

Disconcerting Statistics: The Future of the Hispanic Engineer

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Abstract

The fact that the percentage of minority students in engineering are increasing masks the truth: the number of Hispanic engineering students is distressingly low. In order to begin to increase the number of Hispanic engineering students, the current state of affairs must be understood and analyzed. A thorough analysis shows a lack of representation of Hispanic engineering students with respect to all engineering students and with respect to the U.S. population percentages of Hispanic people. Within these under-representations, in both all bachelor degrees awarded and all engineering bachelor degrees, an interesting discrepancy is apparent. The statistics show that Hispanics do not earn as many bachelor degrees nor engineering degrees as the remainder of the minority group. Another disheartening statistic is the next generation of Hispanic students, the high school graduates. The statistics do not give much hope for the future. The future population trends have been predicted by the U.S. Census Bureau, and if the current state of Hispanics in engineering is not improved, the field of engineering will suffer.

However, there is hope beyond the statistics. The U.S. Government, specifically under the budget proposals of President Bush, is addressing the problem. If successfully passed through Congress, the President's budget will put much needed financial incentives in place to combat the low numbers of Hispanics in education.

This paper will address: the current U.S. population and education statistics, the trend of some minority groups to obtain higher percentages of both bachelor and engineering degrees over the Hispanic population, the next-generation of college students, the projected future populations, the President's actions, and some possible solutions to increase the numbers of Hispanic students in the engineering field.

Current U.S. Population Figures, Including Minority Populations

According to the U.S. Census 2000, minorities constitute 29% of the total U.S. population, with Hispanic people constituting 12.1%, as seen in Figure 1 below. So, one would expect the percentage of Hispanic engineering students to be approximately 12%. Unfortunately, that is not the current situation.

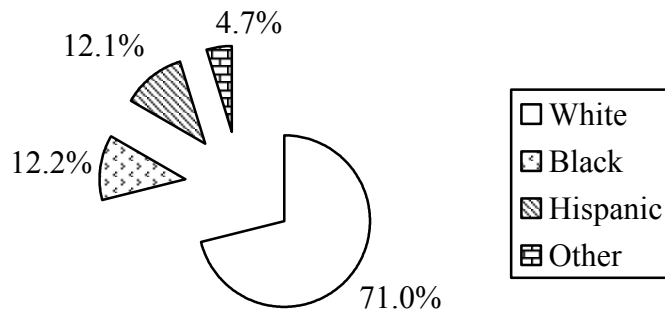


Figure 1. Percentages of U.S. Population with Respect to Race

Current U.S. Education Figures, Including Minority Populations

Minority populations earn 16.5% of any type of U.S. bachelor degrees [1]. This break-down is seen in Figure 2 below.

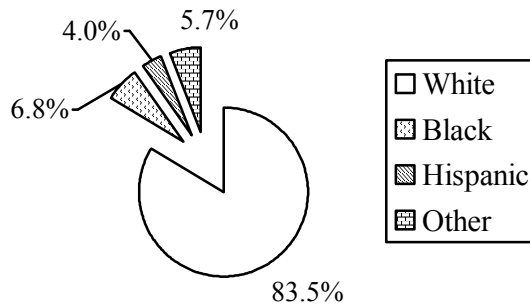


Figure 2. Percentages of U.S. Bachelor's Degrees with Respect to Race

This indicates an interesting trend; the smaller minority sector of "other" has more U.S. bachelor degrees than the Hispanic sector.

