An Investigation of Computational Holistic Evaluation of Admissions Applications for a Minority Focused STEM Research Program

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An Investigation of Computational Holistic Evaluation of Admissions Applications at a Research–Extensive University: Implications for Relevant Stakeholders

We have come to a point in American society in which we seek solutions from our institutions of higher education to several key questions. Namely, we seek solutions to the question of who has a right to access selective programs at certain institutions, or access to funds earmarked for certain purposes. Additionally, we seek solutions to the conundrum of higher education—is it a public or a private good? Given these fundamental questions, proponents and opponents continue to disagree on the notion if the variable of race should be a factor in the selection process. Even after the now infamous 2003 U.S. Supreme Court decision in Gratz v. Bollinger (2003) and Grutter v. Bollinger (2003), many higher educational institutions continue to struggle with a question of whether they should promote diversity as a central value of the university or protect themselves from legal challenge by remaining noncommittal on this topic. Empirical research from the higher education community has provided a wide variety of evidence of the benefits to diversity on the college campus (Chang, Witt, Jones, & Hakuta, 1999; Gurin et al, 2002; Marin, 2000; Maruyama & Moreno, 2000; Moses & Change, 2006). The research community has also provided evidence on how colleges and universities could achieve diversity through their undergraduate, graduate and professional admissions processes (Harbour & Lewis, 2004; Gilbert, 2008); however, given the uncertainty nationwide among colleges and universities, it seems that these recommendations have been greatly ignored.

"On a state-by-state basis, various organizations have attacked race-conscious policies…" (Connerly, 2006; Journal of Blacks in Higher Education, 2007; Kamara, 2007). This issue has become so prevalent that practically on any given day in any major media publication we hear a new example of how universities "have voluntarily abandoned race restrictions" [as a criterion] (Schmidt, 2006) in undergraduate programs. Currently, race-conscious policies have spiraled into the graduate and professional school admissions processes as well. Also, funds that were once earmarked for minority programs are now the subject of legal challenge as well. As a result, we provide a few examples of why the higher education community needs direction on this topic.

Abandonment of Race–Specific Program Scholarship Program in Nebraska

According to the Journal of Blacks in Higher Education (2007), in the state of Nebraska, the monetary allocation of "2.9 million in state funds to help Black, Hispanic and American Indian students afford a college education was previously referred to as the Minority Student Scholarship Program. Now legislation has been introduced to rename the program to 'Student Diversity Scholarships.'" According to this report, any references to Blacks and other minorities will be replaced by students from "diverse, racial, ethnic and cultural backgrounds" (p. 1). The driving force around this issue in the state of Nebraska was that any reference to race in the use of state funds would be subject to legal challenge. As we see from this example, the diversity program in Nebraska has to try to position itself not to have any legal action by taking the notion of race out as the sole factor in receiving these funds.

University of Colorado at Boulder

According to Schmidt (2006), the University of Colorado at Boulder is being challenged by an independent research organization that says "the state's flagship university had little idea how much money it spends on promoting diversity and poorly manages such expenditures." As a result, the University of Colorado at Boulder campus and potentially many other institutions will have to justify every dollar spent on diver-

Abstract

Most recently, many higher education institutions have continued to struggle to answer the question of whether they should promote diversity as a central value of the university or protect themselves from legal challenge by avoiding the inclusion of diversity initiatives. In this article, the authors first provide several examples documenting how U.S. colleges and universities struggle with this question. Second, the authors provide a viable solution to promote diversity at the university that is within all legal parameters of recent court decisions. Third, a case study example citing how diversity can be achieved using holistic evaluation is provided. Finally, recommendations are provided for all relevant stakeholders who want to promote diversity at the university level without facing legal challenge.

sity programs. According to this article, many university officials from across the nation are worried that "colleges are ill prepared to defend such efforts against those demanding that they be subjected to strict cost-benefit analysis."

Northeastern University

According to Kamara (2007) of *Diverse Issues in Higher Education* magazine, at Northeastern University, "a scholarship created to boost Black enrollment…will be open to White students, one of the several policy changes that the university has taken to avoid becoming the target of an anti-affirmative action lawsuit." To protect themselves from future litigation, Northeastern University will not award the scholarships based on race; however, one of the main criteria will be to target students from an urban background. Northeastern University officials report that it's a matter of protecting their programs and complying with the law.

This example clearly reveals many universities across the country are considering themselves at risk when it comes to any programs focusing on the specific race of those who will benefit from the program. As such, these programs are being eliminated all across the nation because their leaders feel they do not have a choice. The message that this example sends is that in order for race-conscious programs to be considered fair and viable, they must be open to all members of society and the selection of the program participants must be fair.

