

**Report On**

**Issues, Implications and Recommendations**  
**Related to Retention**  
**of**  
**Undergraduate Minority Students:**  
**Science and Engineering Fields**

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# CONTENTS

Tables.....	II
Charts.....	III
Foreword.....	IV
Executive Summary.....	1
Introduction.....	3
Issues Related To Retention .....	5
Current Representation and Demographic Trends.....	5
National.....	5
Local.....	11
Educational Status (The degree to which they enter college.)....	12
National.....	12
Local.....	20
Retention (How well are they doing?).....	28
National.....	28
Local.....	34
Degree Attainment (What are they studying?).....	36
National.....	36
Occupational Outlook (Occupational Forecast vs. Minority Degrees).....	50
Implications and Recommendations.....	54
Educational Pipeline.....	54
Recommendations for Future Directions of Local Colleges.....	58
References.....	63
Appendices.....	67

## TABLES

Number	Name	Page
1.	Black High School-Age Population, High School Enrollment, and High School Graduates, 1967, 1970, 1976, 1982, United States.....	13
2.	College Participation of Blacks and Whites, 1967, 1970, 1976, 1982, United States.....	15
3.	Population High School Graduates, and College Enrollment of 18 to 24 Year Olds, by Racial/Ethnic Group: 1970, 1975, and 1980.....	18
4.	The Two Most Popular Colleges for the Graduates of Each Boston Public High School - Fall, 1983.....	22
5.	Cohort Retention Rates, 1983-1985.....	35
6.	Cohort Retention Rates for Racial Groups, 1983-1985.....	37
7.	Cohort Retention Rates with Financial Aid and Without Financial Aid for Racial Groups, 1984-1985.....	38
8.	New Statistics for Minority Engineering Graduates.....	42
9.	Scholastic Aptitude Test (SAT) Scores for College Bound Seniors by Race and Ethnicity and Year.....	45
10.	Percent of First and Second Generation 1981 College Freshmen Choosing Quantitative College Majors by Race and Ethnicity.....	47
11.	Where the Jobs Will Be: Largest Number of New Jobs, Most Rapidly Growing Occupations.....	52

## CHARTS

Number	Page
1. Percent Minorities in the U. S. Population, 1984, Percent of U. S. Birth by Racial/Ethnic Group in 1980 Births Per 1000 Women Age 14-44 in 1980.....	7
2. Percent of U. S. Births by Racial/Ethnic Group.....	8
3. 18-24 Year Olds and 25-34 Year Olds in the U. S. Population, 1950-2010.....	10
4. Boston Public School Student Loss by Percentage, 1984-1985.....	26
5. Enrollment and Dropout Percentages by Race, 1984-85.....	27
6. Percent of Bachelor's Degrees Awarded to Minorities.....	43
7. Percent of Ph.D. Degrees Earned by Minorities, 1985.....	48
8. Percent of Engineering Bachelor's Degrees Earned by Minorities.....	49
9a. Scientific/Mathematical Pool, Grades 10 to 12.....	55
9b. Scientific/Mathematical Pool, College to B.A./B.S.....	56
9c. Scientific/Mathematical Pool, M.S. to Ph.D.....	57

## FOREWORD

The author of this report would like to thank the Bank of New England for its interest and financial support for the development of this report. Special thanks are extended to Bernard Fulp, Timothy Kilduff, and J. Lindsay Shearer. Without the concern and commitment of such financial institutions, our efforts to bring more local minority youngsters with appropriate educational skills into the mainstream of this society based on technology and information will not be realized. There were numerous individuals who provided valuable information including reports and statistics regarding national and local data on the educational status of minorities in this nation. I am especially indebted to Betty Vetter, Commission on Professionals in Science and Technology; Michael Nettles, Educational Testing Services; Sue Berryman, National Center on Teacher Education and Employment, Columbia University; Richard King, New England Board of Higher Education; Frank Williams, College Board; Bard Hamlin, Fenway Retention Consortium, Simmons College; Yohel Camayd-Freixas, Office of Research and Development, Boston Public Schools; Robert Byers, Massachusetts Institute of Technology; Josie Bartie, Massachusetts Institute of Technology; and Alan Fechter, Office of Scientific and Engineering Personnel.

Finally, deep appreciation is acknowledged to Mildred C. Williams who provided the assistance in countless ways, including editorial and secretarial support. Without this support, this project could not have been completed.

## **EXECUTIVE SUMMARY**

Members of our nation's racial minorities are severely underrepresented in higher education--particularly in science and engineering fields. This presents a growing problem as computer technology becomes increasingly prevalent in all walks of life, and as our economy shifts from manufacturing to service industries. We are seeing fewer employment opportunities for unskilled laborers and a new class of white collar jobs. Unfortunately, the new jobs require precisely those skills that racial minorities in this country are least likely to possess.

Clearly, it would be advantageous for our economy, and society as a whole, to have a greater number of minorities making meaningful contributions through skilled jobs. For this to happen, however, will require some significant changes in current educational patterns. Studies show us that black college enrollment has declined since 1976, with nearly 40,000 fewer blacks attending college in 1984 than 1976. Drop-out rates for minorities--both at the high school and college levels--are far higher than for white students, and those minority students who do receive a college education are significantly underrepresented in engineering and science.

