligible institutions there were some whose immediate needs for assistance centered more on planning capability than on implementation capacity, MISIP announced a new category of awards known as "design grants." These small awards, typically $20,000, enabled recipient institutions to conduct needs assessments of their science programs and analyses of their existing resources in science education. It was intended that this increased planning capacity would position the institutions for future growth or strenthening in science, and would improve their abilities to make credible requests for external support. Since 1977, 10 institutions have received design grants. To date five of these have sought and successfully obtained regular institutional support through MISIP

Curriculum Exchange Conference

A special type of a system-wide project was supported in 1978. Unlike those mentioned above, which originated from unsolicited proposals, this award resulted from a Request for Proposals to hold a Minority Institutions Curriculum Exchange Conference The contract was awarded to Barber-Scotia College and the conference was held in Washington, D C in January 1979

The goals of the conference were to facilitate contact and exchange of information among natural and social science faculty representatives at minority institutions concerning advances in curriculum development and instructional techniques that would enhance the quality and effectiveness of science education at minority institutions The conference grew from the recognition that, after several years of MISIP support for curriculum improvement in the sciences for a relatively large number of minority institutions, it was now appropriate to convene such a conference to exchange and disseminate the growing body of experience Most minority institutions in the United States were represented at the conference

Proposal Development Workshops

One of the objectives of MISIP over the years has been to strengthen the competitiveness of minority institutions in obtaining external support, especially from NSF and other federal agencies By 1979, statistics indicated that in one respect this effort was succeeding, for the success rates of proposals submitted at least to the variety of programs offered by the NSF Science Education Resources Improvement Division were beginning to approximate the overall success rates in these programs. However, the submission rate of proposals from minority institutions was less than might be expected from the numbers alone

In order to address this problem MISIP sponsored six proposal development workshops throughout the United States (two in Atlanta because of the concentration of minority institutions in the southeast United States). Each minority institution was invited to select two representatives from its faculty to attend, with an emphasis on selecting individuals with potential leadership and proposal writing skills

Participants worked for 3 days in an atmosphere simulated as closely as possible to a real competition Teams were instructed to prepare an actual proposal from an institution described in a specially prepared case study to an NSF program also detailed in special guidelines The same teams then sat as reviewers of these proposals, using the standard criteria employed in the Foundation.

As a condition of attendance workshop participants were asked to undertake some dissemination efforts among their faculty colleagues on their experiences. For assistance in this, and to aid faculty in general, kits containing the materials distributed to participants during these workshops have now been made available to faculty at all minority institutions The Foundation intends to monitor closely in the next few years submission rates from minority institutions, and especially from workshop participants, for evidence of the success of these workshops.

Special Projects

By 1979 the elements of MISIP opened generally to unsolicited proposals were limited to the relatively large institutional and cooperative grants, and the relatively small design grants Moreover, the former were limited to a continually shrinking pool of institutions that had not received two such awards in recent years, and the latter were limited to very small institutions without

planning experience Clearly there was an intermediate need to be met

Thus in 1979 a new category of awards, known as "special projects," was announced In contrast to institutional awards, special projects were intended to support single-focus activities at the grantee institutions and were limited to $50,000. Titles for special projects awards shown in Appendix C illustrate the range of activities carried out under the awards In two years 21 special projects were supported

Associated Programs

During the time of MISIP at NSF, two other essentially separate elements that were associated with the Program and that were administered by its staff remain with the Foundation after the establishment of the Department of Education and are thus not part of this report The Research Initiation Grants Program, more recently known as, first, Research Initiation in Minority Institutions and now Minority Research Initiation, supports minority scientists' research projects in the basic sciences The program was transferred to the NSF Research Directorates in 1978

A program to establish a geographically dispersed group of Minority Centers for Graduate Education in Science and Engineering near minority population centers was initiated in 1977 with 16 planning and study grants In response to legislative direction this program in 1978 became the Resource Centers for Science and Engineering Program, and continues in the Division of Science Education Resources Improvement at NSF

IV. A CLOSER LOOK AT MISIP

Highlights of eight projects are presented in this chapter to give an overview of the diversity of activities supported by MISIP institutional grants These projects also demonstrate how different techniques can be used to interest students in science and engineering areas

Innovative Instructional Uses of Computers

Jackson State University, in Jackson, Mississippi, offers both graduate and undergraduate degrees and enrolls more than 6,600 students Over the years Jackson State has provided leadership in computer applications among minority institutions Through its programs students at a minority institution in Mississippi for the first time had access to interactive software

In the early 1970's the predecessor of the MISIP program, COSIP-D, awarded a grant to Jackson State, including partial assistance for installing computer terminals and the supporting data sets, cables, and communication devices for interactive computing The initial installation provided for six keyboard/printer terminals to be connected to the University's computing system An upgrade of the main frame computer eighteen months later made it possible to increase the number of interactive terminals to sixteen

This project was based on the philosophy that a student should be familiar with the use of a terminal and the potential of the computer. Since base knowledge is doubling every ten years, educators have an obligation to determine ways to accelerate the rate at which students can access and acquire information. The computer is a large part of the solution to management of the information explosion because it allows one to compress a vast amount of information, store it efficiently, and retrieve it rapidly. A student can call up vast storehouses of data and instruct the computer to carry out laborious calculations The time saved in the execution of calculations provides more time for the student to analyze and interpret results. The emphasis can then shift from repetitious mathematical tasks to problem-solving and decision making The instructor, freed from laborious record keeping, has more time to stimulate the student's imagination, creativity, and critical thinking

As a student interacts with the computer by means of the terminal, he or she becomes directly involved in the instruction process. Students set their own pace, and the constant interaction improves concentration more effectively than reading a textbook. In general, an interactive terminal provides two significant benefits: (1) it provides for self-pacing which often accelerates the student learning rate, and (2) it makes possible individualization of instruction

Originally, the computer was primarily used in such disciplines as the natural sciences, computer science, economics, statistics, and mathematics. The heterogeneous background of entering students presented typical problems to Jackson State A balance did not always exist between computational and communicative skills—both necessary for the training of the undergraduate student; therefore, computer-assisted instruction tutorials were given not only in computational disciplines but also in English, although the 46 tutorial modules in English were not primarily supported by the project Courseware in economics was also available

Culture-Sensitive Science Education at Navajo Community College

The Tsaile campus of Navajo Community College, located on the Navajo reservation in Arizona, has an enrollment of about 300 students This college believes that as an institution of higher education, a sensitivity to the cultural history of the Indian student can be an invaluable ingredient to the success of student performance The MISIP project at this college was directed toward (1) expanding course offerings in the earth and physical sciences, (2) enhancing laboratory activities, and (3) integrating elements of the "Navajo" experience into the development of introductory natural science courses.

Several patterns of behavior have been observed as these activities were implemented When courses are taught using experiences relevant to the culture of these students, attrition rates decline significantly The use of the Navajo Calendar in teaching time concepts is an example of the use of student experiences as a basis for curriculum content and strategy Coyote Stories, fables

used by the Navajo to convey ethical and moral values as well as environmental and ecological relationships, are another example of materials that were instructional as well as motivational because of the experiences and history of American Indians In courses where a higher level of technical information is required, such as organic chemistry and microbiology, problems and experiments related to the culture and environment were found to he much more meaningful Further, culture-related problems stimulate students to follow through with research dealing specifically with the health and environmental concerns of the reservation

Where feasible, student advice and contributions to the development of courses were solicited and cultivated Often, when the instructor is a non-Indian, the student's approach to a problem is from a different perspective then the instructor's, the novel approach which the student develops may be more easily understood by his peers

Navajo Community College has found, during its short history, that using students' cultural experiences becomes a more efficient method for teaching the more difficult and complex concepts of science Students learn the facts and vocabulary of science as they progress through a series of science courses, but often the concepts involved elude them until they see some relationship between the concept and a direct experience This does not mean, however that the science content of the course was subjugated to the cultural world-view of the student, but it does mean that the comparative and contrasting elements of the science-culture dilemma were used to strengthen the students' learning environment The course curriculum remained rigorous and challenging

The final facet of the program was to reconcile the approaches of the science instructor and the local traditionalist This facet was not as successful as the others because, with few exceptions, there was a reluctance on the part of scientists and traditionalists to work together to produce materials for instruction They viewed each other's territory as somewhat exclusive, not understanding each other well enough to realize the common concepts and degree of parallelism that existed Traditional views say to the student "This is the way it is" The scientific view says that observations lead to these conclusions and concepts The difficulty comes in teaching in such a way that students do not lose contact with their culture while, at the same time, accepting the scientific method as an approach to dealing with reality