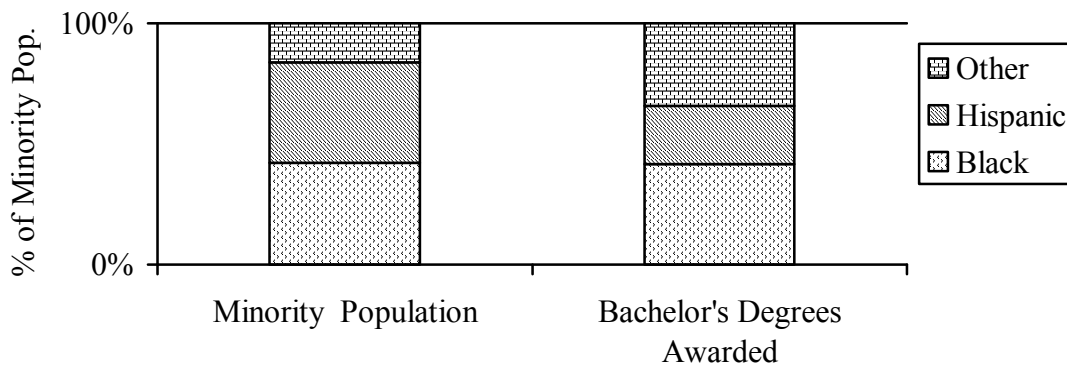


Figure 3. U.S. Minority Population and Bachelor's Degrees

Engineering Fields with Respect to Hispanic Students

Does engineering reflect percentages in more proportion to the U.S. population? With respect to all U.S. bachelor degrees awarded, approximately 8% are engineering bachelor degrees [2]. Of this 8%, minorities constitute 12.5%, which is less than the percentages of minority populations earning any type of degree. Yet, even this percentage is misleading with respect to individual minority populations. Of this 12.5%, Hispanics represent a mere 2.3%. Again, the “other” sector has a higher percentage than Hispanics.

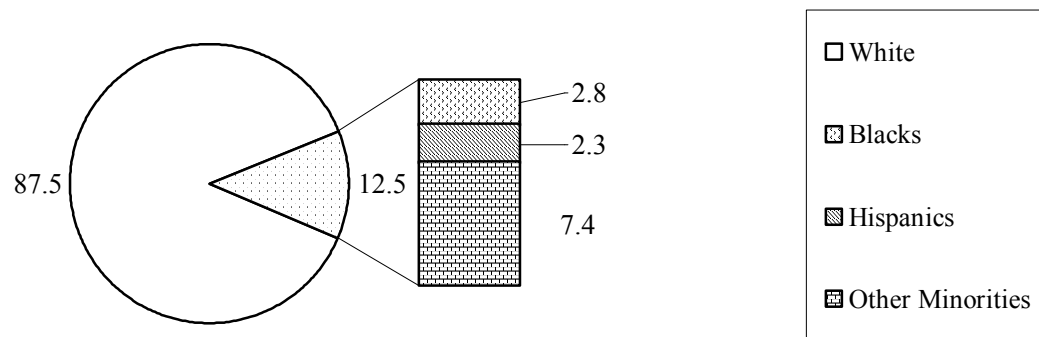


Figure 4. Percentages of Engineering Degrees Awarded with Respect to Race

High School Graduates: Next Generation of College Students

There are two questions, of many possible questions, that can be asked here: Why are the numbers for Hispanics so small? Why is the "other" minority group overshadowing Hispanics with respect to bachelor's degrees? One possible way to answer these questions is to determine the number of Hispanics graduating from high school, which is seen in Figure 5. Obviously, the largest gap is seen in the Hispanic population.

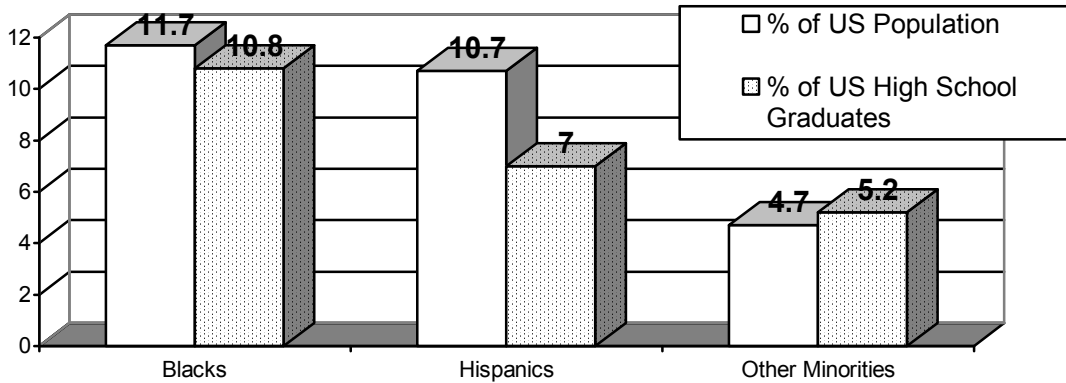


Figure 5. Percentages of Minorities with Respect to U.S. Population and U.S. High School Graduates

Future Projection of the Hispanic Population

According to the U.S. Census Bureau, the year 2100 will reflect different population distributions than the 2000 population [3]. In the year 2100, the numbers are predicted to change; the White population will be 40.3% and the “minority” population will be 59.7%, with the Hispanic population at 33.3%. The comparison of the population distributions of 2000 and 2100 can be seen in Figure 6.

