U.S. COMMISSION ON CIVIL RIGHTS

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COMMISSION BRIEFING

ENCOURAGING MINORITY STUDENTS TO PURSUE CAREERS IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATH

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FRIDAY, SEPTEMBER 12, 2008

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The meeting convened in Room 540 at 624 Ninth Street, N.W., Washington, D.C. at 9:30 a.m., Abigail Thernstrom, Vice Chairperson, presiding.

PRESENT:

ABIGAIL THERNSTROM, Vice Chairman
TODD GAZIANO, Commissioner
GAIL L. HERIOT, Commissioner
PETER N. KIRSANOW, Commissioner
ARLEN D. MELENDEZ, Commissioner
ASHLEY TAYLOR, JR., Commissioner
MICHAEL YAKI, Commissioner

MARTIN DANNENFELSER, Staff Director

STAFF PRESENT:

DAVID BLACKWOOD, General Counsel
TERESA BROOKS
CHRISTOPHER BYRNES, Chief, Programs Coordination Unit
DEMITRIA DEAS
PAMELA A. DUNSTON, Chief, Admin. Services and Clearinghouse Division
LATRICE FOSHEE
ROBERT LERNER, Assistant Staff Director for OCRE
EMMA MONROIG, Solicitor
LENORA OSTROWSKY
VANESSA WILLIAMSON
AUDREY WRIGHT
MICHELE YORKMAN

COMMISSIONER ASSISTANTS PRESENT:

TIM FAY
DOMINIQUE LUDVIGSON
JACK KAMMEN
KIMBERLY SCHULD
HANS VON SPAKOVSKY

PANELISTS PRESENT:

ROGERS ELLIOTT
THOMAS FORTMANN
RICHARD SANDER
RICHARD TAPIA
ROBIN WILLNER

TABLE OF CONTENTS

BRIEFING AGENDA

Topic: Encouraging Minority Students to Pursue Careers in Science, Technology, Engineering and Math

P R O C E E D I N G S

9:40 A.M.

I. Introductory Remarks by Vice Chair

VICE CHAIR THERNSTROM: Good morning, everybody. I am the Vice Chair, Abigail Thernstrom. Gerald Reynolds, the Chair, could not be here today.

On behalf of the U.S. Commission on Civil Rights I welcome everyone to this meeting on encouraging minority students to pursue careers in science, technology, engineering, and math.

This briefing will examine the reasons that a disproportionate number of minority students who start college intending to major in science, technology, engineering or math subsequently abandon those fields of study. Among other things, the Commission is interested in hearing whether students who are placed in an institution whose academic standards more clearly match their own academic preparation are more likely to achieve higher passage and graduation rates in those fields.

An area of special interest is the degree to which admissions policies may unintentionally result in fewer minority students receiving college degrees in science, technology, engineering, and math.

This is very funny. I've got the wrong script here.

At this briefing there will be two panels of experts? No, I don't think so. You have to hold on a minute. I have -- somebody has given me -- my incompetent assistant --

COMMISSIONER YAKI: Point of order. Are the mics really up for people in the back to hear?

(Simultaneous speaking.)

VICE CHAIR THERNSTROM: Was that a yes or a no?

COMMISSIONER YAKI: The answer was a resounding what did you just say? We can't hear you.

VICE CHAIR THERNSTROM: All right, somebody has to fix the microphone.

COMMISSIONER YAKI: Turn the volume up. Turn the volume up.

VICE CHAIR THERNSTROM: Can you hear me now?

COMMISSIONER YAKI: Madam Chair, you should throw your microphone up about two inches.

VICE CHAIR THERNSTROM: How is this? People in the back row raise your hand if you can hear?

COMMISSIONER YAKI: No, no. I'm not hearing the usual thingamajig up here.

(Microphone adjustments.)

VICE CHAIR THERNSTROM: Now with apologies to people in the back row, I'm not going to start all over. I'm just starting at the point of introducing the panelists and I think you know what this briefing is about, in any case, and I apologize to the degree to which I'm coughing. I'm about to put a cough drop in my mouth, but let me introduce people beforehand.

COMMISSIONER YAKI: Isn't that how Patrick Henry learned how to speak? He put cough drops in his mouth and spoke?