Reinforcing Science Learning Skills in Puerto Rico

The Catholic University of Puerto Rico, a private institution, draws a large part of its student body from low-income students in the southern part of Puerto Rico Ninety-five percent of the students are from families whose annual income is below the federally established poverty mark As is often typical of disadvantaged youth, these students enter college with identifiable barriers to the study of science and mathematics This MISIP project in chemistry had as its objective the application of methods to compensate for (1) deficiency of factual knowledge required for understanding chemical concepts, (2) inadequacy in the use of the English language; (3) lack of motivation, and (4) lack of reading comprehension and reasoning abilities required for solving chemistry problems

The instructional program was instituted to develop content-specific subject modules and programmed lessons in Spanish with scientific terminology in both Spanish and English, to create slide-tape lessons on the mathematical applications of chemical concepts, to establish a learning center, to implement a student tutorial program, and to provide flexibility in modes of student progress evaluation

At the end of the first year of program implementation, 1977-78, it was found that attrition was reduced and overall student performance improved. A follow-up study the following year showed that the new teaching methodology initiated through the MISIP grant contributed not only toward improving academic performance in general chemistry, but gave students the opportunity for mastering fundamental concepts that resulted in improved performance in upper-level chemistry courses

During the second year of the program, attrition in the general chemistry course again was reduced, requests for tutoring assistance increased, and operations begun in the learning center The center was well attended by students from all the sciences and mathematics but was measured by its importance in improving the performance of students in chemistry The installation of a microcomputer and the efforts of faculty in developing software also made possible self-paced testin

Research on Phtalic Acid Esters—Our Lady of the Lake University

Our Lady of the Lake University is located in San Antonio, Texas, and has an ethnic minority enrollment of 65 percent of its 1,250 students A portion of one of its MISIP awards was used to acquire a modern gas chromatograph, a key piece of equipment for student research projects

In one such project six students undertook to determine the toxicity of phtalic acid esters (PAE) These are plasticizers used to keep plastics from breaking when bent or folded Because billions of pounds of plastics are produced each year, containing millions of pounds of PAE, concern for the effects of PAE on the environment motivated the research The effects of PAE were studied in three different projects (1) changes in amount of enzyme lactic dehydrogenase as a measure of tissue malfunction in mice, (2) reproductive organs in fish, and (3) nature of PAE-destroying bacteria

Based on their work three of the students presented papers on their findings before the Texas Academy of Science At the start of this project none of the six original students had been interested in continuing

scientific studies at the graduate level. Ultimately two went to graduate school, two to medical school and two to dental school. Others have been inspired by their accomplishments and have continued to work on PAE.

Besides its uses in student research projects, the gas chromatograph has been used in courses such as the organic chemistry laboratory, the instrumentation course, and the ecology laboratory.

For Native Alaskans: Aquaculture Training

Sheldon Jackson College (SJC) is the oldest educational institution in Alaska. Located on a large island in the remote wilderness of Southeast Alaska, 900 miles north of Seattle, the institution began as an industrial training school for Tlingit Indians in 1878 and served Alaska's Eskimos and Indians almost exclusively until the last two decades. Now, about 60-65 percent of the FTE (full time equivalent) students are Native Alaskans. The primary lifestyle backgrounds of these students are commercial and subsistence fishing. When the Alaskan Native Land Claims Settlement Act provided the necessary land and capital for salmon enhancement programs, SJC initiated an applied aquaculture program. This program enabled the college to capitalize on the traditional lifestyle and new career opportunities in fisheries for Native Alaskans.

The aquaculture program was designed to introduce students to marine ecology and aquaculture early in their careers. Students respond very favorably to educational techniques that emphasize the use of laboratories and "hands-on" experience. Also, the aquaculture program provides a career ladder for Indians, Aleuts, and Eskimos interested in learning a practical and meaningful skill in fisheries technology. To provide the necessary training to these students, a commercial salmon hatchery was established on campus. A total of 44 students completed all or parts of the program during 1975-77. In 1978, 40 students, of whom 23 were Native Alaskans or Indians, enrolled in the program. This aquaculture program is a unique and exciting challenge since it uses appropriate technology to interest students in marine ecology.

The fisheries curriculum offers options of a one-year certificate in salmon culture technology, a two-year certificate in fisheries science technology, an Associate of Science degree, or a transfer program to a baccalaurate degree program. Lateral movement from certificate to transfer program or vice versa is also possible.

Matriculation at Sheldon Jackson College for Native Alaskans or Indians is facilitated by an "open door" admissions policy. The MISIP project addressed some of the unique needs of the students accepted. The students ranged in educational preparation from a remedial level in mathematics and communication skills to the level of a college graduate. This diversity of competencies offers a distinct challenge to learning in a classroom serving such students simultaneously. The instructional methods used in the project attempted to minimize negative student attitudes promoted by this diversity. The underlying principle was to stress cooperation rather than competition among the students. Group assignments fostered cooperation and allowed students with various types of expertise to help one another. Students who were deficient in some basic academic skills often had knowledge of related vocational skills. Every effort was made to use vocational expertise as an avenue to provide feelings of accomplishment and success.

A second instructional approach emerged because of the Alaskan lifestyle. The cultural background of Native Alaskans has rarely stressed competitiveness or individual aggressiveness for self-attainment, but rather a sense of community without emphasis on individual accomplishment. Although this attitude has been greatly modified through association in more recent years with the White culture, it is still a prevailing characteristic. Care was taken in the selection of instructors who were sensitive to individual student interaction in classroom situations where such interactions might cause personal embarrassment. After the students had been on campus for a while, many of their apprehensions subsided as they and their instructors became better acquainted.

To assist in their adjustment during the first few months, students were placed upon arrival at the campus in a physical activity type of project, such as collecting salmon eggs for the laboratory. Since this activity provided the opportunity for an effective group orientation, it was fortunate that the return of the salmon crop occurred 10-15 days before other SJC students arrived on campus. By the time formal classes began, the fisheries students were well acquainted with each other, the instructors, and the school. This vocational activity helped in the development of an esprit de corps among the students that formed a positive support structure through other phases of their college program.

Significant in the direction of the program was the guidance given by a technical advisory committee composed of educators, local groups, students, and representatives of government and private fishery-related agencies. The flexibility of the program provided for continuing adjustments based on student evaluations, and feedback from graduates about their preparedness for work or higher education and their acceptance by fisheries employers.

Of the 35 students enrolled in the program during 1979-80, 21 were Tlingit Indians of Alaska and Yakima and Nez-Perce Native Americans of the Columbia River Area. By the end of the academic year, six fisheries students had achieved the Associate of Science degree, nine had completed the requirements for the two-year Fisheries Technician certificate, and eight had qualified for the one-year Aquaculture Technician certificate. There were jobs available for all of them in Alaska in fisheries-related areas.

The program accomplished its four-year goal of establishing a viable, self-supporting curriculum emphasizing on-the-job training for salmon fishery. Recruitment of Native Alaskans into this science-based activity will

undoubtedly have spinoffs in motivating more Native Alaskans toward science careers In the long run, the program should increase the number of role models in science in the Alaskan culture

A Service-Learning Program at Pine Bluff, Arkansas

A MISIP grant was awarded to the University of Arkansas at Pine Bluff in 1975 to initiate a student internship program. The University of Arkansas at Pine Bluff is located in Jefferson County where Blacks constituted 44 percent of the 91 015 population at that time The Delta area of Jefferson County, east of the Arkansas River, a predominantly agricultural community, had a percentage incidence of poverty among minority families more than double that of the non-minority population More than 50 percent of the students were day students, and minority students constituted 87 percent of the student body when the MISIP proposal was funded

The goals of the project were to (1) identify highly qualified students for careers in government and public affairs, (2) involve students in short-term research, and (3) provide formal educational experiences in combination with programmatic experiences for increased understanding of responsibility. The first phase of the program was the development and implementation of a multidisciplinary approach to teaching social science The course integrated political science, sociology, and economics

Following suggestions from students on relevant needs, a two-county internship feasibility study was made This was followed by a series of public service internship seminars to provide student interaction with executive heads of area public agencies professors, and visiting consultants. A directory of public service agencies in Jefferson County was compiled, standard forms for an internship contract and an intern evaluation were designed, and six interns were placed in pilot projects.