Two major causes have been identified for the very low numbers of minority students pursuing studies in science and engineering:

- Those students who go on to earn degrees in science, mathematics, or engineering begin their "tracking" as early as elementary school. Too few minority students get on this track at that critical early state.
- Many of the minority students who enter college drop out because they find themselves ill-prepared for the rigorous academic programs that quantitative fields require, and/or feel alienated from campus life.

A 1986 study showed that while 70 percent of all engineering students complete their education, the retention rate is only 35 percent for blacks and 40 percent for Hispanics. Those blacks and Hispanics who do complete their undergraduate education are also far less likely to pursue graduate study, especially in science and engineering. Blacks, who represent almost 12 percent of the population, earn only 2 percent of the science and engineering doctorates awarded. Hispanics, who represent approximately 7 percent, earn only 1.6 percent.

These inequities seem to result from the combined effect of inadequate preparation in high school, lack of financial aid, and the inability of many minority students to fit into the mainstream of campus life at predominantly white institutions.

To alleviate these problems, parents, community leaders, and the public schools must work with minority students to increase interest in science and mathematics early in their educational careers, to improve public school curricula so that students are better prepared to complete a college education, and to introduce minority students to role models who have pursued careers in high-technology fields.

Outreach programs which begin in elementary or high school, but continue through college, will be necessary to address these issues. In addition, special efforts by colleges and universities to increase minority retention should include special counseling programs, adequate financial aid resources, and a campus-wide commitment to making minority students included in all facets of college life.

Improving the education and economic opportunity for minorities is a major national concern. Minority students represent an ever-increasing proportion of our population, with racial minorities constituting the majority of school enrollments in 23 of 25 of the nation's largest cities. In Boston, for example, blacks alone now make up 47 percent of public school students. For these students to go on to make meaningful societal contributions in the coming decades requires improved participation in higher education. This paper examines the issues involved in making this a reality.

## Introduction

In the past five years numerous reports have been developed on the problems facing this nation regarding the education of our youth on the precollege and college levels. Many of these documents focus on the conditions of minorities, which is the concern of this report. More specifically, this report focuses on the retention of minority students as undergraduates. While most educators are quite aware of the alarming and growing conditions of minorities in education, an overwhelming number of our civic leaders and citizens appear unaware or refuse to accept the fact that too many minority youngsters in this country, including Boston, are falling through the cracks of our educational system. As social scientist Linda Darling-Hammond states in her report, Equality of Excellence,

"...of paramount importance is the content and substance of education received by black (minority) students. Although finances and broad program supports cannot be ignored, in the final analysis, it is the interaction that goes on between students and teachers in individual schools and classrooms that define educational quality and equality. Subtle and not-so-subtle differences in curriculum track, in course content and teaching methods, in the qualifications and commitments of school personnel, and in the opportunities for innovation and enrichment at the school site ultimately determine which students will receive a true education and which will merely be trained to assume a permanent role in the nation's underclass."

This report, which provides a brief review of the educational condition of minority students, attempts to provide some salient facts that local community leaders and private citizens can use as a tool for social action to bring about equality of educational opportunities for minorities in the Boston area. While it is important for minority students to attain a bachelor's degree of any kind, this report pays special attention to the need for minority students to enter scientific and engineering fields. This country will need considerably more scientific and technically trained professionals by the 21st century, and it is key for minorities to make up a substantial proportion of future workforces. Therefore, it is necessary to examine the issue of choosing technical fields. Since technical professions are of utmost value to the job market now, and will be through the next century, upward mobility for minorities depends a great deal on their ability to pursue the quantitatively based science fields.



This report addresses four key issues pertaining to the educational status of minority young people: (1) current representation and demographic trends, (2) educational status (the numbers entering college), (3) academic performance, and (4) degree attainment (What are they studying?). Each of the above issues is examined on both the national and the local (Boston) levels. A fifth section presents a few comments on the occupational outlook in this nation, which can be related to the minority educational status now and in the future. The final section highlights the major points and implications of the previous sections. Recommendations are proposed for policy and research consideration.

One limitation in preparing this report was the absence of a reliable data base on minority students coming from the local school system of Boston. For example, there appears to be no central agency that can provide to the public clear and precise aggregate data on what happens to minority students who graduate from the Boston Public Schools and enter local colleges and universities. The establishment of such an agency would be critical to future studies. While this report is not all-inclusive, it attempts to provide some basis for formulating more effective discussions, further inquiries, projects, and policies to enhance the progress of minority youngsters in the present and future educational pipeline. This is especially needed for the Boston metropolitan minority students.

# **I. ISSUES RELATED TO RETENTION**

## **A. Current Representation and Demographic Trends**

### **1. National**

According to Betty Vetter of the Commission on Professionals in Science and Technology (CPST), the nature of the melting pot that makes up our nation is changing. In 1984, the population of the United States was 75 percent white, 12 percent black, 7 percent Hispanic, 2 percent Asian, 1 percent American Indian, and 3 percent foreign citizens. Our elementary school population however, was less white and more black, Hispanic, and Asian. Minorities now constitute the majority of school enrollments in 23 of 25 of the nation's largest cities. Hispanics will experience the fastest population growth over the next decade, principally because of immigration. Black population growth will be the second fastest.