A Fair Approach to Applicant Selection in Race Specific Programs

As a result of the 2003 U.S. Supreme Court decisions in *Gratz v. Bollinger* (2003) and *Grutter v. Bollinger* (2003), the "university campus today is the site of much backlash" (Chubin & Malcom, 2006, p. 68). This backlash can be captured in a letter to the Chicago Sun-Times:

> As many predicted after the 2003 U.S. Supreme Court decisions on the University of Michigan admissions cases, the ambiguities in those decisions and the absence of definitive guidance from the U.S. Departments of Education and Justice have encouraged activist groups to challenge universities on the use of race in the conduct of admissions, financial aid, and academic support programs. Some colleges and universities have capitulated in the face of threats of legal action and intimidation. Many have voluntarily scrapped programs designed to serve underrepresented minority students for fear that they would become targets. Worse still, the federal government is complicit in this activity by challenging minority focused scholarship and support programs at several institutions and threatening to withhold federal funding for research and education…. It is disappointing that many universities have not stood their ground and, instead, have succumbed to risk-averse legal advice that suggests that it is better to switch than to fight. (Slaughter, 2006)

It has been estimated, by an anti-affirmative action organization, that over 100 colleges "have voluntarily abandoned race restrictions [as a criterion], and only a handful have refused to do so" (Schmidt, 2006) in undergraduate admissions. Several race-specific programs have experienced the same backlash (Schmidt, 2004). On a state by state basis, various organizations have vowed to attack race-conscious policies. As a result, California has passed Proposition 209 (Proposition 209, 2006) and Michigan recently passed Proposal 2 (Michigan Proposal 2, 2006). Contrary to these attacks on race-conscious policies, research has shown that there are educational benefits to diversity (Chang, et. al. 1999; Gurin et. al. 2002; Maruyama & Moreno, 2000; Marin, 2000; Moses & Chang, 2006). Nevertheless, the debate over race-conscious policies is ongoing. The debate can be summarized in a quote by Justice Ruth Bader Ginsburg in the *Parents Involved in Community Schools v. Seattle School District No. 1* and *Meredith v. Jefferson County Board of Education* (2006). Justice Ginsburg asked the question, "It's hard for me to see how you have a racial objective but a nonracial means to get there. How would you get there without quotas" (Asquith, 2006)?

Existing Holistic Evaluations used at Selective Colleges and Universities

The current state of holistic evaluation is based significantly on subjective judgments made by reviewers. For example, the University of California at Los Angeles (UCLA) recently adopted a holistic review model after sharp criticism over its decline in minority enrollments (Silverstein, 2006). Under the new holistic review model each application is "read and considered in its entirety, rather than having sections reviewed by different people" (Bartlett, 2006, p.1). After the application is reviewed it is scored and then selections are made based on scores. In some cases, the scores from multiple readers are averaged. This creates a new set of

problems that are just as bad as preferences, if not worse. When one looks closely at this holistic review model, it is clear that the model relies heavily, if not completely, on reviewer judgment. Although, academic achievement is given the most weight in these considerations, it is still one of many factors being considered in the holistic review. Presumably, all of the applications being considered meet or exceed the minimum academic qualifications for admissions; otherwise, they would be immediately denied without a holistic review. The problem with modern holistic review as seen with UCLA is that it is not reproducible. In short, it's not scientific. Here's a test scenario for reproducibility.

> Given two teams of admissions officers all trained on the same holistic review process, 200 academically qualified applications with varying grade point averages, standardized test scores, achievements, etc., 20 admissions slots; will the two teams select the same 20 applications for admissions? If there is no guarantee that the two teams will reach the same decisions, then the process is not scientific, it's subjective at best; therefore, it is not reproducible.

When holistic review is based solely on the reviewers' judgment, this is problematic given that admissions decisions can not be proven beyond any reasonable doubt that they were not improperly reached. No admissions officer can prove that race/ethnicity, gender, national origin, or some other proxy admissions attribute was not used to make the ultimate admission decisions. After UCLA implemented its holistic review model, there was a 2.2% increase in minority enrollment in the Freshman class (Schmidt, 2007). The holistic review model appears to have worked, but decisions were reached using a non-scientific approach. As such, the results are a one time finding that can not be reproduced, leaving room for legal scrutiny on decisions. Several other institutions have implemented holistic review models where some include race/ethnicity, gender, national origin, etc. In all holistic review implementations, the models rely heavily, if not solely, on reviewer judgment. A more scientific approach to holistic reviewing is needed in order to achieve fairness in admissions decisions at a time when the nation's population is growing in size and diversity.