The program was designed to focus on political science and agriculture In the political science area, the concentration was on public administration and legal training. This was reflect[illegible] the selection of participating agencies represe[illegible] e functions of city attorney, county circuit judge, juvenile judge, sheriff, state corrections department, congressman, mayor, and district superintendent of schools

The agricultural aspects of the project had the objective of upgrading the income potential of selected small families in the immediate vicinity of the university by having students participate in a farmer-trainee program. Students assisted farmers in becoming involved in district farming groups

The success of this MISIP project can be measured by the enthusiasm of the students, the substantial interest shown by the community, and the support provided by the university The latter is illustrated by the new full-time faculty member hired in public administration, and by the fact that the departments of history and political science were awarded an interdisciplinary $120,000 federal grant from ACTION for the purpose of further developing the intern program in the 1978-79 academic year

In view of the emphasis on career opportunities for social science majors, this service-learning program has scored impressive results. (1) Of the first six MISIP-supported interns, four pursued graduate studies in public administration or law; (2) Of the ACTION-sponsored interns, one received a graduate scholarship for study in public affairs and one received a 1980 Harry S Truman Scholarship; (3) Other intern students have secured jobs or have been invited to continue as interns with the participating agencies, and (4) Interns are continuing in the offices of the congressman, mayor, city attorney, and circuit court judges

In summary, the four years of experience in the service-learning program prepared students far more effectively for serving community needs, for the real world of public service, for gainful employment in public service agencies, and for advancing their educational goals in graduate school than would have been the case had the learning program been limited to on-campus activities.

Science Instruction Strategies in Selma Junior College

Selma University (SU) is a predominantly Black private junior college located in the central part of Alabama The majority of SU's students come from socio-economically poor households, with generally mediocre science backgrounds They are reluctant to choose science because of the strongly nurtured notion: "Science is hard " Motivation to learn and a strong urge to achieve were conspicuously lacking, probably the result of a poor self-concept.

The purpose of the MISIP grant was to identify suitable instructional strategies that would bridge the gaps in the students' high school science experiences and prepare them to cope with college-level science instruction. The emphases of the project were directed toward learning and the environment. The thrust of the instructional strategies used at SU was to improve motivation and retention and to increase proficiency The underlying philosophy of faculty participants was that effective learning occurs when learning is perceived by the student as beneficial for his or her own purposes. Some of the instructional methods under trial at Selma made possible with MISIP funds are described in the following paragraphs.

PERSONALIZED SYSTEM OF INSTRUCTION (PSI). This curriculum approach places emphasis on the student taking the leadership in the learning process. Given carefully designed instructional materials, the pace of individual learning is established by the correctness of the student's responses and motivation. A course in General Biology and one in Physical Science were developed as PSI courses. One hundred first semester freshmen took the Biology course; twenty first-semester sophomores took the Physical Science course. After the early observation that PSI courses with teachers in passive roles were not effective, the learning response

of the students was greatly improved when the courses were modified to include an active role for instructors in classroom instruction and supervision.

STUDENT-STUDENT TUTORIALS It is widely accepted that students learn from one another as they do from other aids, such as faculty, examinations, and textbooks Based on this thesis, scholastically high achieving sophomore students in mathematics, biology, chemistry, and the physical sciences were selected to become student tutors. Each tutor was assigned a small group of students who were having difficulty in comprehending classroom instruction The overall program was monitored by faculty of the respective courses Over 95 percent of the students who attended these tutorials regularly performed well in regular course work

LEARNING BY EXPERIENCE Students tend to be motivated to learn when involved in activities they enjoy There was a need, particularly in science courses, to make extensive use of this thesis. Science laboratory experiences are particularly applicable to innovative and highly motivational activities. At SU, highlighting learning by innovative experiences, activities were centered around increasing student interest in listening, seeing, and doing This instructional method, emphasizing active participation in the learning process, was very effective, particularly with freshman students

INVESTIGATIVE (LABORATORY) ASSIGNMENTS. This program, offered during Fall 1978 to promising sophomores, provided an opportunity for the student to design carry out and report on simple scientific investigations Students were encouraged to select a laboratory research problem, write a research term paper (mostly literature survey), attend seminars, etc , as special assignments The seminars provided an arena for students to present their research work to their peers in the setting of a quasi-professional meeting

CREATIVE PROBLEM SOLVING Problems were selected to sharpen students creative thinking and decision making skills in handling conflict situations This activity was presented during laboratory sessions when the role of the instructor was to define problems and solicit students views of feasible solutions In such an informal laboratory setting students were more apt to express their ideas, particularly students hesitant to become involved in a discussion

The catalytic effect of this MISIP project is noteworthy At the time of the award, the science education program at the school was virtually nonexistent Developments that grew out of the project have enabled the Science Division to secure over $1,000,000 in federal grants Thus, by 1979, Selma University had a new science building equipped with advanced laboratory facilities, a computer center, and a greenhouse Its science course offerings were expanded from one general biology course and one course for pre-nursing students in 1976 to courses adequate for an associate degree in science Enrollment in science classes increased to the extent that in May 1980, for the first time, more associate of science degrees were awarded at commencement than associate of arts degrees

Research Techniques Training at Knoxville College

The MISIP grant to Knoxville College in Knoxville, Tennessee, supported a program to help students develop the research skills required of modern social scientists. Entitled the Research Methodology Minor, the program was a sequence of seven courses for students majoring in psychology and sociology

In this course sequence students were introduced to basic research concepts, computer facilities, research literature, and techniques of observational and recording skills required for developing research projects. Students were trained to operate videotape recorders, 35mm cameras, and tape recorders They were required to apply computer technology, including basic programming and graphic applications, to a research topic of their choice. A research program was completed either as laboratory or field research The final course in the sequence required that the student demonstrate proficiency in a major academic area, the preparation of research papers, test-taking skills, and reference techniques

A second feature of the Research Methodology Minor program at Knoxville College included financial support for student and faculty research Students were selected as faculty research assistants and received support for a research project and travel to conferences to present results In addition to support for research, faculty were assisted in the development of computer skills, continuing education, and travel costs for accompanying student research assistants when participating in conferences

The program also sponsored an annual conference entitled "Black Social Scientists " This event provided faculty and students from minority institutions opportunities for meeting outstanding social scientists, planning cooperative research, and exchanging ideas.

An allocation for equipment enabled the college to expand its computing capabilities by adding time-sharing access terminals A graphic microcomputer was acquired and laboratories were set up for studying social interactions and non-verbal behavior and computerized biofeedback

The Research Methodology Minor program generated considerable interest and resulted in an improved research orientation of both students and faculty During each of the first two years of the project more than 20 research papers were presented by undergraduates before professional societies such as the National Institutes of Science and the Southeastern Psychological Association The number of students accepted in graduate schools more than doubled Faculty research proposals funded, as well as funding levels, increased significantly Many of the psychology and sociology faculty have been sought out as consultants on the program and

faculty publications have increased appreciably. Perhaps the best evaluation of the project was the determination of other departments to institute the Research Methodology Minor for their own majors. Local and regional recognition of the program has been productive in attracting students.

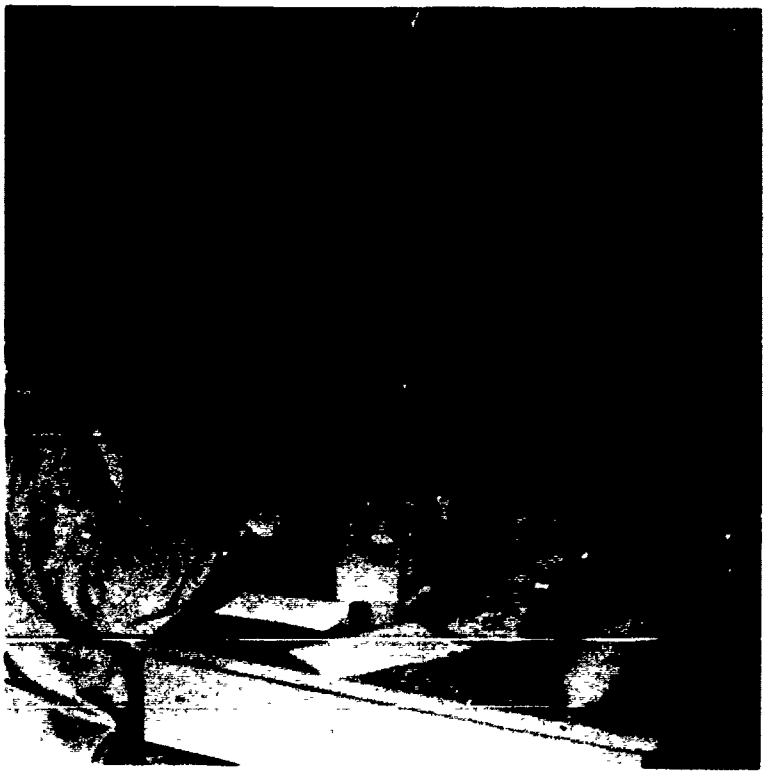
V. A FINAL NOTE

At the time of its beginning in 1972 the MISIP program was a new type of activity at the National Science Foundation. By the end of 1980 the concept of activities targeted at disadvantaged ethnic minorities had become established, and the Foundation's and the Nation's interest in strongly encouraging the participation by minorities and minority institutions in all grant programs was accepted. The contribution of MISIP to this evolution was subtle through this period, but clear in retrospect. A major factor was that, through the competitive process and peer review, merit was always the overriding basis on which projects were funded. The dialogue generated in this process between the Foundation and minority institutions provided the basis on which the Foundation could initiate other minority focused activities