Just as important is the birth rate in the United States. Among the more than 3.5 million babies born in 1980, 72 percent were white, 15.3 percent were black, 8.5 percent were Hispanic, 2.3 percent were Asian, and less than one percent were American Indian. These were the children who started first grade in September 1986. Birth rates vary significantly within populations. Births per 1,000 women aged 14-44 in 1980 was 14.2 for white, 26.5 for black women, 23.5 for Hispanic women and 13 for Asian women.

Immigration increases minority proportions of the population, particularly the Hispanic proportion. Projections for 1990 show that birth rates will drop to 64.5 percent of 1980 levels for whites, 22 percent for black women, 10.5 percent for Hispanic women, 2 percent for Asian women, and 1 percent for American Indian women. Projection to the year 2000 shows that only 55.9 percent of the babies born to U. S. mothers will be white, while 28.8 percent will be black, 12.6 percent Hispanic, 1.6 percent Asian and 1.1 percent American Indian. (These proportions do not take into account both legal and illegal immigration. If immigration was taken into account it is possible that Hispanic births would exceed black births by 1990.)

Clearly, when one views these trends, it becomes increasingly obvious that America must increase educational opportunities and encouragement for the growing number of our minority youngsters in our population. If we follow the patterns of the past that leave out large segments of minorities in higher education--particularly in technical higher education--we lose a significant number of the potential minority talent (Charts 1 and 2).

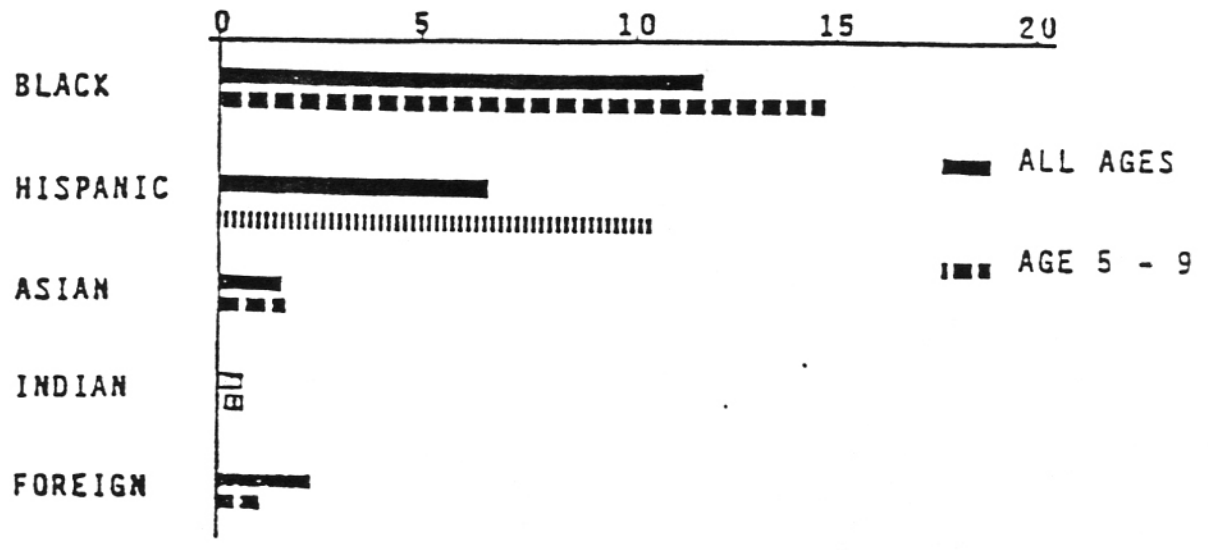
Blacks, historically, in the United States have always placed a high premium on educational attainment. But, this history notwithstanding, current efforts to bring increasingly larger numbers of minorities into the mainstreams of the work world are hampered, in part, by inordinately high rates of functional illiteracy among blacks and some other minorities. The problem has reached clearly unacceptable levels for this society. The problem can no longer be dismissed as the responsibility of the school systems. Parents also have a responsibility to cooperate with teachers, principals and school supervisors to assure that minorities master the competencies that are vital for normal daily functioning in a technological world of work.

Hence, there is a compelling urgency for a return to those fundamental, traditional values of cooperation and reciprocity; belief in the collective will, respect for self and authority of parents and elders: a commitment to achieve even when confronted with what appears to be insurmountable adversities; educational attainment; self-determination; self-discipline, and pride in oneself, in family, and in community. Re-socialization of these traditional values requires action by the most basic social institutions within black society: the family, religious organizations, schools, social service agencies, and businesses. Resocialization also demands competent leadership and commitment among those identified as experts and professionals.