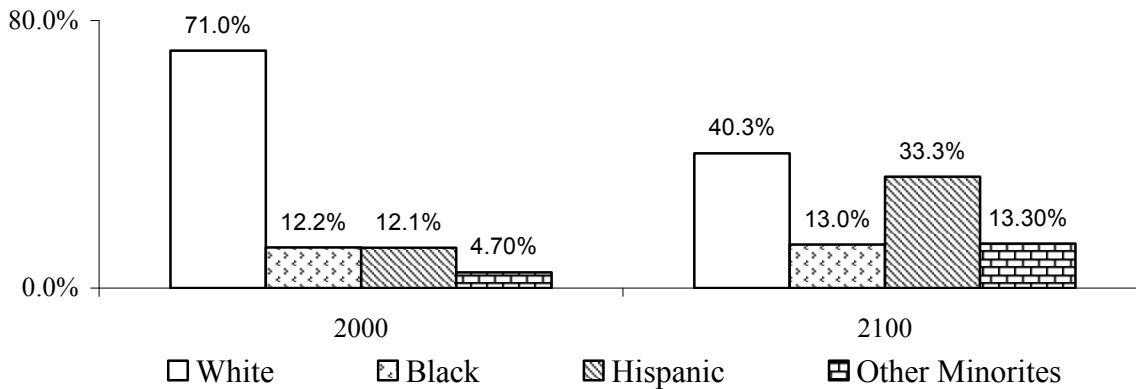


Figure 6. Percentages of Population Distributions of 2000 and Projected 2100 with Respect to Race

If the current trend of woefully small percentages of Hispanics in engineering continues, the future of engineering in the United States is bleak.

U.S. Government Support to Increase Numbers of Hispanic Students

Fortunately, the U.S. Government is attacking the problem of low numbers of Hispanic students. President Bush has proposed a new \$1.5 billion High School Initiative. According to senior Department of Education officials, this Initiative has the “potential to do more to curtail the high

dropout rate problem among Hispanics and other minorities than any other federal initiative in history” [6]. The President has also appointed Adam Chavarria as Director of the Department's White House Initiative on Educational Excellence for Hispanic Americans. Beyond this, the President's proposed budget also “targets \$95.9 million to help Hispanic-Serving Institutions, a key part of the administration's effort to increase academic achievement, high school graduation, postsecondary participation, and lifelong learning among Hispanic Americans” [6]. These measures are needed and must be encouraged through sponsorship in the U.S. Congress.

Conclusion: Solutions to Increase Numbers of Hispanic Students

There is an obvious need to increase the number of Hispanic engineering students. In our goal to discuss increasing the number of Hispanic engineering students, we have presented the current state of affairs showing a lack of representation of Hispanic engineering students. We have showed that the statistics indicate that the Hispanics do not earn as many bachelor degrees, engineering degrees, or high school diplomas as the remainder of the minority group. We have also showed that the minority population will become the majority population in a century, mainly due to the projected increase in the Hispanic population. If the current state of Hispanics in engineering is not improved, the field of engineering will suffer.

Increasing the number of Hispanics in engineering requires three sub-goals: (1) Increase the number of Hispanic high school graduates, (2) Increase the number of Hispanic college applicants, and (3) Introduce engineering to potential college students and current college students as close to matriculation as possible. The way in which all three of these goals can be obtained is to partner with middle and high schools.

Organizations such as The Society of Hispanic Engineers (SHPE) and The National Action Council for Minorities in Engineering (NACME) support the increase of the number of Hispanics into the fields of engineering and science [7, 8]. While these organizations promote Hispanics in engineering, the numbers of actual Hispanic engineering students is still woefully low. Increasing the numbers of Hispanic engineers requires the encouragement and support of many more organizations. As stated above, the U.S. Government, specifically President Bush's administration, is keenly aware of the problem. In his budget, the President has set aside funds to target Hispanic education, introduced the new High School Initiative, to further combat the problem, and appointed Adam Chavarria, Director of the Department's White House Initiative on Educational Excellence for Hispanic Americans, among other positive actions.

As educators, we must encourage our Hispanic students to finish high school, apply and attend college, and take as their major an engineering discipline. The fate of engineering in the U.S. in the future depends on our Hispanic population; we must act now.

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