In addition to the Minority Research Initiation and Resource Centers for Science and Engineering programs noted on page 00, there were three other minority-focused activities funded by the Foundation in 1980: Minority Graduate Fellowships, Minority Institutions Graduate Traineeships and Research Apprenticeships for Minority High School Students. Exclusive of the Minority Research Initiation program which is funded by the NSF Research Directorates, these programs account for $5,900,000 of the $77,400,000 NSF Science Education obligation for 1980. An additional $6,300,000 of the 1980 Science Education budget was awarded to minorities and minority institutions in non-targeted programs.

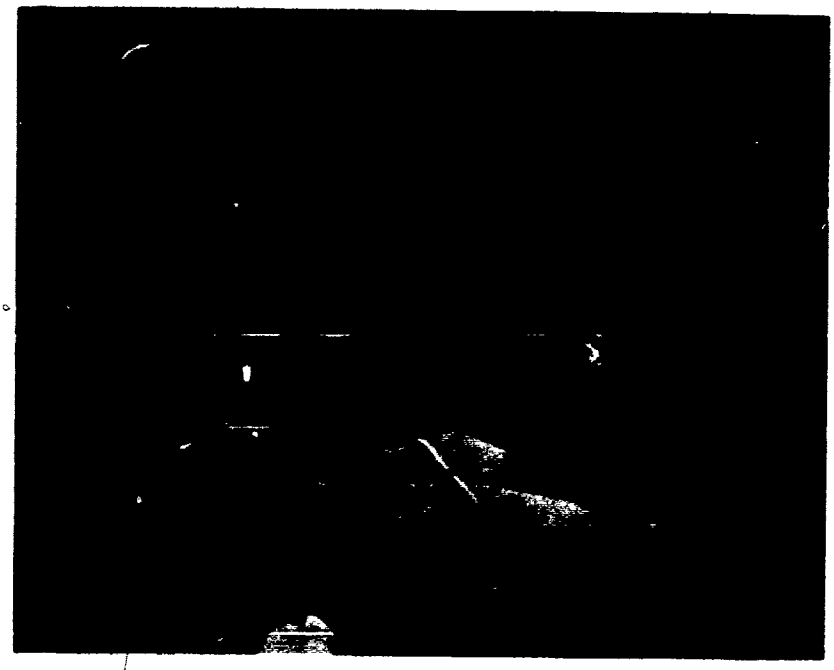
The concern first addressed by MISIP continues to evolve. By 1980 it was an established objective of the Science Education Directorate to place special emphasis on programmatic activities for groups underrepresented in science. In 1981 this approach was given further emphasis by the Congress which directed in the FY 1981 NSF Authorization Act a minimum level of support in the Foundation for minority-focused activities. Thus the transfer of MISIP leaves intact a wide range of targeted programs, review and advisory committees for minority programs for both the National Science Board and the NSF staff, and a determined intention to continue in the direction MISIP initiated.

Jackson State University: Computer terminals are in daily use by students.



Navajo Community College: Teamwork in the laboratory.

University of Arkansas-Pine Bluff: Student interns at work with Congressman Beryl Anthony



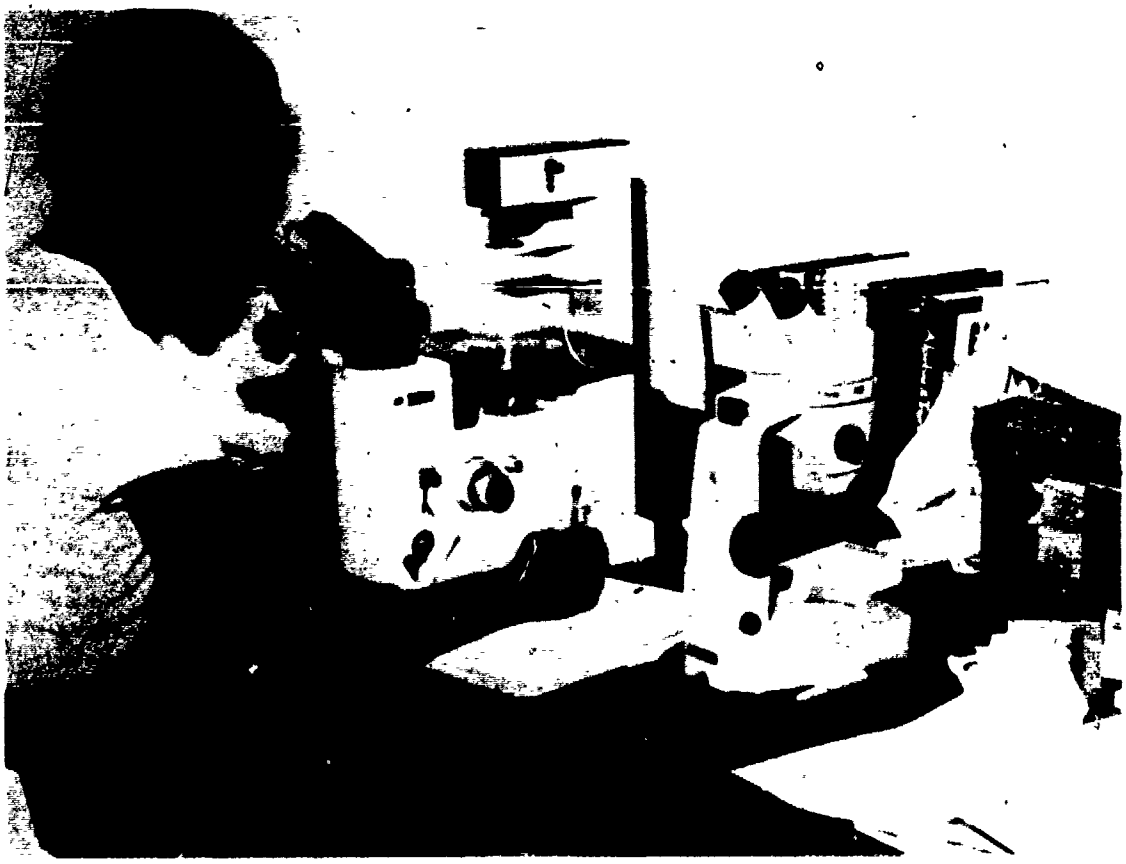
Our Lady of the Lake University: Determining the toxicity of phtalic acid esters (top and middle).

Catholic University of Puerto Rico: Technology-assisted learning carrels.

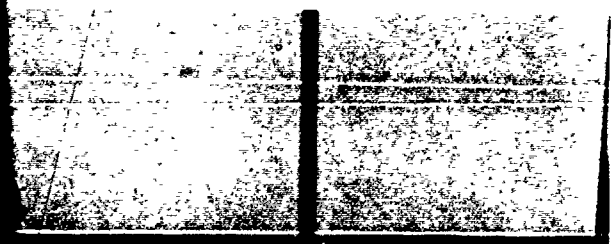
Sheldon Jackson College: Explaining how to test male and female salmon for maturity of sperm eggs (top); sorting male and female salmon into separate holding pens (bottom).

University of Arkansas-Pine Bluff: Service-learning program (top); field training with local farmers (bottom).

Selma University: Advanced instructional equipment for physiology—taking an electrocardiogram (top); studying tissue cultures (bottom).



Knoxville College: Training in using computers in research projects (top); presenting student research paper at conference at Atlanta (bottom).