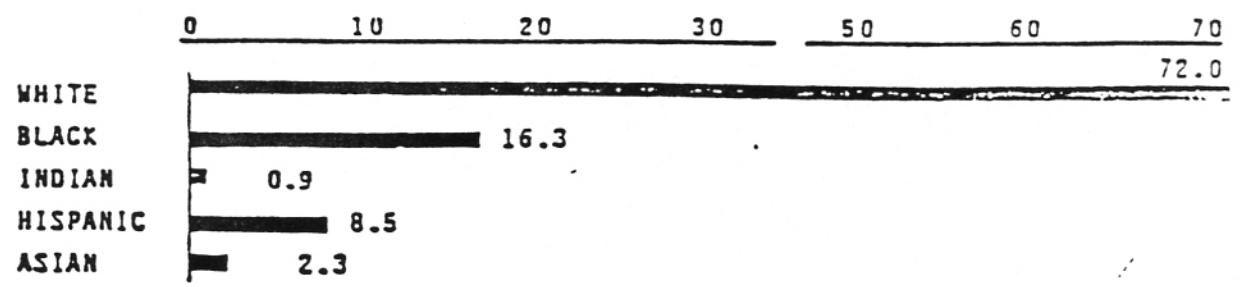
The United States, with 234 million people, trains about 73,000 engineers per year. Japan, with half our population trains about 70,000, and the Soviet Union, with 275 million people, trains about 450,000. These statistics indicate that there is a lot more we could be doing to educate a higher proportion of our population for work in technical fields. The key is to bring about new approaches and attitudes toward how we train scientists and engineers, and,

Chart 1

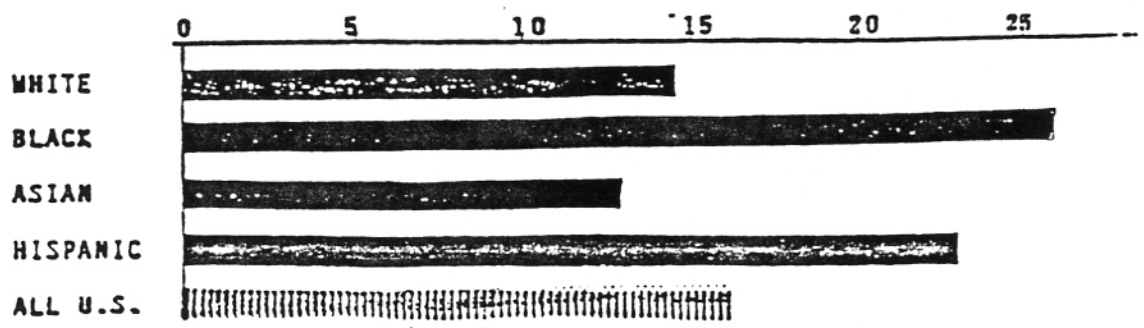
PERCENT MINORITIES IN THE U.S. POPULATION, 1984



PERCENT OF U.S. BIRTHS BY RACIAL/ETHNIC GROUP  
1980

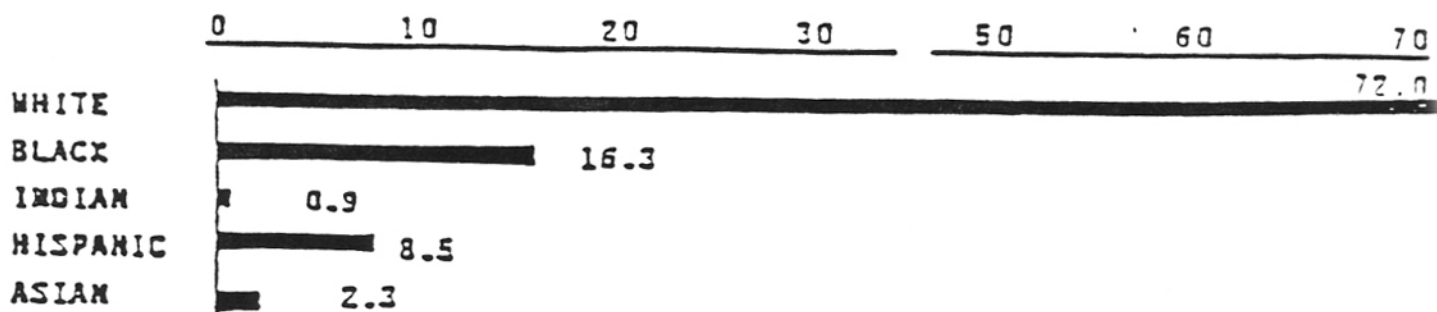


BIRTHS PER 1000 WOMEN AGE 14-44 IN 1980

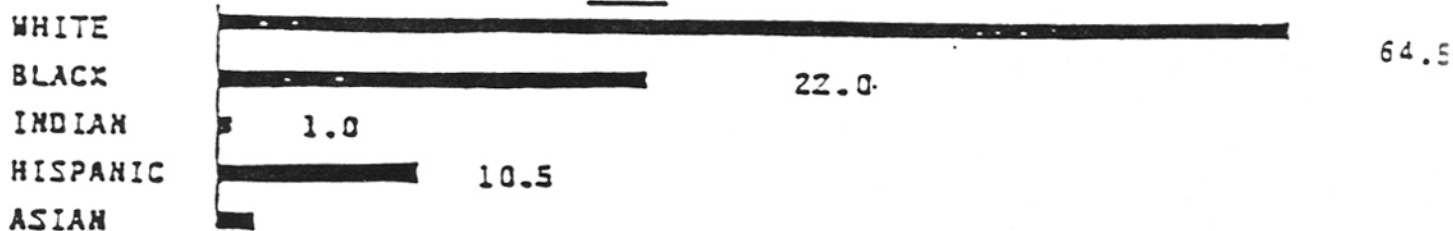


Source: Commission on Professionals in Science and Technology  
October, 1986.

