The Policy of STEM Diversity: Diversifying STEM Programs in Higher Education

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Statement of the Problem

The ability of the United States to compete in a global economy has a direct correlation with its ability to significantly diversify the science, technology, engineering, and mathematics (STEM) workforce throughout the country. In his 2010 speech on the economy, President Barack Obama stated, "This is our moment. . . we've got to rebuild on a new and stronger foundation for economic growth. We need to do what America has always been known for: building, innovating, educating, and making things" (Holdren, 2011). With the steadily increasing minority population in the United States, minorities are one of our greatest untapped resources positioned to heed this call.

The Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, led by Freeman Hrabowski, indicated that "minorities are seriously underrepresented in science and engineering, yet they are also the most rapidly growing segment of the population" (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2011, p. 1). Minorities, while comprising 28.5 percent of the national population in 2006, only represented 9.1 percent of Americans in the science and engineering ocuppations (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2011), inspite of the fact that STEM occupations are projected to grow to more than 9 million between 2012 and 2022 (Vilorio, 2014). A subsequent report from Hrabowski's committee went on to list several significant reasons that support the need to invest in the diversification of the the Science and Technology Workforce: "Our sources for the Future S&E workforce are uncertain;" "the demographics of our domestic population are shifting dramatically;" and "Diversity is an asset" (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2011). Severval studies, with similar findings, preceded Expanding Underrepresented Minority Participation: *America's Science and Technology Talent at the Crossroads,* "A Nation at Risk, 1983" and "Rising Above the Gathering Storm, 2007."

According to the Committee on Equal Opportunities in Science and Engineering (CEOSE), a part of the framework needed to improve American competitiveness in STEM, would involve broader participation in STEM (2011). Considering the growing minority population and the aging STEM workforce in the United States (Committee on Equal Opportunities in Science and Engineering, 2011), the need to recruit and retain underrepresented minorities in STEM is vital to the prosperity and security of the United States. Key federal agencies have developed programs such as the Historically Black Colleges and Universities Undergraduate Programs (HBCU-UP) and the Louis Stokes Alliance for Minority Participation (LSAMP) in order to target underrepresented minorities for STEM career paths. Although these programs are successful, they do not have the capacity to meet the growing demand for U.S. citizens with these STEM skills (Burgoyne, et al., 2010). The HBCU-UP and LSAMP are just two of the federally funded programs that provide colleges and universities an opportunity to compete for funding to increase the number of underrepresented minorities entering STEM programs throughout the United States. We need more robust STEM policy to scale up programs like HBCU-UP and LSAMP. However, efforts to provide additional resources to colleges and universities whose goals are to increase underrepresented minorities in STEM have been hampered by litigation and budget restraints.

The goal of the National Science Foundation (NSF) is to meet the nation's call to, "promote the progress of science; advance the national health, and welfare; to secure the national defense," (The National Science Foundation Act of 1950, 42 U.S.C. §1861, et seq., 2012). As colleges and universities strive to diversify their STEM programs in an effort to support NSF's mission, they must also heed the increasingly litigious policy environment that governs funding and recruitment of underrepresented minorities throughout the nation's institutions of higher learning (Burgoyne, et al., 2010).

The federal government, in concert with most states, mandated the development of STEM policy and programs that broadens participation and increased funding. Legislation such as the CEOSE [Committee on Equal Opportunities in Science and Engineering, 42 U.S.C. §1885c (2011)] and the American COMPETES Act, 20 U.S.C. §9801 (2007), have been driving education policy for more than 30 years in the United States. In addition, federal agencies such as the Nation Institute of Health (NIH) and NSF have ramped up efforts to achieve the nation's goals by funding programs such as: Tribal Colleges and University Programs (TCUP), Advancement of Women in Academic Science and Engineering Careers (ADVANCE), Alliance for Broadening Participation in STEM (ABP), and Research Experience for Undergraduates (REU); resulting in an increase of the number of underrepresented minorities persisting in STEM career paths (Over 24 percent of HBCU alumni enrolled in a STEM graduate program; 16 percent completed graduate degrees; Nationally, 35 percent of HBCU graduates had completed a graduate degree, opposed to 25 percent of an appropriate national comparison group of bachelor degree recipients in STEM. In addition, 34 percent of HBCU-UP alumni completed graduate degrees, 13.5 percent higher than African American students nationally (20.5 percent) (Clewell, Cohen, & Tsui, 2010). In spite of these gains the Education and Human Resource Directorate (EHR) budget, which houses these programs, represented only 12% of the $6,884 million allocation FY 2013 (National Science Foundation, 2013).