APPENDICES

A. All Awards by Year

Year	Institutional and Cooperative Proposals			Other Proposals			All Awards	
	Submitted[1]	Awards	Total Awarded	Submitted[2]	Awards	Total Awarded	Awards	Total Awarded
1972	61	17	4,992,300	—	—	—	17	4,992,300
1973	16	19	4,167,600	1	1	57,100	20	4,224,700
1974	52	26	5,573,793	2	2	366,900	28	5,940,693
1975	56	21	4,489,200	5	5	469,603	26	4,958,803
1976	33	24	4,564,616	6	6	45,552	30	4,610,168
1977	83	34	5,129,904	7[2]	4	78,700	38	5,208,604
1978	45	24	4,461,224	8	4	236,509	28	4,697,733
1979	39	23	4,239,238	23	16	789,289	39	5,028,527
1980	31	19	4,017,033	89	20	778,826	39	4,795,859
Total	416	207	41,634,908	141	58	2,822,479	265	44,457,387

[1] New proposals submitted. In the early years of the program some proposals were carried over into following years for decision.

[2] Design grants (introduced in 1977), the Curriculum Exchange Conference (competed in 1978) and Special Projects (introduced in 1979) involved competition among submitted proposals. See also the footnote to System-Wide Projects, Table C.

B. INSTITUTIONAL AND COOPERATIVE AWARDS

DISCIPLINE KEY

Anthro.	Anthropology
Archit.	Architecture
Astron.	Astronomy
Biol.	Biology
Bot.	Botany
Chem.	Chemistry
Comp. Sci.	Computer Science
Econ.	Economics
Elec. Eng.	Electrical Engineering
Eng.	Engineering
Eng. Phys.	Engineering Physics
Env. Sci.	Environmental Science
Gen. Sci.	General Science
Geog.	Geography
Geol.	Geology
Math.	Mathematics
Nat. Sci.	Natural Science
Psy.	Psychology
Phys	Physics
Phys. Sci.	Physical Science
Physiol.	Physiology
Pol. Sci.	Political Science
Sci.	Science
Soc.	Sociology
Soc. Sci.	Social Science

B. Institutional and Cooperative Awards (Continued)

1972

Institution	Amount	Disciplines Involved
Cheyney State College	$287,400	Soc. Sci. (Urban Studies)
Grambling State College	324,800	Biol., Chem., Math., Phys., Comp Sci , Soc. Sci.
Lane College	240,900	Biol., Chem., Math., Phys.
Morehouse College	351,500	Biol., Chem.
North Carolina A&T State University	237,300	Phys., Econ., Math.
North Carolina A&T State University	312,200	Psy.
Paine College	280,900	Biol., Chem., Math , Phys , Psy , Soc.
Rust College	327,300	Biol., Chem., Math.. Phys.
Rust College	311,400	Geog., Anthro., Psy., Soc., Econ., Pol. Sci.
Shaw University	338,600	Urban Sci.
Shaw University	342,000	Biol., Chem., Math., Phys.
Southern University, Baton Rouge	225,800	Biol., Chem., Math., Phys.
Spelman College	279,400	Biol., Chem , Math.
Tougaloo College	316,500	Chem., Econ., Math., Phys., Pol. Sci , Psy , Soc., Anthro.
Tuskegee Institute	253,700	Econ., Pol. Sci., Soc.
Wiley College	166,600	Biol., Chem., Phys.
Xavier University of Louisiana	396,000	Math., Chem., Comp Sci
17 Awards	$4,992,300	

1973

Institution	Amount	Disciplines Involved
Bishop College	$211,700	Biol., Chem., Math , Phys.
Central State University	377,700	Anthro., Soc., Physiol.
Claflin College	154,000	Biol., Chem., Math., Phys
Clark College	222,600	Biol , Chem , Math , Phys
Coppin State College	228,900	Math., Pol. Sci , Soc.
Elizabeth City State University	177,400	Biol., Chem., Soc.
Florida A&M University	204,200	Biol., Chem., Math , Phys
Jackson State University	212,600	Biol., Chem., Math., Phys
Lincoln University (Pennsylvania)	242,100	Soc., Econ.
Livingstone College	215,000	Biol., Chem., Math., Phys. Geol
Miles College	144,600	Soc , Pol. Sci., Econ.
Savannah State College	240,000	Eng., Math., Phys., Chem., Soc
South Carolina State College	237,400	Biol., Chem., Math., Phys
St Augustine's College	172,400	Biol., Chem., Math , Phys , Soc
Tennessee State University	244,500	Biol., Physiol
Virginia State College	167,800	Pol Sci
Wilberforce University	251,000	Biol., Chem , Math , Phys
Winston-Salem State University	208,500	Biol., Chem., Phys
Winston-Salem State University	255,200	Physiol , Soc
19 Awards	$4,167,600	

B. Institutional and Cooperative Awards (Continued)

1974

Institution	Amount	Disciplines Involved
Alabama A&M University	$212,420	Biol., Chem., Math., Phys
Albany State College	185,000	Biol., Chem., Math., Phys.
Alcorn A&M University	173,358	Biol., Chem., Math., Phys
Alcorn A&M University	169,379	Econ., Pol Sci., Soc Sci
Bacone College	131,216	Biol., Chem., Math., Phys Sci., Soc Sci
Barber-Scotia College	205,000	Biol., Chem., Math
Bethune-Cookman College	209,000	Biol., Chem., Math., Phys.
Clark College	179,025	Psy., Soc. Sci.
College of Ganado	330,000	Nat. Sci., Soc. Sci., Math.
Fisk University	247,030	Biol., Chem., Math., Phys
Friendship Junior College	80,040	Biol., Chem., Math., Soc Sci
Howard University	357,100	Phys., Astron
Jackson State University	311,500	Biol., Chem., Math., Phys., Pol Sci., Psy., Soc. Sci
Johnson C Smith University	209,833	Biol., Chem., Math., Phys.
Mississippi Industrial	160,439	Biol., Chem., Math., Phys
Norfolk State University	240,000	Biol., Chem., Math., Phys
Prentiss N&I Institute	206,800	Biol., Math., Phys. Sci., Soc Sci
Sheldon Jackson College	160,000	Forestry, Fisheries, Wildlife Management, Gen Sci
Southwestern Christian College	66,850	Biol., Chem., Math., Phys
Talladega College	255,000	Biol., Chem., Econ., Math., Phys
Texas Southern University	275,000	Biol., Chem., Math., Phys
Tuskegee Institute	250,000	Biol., Chem
Virginia Union University	218,450	Biol., Chem., Math., Phys.
Voorhees College	315,165	Biol., Chem., Math., Phys., Soc Sci
Wiley College	160,000	Biol., Chem., Math., Phys., Soc. Sci.
Xavier University of Louisiana	266,188	Pol. Sci., Psy., Soc. Sci.
26 Awards	$5,573,793	

1975

Institution	Amount	Disciplines Involved
Alabama Lutheran Academy & College	$148,300	Nat. Sci., Math., Soc. Sci.
Albany State College	178,400	Soc. Sci., Econ., Soc.
University of Arkansas @ Pine Bluff	105,000	Pol. Sci., Econ., Soc.
Daniel Payne College	150,000	Biol., Chem., Math., Phys
Dillard University	222,000	Biol., Chem., Math., Phys.
Edward Waters College	170,000	Biol., Chem., Math., Phys.
El Paso Community College	230,000	Biol., Chem., Math., Phys., Psy
Howard University	325,000	Eng., Comp. Sci.
Inter American University of Puerto Rico —San German	313,300	Biol., Chem., Math., Phys.
Knoxville College	294,000	Biol., Chem., Math., Phys
Mississippi Industrial College	203,000	Pol. Sci., Econ., Soc., Psy., Anthro
Mississippi Valley State University	230,000	Biol., Chem., Math., Phys. Sci.
Morristown College	170,000	Biol., Chem., Env. Sci., Space Sci., Phys Sci., Math
Oakwood College	228,700	Biol., Chem., Math., Phys.
Our Lady of the Lake College	163,000	Biol., Chem., Econ., Math., Pol Sci., Psy., Soc
University of Puerto Rico @ Mayaguez	350,000	Eng.
University of Puerto Rico @ Rio Piedras	227,500	Biol., Nat Sci., Soc. Sci
Roanoke-Chowan Technical Institute	190,000	Biol., Chem., Math., Phys., Soc Sci
S. D. Bishop State Junior College	125,000	Biol., Chem., Math.
Spelman College	166,000	Econ., Pol. Sci., Psy., Soc
Texas Southern University	300,000	Econ., Pol. Sci., Soc. Sci., Psy., Biol., Chem., Math., Phys.
21 Awards	$4,489,200	