The Applications Quest Model for Protecting Race−Specific Programs

Although race-conscious policies have been shown to have significant benefits (Chang, et. al. 1999; Gurin et. al. 2002; Maruyama & Moreno, 2000; Marin, 2000; Moses & Chang, 2006), the fairness of such programs has been brought under question. Affixing the monikers "race-conscious" or "race-specific" tends to imply exclusivity and as a result opens the door for legal scrutiny on the basis of discrimination. Race-specific programs can survive these challenges, but these programs must adopt some new practices.

The first step to protecting race-specific programs is to open the doors for all qualified applicants to participate. In other words, participation in these programs can not be determined solely by the applicant's race. Besides, race-specific programs can benefit members from the majority. A number of questions could potentially be answered by using the *Applications Quest* model to protect race-specific programs: (a) Will White males benefit from race-specific programs for African Americans?; (b) When the applicant criteria for a selective program is open for everyone to apply, will members from the majority actually apply and will they actually partake in the program if selected?; and (c) Will White males, Hispanic males, females apply for scholarships and participate in a program for African American males? These are significant questions to this model that will be answered in future research.

After the doors have been opened for all qualified applicants to participate, the next step is to create a qualified applicant pool. Qualified applicants can be defined by several criteria; some include academic credentials, recommendations, and economic status. To reduce the opportunities for individuals to bring legal action against the institution, the variables of race, gender, national origin should not be one of the qualifying attributes/variables; the program should be safe from legal action. Presumably, the number of qualified applicants will exceed the number of slots available for selection into the program. In order to select the applicants that will ultimately participate in the race-specific program, *Applications Quest* will be used. Race, gender, national origin, essay rankings and any other application information can be processed in *Applications Quest* to select the program participants. *Applications Quest* uses a holistic comparison approach in selecting applicants; as such, *Applications Quest* adheres to all the legal decisions on Affirmative Action and the use of race, gender, national origin in admissions, school placement and other policies. *Applications Quest* does not give prefer-

ence to any attribute/variable on the admissions application, (e.g. race); therefore, it is compliant with all legal decisions on this matter. This is accomplished by executing holistic comparisons between all qualified applications. Imagine taking two qualified applications and placing them side by side. If the two applications are identical, then they are 0% different and 100% different. This establishes a comparison scale for holistically comparing applications. For example, if you change the grade point average on one of the two qualified applications, they will no longer be identical; however, they will be to some extent more similar than different. *Applications Quest* measures the exact degree of this difference and computes the difference between all application pairs on a 0% – 100% scale. After comparing all qualified applications to each other, the applications will be places into clusters/groups based on their holistic similarity. These clusters/groups represent holistically diverse applicant pools. Once these clusters have been formed, *Applications Quest* will make recommendations on which applicants should be selected to participate in the program in order to optimize holistic diversity by selecting the most holistically novel application from each cluster (Gilbert, 2006). This approach produces the most holistically diverse applicants within the qualified applicant pool.

Prior to the selection of the program participants, the race-specific program must implement stern rules of participation. These rules must be specified in the application material and each applicant must agree to the specified rules before submitting an application. As a result, the applicants must agree to participate in all the program activities. This will eliminate false applicants, those that simply want to earn a scholarship or prove a point. For example, assume University XYZ has a race-specific program for African American males. This program awards scholarships for its participants. The program has the following requirements: (a) monthly meeting requirements; (b) mandatory participation in an annual conference for African-American males; and (c) a term paper on African-American males and achievement. Any participant that does not exhibit full participation in the program by adhering to these rules will forfeit their scholarship. This policy will ensure that each applicant has a genuine interest in the program.

Findings from a Case Study on One Race–Specific Program Using *Applications Quest*

A major research institution in the Southeast implemented a race-specific program for minorities to attend a science, technology, engineering and mathematics (STEM) summer research program. Each year this program accepts fifty (50) students to participate in their summer program. This program had been in existence since the late 1990s. After the attacks on race-specific programs, this program adopted *Applications Quest* to select its participants. The program decided to remain race-specific, but it could no longer operate as race-exclusive. The program has been using *Applications Quest* for the past two years and the results of using *Applications Quest* are explained here.