VICE CHAIR THERNSTROM: I'm sure you've got the historical record right, Michael, so I will accept your rendering of that historical fact.

Anyway, the record of this briefing will be open until Tuesday, October 14, 2008, and public comments may be mailed to the U.S. Commission on Civil Rights, Office of Civil Rights Evaluation, Room 740, 624 9th Street, N.W., Washington, D.C. 20425.

We are pleased to welcome a panel of experts that will address the topic that I've already outlined and which the back row didn't hear, but I

think you know what it is.

Our experts are to begin with Richard Sander. Dr. Sander received his Bachelor's degree from Harvard, a law degree, and a doctorate in Economics from Northwestern. He has taught at UCLA School of Law since 1989 where he does empirical research on social policy. He's probably best known for his research on legal education. In this area, Dr. Sander has studied academic support programs, class-based affirmative action, and most recently the systemic effects of racial preferences in legal education and law firms. And I am going to stop for a minute and take a cough drop.

(Pause.)

And in case anybody was taking my facetious remark seriously, I have a super-competent assistant who has even given me a cough drop and a cup of water, but in general, keeps me functioning in this Commission and is terrific.

Dr. Richard Tapia -- am I pronouncing your name correctly?

MR. TAPIA: That's fine.

VICE CHAIR THERNSTROM: Dr. Tapia currently holds the title of university professor,

Maxfield-Oshman Professor in Engineering at Rice University. While at Rice he has directed or co-directed more under-represented minority and women doctoral recipients in science and engineering than anyone in the country. He has received numerous national awards including the National Science Foundations Inaugural Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring. Leading professional organizations have named two conferences in Dr. Tapia's honor describing him as a seminal figure who inspired a generation of African-American, Native American, and Latino students to pursue careers in mathematics. I am so sorry about this cough.

Dr. Elliott has taught at Dartmouth College since 1962 with a special focus on -- yes, I do -- that would be fabulous. Thank you.

(Pause.)

COMMISSIONER YAKI: So are we on Dr. Elliott?

Rogers Elliott. Dr. Elliott has taught at Dartmouth College since 1962 with a special focus on psychology and law and individual differences and abilities. An area of special interest to Dr. Elliott

has been the relatively low number of African-American science graduates in spite of the apparently relatively high number of such students who started college to obtain a major in those fields. The basis for Dr. Elliott's presentation today is a study titled "The Role of Ethnicity in Choosing and Leaving Science in Highly-Selective Institutions" which is co-authored with several colleagues.

Thomas Fortmann, our next speaker, Tom Fortmann, received a B.S. in Physics from Stanford University -- I went to Cal, so I have got some issues there -- and a Ph.D. in Electrical Engineering from MIT.

VICE CHAIR THERNSTROM: You're allowed to read, but not ad lib.

(Laughter.)

COMMISSIONER YAKI: You gave me the paper I have control of the paper.

He has spent a quarter century as a successful technology entrepreneur and is a strong advocate for improving the teaching of science and math. Dr. Fortmann was appointed to the Massachusetts Board of Elementary and Secondary Education in 2006. He was instrumental in modifying state regulations to

require a mathematics test for elementary certification and he wrote the state guidelines specifying college mathematics courses for elementary teacher candidates.

Last, but not least, is Robin Willner. Ms. Willner is Vice President of Global Community Initiatives for the IBM Corporation. She joined IBM in 1994 to design and implement re-inventing education, a $75 million initiative in K through 12 school reform. This program is comprised of dozens of collaborative efforts across the U.S. and throughout the world to develop new applications of technology, to overcome common barriers of school improvement and increase student achievement. Ms. Willner serves on the Boards of Directors of Grantmakers for Education, the Center for Education Policy, and the National Academy of Engineering K through 12 Task Force.

I'm going to ask you all to please swear or affirm that the information you have provided is true and accurate to the best of your belief. Please raise your right hand and just say I do.

(The witnesses were sworn.)

COMMISSIONER YAKI: Thank you very much and I will now turn it back to the Vice Chair.

VICE CHAIR THERNSTROM: Thank you all for coming. We very much welcome your participation here and I'm going to call you in the order in which - -the order that I've given for the record. So, Dr. Sander, you're on for ten minutes and -- well, you already know the order because it is the order in which you are sitting and which I introduced you.