B. Institutional and Cooperative Awards (Continued)

1976

Institution	Amount	Disciplines Involved
Alabama State University	$105,340	Math , Comp. Applications in Nat. Sci.
Atlanta University Center (Consortium)	264,998	Comp. Applications in Nat /Soc. Sci
Bennett College	170,835	Biol., Chem , Math., Phys.
Bishop College	115,438	Soc. Sci., Math.
Central State University	272,095	Comp. Applications in Nat. Sci.
Chicago State University	133,046	Biol., Chem., Math., Phys.
College of the Sacred Heart	104,530	Biol., Chem., Phys.
University of Hawaii, Hilo	231,044	Psy., Anthro., Biol., Chem , Math , Phys , Pre-Eng., Comp. Sci.
Hostos Community College	103,270	Biol., Chem., Phys.
Huston-Tillotson College	212,436	Pol. Sci., Soc., Econ., Geog.
Lincoln University, Missouri	146,901	Quantitative/Statistical Methods in Soc. Sci.
Mary Holmes College	177,742	Biol., Chem., Math . Phys., Econ , Pol Sci., Psy., Soc.
Miles College	219,233	Biol., Chem., Math.
Morgan State University	213,755	Computer Applications in Soc. Sci.
Morris Brown College	102,087	Anthro., Pol. Sci., Psy.
Norfolk State University	192,344	Econ., Pol. Sci., Psy., Soc.
Paine College	198,812	Geog., Pol. Sci., Soc.
Pan American University	247,091	Biol., Chem., Math., Phys. Sci.
University of Puerto Rico @ Mayaguez	229,605	Biol., Chem., Phys , Geol.
University of Puerto Rico @ Rio Piedras	251,513	Computer Applications in Phys. Sci.
Sinte Gleska College Center	260,405	Life Sci., Phys. Sci., Math.
Southern University @ Shreveport	132,310	Biol., Chem., Math., Phys.
Southwestern Christian College	135,600	Biol., Chem., Math., Phys.
Turtle Mountain Community College	197,285	Nat. Sci., Soc. Sci., Math
24 Awards	$4,564,616	

27

B. Institutional and Cooperative Awards (Continued)

1977

Institution	Amount	Disciplines Involved
University of Arkansas @ Pine Bluff	$151,400	Biol., Chem
Atlanta Junior College	229,400	Biol., Chem., Math., Phys., Comp. Sci.
Bayamon Central University	117,600	Biol., Chem., Math., Phys.
Bronx Community College—CUNY	241,500	Chem
Catholic University of Puerto Rico	122,700	Chem.
Claflin College	141,200	Comp. Applications-Nat./Soc. Sci.
Community College of Baltimore	140,800	Biol., Chem., Phys.
Community College of Micronesia	93,300	Sci., Math.
East Los Angeles College	138,600	Math., Eng., Life Sci.
Federal City College	195,800	Biol., Chem., Math.
Hampton Institute	201,100	Psy., Soc., Pol. Sci., Math.
H. Council Trenholm State Technical College	214,900	Biol. Sci., Phy. Sci., Math
Humacao University	127,600	Biol., Chem.
Inter American University of Puerto Rico @ San Juan	129,300	Psy., Anthro., Econ., Geog
Jackson State University	139,600	Econ., Pol. Sci., Soc., Geog.
La Guardia Community College	150,700	Biol., Chem., Phys
Lawson State Junior College	55,400	Biol., Chem., Math., Phys.
Lomax-Hannon Junior College	134,900	Nat./Soc. Sci.
Los Angeles City College (Consortium)	140,600	Biol., Chem., Phys., Earth Sci.
Medgar Evers College	85,000	Math.
Navajo Community College @ Shiprock	172,000	Biol., Chem., Phys., Earth Sci.
Navajo Community College @ Tsaile	138,600	Biol., Chem., Phys., Geol., Comp Sci
American Indian Satellite Community College	120,800	Biol., Chem., Phys., Geol
Oakwood College	209,800	Biol., Chem., Phys., Eng
Philander Smith College	240,900	Biol., Chem., Math.
Prairie View A&M University	177,200	Biol., Chem., Phys
Puerto Rico Junior College	67,200	Biol.
University of Puerto Rico @ Cayey	120,400	Biol., Chem.
Selma University	133,100	Biol., Chem., Math., Phys.
Shaw College—Detroit	123,800	Biol., Chem., Math., Phys.
Sheldon Jackson College	191,504	Chem., Soc. Sci.
Texas A&I University @ Kingsville	168,200	Chem., Geog., Phys., Math., Eng
Turabo University College	121,000	Chem., Math.
Xavier University	194,000	Biol., Chem., Phys.
34 Awards	$5,129,904	

B. Institutional and Cooperative Awards (Continued)

1978

Institution	Amount	Disciplines Involved
Atlanta Junior College	$236,283	Comp. Applications-Nat./Soc. Sci.
Bethune-Cookman College	163,261	Quant. Methods in Soc. Sci.
Central YMCA Community College	175,000	Sci., Math.
College of the Virgin Islands	186,200	Biol., Chem., Marine Biol.
Denmark Technical Education Center	136,800	Phys., Math.
Grambling State University	223,018	Biol., Chem., Math., Phys.
Hampton Institute	277,348	Biol., Chem., Eng., Math., Phys.
Highland Park Community College	168,410	Biol.
Inter American University @ San German	110,818	Biol., Chem., Phys.
Inter American University @ San Juan	125,000	Biol., Chem., Math.
Johnson C. Smith College	185,000	Soc., Econ., Pol. Sci.
Kennedy-King College	145,336	Biol., Psy. Soc. Sci.
Kentucky State University	200,000	Biol., Chem., Math., Phys.
Knoxville College	235,369	Psy., Soc.
Lummi School of Aquaculture	107,310	Fisheries Management and Aquaculture
Medgar Evers College	173,600	Math., Phys./Life Sci.
New Mexico Highlands University	175,882	Biol., Chem., Env. Sci.
New York Community College	253,100	Phys., Astron., Gen. Sci.
Oglala Sioux Community College	218,495	Biol., Chem., Math.
Prairie View A&M University	165,796	Eng., Chem., Biol., Math.
Selma University	119,727	Soc. Sci., Econ., Pol. Sci., Anthro.
Standing Rock Community College	157,471	Phy. Sci., Nat. Sci., Math.
Tougaloo College	272,000	Comp. Applications-Nat./Soc. Sci.
University of the Sacred Heart	250,000	Math., Biol., Chem., Phys., Econ.
24 Awards	$4,461,224	

1979

Institution	Amount	Disciplines Involved
Bacone College	$180,252	Math., Sci.
Community College of Baltimore	249,884	Biol., Chem., Comp. Sci., Math., Phys.
Barber-Scotia College	115,775	Nat./Soc. Sci.
Brooklyn Center—LIU	225,462	Biol., Chem., Phys.
Cheyney State College	252,270	Math., Comp. Sci.
City College CUNY	227,026	Sci., Eng.
Coahoma Junior College	97,250	Sci
Coppin State College	106,652	Chem., Phys. Sci.
Edward Waters College	243,766	Biol., Chem., Phys.
Inter American University of Puerto Rico @ Guayama	115,252	Chem.
Kennedy-King College	121,480	Nat./Soc. Sci.
Lehman College	221,161	Nat. Sci., Math.
Lincoln University	198,798	Biol., Chem., Math., Phys
University of Maryland—Eastern Shore	209,407	Nat. Sci.
Ministerial Institute	88,910	Biol., Math., Phys. Sci.
Our Lady of the Lake University	261,571	Multidisciplinary
Paul Quinn College	180,975	Biol., Chem., Math., Phys.
S. D. Bishop State Junior College	141,983	Biol., Chem., Math., Phys.
Southern University	265,064	Multidisciplinary
Talladega College	218,877	Biol., Chem., Math., Phys. Psy., Soc
Utica Junior College	285,087	Biol., Chem., Comp. Sci., Math.
Wilberforce University	92,862	Biol., Chem., Math., Phys., Pre-Eng
World University	139,474	Biol., Chem., Math., Phys
23 Awards	$4,239,238	

B. Institutional and Cooperative Awards (Continued)

1980

Institution	Amount	Disciplines Involved
College of the Virgin Islands	$240,022	Comp. Sci , Eng., Phys.
Donnelly College	196,177	Comp. Sci., Math.
Hostos Community College	269,252	Biol., Chem., Math., Phys.
Humacao University College	268,800	Biol., Chem., Math., Phys., Soc Sci
La Guardia Community College	265,104	Biol., Chem., Math., Phys.
Lane College	204,200	Biol., Chem., Comp Sci., Math
Laney College	220,800	Chem., Life Sci., Math , Phys. Sci.
Le Moyne-Owen College	167,508	Biochem., Biol., Chem., Math.
Lummi School of Aquaculture	112,240	Biol Sci.
Malcolm X College	181,169	Biol., Chem., Math., Phys Sci , Soc. Sci
Mary Holmes College	178,600	Math., Phys.
Northern New Mexico Community College	259,200	Biol , Chem., Eng., Math. Phys
Olive-Harvey College	231,322	Archit., Biol., Bot., Chem., Elec. Eng., Math., Phys., Phys. Sci.
Pan American University	236,635	Anthro., Pol. Sci., Psy., Soc.
Philander Smith College	203,400	Biol., Chem., Math., Psy.
Stillman College	246,720	Biol., Chem., Math., Phys.
Tennessee State University	197,115	Chem., Math., Phys.
Winston-Salem State University	204,500	Biol., Chem , Math., Phys., Phys. Sci., Soc.
World University	134,269	Psy., Soc. Sci.
19 Awards	$4,017,033	