A Case In Point

The first year *Applications Quest* was used in this program, there were 127 qualified applicants. Eighty-five (85) percent of the applicants were African or African-American, 6.3% were White and 3.15% were Latino (see Table 1). With respect to gender, 18.9% were male and 81.1% female (see Table 2). The average grade point average for the applicants in the first year was 3.43 on a 4.00 grade point scale. A 3.0 grade point average was required for all program applicants, (see Table 3). Other factors used in comparing the applicants included current institution, major, first generation college student and others. When *Applications Quest* processes applications, it calculates a difference index for the applicant pool and those it recommends for admissions. The difference index is a measure of the average holistic difference between applications (Gilbert, 2006). The difference index for the 127 applications in the first year was 57.0%. This means on average, the 127 applications were holistically 57.0% different. Each application was loaded into *Applications Quest* with a goal of selecting 50 applicants from the 127.

Race/Ethnicity	Recommended Applicants	All Applicants
African or African-American	39 (78.00%)	108 (85%)
Latino	3 (6.00%)	4 (3.15%)
Multiracial	2 (4.00%)	2 (1.57%)
Other	2 (4.00%)	5 (3.94%)
White	4 (8.00%)	8 (6.30%)
Total	**50 (39.37%)**	**127 (100%)**

Table 1: Race/Ethnicity of Qualified Applicants from Year 1

After processing in *Applications Quest,* 50 applicants were recommended for admission and their racial, gender and grade point average breakdown is given in Tables 1, 2 and 3. The difference index for the 50 recommended applications in *Applications Quest* was 62.3% versus 57.0% for the entire applicant pool. Therefore, the recommended applicants were holistically 5.3% more diverse than the entire applicant pool. The program administrators were very pleased with these results. Therefore, the program administrators agreed to use *Applications Quest* again the following year.

In the next year of the summer program, the program administrators received 176 qualified applications. This was a 35.6% increase from the previous year. This increase in applications is due to a significant increase in applications from the racial majority (White) applicants. Table 4 has the racial/ethnic breakdown of the applicants. Notice that the number of White applicants significantly increased from the previous year. The difference index for this applicant pool was 29.1%, which is significantly different from the difference index in the first year (57%) because the second year applications contained different attributes. All 176 applications were loaded and processed in *Applications Quest* with a goal of recommending 50. After processing the 176 applications, *Applications Quest* found a difference index of 39.23% for the 50 recommended applicants, yielding a 10.17% difference in the difference indexes. Again, *Applications Quest* had selected a holistically more diverse group of applicants versus the applicant pool. The demographics of the 50 recommended applicants can be found in Tables 4, 5 and 6, race, gender and grade point average.

Discussion

So what can be made of these findings on the use of *Applications Quest* in a race-specific program at a major research institution? First, as in the findings of this study suggests, many colleges/universities across the nation want to continue their diversity initiatives through race-specific programs and funding opportunities; however, until now, the research community had failed to provide a viable solution that would withstand legal challenge. As a result of the data presented in Tables 1-6, we find that after a holistic evaluation of an entire applicant pool, *Applications Quest* selects for admission a more holistically diverse pool than the original pool that applied for the race-specific program. Second, *Applications Quest* does not give preference to any attribute, specifically race;

Gender	Recommended Applicants	All Applicants
Female	34 (68.00%)	103 (81.10%)
Male	16 (32.00%)	24 (18.90%)
Total	**50 (39.37%)**	**127 (100%)**

Table 2: Gender of Qualified Applicants from Year 1

	Average	Standard Deviation	Max	Min
Recommended Applications	3.42	0.29	4.00	3.00
All Applications	3.43	0.29	4.00	3.00

Table 3: GPA of Qualified Applicants from Year 1

therefore, it is compliant with all legal decisions from the U.S. Supreme Court. This is especially important given the current debate around this issue. As a result, the variable of race is processed like all other applicant information to holistically determine a diverse student body. Finally, *Applications Quest* makes recommendations for admission to race-specific programs or to any university who seeks to have a diverse student body by reducing the threat of legal challenge. Although a few examples have been given in the media of universities that have struggled with these issues, there are numerous colleges/universities around the country, that haven't been given media attention to this point, who are seeking answers to these issues. As a result, a viable solution has emerged, *Applications Quest.*

Given the variety of issues surrounding this topic, it is important that specific recommendations be provided to key constituents who can have a major impact on this issue. More specifically, recommendations are provided to: (a) presidents and provosts and (b) student affairs professionals.

Recommendations for Academic Affairs Professionals

Academic Affairs professionals at colleges/universities will have to become more proactive if colleges/universities are going to continue to promote diversity as a key element in their respective student bodies and race-specific programs/funding opportunities.

1. Every effort should be made to keep diversity at the forefront of the institutional practices of the college/university. This is especially important for employees who continue to be on the front lines on implementing

these initiatives at the institution.

