

IV. SERVICE TO THE CITY, THE REGION, AND THE STATE

A. Introduction

Newark College of Engineering is situated at the heart of one of the greatest industrial and societal complexes in the world. Today, therefore, the College finds itself faced with two major service responsibilities: one to government, commerce and industry; the other to the individual citizens of the region, particularly in regard to the amelioration of poverty and urban decay. New Jersey, the nation's most urbanized state, has a social and economic system which depends heavily upon the proper functioning of technologically based sub-systems of transportation, communications, electric power, and so forth. In health, safety, welfare, and education, vital services are delivered by men and women with various technical skills. Many industries and agencies of government seek advice from NCE's faculty and hire its graduates. The College's campus is located in Newark's congested downtown area, near one of the most blighted sections in the U.S. As a publicly supported institution built on tax-free land, much of it created by urban renewal, and surrounded by the schools and dwellings of Newark's poor, NCE cannot but see "service" written large at every turn.

Persons active in government and the community are well aware that NCE has an important service role to perform. Their opinions were voiced in a survey prepared in connection with this case study. Most expressed a strong hope that the College would make a major contribution in meeting the challenges of today's society. They cited housing, pollution, public safety, mass transit, traffic control, and related subjects as being legitimate areas for NCE's concern. Their comments focused on the city of Newark, but the region and whole state were included in the catalog of ills that needed treatment. A sense of crisis pervaded most answers, but also a faith that a reputable engineering college, evolving into a technological university, could help to provide a broad range of services and

find solutions to these and other problems.

The expectations of those surveyed need to be weighed against the College's resources and limitations. Specific programs of service must flow naturally from the traditions and procedures of the College. Such programs must neither transcend nor dominate its fundamental educational mission. The number and kinds of programs will be limited, clearly enough, by available funds and the attitudes and skills current among faculty and administration. College personnel who perceive disparities between the College's performance and society's needs will raise with their colleagues the possibility of launching new service programs when they are feasible. The institution cannot afford to pass up opportunities to forge stronger links with the public, locally and throughout New Jersey.

What kinds of services does NCE perform? How did they originate? What needs do they meet? An examination of some current programs may provide an idea of the opportunities that exist, the achievements that have been registered, and the limitations that affect the College's service role.

B. Service to the Region and the State

1. A Resource for Industry

An important aspect of the College's service function is its position as a "resource" for industry in the region, the state, and even nationally. The campus is the scene of several dozen conferences annually in such diverse programs as sales engineering, executive development, mathematics for engineers, fire protection technology, coatings technology, and others, most of which are offered by NCE's Division of Continuing Engineering Studies. Faculty members frequently testify as expert witnesses in contested cases and consult as advisors to business and industry. Through its Placement Office the College provides industry with data on engineering and scientific manpower needs and wage and salary trends.

Such data are especially useful to small firms that normally are out of touch with the national professional societies. The Placement Office has also helped conduct training programs for corporate recruiters, manpower planners, and line supervisors. Business and industry also have access to the College's library of 79,000 volumes.

The Division of Continuing Engineering Studies currently enrolls about 700 persons in evening workshops and classes. It brings specialists from business and industry to NCE to transmit to persons working at various levels of engineering the knowledge and skills they have acquired through experience.

There is also the prospect of granting undergraduate credit, under other auspices within the College, for corporate-related research in senior project courses. Two problems that will have to be solved are those of responsibility and liability for work done by students and of setting grade standards for student work of a marginal nature. Both problems are similar in nature to those of the public service internships program described on Pages 50 to 51.

Off-campus courses are the subject of increasing discussion at the College as a means of broadening its service role and clientele. They would be unique to NCE's position in New Jersey, but would be similar in nature and purpose to the well-established programs existing at other institutions, particularly in the West. Few off-campus programs presently exist in New Jersey. New audio-visual technologies make possible certain off-campus courses that could be offered by NCE on a provisional or experimental basis.

2. Serving the Profession

The College is the headquarters for the New Jersey Engineers' Committee for Student Guidance, one of the many such state and regional organizations sponsored by the Engineers Joint Council. This volunteer group of practicing engineers was founded in 1950 to give reliable information about the profession to high school

students and student-guidance groups. The office of its Meetings Coordinator receives inquiries and arranges the desired seminars, movie presentations, and visitations. A growing number of such events is being manned by undergraduate student teams. At present three of the Committee's six officers are NCE people. The College provides mailing and duplicating facilities and some secretarial help.