PERCENT OF U.S. BIRTHS BY RACIAL/ETHNIC GROUP  
1980



1990



2000

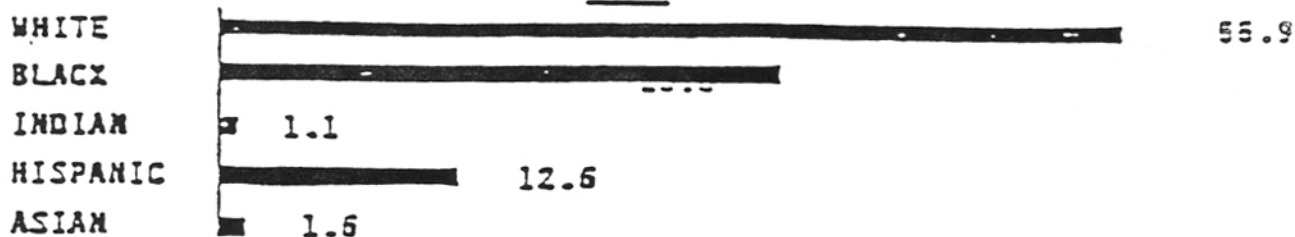


Chart 2

Source: Commission on Professionals in Science and Technology  
October, 1986.

more specific to this review, how we attract young minority people to study those fields. We have not been very successful in attracting young minority people into science and engineering and we simply have to face up to and deal with our failure. Perhaps minorities do not see excitement in science or engineering.

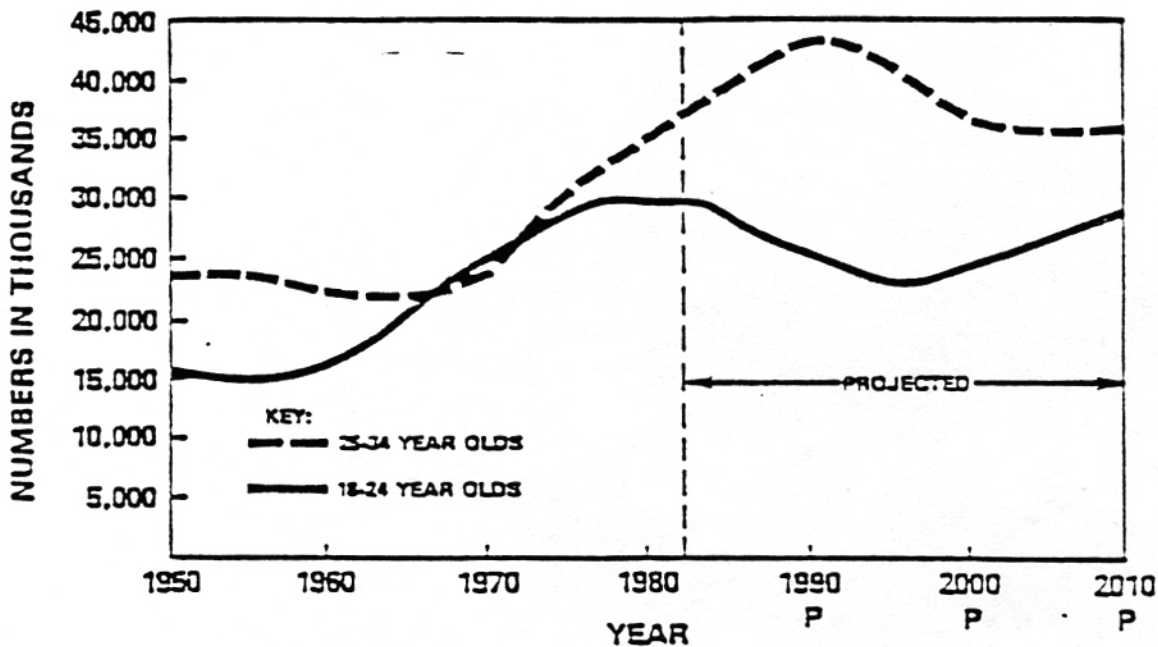
We need to help them see it. Perhaps minorities cannot find role models in science and engineering. Perhaps minorities interested are discouraged because of poor training and inadequate preparation in quantitative subjects. We need to encourage their presence there. As we will see, there are an almost endless series of steps we can take to promote minority enrollment and persistence in collegiate studies of science and engineering (CPST, 1986). (See Chart 3.)