II. Speakers' Presentations

MR. SANDER: So I've got a PowerPoint that's up before you. I'm going to pass up to the Commission copies of the PowerPoint presentation. I'll be writing up comments later for the record.

Let me just say of the outset that the research I'm presenting today is preliminary in many ways. Much of it is based on data that we obtained from the University of California this summer. I am working with several co-authors to refine these analyses so I think we have interesting and solid results, but they will be subject to revision as we move forward in doing this analysis.

Next slide, please.

I'd like to start by just trying to lay out for everyone the parameters of the issue that we're talking about here by giving a few statistics.

This chart shows how different races are doing in achieving bachelor degrees and advanced degrees in science. And what I've done is normalize everything to whites where whites are indexed at one hundred so that you can see the attrition or over-representation of each group relative to their proportion of the population as you move through the ladder.

So if you compare blacks and whites, blacks are about 56 percent as likely as whites to get a B.A. relative to their proportion of the general population, and about 43 percent as likely to get a Ph.D.

Attrition from science is even steeper. Blacks are 36 percent as likely as whites to get a B.A. in science and 15 percent as likely to get a Ph.D. in science. If you look at the -- if you exclude biological sciences, then the black number falls to about eight percent.

Hispanics, you can see, follow a generally similar pattern, while Asians are intensely over-represented and extremely successful in science.

A very interesting pattern to notice comparing blacks and Hispanics though is that the Hispanic attrition really occurs in the general

educational process. If you compare Hispanics in a B.A. or Ph.D. population, compared with Hispanics in science B.A.s or Ph.D.s, Hispanics actually are over-represented in science compared to concentrations in other fields. So that's an important signal that something somewhat different is going on with blacks and Hispanics.

Next slide?

So I think what we're discussing today, as I understand it, are four possible hypotheses about why the black and Hispanic numbers are lower. Hypothesis 1 is that black and Hispanic students are just less interested in science than whites and Asians. Hypothesis 2 is that blacks and Hispanics have lower achievement levels, lower credentials by the time they finish high school, and that subsequently influences their success rate.

Hypothesis 3 is that minority students have worse outcomes because of factors like discrimination or inadequate support in higher education.

Hypothesis 4 is that many talented minorities are interested in and go into science in college, but experience mismatch effects that cause

them to struggle or leave science.

The mismatch effect which was developed by Dr. Elliott in the very important article that he'll be talking about soon essentially argues that if you go to an educational environment that's competitive and where your credentials are much lower than those of your classmates, you will struggle disproportionately. You will learn less and you'll be more likely to drop out or leave the science major than you would be at an institution where your credentials matched the rest of your class.

So these are four different possible explanations that we'll be exploring.

Next slide.

First hypothesis is whether minorities are less interested in science. And this, I think, is the easiest to dispose of because clearly blacks and Hispanics are interested in science.

Next slide.

If you look at this data, this is from three different sets of information comparing the level of interest at the end of high school between different racial groups. The first two rows are from data I have from the University of California. The

third row is from the HERI survey conducted by Alexander Astin. The fourth row is Dr. Elliott's data on the four elite institutions he'll be talking about. In all cases, you can see that blacks and Hispanics are more interested in science as they finish high school than whites are. It's not a large margin, but it's a very consistent margin. So I think Hypothesis 1 is incorrect. That does not explain what's going on.

Hypothesis 2, next slide.

Here, I think it's very clear that a major part of the story, probably the largest part of the story, is explained by the lower achievement levels of minorities by the time they finish high school. That fact has been obscured somewhat by some of the writing in this area, in particular, writing by Bowen and Bok in their famous work "The Shape of the River" which attempted to evaluate Affirmative Action programs in the '70s, '80s, and '90s.

Next slide.

If we look at a representative table from Bowen and Bok, what you see here is an analysis that they do of how graduation rates are affected by SAT scores in the elite schools that they studied in

"Shape of the River." The basic theme of Bowen and Bok -- next slide -- you'll see this again is that SAT scores don't matter much, that your incoming credentials are largely irrelevant and what really matters is where you go to school, that if you get a preference into one of the elite schools to study, you're very likely to be successful. That finding, I think, is fundamentally wrong and I don't think it's holding up to subsequent research.

Next slide.

