

DOCUMENT RESUME

ED 203 780

HE 014 045

AUTHOR McLaughlin, W. Barry  
TITLE Career Access Models: The Philadelphia Minorities in Engineering Consortium.

PUB. DATE [81]  
NOTE 9p.

EDRS PRICE MF01/PC01 Plus Postage.  
DESCRIPTORS \*Articulation (Education); College Preparation; \*College School Cooperation; College Students; Communication Skills; Consortia; \*Engineering; Enrichment Activities; Field Experience Programs; Government School Relationship; Higher Education; High School Students; Industry; Internship Programs; Junior High School Students; Mathematics Instruction; \*Minority Groups; Program Development; \*School Business Relationship; School Community Relationship; Science Instruction; \*Secondary Education; Student Experience; Student Motivation

IDENTIFIERS \*Philadelphia Regional Intro Minorities Engineering

ABSTRACT

The Philadelphia Regional Introduction for Minorities to Engineering (PRIME) program, a nonprofit consortium of colleges, public schools, business/industry, government, and community agencies, is described. The pre-engineering program begins in the seventh grade and continues to track students through their college years. At the middle schools, information, motivation, and enrichment activities are stressed, while at the senior high schools, skill development in mathematics, science, and communication are emphasized. To bridge the gap between the theory of the classroom and work world, each PRIME school is adopted by a business or government office that provides field trips, speakers, role models, audiovisual presentations, and demonstrations. Generally, each designated school has a PRIME team composed of a science, mathematics, and English teacher. Classroom visits by an industry representative, preferably a working engineer, introduce students to the work of the company, to engineering in general, or to a particular engineering specialty. The representative may also confer with PRIME teachers regarding engineering concepts, to assist in judging student engineering projects, or to plan the two field trips. Each summer a select group of post-eighth graders spends a month on one of the four university campuses, rotating each year. Students receive a sequential set of skill building activities that involve both hands-on and simulated projects. Lessons in computer science begin in the eighth grade. At the end of the 12th grade, students who elect to attend engineering school are placed in industrial internships or are enrolled in a prefreshman collegiate program. Information on program enrollment and organization is included. (SW)

\*\*\*\*\*  
\* Reproductions supplied by EDRS are the best that can be made \*  
\* from the original document. \*  
\*\*\*\*\*

Barry  
McLaughlin

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION  
NATIONAL INSTITUTE OF EDUCATION  
EDUCATIONAL RESOURCES INFORMATION  
CENTER (ERIC)

- This document has been reproduced as received from the person or organization originating it.
- Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Career Access Models: The Philadelphia  
Minorities in Engineering Consortium

by W. Barry McLaughlin

Philadelphia has long been known as a center for educational innovation. In the mid-sixties, Philadelphia set the pace nationally for such experimental projects as "Schools Without Walls", the Parkway Program, and the "School for All Ages". Yet, no program has had as much impact on the quality of science and mathematics instruction, or, on the partners involved than has the PRIME program. PRIME stands for Philadelphia Regional Introduction for Minorities to Engineering and is a non-profit consortium of educators and teachers, business and university faculties, parent, student and civic organizations working in partnership to increase the number of minorities in the engineering professions.

Founded in 1973, PRIME has evolved into a network of 33 business firms and industries, 7 governmental agencies, 7 community organizations, 7 colleges/universities, and 2 public school districts. Over 2600 students, in grades 7 through 12, are studying pre-engineering curricula in 36 participating junior and senior high schools in the Philadelphia and Camden areas. To date, more than 400 of its 620 graduates are matriculating engineering students in colleges and universities throughout the United States. According to the deans of several engineering schools, PRIME graduates are much sought after candidates and are known to be talented, highly motivated students. Since PRIME may have design and program elements that may be replicated by other urban communities planning similar ventures, a close examination of its organizational structure and its programs should be helpful.