This sentiment did not always garner widespread support. In fact, President Ronald Reagan took office in 1981 with the three goals for education: 1) Abolishing the newly formed department of education, 2) obtaining legislation to offer tuition tax credits to parents of pupils in private and parochial schools, and 3) securing a constitutional amendment to allow prayer in school (Fiske, 1988). As a direct response to a report issued by President Reagan's National Commission on Excellence in Education entitled, A Nation at Risk: *The Imperative for Educational Reform* in 1983, the administration quickly abandoned its goal of abolishing the department of education and embraced the federal government's newly defined role of guiding education policy (Ginsberg, 2011). Historically, diversity in education has always been a point of contention in American Society, particularly in the South. During Reconstruction Southern planters were apprehensive regarding the idea of educating African Americans, spurring economic and political competition (Anderson, 1988).

Landmark Court Decisions

W.E.B. Dubois stated in the *Souls of Black Folks* (1903) more than 100 years ago that the problem of the 20th Century would be the color-line, our nation's

history regarding diversity in education has been long and contentious. Citing the landmark decision, *Brown v. Board of Education of Topeka, 349 U.S. 294* (1954), this decision repudiated the separate but equal doctrine and the constitutionality of it in private business, established more than 63 years earlier in *Plessy v. Ferguson, 163 U.S. 537* (1896); resulting in a plethora of Jim Crow laws that debilitated not only African Americans, but all minorities and women. One of the most significant Supreme Court cases directly impacting college and university admission policies of minorities Post-Civil rights era was the 1978 landmark decision *Regents of the University of California v. Bakke, 438 U.S. 265,* (1978). In this decision the United States Supreme Court decided that Allan Bakke was denied his constitutional rights by being denied admission into the University of California Davis School of Medicine (U.C. Davis). The all male court was split with Justice Powell casting the deciding vote. Powell, writing a separate majority opinion and a minority opinion, argued that the use of a racial quota system utilized by U.C. Davis was rigid and violated the 14th Amendment. Powell proposed that the admission policies at U.C. Davis be subjected to the intermediate scrutiny contending that the use of race was permissible as one of several admission criteria. Powell emphasized that the need to address racial imbalance as a result of societal discrimination, the need for a diverse student body to enrich education, is a compelling argument, however, U.C. Davis failed to produce such an argument [Regents of the University of California v. Bakke, (1978)]. More recently the Supreme Court ruled that race could not be a dominating factor in *Grutter v. Bollinge*r, 539 U.S. 306 *(2003) and* Gratz v. Bollinger, 539 U.S. 244 (2003).

The impact of recent Supreme Court decisions has reverberated from post-secondary through K-12, establishing precedence for school choice admission policies on the elementary and secondary levels. School districts in Seattle, Washington and Louisville, Kentucky utilized quotas to maintain a racial balance within its school districts, however, the 2007 Supreme Court decision in *Parents Involved in Community Schools v. Seattle School Dist. No. 1, 127 S.Ct. 2738* (2007) found that there was no "compelling government interest" and the admission policy governed by a racial quota was not "narrowly tailored" to the interest of diversity (2007). As a result of established precedence, states such as California have abolished quota programs throughout its entire university system.

State Law

As an alternative, in California policy-makers are experimenting with new admission rules that would increase diversity with the University of California (UC) System. The policy would increase the guaranteed student admission rate from 4% - 9% statewide, including the top 9% at every high school (Haefele, 2009). The plan would also eliminate the need for students taking college prep courses and the SAT Exam from taking the SAT subject tests (Haefele, 2009). The changes in the policy, in theory should result in an increase in potential students attending UC schools, particularly underrepresented minorities. As a result of of the admission policy changes, critics only project a 1% increase of African American and Hispanic students; the Academic Senate's Board of Admissions and Relations with Schools (BOARS) has been under attack by the Asian Pacific Islander Legislative Caucus, stating that the policy shift has put Asian Pacific Islanders at a disadvantage, alleging discrimination (Haefele, 2009). Since the enactment of California Proposition 209 Asian American undergraduate enrollment at UC Berkley has risen to 42% (Haefele, 2009). The importance of implementing policy that will withstand legal scrutiny, is essential to abide by state and federal law as well as protecting institutional and state resources. So, how should institutions of higher learning proceed regarding STEM diversity policy? Are "race neutral" policies a silver bullet for academic diversity?