But there is perhaps a more fundamental reason for our past failures. Strong self-images and driving personal aspirations are most often found in successful scientists and engineers, are rooted in close, supportive, and demanding families. Such families were a prominent part of black America during the first half of this century. They probably explain how those black high school and college graduates of the '30s, '40s and '50s could accomplish so much, against such daunting racial odds that characterized many parts of America during those decades. Black progress in education and elsewhere has stalled at a time when the black family as an institution has been under severe stress. Dropping out, underachieving and other educational pathologies common among black youngsters will not disappear without the rehabilitation of the black family as a channel for the transmission of values. The above comments are true for other underrepresented minorities as well (Wharton, 1986).

The irony is that the new jobs that are expected to replace the 5 million to 15 million that are being lost or restructured in manufacturing will require precisely those skills that members of the minority underclass are least likely to possess. But it isn't just the underclass that will suffer. The American economy will be ill served by a population that includes growing numbers of uneducated and unskilled minorities. They will be drug-infested, crime-ridden teenage parents constituting not just wasted potential, but a terrible drain on the national economy.

Chart 3

# 18-24 YEAR OLDS AND 25-34 YEAR OLDS IN THE U.S. POPULATION, 1950-2010



NOTE: FIGURES FOR 1983 TO 2010 ARE PROJECTED

SOURCE: PROJECTIONS OF THE POPULATION OF THE UNITED STATES, BY AGE, SEX AND RACE, 1983 TO 2080, SERIES P-25, NO 952 (WASHINGTON, DC: U.S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS, MAY 1984).

Meanwhile, we are doing little to relieve the problem. The federal government plays along its edges, toying with welfare reform, for instance, while cutting expenditures for education and training. And the civil-rights advocates argue about whether the federal government or minorities themselves should be in the forefront of shaping solutions. As one expert put it "What is desperately needed is for all who seek to improve the plight of the nation's poor is to join hands with black Americans in spearheading a self-help renaissance--the next battle-front in the struggle for equal rights" (Rasberry, 1987).

## **2. Local**

Blacks now make up 47 percent of the students in Boston Public School system (BPS). Whites constitute 28 percent. Other minorities, including Hispanics, Asians and Native Americans make up 25 percent (Willie, 1985).

Boston's ethnic character is changing, while its white population has decreased from 95 percent in 1950 to 70 percent in 1980. Its black and other minority populations have grown from 5 percent in 1950 to 30 percent in 1980. By 1990, Boston will be nearly 40 percent minority, and all indications show that this trend will continue to the end of the century (Hart, 1985).

Boston has gained 77,000 jobs since 1976. As a result of the development boom, workers will be in growing demand to fill positions in office work, accounting, finance, management, and special services. There was a net gain of 18,000 jobs in 1984 alone, double the average yearly gain of jobs during the preceding seven years. Estimates are that Boston will gain 100,000 new jobs before 1995. A considerable proportion of those jobs will be generated by a projected \$6.2 billion in new construction. Some \$2.7 billion of that construction is already under way.

Major expansion is projected for Boston's communications, money management, finance, and business/professional services. The high technology industry also is expected to continue to thrive, despite job rollbacks in at least four technology firms since January, 1985. All told, projections are for gains of 56,000 office jobs, 10,500



manufacturing jobs; 5,400 hotel jobs, and 9,000 retail trade jobs (Blackwell, 1985). Peak demands will probably be in for three to ten years, so we still have time to educate and train minority young people for these jobs. Some programs are already in place. For example, the the Urban League of Boston Employment Resource Center (ERC), Jobs for Youth, Action for Boston Community Development (ABCD), and Project Commitment are among those that exist.

## **B. Educational Status**

### **1. National (The degree to which they enter college.)**

The size of the 14 to 19 year old black population is the fundamental demographic fact that determines high school completion trends. Overall growth of this population increased steadily from the mid-1960s to mid-1970s, then declined slightly up to 1982. (See Table 1). That age group, both black and white is now shrinking (Fenway, March 1986).

The primary factor that controls black students' eligibility for college is the number who graduate from high school. For the nation as a whole, 18- to 19-year-old high school graduates grew by 53 percent between 1967 and 1976, but slowed to an annual increase of 9 percent between 1976 and 1982. Black 18- to 19-year-olds graduating from high school also increased during this period, but growth was appreciably slower than for whites. At virtually every age and level of education, blacks enroll in school or college at lower rates than whites. Rates for blacks increased until 1976, but since then they have declined.

Looking ahead, the proportion of the population from historically underprepared groups (blacks and Hispanics) can be expected to rise sharply in the years ahead. Today, we are a nation of 26.5 million blacks and 14.6 million Hispanics. By 2020, we will be a nation of 44 million blacks and 47 million Hispanics (even more if Hispanic immigration rates increase). By 2020 blacks and Hispanics will account for 34 percent of the nation's population, increasing still more the complexity we will encounter meeting the needs of a diverse student population (Fenway Retention, March 1985).