ED203780

HS 014045

## PRIME Organization

PRIME is first of all an organization of people with strong commitments for social justice. These people are also associated with organizations whose missions match well with their commitments. Many industry members, for example, have national as well as international reputations, and many of these companies have placed great priority on delegating authority to their representatives on the PRIME Board. Equally well represented are a number of high ranking people from the educational community. These include several deans of engineering colleges, four directors of science and mathematics education in public schools, and a vice-president of the Franklin Institute. The successful cooperation of such a diverse body is motivated by both altruism and economic self-interest. PRIME's success has, in fact, depended upon it getting "all the shareholders together" such that no single interest dominates. The Board of Directors, therefore, is composed of the total membership, all of which are institutions. Standing committees, such as the Student and Community Involvement Committee, give scope and structure to consortia components which may be less active elsewhere. Others, notably the Program Planning & Evaluation component, are designed specifically for cooperative efforts and fuses the talents of education and industry. Leadership of this committee alternates annually between the representatives of the two fields.

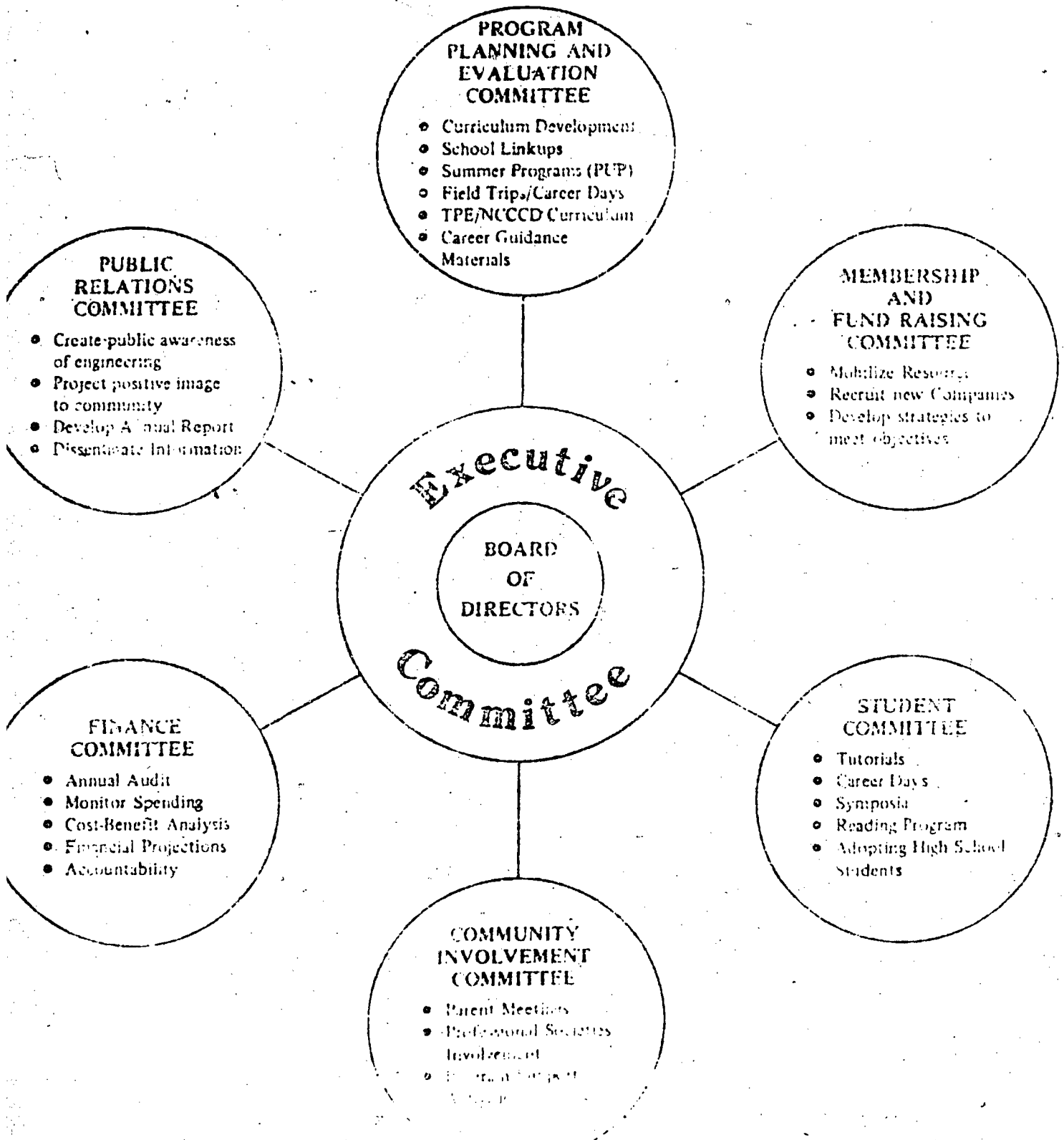
The officers who sit on the PRIME Board of Directors are elected annually with all but the Treasurer eligible to serve two consecutive terms. Such limitations reflect PRIME's concern for sharing obligations and particularly for fiscal responsibility. On the other hand, by serving on the Finance Committee, the out-going treasurer helps insure the continuity of sound fiscal policy and practice. PRIME has unified all of the elements