Another service that NCE has performed for almost forty years consists of preparing, proctoring, and grading the Professional Engineering Examinations for the State of New Jersey. A similar service is provided for the Land Surveyor's Examination.

3. The Research Foundation

The Foundation for the Advancement of Graduate Study in Engineering is a major instrumentality through which NCE interacts with business, industry and government. It was originally called the NCE Research Foundation.

At the time the Research Foundation was established, in 1959, there was little money and virtually no grant activity for research at the College. The Foundation was supposed to deal with these matters and such others as patent rights and in-service teacher-training institutes. After a period of initial organization and development, the Foundation was reorganized in the mid-sixties to attract more support from New Jersey's major corporations and to relate its activities more directly to the interests of industry and to the research needs of the College. Industry helped to fund the new approach. A Board of Overseers was recruited from eminent businessmen and scientists to raise funds and to set broad policies.

Pertinent here are the relationships between the Foundation and business, industry, and government in the area of service. For example, a program of College-Industry Seminars is now in its third year. It brings to the campus experts from industry and government to conduct advanced scientific and technical

seminars. From 18 to 24 seminars are held annually. Each is attended by up to 40 persons from industry in addition to faculty and guests. One result has been that many have visited the campus for the first time and have thus become aware of the opportunities it offers.

Another example is the research project worked out jointly between the Foundation and a specific company. In one such approach, the project is funded by the U. S. Department of Commerce under the State Technical Services Act. By this means the Foundation provides technical assistance to small and medium-sized New Jersey industries in such fields as chemicals, metallurgy, electronics, plastics, and machine tools. In the future, the Foundation intends to coordinate its research project approach with the goals of the New Jersey Department of Economic Development so as to maximize the benefits to business in the State.

4. The Center for Urban and Environmental Engineering

On the regional level, an important potential for service exists in the College's Center for Urban and Environmental Engineering. It was founded in 1965 as an offshoot of the Foundation, but languished because of insufficient funds and inadequate means of relating to government and industry. In 1969 the Center was reorganized, and a technical director was appointed. A research staff of thirteen faculty members with diverse experience and skills serves without compensation. With the publication of a brochure, "Crises of Environment: Toward the Solution of Urban Problems," the Center began a campaign to secure industrial and municipal sponsors. Several research projects aimed at various pollution and urban problems were undertaken, but overall results are limited. A conference on "Environment for Inner City Residents" is being organized for next year. It will emphasize that pollution affects all people and will seek to gather information on the problems and experiences of those who attend from Newark and adjacent towns.

The potential for service by the Center has not yet been tested. Some

industries are reluctant to promote plans for pollution controls, and many municipalities, especially the smaller ones, are wary of dispassionate outsiders coming in to study local problems. Means to overcome these roadblocks will have to be devised before the Center can play a valid service role. A step in that direction was the setting up last year of an Advisory Board to offer independent suggestions and criticisms on the Center's work, but, again, little has been accomplished. Some means of coordination may have to be established between the Center's activities and official State enforcement policies.

5. Public Service Internships

NCE offers several programs designed to relate students and faculty to the needs of municipal and county government. The public service internship is one. In 1969-70 the N.J. Department of Community Affairs issued guidelines under which it would sponsor young people in responsible part-time positions in public affairs. At the initiative of the College's Department of Civil and Environmental Engineering, NCE agreed to coordinate its project course in civil engineering with the State's guidelines. It set up student jobs with salaries paid by the State and with planned work experiences that would be meaningful and instructive. Subsequently ten students worked up to fifteen hours per week each in municipal government in Newark. Work-study assignments that were successfully completed included an analysis and design of a vest pocket park system within the "Model Neighborhood" area of Newark, a study of Newark's solid waste disposal system, and an evaluation of the economic feasibility of a proposed extension of the Newark City Subway to outlying areas of the city and county.

Under revised State guidelines, only students from economically disadvantaged families can now apply for the internship program. State allotments have been reduced, but the program at NCE will continue. It will be modified and expanded by the Department of Civil and Environmental Engineering so that all seniors

(about 120 per year) will register for project courses in supervised (although not necessarily paid) situations. Teams of faculty and students will participate in projects in Newark and in other localities. The acceptance, or at the least serious consideration, of the recommendations made by such teams will depend upon the economic and political feasibility of implementing them and the open-mindedness of local officials.

The concept of the public service internship holds exciting possibilities for students and faculty in a number of programs that might evolve as the College develops into a technological university. A graduate program in public administration, for example, could utilize to advantage the unity of practice and theory which internships and project courses promote. The College could also thereby render specific services to agencies of government that might be deficient in engineering and administrative talent.