Table 1

BLACK HIGH SCHOOL-AGE POPULATION, HIGH SCHOOL ENROLLMENT,  
AND HIGH SCHOOL GRADUATES, 1967, 1970, 1976, 1982  
UNITED STATES

	1967	1970	1976	1982	Percent Change		
					1967- 1970	1970- 1976	1976- 1982
High School-Age Population <sup>a</sup>	2,723	2,905	3,385	3,306	6.7%	16.5%	-2.4%
High School Enrollment <sup>b</sup>	1,651	1,836	2,258	2,128	11.1	23.1	-6.1
High School Graduates <sup>c</sup>	402	443	614	667	10.2	38.6	8.6

<sup>a</sup> Population aged 14 to 19 years

<sup>b</sup> Total high school enrollment

<sup>c</sup> High school graduates for persons 18 to 19 years old

Source: U.S. Bureau of the Census. Current Population Reports,  
Population Characteristics, Series P-20.

Despite two decades of court orders requiring school desegregation, many minority students in America continue to attend segregated schools that have fewer resources than predominantly white schools. These schools, and more often than not, are poorly prepared to begin the training of minority students for professional careers in science and engineering. The problem is greater than a lack of adequate laboratory facilities and textbooks. It is the lack of opportunities for serious minority science students to work alongside fellow students who share their interests and enthusiasms about science. The educational opportunities of many minority children are hindered by both poor science teaching materials and equipment as well as teachers with little or no training in the sciences (Nettles, 1986).

At the college level, while black enrollment has been declining since 1976, enrollment of white students has remained constant. This is particularly significant because the percentages of all white high school students have been declining, while the number of black high school students has increased steadily from 1967 to 1982.

Most important have been changes in the number of black and white college students. The number of 18- to 19- year-old white high school graduates declined about 5 percent from the mid-1960s to the mid-1970s, then increased just over 2 percent from 1976 to 1982. (See Table 2). An increase of 4 percent of black high school graduates from 1967 to 1976 was widely noted as a positive and significant trend. There was a decline of more than 8 percent, however, from 1976 to 1982, and that was seen as an important setback for the course of black higher education.

Declining college enrollments are a new phenomenon for whites, but not for blacks. Total black enrollments have been declining since 1976. Other minority groups have experienced only slight increases in absolute enrollment numbers and these have turned out to be proportional decreases. Nearly 40,000 fewer blacks were enrolled in colleges and universities in 1984 than in 1976, a period of modest enrollment growth for white students.

Table 2

COLLEGE PARTICIPATION OF BLACKS AND WHITES  
 1967, 1970, 1976, 1982  
 UNITED STATES

	Percent of High School Graduates in College	
	Blacks	Whites
1967	45.0%	53.7%
1970	43.1	51.3
1976	49.2	49.2
1982	41.1	51.3

Note: High school graduates for persons 18 to 19 years old.

Source: U.S. Bureau of the Census. Current Population Reports, Population Characteristics, Series P-20.

Federal funds have not been adequate to encourage minority college enrollments, and increased loan funds that have become available have not been an attractive form of financial aid for minority students. This ought to be readily understandable; students from families with incomes of about \$13,600 (the median income for black families in 1982) are reluctant to borrow what seems to them to be staggering amounts of money (Fenway, March, 1986).

Outreach programs initiated by colleges, universities, and state systems and directed at minority students in senior and junior high schools and elementary schools, although of only modest use in the past, will become increasingly essential in the future as America seeks to increase minority participation in the scientific and engineering professions. These programs, which link colleges and minority precollege students, tend to vary according to institutions and the communities they serve. But the research that has been gathered to date shows that such programs can be key to guiding minority students to post secondary education.

One group of efforts that have been in existence long enough to have established track records are the Mathematics, Engineering and Science Achievement (MENSA) programs conducted in California. These begin at the junior high school level and extend through college. MENSA has 33 different programs geared to the needs of minorities and seventeen operate at the precollege level. Results published recently showed that there is a 13 per cent higher retention rate for engineering students on sixteen campuses of the University of California and California State University systems who participate in MENSA than engineering students as a whole on those campuses. Among the black engineering students, MENSA made a dramatic difference: 64 percent of black participants continued in engineering after three years, compared with 13 percent of black non-participants.

One problem of many outreach programs is that they are very selective in the precollege students they attract. Many appeal to only the highest-achievement students--those with 1100-1200 SAT scores and high grade point averages. Unfortunately, these are the students who have the least difficulty in securing entrance to a good college. The problem is to expand the pool to include average minority students.

A recent study on high school dropouts in the State of New York shows that without intervention, only limited numbers of youngsters of color will ever be eligible for further education. For example, New York has one of the highest dropout rates in the nation. Only Georgia, Florida, Louisiana and Mississippi report rates higher than New York's 34 percent. For non-white New Yorkers the dropout figures are staggering: Latinos 62 percent, blacks 53 percent, and Native Americans 46 percent. All this despite New York's being seventh in teachers' salaries nationally and second in per pupil expenditures.

We must halt these distressing trends and change the quality and content of the education of people of color. Toward those ends, the Task Force that Governor Cuomo of New York appointed to make the study called on the him to declare a State of Emergency, to assume personal responsibility for the crisis and to take the leadership in fighting it (New York State, 1986).