Navigating Federal and State Admission Requirements

Institutions of higher learning must be sure that their organization's mission reflects the need to promote diversity as means to ensure a robust exchange of ideals and views central to most colleges and universities (Clewell, Cohen, & Tsui, 2010). However, as an alternative to policies that bolster the enrollment of underrepresented minorities, systems like UC Berkley have adopted race-and gender-neutral policies that negatively impact the enrollment of underrepresented minorities. UC Berkley had an academic desire to diversify its student body and a legal desire to circumvent future litigation. With race and gender-neutral policies the legal desire to challenge the aim for diversity quickly fades, diminishing the need to employ the constitutional and statutory tool of strict scrutiny. In a guidance issued by then Assistant Secretary for Civil Rights, Stephanie J. Monroe, "strict scrutiny" was interpreted as "racial classifications narrowly tailored to achieve a compelling governmental interest." Monroe went on to provide two instances where this could occur 1) to remedy the effects of intentional discrimination; note race can be an eligible criterion 2) race to achieve diversity: a. race may be used as a factor among many; b. each student must receive individualized consideration. In addition, genuine good-faith consideration of workable race-neutral alternatives must be employed by the institution (Monroe, 2011). Educational institutions must pose the questions: 1) Does the policy in question contradict the Equal Protection Clause or Title VI of the Civil Rights Act? 2) Can the policy in question withstand "strict scrutiny" of the courts? 3) Will the policy contradict state law or applicable local education agency (LEA) board policies (Monroe, 2011)?

Conclusion

In the final analysis, if the United States is to survive as a dominating economic, technological, and military force within the world, it must make a significant investment within its own human resources. These investments must be in the form of STEM education policy and resources. The increasingly non-white human capital, if not cultivated will quickly, convert into an economic and social liability. At every major crossroad since the industrial revolution, dominate forces within U.S. society have made very difficult decisions usually yielding to the idea of interest convergence (Bell, 1979-80). However, forces radically against minorities having access to power and control within the U.S. are holding fast to a shrinking chauvinistic ideology. If allowed, the prideful actions of a small minority will condemn the United States to mediocrity.

In a 2013 study by the Program for the International Assessment of Adult Competencies (PIAAC), U.S. adults scored below the international average in three measured job-related skills, literacy, numeracy, and problem solving in technology-rich environments (Goodman, 2013). A more recent study from the PIACC entitled *Skills of U.S. Unemployed, Young, and Older Adults in Sharper Focus: Results from the PIAAC 2012/2014* indicated U.S. adults scored below the international average in numeracy and problem-solving in technology-rich environments, but on average in literacy (Rampey, 2016). PIAAC defines **literacy** as: "understanding, evaluating, using and engaging with written text to participate in society, to achieve one's goals and to develop one's knowledge and potential;" **numeracy** as: "the ability to access, use, interpret, and communicate mathematical information and ideas, to engage in and manage mathematical demands of a range of situations in adult life;" **problem solving in technology-rich environments**: "using digital technology, communication tools, and networks to acquire and evaluate information, communicate with others, and perform practical tasks " (OECD 2012). The data is even more revealing when examining race/ethnicity.

The aforementioned studies included more than 20 participating PIAAC countries (Japan, Finland, Belgium, Netherlands, Sweden, Norway, Denmark, Slovak Republic, Czech Republic, Austria, Estonia, Germany, Canada, Cyprus, Republic of Korea, England and Northern Ireland, Poland, Ireland, France, Italy, and Spain) whom scored higher than the United States in numeracy; according to the Organization for Economic Cooperation and Development, the study provides a more complete picture of "human capital" (2012).

These studies provide clear and concise data regarding alarming trends in STEM literacy, debunking the anti-diversity minority. However, a group comprised of Fortune 500 companies and elite research institutions have praised efforts of STEM diversity advocates, citing the continual need to support their efforts. A friendly brief

to the Supreme Court in the Gratz v. Bollinger & Grutter v. Bollinger summarizes the need for diversity best:

> Higher education, particularly in the fields of science, technology, engineering and mathematics, plays a critical role by increasing basic knowledge and generating a well-trained workforce on which industry and government depend. Whatever one's politics may be, for the good and prosperity of all society, higher education must prevail in its goal of increasing access for minorities to education at all levels and in all fields, but particularly in STEM fields.
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Works Cited

National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. (2011). *Expanding Underrepresented Minority:America's Science and Technology Talent at the Crossroads.* Washington, D.C.: The National Academies Press.