What is needed is a commitment by the College to maintain these programs even if outside funding should become less easily available. The unresolved questions are: How will the decline in enrollments affect the observance of such a commitment? What mechanisms can be created to implement such programs on a long-term basis?

C. Service to the City

1. 1967, a Turning Point

Prior to the civil disorders in Newark in 1967, the College was not significantly involved in reaching out to the growing numbers of low-income families in Newark, who were gradually forming a majority of the city's population.

By that year about three-quarters of the city's public school enrollment came from the black and Spanish-speaking communities, yet a decreasing number of graduates from the senior high schools was going on to college. The 1967 disorders

prompted concerned members of the faculty and administration to form a committee that included persons from all areas of College life. The committee realized, as did the College faculty generally, that the relationship of the institution to the people of Newark could not continue in the direction it had been moving: declining numbers of Newark residents attending NCE; a very limited number of blacks as students or College employees, and virtually none of Hispanic background; and very few direct or visible returns to the city from the College's presence on High Street. Some College personnel feared verbal and physical attacks, while others felt a heightened sense of commitment and understanding. All agreed that some positive action had to be taken.

2. A Commitment to Service

The President affirmed the College's commitment to community service at the opening meeting of the faculty in the fall of 1967. The Deans of Engineering and of the Graduate Division then issued a statement setting the tone for the above-mentioned committee. It said in part: "NCE has traditionally provided a low-cost education to those who were moving up the socio-economic ladder, but relatively few members of the disadvantaged community surrounding the College had sought an engineering education. Obviously something more than an open door and low tuition is needed." Before the year's end, plans were drafted for a special program to serve disadvantaged students, to begin the following summer. The initial stages of planning and recruitment involved the two deans, several interested students, the staff of the Counseling Center, members of the faculty, a black engineer, high school personnel, and a black minister.

3. The Engineering Opportunity Program

The College's Engineering Opportunity Program (EOP) began in July, 1968, with twenty students, primarily from Newark, most of them black, who had done relatively

well in their inner-city high schools but who had achieved low scores on the standard admissions tests. Their median SAT's in math were 425 and in verbal, 350, compared with NCE's medians for entering freshmen of 620 and 485. The students received summer instruction, orientation and counseling, and were involved in personal and social contacts with the College staff attached to the program. In September they were enrolled as regular freshmen, but carried only about 13 credit hours compared to the normal 18. They continued to receive financial aid for tuition and personal expenses, and special tutoring, counseling, and cultural opportunities. In spite of the experimental nature of the program and the students' weak backgrounds, most of those in the program showed definite signs of accomplishment. Of those who dropped out, most either transferred to liberal arts colleges or entered useful employment.

Those responsible for EOP have learned lessons from it. Improved procedures and recruiting methods have been developed. Each annual EOP group has achieved more scholastically than the preceding one, in part no doubt because of these improvements.

EOP motivated many of the faculty to examine their attitudes toward the potential of black students for entering the engineering profession. At first, many in the College community held skeptical views. Among the faculty there was a fear that NCE's standards might be lowered because EOP students were not as well prepared as the general run of the students being admitted. These attitudes were ameliorated somewhat through contact between the EOP students and the faculty, private discussions with the misinformed, and discussions with faculty members who had EOP students in their classes. Sensing these doubts and animosities, the students created defensive mechanisms to protect themselves. Today there are still pockets of tension and misunderstanding, but they are being managed and worked on; and each succeeding group in the program (which now contains a mixture of whites, orientals, Hispanic, and a black majority) finds that the ground has

been somewhat better prepared for it than for the group that came before. They discover a firmer hand and clearer direction in the program than existed at first. They acknowledge that the faculty is usually fair in work assignments and grading. But they continue to probe the system and to demand full recognition and acceptance. To the extent that the expectations of the students are not completely met, there will continue to be tensions and crises from time to time.

NCE's Engineering Opportunity Program proved to be prophetic in anticipating the thrust of public policy in New Jersey. In July, 1968, the Legislature created the Education Opportunity Fund to provide scholarship assistance to educationally and economically disadvantaged youth who might not otherwise be able to attend college.

As the major public technological institution in New Jersey, NCE will have to expand its enrollment among disadvantaged youth, even as it broadens the range of programs and services it provides to the city and the state. The recently established Bachelor of Technology program is a step in that direction.