2. Direct action should be taken to educate/support employees who explore viable solutions (i.e., Applications Quest) to diversify the student body on race-specific programs. When implementing viable solutions, increased media attention may occur, however, the support of the president/provost is critical given that Applications Quest meets all of the legal requirements of the U.S. Supreme Court. However, full support by Academic Affairs professionals will be critical in the court of public opinion.

Recommendations for Student Affairs Professionals

As the personnel (i.e., admissions officers, program directors, etc.) or the front lines of this issue, the following recommendations are especially important:

1. An increased effort should be made to continue to recruit and retain a diverse student body even in a time where the benefits of diversity are being questioned.
2. Every effort should be made to continue to seek viable solutions that will keep race-specific programs/funding opportunities with viable solutions (i.e. Applications Quest) on the radar screen of university administrators.
3. Efforts should be made to pilot with viable solutions that are available. As many universities seek to maintain the integrity of their programs are now stepping forward to make use of this program to achieve the various goals that are set forth.
4. Continue to bridge the gap between student affairs and academic affairs to assist with this initiative.

Conclusion

As a result of several attacks on race-specific programs and recent decisions in high profile court cases, it is no longer acceptable for institutions of higher learning to offer race-exclusive programs; however, race-specific programs are still legal. Under these constraints, we recommend an inclusive selection process for race-specific programs using a data mining and analysis tool, Applications Quest. We presented findings from a case in point study that demonstrates how this process can be utilized to achieve diversity goals within legal bounds. Our results illustrate how Applications Quest provided holistically diverse applicant recom-

Race/Ethnicity	Recommended Applicants	All Applicants
Not Specified	1 (2.00%)	2 (1.14%)
African-American	19 (38.00%)	96 (54.55%)
AA(WestIndian)	1 (2.00%)	1 (0.57%)
AA/White	0 (0.00%)	1 (0.57%)
African	1 (2.00%)	1 (0.57%)
African:Ethiopian	0 (0.00%)	1 (0.57%)
African:Nigerian	0 (0.00%)	1 (0.57%)
Albanian	1 (2.00%)	1 (0.57%)
Asian	3 (6.00%)	4 (2.27%)
Asian:Indian	2 (4.00%)	4 (2.27%)
Asian:Taiwanese	0 (0.00%)	1 (0.57%)
Australian	0 (0.00%)	1 (0.57%)
Black/Indian	1 (2.00%)	1 (0.57%)
Brionni	1 (2.00%)	1 (0.57%)
ChineseAmerican	0 (0.00%)	1 (0.57%)
EastIndian	1 (2.00%)	1 (0.57%)
Ethiopian/Black	1 (2.00%)	1 (0.57%)
Greek	0 (0.00%)	1 (0.57%)
HaitianAmerican	0 (0.00%)	1 (0.57%)
Indian	1 (2.00%)	2 (1.14%)
Latino	3 (6.00%)	6 (3.41%)
Latino:Cuban	0 (0.00%)	2 (1.14%)
Latino:Mexican	1 (2.00%)	1 (0.57%)
MiddleEastern-Egyptian	1 (2.00%)	1 (0.57%)
Mixed	0 (0.00%)	1 (0.57%)
Other	1 (2.00%)	1 (0.57%)
Polish-American	1 (2.00%)	1 (0.57%)
White	8 (16.00%)	38 (21.59%)
White/Asian	1 (2.00%)	1 (0.57%)
White/NativeA	1 (2.00%)	1 (0.57%)
Total	**50 (28.41%)**	**176 (100%)**

Table 4: Race/Ethnicity of Qualified Applicants from Year 2

mendations from different qualified applicant pools across a two year investigation. Each year the applications slightly changed yielding significant differences in the difference indexes for each year; however, the final results were the

same for each year. The final results were holistically more diverse recommendations versus the original qualified applicant pool. This approach enables administrators of race-specific programs to continue their work and ultimately increase or maintain diversity within their institutions and organizations.

Gender	Recommended Applicants	All Applicants
Not Specified	1 (2.00%)	2 (1.14%)
Female	39 (78.00%)	126 (71.59%)
Male	10 (20.00%)	48 (27.27%)
Total	**50 (28.41%)**	**176 (100%)**

Table 5: Gender of Qualified Applicants from Year 2

	Average	Standard Deviation	Max	Min
Recommended Applications	3.37	0.76	4.00	0.00
All Applications	3.39	0.56	4.00	0.00

Table 6: GPA of Qualified Applicants from Year 2

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