A year ago I obtained data from the University of Michigan in litigation over the constitutionality of Proposition 2 and we found that when you look at SAT scores, and other admissions credentials that are used by Michigan in admitting students and you group students according to their credential levels, there were dramatic differences in outcomes based on student credential level. Even more interesting is that minority outcomes, although generally lower in most tables, including the Bowen and Bok analysis, are actually higher when you control for index.

So here we have a chart showing the percentage of students coming in and getting degrees

in science and as you can see, for students who receive a large preference, those with scores of under 660, success rates are very low, about 5 percent for blacks and about 3.5 percent for whites. Whereas, if you look at students who didn't receive a preference with net scores of 820 or higher, about 44 percent of blacks are getting science and engineering degrees, compared to about 35 percent of whites.

Next slide, please.

If you look at graduation rates in four years, you see a very similar story. Again, this is University of Michigan, 1999 entering students. Students receiving a large preference have miserable graduation rates in four years. Students not receiving a preference have spectacular graduation rates, well, not spectacular, but very good. And the black rates end up surpassing the white rates once you get into the no preference range.

This finding holds up from a variety of data sources, most recently data that I've obtained through the University of California which covers about a half a million students over the period 1992 to 2006. One finds that credential levels are incredibly predictive of how successful you are within

an institution. So what this means is that in general because credential levels are lower for blacks and Hispanics than they are for whites at the start of college, we're going to have to expect somewhat lower success rates. There may be things we could do, but that statistical relationship is quite strong and prevalent.

And secondly, where you end up going to college is potentially highly important. It's a little bit implausible, just looking at the Michigan data, that students who receive a large preference at Michigan, who are, after all, strong students compared to the general population, are having such low success rates in graduation and such incredibly low rates persisting in science.

Go down two slides, please.

So to look at Hypotheses 3 and 4, that is, what's causing the higher attrition rates of blacks and Hispanics in college, we're really interested in comparing two things. One is what's the effect of being mismatched at the particular school that a student attends and what's the effect of being a minority when you control for other characteristics?

And to look at these, I'm going to present

to you data mostly from the University of California, as well as another dataset with which, for the first time, we can effectively control for race and mismatch effects separately. Next slide, please. The University of California data, as I said, covers almost a half a million students and it ranges across eight University of California campuses. For these analyses I'm just presenting some simple bar graphs for the most part that show the rough relationship.

If you look at regressions, the story is told I think much more powerfully. But basically what we're looking at here is we're comparing students who were mismatched at Berkeley and a little less mismatched at UCLA, the most competitive UC schools with students who are otherwise similar in their academic credentials, but are going to less competitive UC campuses. And the question is, for this pool of similar matriculants, how do the success rates for students at the elite campuses compare to those for students at the less elite UC campuses?

Next slide, please.

So this looks at under-represented minorities entering the UC system in 1992 to 1994. These are general estimates of the probability that

students entering the various campuses are going to end up getting a bachelor's degree in science or engineering.

What you see here is that at UC-Berkeley and UCLA, the rate is about five percent. At the other campuses, it's consistently higher, generally it's dramatically higher. So at five of the six campuses it's double the Berkeley-UCLA rate.

Next slide, please.

This looks at a similar pool of students from the '95-'97 cohort, and we see a similar story.

Next slide.

Next slide, please.

Now this is a different cohort. Here, we're looking at students who say when they come into the UC system that they want to major in science. And it's looking at their ultimate success rate in getting a science degree. So the percentages are all higher because we're excluding students who never intended to go into science.

Remember, these are students with a significant degree of mismatch at Berkeley, but are less mismatched at UCLA and even less mismatched at the other UC schools. Their success rate at Berkeley

is about 12 percent. Their success rate at UCLA is about 25 percent. Their success rate at the other schools ranges from the low 20s to the high 40s. So again, I think all these things show very compelling evidence that there really is a mismatch effect that's going on.

Next slide, please.

This slide shows that the story does not differ significantly for underrepresented minorities, and in fact, non-mismatched minorities at campuses like Santa Barbara and Irvine achieve greater success rates than their similar non-mismatched white counterparts.

Why don't we go into the next one as well?

One possible counter-hypothesis would be that Berkeley and UCLA are just really rotten places to do science, so here we look at students who are positively mismatched – that is, they have credentials that compare favorably with their classmates. And here you see that Berkeley and UCLA's rates are as high or higher than those of the schools that we've been comparing them to.