The College's image among minority groups in Newark is negative or non-existent, and the fact that the present Mayor of Newark is a graduate of the College has not substantially changed this image. Some feel that if community people will not come in greater numbers to the College, then the College will have to go to the community. One suggestion has been a storefront technology-information center as a means of bringing information about environmental and technical problems in everyday life and of stimulating interest in the College. Another is that an intensive recruiting program be initiated for black and Hispanic staff members. Whatever the specific method employed, it may have to embody an innovative approach if the College is to embark on new paths of service in this area.

4. Further Service to Minorities

The generally favorable results of the EOP program have encouraged the College

to launch new programs of service to minority groups.

One is the Technology Opportunity Program (TOP), begun in 1970 as a bridge-year leading into the evening Division of Technology certificate programs. At present about twenty men are enrolled in remedial courses in science and mathematics. They also receive tutoring, counseling, and presentations of career alternatives. Half of the group does not have high school diplomas and is working toward the equivalency certificate.

Another program is the Construction Management Series. It offers to minority group subcontractors short courses in business administration, essentials of forming a construction business, accounting, labor relations, contracts, and budgets. Essential supportive services are provided through informal counseling and career discussions. Sessions are led by people from business and industry, among whom are black architects, construction contractors, and counseling personnel.

Inspired by the need to relate to the crisis in Newark, several NCE fraternities, among whom a tradition of service has flourished, decided to assist Newark high school students with their studies. Eta Kappa Nu, for example, voluntarily tutored college-motivated youth at adjacent Central High School. The number of high school students served totals about four dozen, and reports indicate useful results from the viewpoints of academic progress and social interaction. This need is also recognized by the NCE student chapter of the Association for Computing Machines. Jointly with the Student Senate it has sponsored field trips for seventh graders at the Warren Street Elementary School. The children visited an IBM plant and saw films, demonstrations, and the plant's facilities.

5. Service to the Local Community

The College conducts several programs of direct impact on the local community. Its officials understand that expanded efforts are needed to attract Hispanic and black students to the College and the profession. These young people are normally

uninterested in careers in engineering and science. Inadequate scholastic preparation often precludes their success at NCE. In light of these factors, the President, the Dean of Engineering, and the Dean of the Graduate Division proposed that a pilot High School Program be started as a prelude to an application for a National Science Foundation Grant. Under this program twelve students from Central and nearby Arts High Schools met one afternoon a week per semester with NCE faculty members to work on air and water pollution and other studies. The outcome of one such study - a tot lot - will actually be built on Newark's West Side with federal funds assisting.

After the pilot project had shown that the program was feasible, the College applied for and was awarded an NSF grant to provide a summer program in urban engineering. As a consequence, thirty high school juniors from schools in Newark and the surrounding area participated during the summer of 1971 in a six-week program that combined a rationale for approaching urban problems with review work in mathematics, physics, and chemistry. Its purposes were to furnish students with an understanding of how scientists and engineers tackle problems and to show that professional careers may lie within the range of student interest and capability. The College is now seeking funds to continue the program in following summers.

Another effort, sponsored by NCE's Research Foundation, is the Central High School Program. This has enabled students at the neighboring high school to work with NCE faculty on selected research projects. Between 15 and 30 students a year have participated. Getting them together with their college faculty advisors is sometimes a problem. High school authorities fail to release students at scheduled times or else send them when faculty members are unavailable -- and the match between individual students and faculty is not always felicitous.

It may also be necessary for NCE to stimulate or support efforts to create in the very young, in kindergarten and preschool, an awareness of the importance

of science and technology in their lives. Perhaps a greater interest in these fields will thereby develop among children and youths from the so-called disadvantaged groups. This mission cannot be the College's alone, however; it will require a coordinated educational effort by public, professional, and private agencies, particularly by elementary and high school principals and teachers.

D. An Ongoing Commitment

The sum of the services discussed above is still short of the total which some faculty and administrators at the College feel is needed to take full advantage of the resources of the College in coping with the immense educational and social needs of the 1970's. But considering the rather short span of years in which these services have been developed, they represent a meaningful involvement of time, ideas, money, and energy, and, even more significantly, in commitment, that is having a profound impact upon the College and its constituency. No aspect of College activity is immune from a consideration of the service role and its effectiveness. A consciousness of the need for service pervades many levels within the College and enters into all discussions of the College's future.

Newark College of Engineering, like numerous institutions of American life, is being tested as never before. Its location in the City of Newark adds a special urgency to this testing process. Its manifold interfaces with the vast industrial-population complex in the North Jersey-New York-Connecticut region links its future to the economic and social development of this vitally important area. To the extent that NCE continues to provide an expanding and increasingly fruitful range of services to the people of the city, the region, and the state, it will survive and grow as an institution worthy of public respect and support.