needed to deal with science/math education effectively---the schools, universities, industry, government, and the community. The founder, Wayne L. Owens, noted that a sign of PRIME's stability is that it progresses despite changes in leadership, including his own departure more than four years ago, and that it is not identified with any one person or company or university. "It's everybody's program. Most of all, it's the student's program", states Owens.

### PRIME in the Schools

The PRIME program begins at the 7th grade level and continues to track (or roster) students through their entire junior, senior, and college years. By starting at the 7th grade level, PRIME departs appreciably from the pattern followed by most pre-college programs. This early start allows for proper screening, opportunity for developing lasting interest for careers in engineering, and time for appropriate academic preparation. Chiefly by design, the program begins with a large pool of students and at the end retains only those whose interests and abilities make them most likely to succeed in engineering. Students are identified in collaboration with school counselors, science and mathematics teachers. These students, after careful parental consultation, are then enrolled in a PRIME class that is rostered for a minimum of two periods per week. At the middle schools, information, motivation, and enrichment activities are stressed. In the senior high schools, PRIME emphasizes skill enhancement in mathematics, science, and communications. To bridge the gap between the theory of the classroom and work world, each PRIME school is "adopted" by a business or government link-up that provides field trips, speakers, role models, audio-visual presentations and demonstrations.

STRUCTURE



Teachers in the PRIME program volunteer to participate. As a general rule, each designated school has a PRIME team consisting of a science, mathematics, and English teacher. From the pool of volunteers at each participating school, the building principal and a representative from the school district's office of mathematics or science will make the final determination. The teachers who are selected are responsible for administering the PRIME program in their respective classrooms, keeping records of the PRIME student's progress, and handling funds allocated for the purchase of consumable materials which may be used for projects and/or PRIME instruction. Curriculum materials at both junior and senior high schools are modularized to supplement existing textbook materials. In some senior high school electives, PRIME underwrites the cost of specialized materials. As participants in the program, teachers are encouraged to participate in a number of in-service and summer workshops in science education which are sponsored by PRIME in collaboration with the engineering colleges and industry. Senior high school mathematics and science teachers, for example, were placed in industrial internships working side-by-side with a practicing engineer to sensitize these teachers to what engineers do and to enable them to better understand the work world of the engineer.

Key to the success of the academic year program is the company-school link-up. Thus, each member company serves as an informational and motivational resource for an assigned school, usually the school closest to the company. An industry representative, preferably a working engineer, visits the PRIME class for one period per month, using the time to introduce students to the work of the company, to engineering in general, or to a particular engineering specialty. These industry representatives may also use

their visits to confer with PRIME teachers regarding engineering concepts, to assist in judging student engineering projects, or to plan the two field trips which each organization has agreed to sponsor. Field trips have become an extremely valuable contribution because they provide motivation through on-site exposure of students to engineers at work, while permitting the students to learn from direct observations how processes operate and products are made. In addition, because students write reports as follow-up activities, these visits provide opportunities for developing communication skills.