B. Institutional and Cooperative Awards (Continued)

SUMMARY

Institutions Receiving Three Awards (3)

Jackson State University
Winston-Salem State University
Xavier University of Louisiana

Institutions Receiving Two Awards (61)

Albany State College
Alcorn State University
University of Arkansas—Pine Bluff
Atlanta Junior College
Bacone College
Barber-Scotia College
Bethune-Cookman College
Bishop College
Central State University
Cheyney State College
Chaflin College
Clark College
Community Colege of Baltimore
Coppin State College
Edward Waters College
Grambling State University
Hampton Institute
Hostos Community College
Howard University
Humacao University College
Inter American University—San German
Inter American University—San Juan
Johnson C. Smith University
Kennedy-King College
Knoxville College
La Guardia Community College
Lane College
Lincoln University (Pa.)
Lummi School of Aquaculture & Fisheries
Mary Holmes College
Medgar Evers College
Miles College
Mississippi Industrial College
Norfolk State College
North Carolina A&T State University
Oakwood College
Our Lady of the Lake University
Paine College
Pan American University
Philander Smith College
Prairie View A&M University
University of Puerto Rico—Mayaguez
University of Puerto Rico—Rio Piedras
Rust College
University of the Sacred Heart
S. D. Bishop State Junior College
Selma University
Shaw University
Sheldon Jackson College
Southern University—Baton Rouge
Southwest Christian College
Spelman College
Talladega College
Tennessee State University
Texas Southern University
Tougaloo College
Tuskegee Institute
Wilberforce University
Wiley College
World University
College of the Virgin Islands

B. Institutional and Cooperative Awards (Continued)

SUMMARY

Institutions Receiving One Award (76)

Alabama A&M University
Alabama Lutheran Academy & College
Alabama State University
American Indian Satellite Community College
Atlanta University Center
Bayamon Central University
Bennett College
Bronx Community College
Brooklyn Center—Long Island University
Catholic University of Puerto Rico
Central YMCA Community College
Chicago State University
City College—CUNY
Coahoma Junior College
Community College of Micronesia
Daniel Payne College
Denmark Technical Educational Center
Dillard University
Donnelly College
East Los Angeles Community College
El Paso Community College
Elizabeth City State University
Federal City College
Fisk University
Florida A&M University
Friendship Junior College
College of Ganado
H. C. Trenholn State Technical College
University of Hawaii
Highland Park Community College
Huston-Tillotson College
Inter American University—Guayama
Kentucky State University
Laney College
Lawson State Junior College
Lehman College
Le Moyne-Owen College
Lincoln University (Mo.)
Livingstone College
Lomax-Hannon Junior College
Los Angeles City College
Malcolm X College
University of Maryland—Eastern Shore
Ministerial Institute & College
Mississippi Valley State University
Morehouse College
Morgan State University
Morris Brown College
Morristown College
Navajo Community College—Shiprock
Navajo Community College—Tsaile
New Mexico Highlands University
New York City Community College
Northern New Mexico Comm. College
Oglala Sioux Community College
Olive-Harvey College
Paul Quinn College
Prentiss Normal & Industrial Institute
Puerto Rico Junior College
University of Puerto Rico—Cayey
Roanoke-Chowan Technical Institute
Savannah State College
Sinte Gleska College Center
Shaw College @ Detroit
South Carolina State College
Southern University—Shreveport
St Augustine's College
Standing Rock Community College
Stillman College
Texas A&I University—Kingsville
Turabo University College
Turtle Mountain Community College
Utica Junior College
Virginia State College
Virginia Union University
Voorhees College

C. Other Awards

Impact Study	1 Award	$57,100
Institute for Services to Education	1973	$57,100
System-Wide Projects[1]	9 Awards	$1,228,851
Atlanta Junior College Clearinghouse for Computer-Assisted Instructional Science Materials	1979	$50,000
Bennett College Mid-Atlantic Conferences on Educational Computing	1979	$219,213
Human Resources Research Organization Case Studies on Academic Computing in Minority Institutions	1979	$46,215
Knoxville College Workshops in Educational Technology for the Teaching of Science and Mathematics	1974	$215,200
Inter American University @ San German Approaches to Increased Minority Participation in Science	1980	$24,057
Jackson State University Workshops on the Impact of Major Computer Systems	1980	$38,766
Lincoln University @ Missouri Workshops on Education Computing in Minority Institutions	1974	$151,700
Lincoln University @ Missouri Workshops on Education Computing in Minority Institutions	1975	$433,700
Talladega College Visiting Scientists Program	1979	$50,000

[1] All projects catalogued as "system-wide" were orginally submitted either as cooperative proposals or as special project proposals, but have been grouped in this category or clarity of presentation.

C. Other Awards (Continued)

Briefing Conferences	10 Awards	$81,455
Atlanta University	1976	$6,248
Chicago State University	1975	$6,598
El Paso Community College	1975	$16,500
Federal City College	1975	$7,160
Lincoln University	1976	$11,700
Morgan State University	1976	$6,304
Navajo Community College	1976	$9,632
University of Puerto Rico @ Rio Piedras	1975	$5,645
College of the Sacred Heart	1976	$5,598
St. Phillip's College	1976	$6,080
Design Grants	10 Awards	$197,814
Biscayne College	1979	$19,943
Caribbean University College	1979	$19,822
Colegio Cesar Chavez	1980	$20,000
D-Q University	1978	$19,574
Jarvis Christian College	1978	$20,000
Laney College	1978	$19,775
Ministerial Institute & College	1977	$19,[illegible]00
Northern New Mexico Comm College	1977	$19,40[illegible]
Oglala Sioux Community College	1977	$20,000
Paul Quinn College	1977	$20,000
Curriculum Exchange Conference	1 Award	$177,160
Barber-Scotia College	1978	$177,160
Proposal Development Workshops	6 Awards	$209,779
Atlanta University	1979	$45,113
Atlanta University	1979	$34,635
Chicago State University	1979	$30,341
Howard University	1979	$27,992
Los Angeles City College	1979	$36,217
University of Texas—San Antonio	1979	$35,481

C. Other Awards (Continued)

Special Projects	21 Awards	$870,320
Albany State College Curriculum Enhancement in Plant Science	1980	$42,830
Barber-Scotia College Pre-Freshman Enrichment in Science and Mathematics	1980	$43,266
Borough of Manhattan A Physics Course Emphasizing Computer Electronics	1980	$40,997
Clark College Lectured-Tutored Videotape Instruction in Elementary Calculus	1979	$49,404
Flaming Rainbow University Enrichment Experiences in Science for Incoming Rural Indian Students	1980	$38,168
Laredo Junior College Improved Student Training in Biological Research	1980	$43,429
Livingstone College Computer Literacy for Science Students	1980	$43,750
Los Angeles Southwest College Development of Learning Modules Using Computer-Assisted Instruction	1980	$45,734
Malcolm X College Pre-Freshman Science and Mathematics Enrichment Program	1979	$49,925
Morehouse College Summer Science Institute for Pre-Freshman	1980	$33,924
Nebraska Indian Community College Environmental Studies Curriculum Based on the Ecosystem of the Great Plains Region	1980	$46,630
Norfolk State University Seminar in Science Research Skills	1980	$46,024
North Carolina A&T State University Information Aids to Career Development for Minority Students in Science	1979	$49,988
North Carolina Central University Computer-Assisted Homework Assignments in Sociology and Geography	1980	$38,835
Passaic County Community College Basic Science Skills Improvement Through Computer-Assisted Instruction	1980	$27,695
Standing Rock Community College Production of A-V Materials to Upgrade Introductory Science Course	1980	$43,415
Tuskegee Institute Mathematics/Computer Science Learning Center	1980	$37,711
University of the District of Columbia Pre-Freshman Mathematics Enrichment Program	1979	$25,000
Virginia Union University Science Improvement via Academic Computer Usage	1980	$33,420
Wilberforce University Student Career Counseling and Research Training Program	1980	$43,170
Xavier University of Louisiana Computer Science Training for Mathematics	1980	$47,005

D. Institutional and Cooperative Awards by Predominant Minority Group

Predominant Minority	Eligible Institutions[1]	Proposals Submitted	Awards	Different Institutions Receiving Awards
Alaskan Native	4	3	2	1
American Indian	6	17	10	9[2]
Black	143	311	151	99[2]
Mexican-American	16	19	8	6
Puerto Rican	25	39	20	14
Micronesian	1	1	1	1
Combination	19	26	15	10[2]
Total	214	416	207	140[2]

[1]Note: Eligibility refers to accredited minority institutions. Awards may also be made to minority institutions actively seeking accreditation. The number of such institutions is not recorded

[2]Included among these totals are 11 institutions (11 awards) not included in the current eligibility pool of 214 institutions.