Anderson, J. (1988). *The education of Blacks in the South, 1860-1935*. Chapel Hill, NC: University of North Carolina Press.

Bell, D. A. (1979-80). Brown v. Board of Education and the Interest-Convergence Dilemma. *Harvard Law Review , Vol. 93*, 518-533.

Brown v. Board of Education of Topeka, 349 U.S. 294 (The Supreme Court 1954).

Burgoyne, R., Shaw, T. M., Dawson, R. C., Scheinkman, R., Coleman, A. L., Y.Winmick, S., . . . Malcom, S. M. (2010). *Handbook on Diversity and the Law:Navigating a Complex Landscape to Foster Greater Faculty and Student Diversity in Higher Education.* American Association for the Advancement of Sciences.

Clewell, B. C., Cohen, C. C., & Tsui, L. (2010). *Capacity Building to Diversitfy STEM:Realizing Potential among HBCUs.* Washington, D.C.: the Urban Institute.

Committee on Equal Opportunities in Science and Engineering. (2011). *2009-2010 Biennial Report to Congress Broadening Participation in America's STEM Workforce*. Arlington: National Science Foundation.

Committee on Equal Opportunities in Science and Engineering. (2013). *2011-2012 Biennial Report to Congress Broadening Participation in America's STEM Workforce.* Arlington: National Science Foundation.

(2010). *Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the.*

Fiske, E. B. (1988, January 27). Reagan Agenda: Taking New Tack. *The New York Times*, p. B8. Retrieved from http://www.nytimes.com/1988/01/27/us/education-reagan-agenda-taking-new-tack.html

Ginsberg, R. (2011, July 15). *Education Encyclopedia-StateUniversity.com*. Retrieved from Education Reform: Overview, Reports Of Historical Significance: Ginsberg, R. (2011). Education Reform:Overview, Reports of Historical Significahttp://education.stateuniversity.com/pages/1944/Education-Reform.html

Goodman, M. F. (2013). *Literacy, Numeracy, and Problem Solving in Technology-Rich Environments Among U.S. Adults: Results from the Program for the International Assessment of Adult Compentencies 2012: First Look (NCES 2014-008)*. Washington, DC: U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved 3 16, 2016, from http://nces.ed.gov/pubsearch.

Haefele, M. (2009, August 18). *Is UC Opening the Door to Trouble?* Retrieved 2014, from Los Angeles Times: www.latimes.com/news/opinion/la-oe-haefele18-2009aug18,0,7132150,print.story

Holdren, J. P. (2011, January 5). *COMPETES Passage Keeps America's Leadership on Target.* Retrieved 2014, from White House Blog: https://www.whitehouse.gov/blog/2011/01/05/competes-passage-keeps-americas-leadership-target

Monroe, S. J. (2011, July 14). *Office of Civil Rights*. Retrieved 2014, from U.S. Department of Education: http://www2.ed.gov/about/offices/list/ocr/letters/raceassignmentese.html

National Science Foundation. (2013). FY 2013 *Performance and Financial Highlights.* Washington D.C.: National Science Foundation.

Organization for Economic Cooperation and Development. (2012). *Literacy, Numeracy, and Problem Solving in Technology-Rich Environments: Framework for the OECD Survey of Adult Skills, OECD Publishing. OECD Publishing.* Retrieved from http://www.oecd-ilibrary.org/education/literacy-numeracy-and-problem-solving-in-technology-rich-environments_9789264128859-en.

Rampey, B. F. (2016). *Skills of U.S. Unemployed, Young, and Older Adults in Sharper Focus: Results From the Program for the International Assessment of Adult Competencies (PIAAC) 2012/2014: First Look (NCES 2016-039)*. National Center for Education Statistics. Washington, DC: U.S. Department of Education. Retrieved from http://nces.ed.gov/pubsearch

Reynolds, B. (1983). Annual Conference of State Advisory Committee Chairperson, U.S. Commission on Civil Rights. *Civil Rights Goals for the Year 2000 and the Means for Achieving Them.* Washington, D.C.: Viewpoints.

Vilorio, D. (2014, Spring). STEM 101: Intro to tommorrow's jobs. *Occupational Outlook Quaterley*. Retrieved November 18, 2015, from http://www.bls.gov/careeroutlook/subject/stem.htm

Cases

Statutes

Other Authorities

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