This review has focused on minority student admission and retention at the undergraduate level, and is concerned with those who leave the educational system at two points: before entering college and before the completion of four undergraduate years. It is not known if fewer minorities are entering higher education as freshmen or if more are withdrawing after college entrance. We do know, however, that minority students who enroll in college for the first time are less likely than whites to graduate. In part, this is because nearly half of all minority students in higher education are enrolled in two-year colleges, where, regardless of race, students are less likely to transfer four-year institutions to receive their bachelor's degree.

Although blacks have made great strides in closing the gap with whites with respect to high school graduation rates, blacks in the 25- to 29-year-old group in 1980 were only half as likely as their white counterparts to complete college. The numbers were 12 percent and 24 percent, respectively. Table 3 shows that in 1980, smaller proportions of the 18- to 24-year-old population, as well as

Table 3 Population, High School Graduates, and College Enrollment of 18- to 24-Year-Olds, by Racial/Ethnic Group: 1970, 1975, and 1980

Racial/Ethnic Group and Year	Population	High School Graduates	College Enrollment	High School Graduates as a Percent of Population	College Enrollment as a Percent of Population	College Enrollment as a Percent of High School Graduates
				Numbers: in Thousands		
<b>White</b>						
1970	19,608	15,960	5,305	81.4	27.1	33.2
1975	22,703	18,383	6,116	83.2	26.9	32.4
1980	23,975	19,787	6,334	82.5	26.4	32.0
<b>Black</b>						
1970	2,692	1,602	416	59.5	15.5	26.0
1975	3,213	2,081	665	64.8	20.7	32.0
1980	3,555	2,479	688	69.7	19.4	27.3
<b>Hispanic</b>						
1970	—	—	—	—	—	—
1975	1,446	832	295	57.5	20.4	35.4
1980	1,962	1,054	315	53.7	16.1	29.9

Source: U.S. Department of Commerce, *Current Population Report*, "School Enrollment—Social and Economic Characteristics of Students," Series P-20, Nos. 222, 303, 362.

smaller proportions of the pool of high school graduates, were enrolled in college than in 1975. The decrease was proportionately larger for blacks and Hispanics than for whites, re-establishing a gap that had nearly closed in 1975.

While 28 percent of 18- to 24-years-old black high school graduates were enrolled in college in 1980 (as compared to 32 percent for white high school graduates), only 19 percent of that group was enrolled in college (as compared to 27 percent of their white counterparts). The difference can be found in high school dropout rates (Darling-Hammond, 1985).

A key problem is that minorities do not complete high school in the same numbers that mark non-minority students. While the dropout rate for all high school students is too high, it is a particularly serious problem for blacks. Not surprisingly, the problem is worst for inner-city minority students. Another vexing problem is that when minority students do attend high school they do not take the courses that will prepare them to continue their education, especially at four-year colleges and universities. Minority high school graduates are not equipped with strong knowledge in those subjects that would allow them to pursue the college majors that could broaden their occupational choices. Strong teaching in mathematics and science is generally lacking in inner-city schools. This lack handicaps minorities who do have the desire to prepare for college. What minority inner city precollege students need is the kind of supplementary instructional support outside of the school system that will strengthen basic skills in writing, computers, mathematics, science and other qualitative subjects. At the same time, motivated minority students, should when necessary, stay in school beyond the senior year to master the important basic skills they will need to succeed in college.

Those minority precollege students who make it to their senior year of high school and anticipate entering college, exhibit a surprising degree of optimism about their future career options. Their initial desires upon arriving at college center on majors that will give them excellent options for a careers in a technological society. The minorities who show interest in majoring in science-based fields when they entered colleges, however, change drastically



before they complete their degrees. The question then is: What happens to entering minority students who intend to major in the science or engineering, but switch during succeeding years?

Undergraduate science programs serve students as testing grounds for entry into technical and scientific professions. The result is that rigorous curricula produce high dropout rates. The average minority undergraduate, perhaps inadequately prepared for college altogether, becomes an early casualty. The College Board's latest annual surveys of college-bound high school seniors show that 41 percent of black college-bound seniors, 39 percent of Native Americans, 47 percent of Asians, and 39 percent of whites indicate an interest in majoring in science and engineering when they begin college (The College Board, 1984). What happens to them? Why don't they do that? The answers are myriad and they are buried in the culture, the social structure, and the politics of the nation.

## 2. Local

A recent study of the college experiences of Boston Public School graduates sheds light on the postsecondary educational status of local minorities. The study was carried out at the Center for Applied Social Science, Boston University by Katherine Esty, Edward Hackett, and Peter Langer. A report entitled Patterns of Enrollment: The College Experience of Boston Public School Graduates was published in November 1984. Twenty-two Boston area colleges and universities provided information for the study. Six colleges accounted for 80 percent of all enrollees, 44 percent were graduates of four specific BPS high schools. The study examined more than 1,000 BPS high school graduates who enrolled as freshman at these colleges in 1983.

Of those studied, 82 percent completed at least one course in the fall semester of 1983. Freshmen in community colleges completed the fall semester at about the same rate as students at 4-year institutions, but were less likely to re-register for the next semester. Asian students had the highest retention rates, followed in order by blacks, whites, Hispanics, and "others." The mean age was 21.