E. Institutional and Cooperative Awards by State

	Eligible Institutions[1]	Proposals Submitted	Awards	Different Institutions Receiving Awards
Alabama[2]	14	35	20	14
Alaska	4	3	2	1
Arizona	2	4	2	2
Arkansas	4	7	4	2
California	11	10	3	3
Colorado	—	1	—	—
Connecticut	—	—	—	—
Delaware	1	2	—	—
Florida	4	13	5	3
Georgia	9	27	14	8
Hawaii[2]	—	3	1	1
Idaho	—	—	—	—
Illinois	8	12	6	5
Indiana	—	—	—	—
Iowa	—	—	—	—
Kansas	2	1	1	1
Kentucky	2	2	1	1
Louisiana	6	20	9	5
Maine	—	—	—	—
Maryland	5	13	5	4
Massachusetts	1	—	—	—
Michigan	4	8	3	2
Minnesota	—	—	—	—
Mississippi[2]	11	35	19	11
Missouri	2	3	1	1
Montana	—	—	—	—
Nebraska[2]	—	1	1	1
Nevada	—	—	—	—
New Hampshire	—	—	—	—
New Jersey	3	—	—	—
New Mexico[2]	6	6	3	3
New York	10	14	11	8
North Carolina	16	31	16	10
North Dakota[2]	—	4	2	2
Ohio	4	8	4	2
Oklahoma	2	5	2	1
Oregon	1	1	—	—
Pennsylvania	3	5	4	2
Rhode Island	—	—	—	—
South Carolina[2]	10	18	6	5
South Dakota[2]	—	2	1	2
Tennessee	7	26	9	7
Texas	24	33	18	11
Utah	—	—	—	—
Vermont	—	—	—	—
Virginia	7	11	6	4
Washington[2]	—	2	2	1
West Virginia	—	—	—	—
Wisconsin	—	—	—	—
Wyoming	—	—	—	—
District of Columbia	3	8	3	2
Guam	1	—	—	—
Micronesia	1	1	1	1

E. Institutional and Cooperative Awards by State (Continued)

	Eligible Institutions[1]	Proposals Submitted	Awards	Different Institutions Receiving Awards
Puerto Rico	24	39	20	13
Samoa	1	—	—	—
Virgin Islands	1	2	2	1
Total	214	416	207	140

[1]Note: Eligibility refers to accredited minority institutions. Awards may also be made to minority institutions actively seeking accreditation The number of such institutions is not recorded.

[2]Included among these states are 11 institutions (11 awards) not included in the current eligibility pool of 214 institutions

F. Institutional and Cooperative Awards to Two-Year Institutions

Fiscal Year	Eligible Institutions[1]	Proposals Submitted	Awards	Average Award
1974	84	8	5	$162,181
1975	84	14	5	172,660
1976	84	8	6	167,769
1977	104	31	15	144,787
1978	100	16	10	171,793
1979	97	16	8	160,012
1980	96	14	9	212,651
Total		107	58	

NOTE: Two-year institutions were not eligible before FY 1974.

[1]Note: Eligibility refers to accredited minority institutions. Awards may also be made to minority institutions actively seeking accreditation. The number of such institutions is not recorded.

G. Institutional and Cooperative Awards to Four-Year Institutions

Fiscal Year	Eligible Institutions[1]	Proposals Received	Awards	Average Award
1972	85	61	17	$293,665
1973	85	16	19	219,347
1974	127	44	21	226,804
1975	127	42	16	226,619
1976	127	25	18	189,506
1977	137	52	19	155,690
1978	115	29	14	195,949
1979	118	23	15	197,276
1980	118	17	10	210,317
Total		309	149	

[1]Note: Eligibility refers to accredited minority institutions. Awards may also be made to minority institutions actively seeking accreditation. The number of such institutions is not recorded.

H. Institutional and Cooperative Awards-Expenditure-Categories

(207 Awards)

	Amount	% of Total
Professional Staff	$ 9,659,299	23.2
Other Manpower	4,749,379	11.4
Permanent Equipment[1]	15,155,106	36.4
Renovation	1,998,476	4 8
Other Direct Costs[2]	4,246,761	10.2
Indirect Costs	5,828,887	14.0
Total	$41,634,908	100.0

[1] Includes Consultants, Lecturers, Technicians and Students
[2] Includes Staff Benefits

I. Program Officers

Paul Brown, *Program Manager, 1974*
Current Position: Associate Director, Resource Center for Science and Engineering, Atlanta University, Atlanta, Georgia

Joseph Danek, *Program Manager, 1976*
Current Position: Program Manager, Experimental Programs, Intergovernmental Science and Public Technology, NSF

Arthur Diaz, *Program Manager, 1974-1975*
Current Position: Researcher, IBM Corporation, San Jose, California

Frank Dukepoo, *Program Manager, 1977-1978*
Current Position: Department of Biology, Northern Arizona University, Flagstaff, Arizona

Gerald Edwards, *Associate Program Director, 1972-1973*
Current Position: Program Manager, Division of International Programs, NSF

Lewis Gist, *Program Manager, 1973-1975*
Current Position: Division Director, Division of Scientific Personnel Improvement, NSF

Robert Harvey, *Program Manager, 1978-1979*
Current Position: Vice President, Knoxville College, Knoxville, Tennessee

Reinhold Korgen, *Program Manager, 1973-1974*
Deceased

Shirley McBay, *Program Manager/Director, 1975-1980*
Current Position: Dean for Student Affairs, Massachusetts Institute of Technology, Cambridge, Massachusetts

Arlene Maclin, *Program Manager, 1980*
Current Position: Program Manager, Minority Institutions Science Improvement Program, Department of Education

Shirley Malcom, *Program Manager, 1980*
Current Position: Head, Office of Opportunities in Science, American Association for the Advancement of Science

James Mayo, *Program Director/Section Head, 1972-1976*
Current Position: Director, Electro-Chemical Energy Storage Division, Department of Energy

Koosappa Rajasekhara, *Program Associate, 1979-1980*
Current Position: Director of Research and Grants, Dundalk Community College, Baltimore, Maryland

Paul Rodriguez, *Program Manager, 1978-1979*
Current Position: Director, Allied Health and Life Sciences, University of Texas, San Antonio, Texas

Theodore Reid, *Program Manager, 1976*
Current Position: Program Manager, Faculty Oriented Programs, Division of Scientific Personnel Improvement, NSF

Ciria Sanchez-Baca, *Program Manager, 1974-1976*
Current Position: Science Education Specialist, Office of Bi-lingual Education and Minority Language Affairs, Department of Education

Orville Scott, *Program Associate, 1972-1973*
Current Position: Southwest Resource Center for Science and Engineering, University of New Mexico, Albuquerque, New Mexico

Argelia Velez-Rodriguez, *Program Manager/Program Director, 1979-1980*
Current Position: Program Director, Minority Institutions Science Improvement Program, Department of Education

Robert Watson, *Associate Program Director, 1972-1973*
Current Position: Deputy Division Director, Division of Science Education Development and Research, NSF

J. Senior Staff

Program Director, MISIP

James Mayo, 1972-1976
Shirley McBay, 1976-1980
Argelia Velez-Rodriguez, 1980

Division Director, Higher Education in Science

Alfred Borg (Acting), 1972-1973
Francis O'Brien, 1973-1975
Jerome Daen, 1975-1976

Division Director, Science Education Resources Improvement

Walter Gillespie, 1976-1978
Terence Porter (Acting), 1978-1979
Marjorie Gardner, 1979-1980

Assistant Director for Science Education

Keith Kelson (Acting), 1972-1973
Lowell Paige, 1973-1975
Harvey Averch, 1975-1977
James Rutherford, 1977-1980