As important as these academic year programs are, PRIME's summer activities provide opportunities for the most capable of the academic year students to reinforce skills and to sustain motivation. In cooperation with five of the universities in the Philadelphia area---universities with engineering curricula, PRIME operates the PRIME Universities Program, or PUP. Each summer, a select group of post-8th graders spend a month on the campus of one of the universities with college professors, and for each of four consecutive summers, the students will rotate to a new campus, as a fresh crop of post-8th graders are admitted. "PUP" students receive a sequential set of skill building activities which involve both "hands-on" and simulated projects. Lessons in computer science begin in the 8th grade and progressively increase in sophistication and difficulty as the student passes through the summer sequence. Mathematics and science concepts also are taught at progressively higher levels of instruction, ending in a final summer of applications of the concepts learned in the previous three summers. At the end of the 12th grade, students who elect to go on to engineering schools are placed into industrial internships or are enrolled in a pre-freshman collegiate program.

Because of the importance of reading skills and the as yet unexplained "reading dip" which occurs at about the sixth grade level, PRIME offers an accelerated reading laboratory for post-7th grade students. Designed for an eight week period, students selected spend the first two weeks in clinics under the guidance of a Reading Specialist. For each of the remaining six weeks, students pledge to read one book per week. Progress is monitored weekly at neighborhood libraries. Students who complete the entire sequence are provided certificates and a book. This program has been highly successful as a low-cost innovative way of sustaining student interest during the summer months.

#### PRIME's Progress in Numbers

In 1977, PRIME's first graduating class numbered 81 students with 64 students being accepted to colleges of engineering or engineering technology. By 1979, of the 150 PRIME students who graduated, 90 entered engineering colleges and another 16 selected engineering technology programs. In addition to the continuing increase in the number of PRIME graduates going into colleges of engineering there has also been a significant increase in the number of minority students attending member institutions of higher education. Indeed, these figures have increased from 239 minority students enrolled in area engineering schools in 1974 to well over 640 students enrolled in 1979. These numbers are impressive but they are only one aspect of program success. Perhaps an even greater indicator of success can be measured today by the number of programs modelled after PRIME. There are now seven such programs, in various stages of development, that are modelled after the PRIME program. These programs range from the Harrisburg/Pittsburgh programs which are still in their formative stages to the Wilmington



(FAME) or the Boston (MASS-PEP) programs which are operating fully. PRIME's impact is not limited to external systems. Today, recognizing the need to better prepare youth for careers in engineering and the sciences, the School District of Philadelphia has established a separate magnet school for engineering. PRIME serves as a member of that school's Advisory Council.

PRIME's success is made possible by adhering to three major guidelines. First, any approach to widening career opportunities for minorities must involve all sectors of the community. Not only has PRIME mobilized all elements of the community to effectively deal with non-traditional career paths, but, it spreads the cost for these services among many companies, universities and the school system. No single company or university acting in isolation can provide the range of services made possible through the consortium arrangement. Secondly, any regional approach to what is essentially an investment in human potential must reach the student at the earliest possible grade level, and, must continue to monitor interested students throughout their entire educational sequence. And finally, any approach must have an impact on not only what the student is taught but how he is taught. PRIME operates on all three fronts in a comprehensive yet focused manner.

Still, like all programs that reflect diverse and, therefore, vested interests, PRIME has its ups and downs. By design, the program is a long-term, manpower investment program. Business which largely supports the programs at times expects instant recruits. The school districts do not always perceive the necessity for substantive change and, like most urban centers, have complex problems involving teacher preparation, unionization, financing and scheduling. Finally, limited funds have precluded a staffing pattern that would enable PRIME to respond to the increasing demands of suburban and parochial school systems. In spite of these constraints or because of them, PRIME has grown and sustained momentum. It is a minority program that works.