Next slide.

This is a different database using the

collegiate learning assessment program that has been started nationwide and has about 200 participating colleges. I'm looking at something very narrow here which is just your likelihood of being a math major. And what I've done is run a similar regression control for four different factors: SAT score, your local mismatch compared to your classmates at your institution, your gender, and whether you're African-American. And what this regression is showing is that gender and race are not predicting your likelihood of getting a math degree. SAT is strongly predictive, but the strongest predictor here is actually the mismatch. It has a stronger negative effect than the SAT's positive effect.

This is a simple analysis, but more complicated regressions that I've done with the University of California data are yielding very similar results. In other words, race drops out of the equation in most of the analyses that I do when you control for both mismatch effect and college credentials. The mismatch effect I would not argue is stronger than the credentials effect, in general, as an overall explanatory factor. I think that my preliminary assessment is that probably 60 percent or

so of the story that we're looking at here in terms of under-representation of minorities is due to low credentials and 25 to 30 percent is due to mismatch effects with a variety of other factors causing the balance.

Thanks very much.

VICE CHAIR THERNSTROM: Thank you very much. Sorry about that.

Dr. Tapia, you are up.

MR. TAPIA: I'm Richard Tapia. I'm a mathematician.

VICE CHAIR THERNSTROM: Did I mispronounce your name?

MR. TAPIA: Don't worry about it.

VICE CHAIR THERNSTROM: Sorry about that.

MR. TAPIA: I'm Richard Tapia. I'm a mathematician from Rice University in Houston where I hold the title University Professor, Maxfield--Oshman Professor in Engineering and Director of the Center for Excellence and Equity in Education. One of my claims is that Rice, through my leadership, reproduced a very large number, probably the largest number in the country of under-represented minority doctoral recipients in mathematics, science, and engineering.

Rice is a very highly competitive level one research university.

First, I'll tell you a bit about myself. I was born in Los Angeles to parents who immigrated from Mexico. I attended a below-average high school in Los Angeles, in fact, a very poor high school. I was not directed to college by school teachers or counselors, although I had demonstrated strong mathematical talent. I was directed to college by a coworker at a muffler factory that I was working at after high school. I attended community college. It was a great experience.

I attended community college. I was directed to UCLA by community college math professors, very fortunate. They got a hold of me. They said you've got great math talent. You should go to UCLA. I was going to go to a state school and that was one of the turning points of my life, going to UCLA was phenomenal.

After a Ph.D., I was directed by UCLA math professors to faculty at the University of Wisconsin to faculty at Stanford and to Rice, again, very fortunate for me. I have numerous awards for my accomplishments, first native born Hispanic elected to

the National Academy of Engineering; first minority mathematician promoted to a category of University Professor; was a Clinton appointee to the National Science Board, on and on.

The need to STEM activity. STEM is of great value to nations. It strengthens their economy. The United States leads the world in STEM higher education. The United States educates STEM leaders for most of the world's industrial nations.

Domestic STEM leadership. Top research universities choose faculty from Ph.D.s produced at top research universities. That's simple. Ph.D.s produced minority-serving schools or less prestigious schools will not become faculty at top research universities. Indeed, it's unlikely they'll become faculty at minority-serving institutions.

The nation selects leaders from graduates and faculty of U.S. universities with world-class STEM research programs. If we, the under-represented minorities are to be an effective component in STEM leadership, then we must have an equitable presence at students and faculty at the very top level research universities. We will serve as role models, mentors, guide and inspire the next generation.

A measure of success, it's certainly not numbers of degrees obtained by minorities alone, that's not a good measure of success. They must be degrees that are competitive with the population overall. The distribution cannot be skewed towards weaker schools. This type of skewing would perpetuate the stereotype. Separate, but equal, is indeed always separate, but never equal.

We need minorities who can lead and those have to be produced by institutions that give credibility to the scientific accomplishments of the person. My educational axioms are we should not be able to predict quality of education received by race of ethnicity. Race and ethnicity should not dictate educational destiny. Our current path will lead to a permanent underclass that follows racial and ethnic lines. Public education must make the nation strong, not make the nation weak. An important message.

Under-representation endangers the health of the nation more than it endangers the health of the professions. Moreover, the under-represented minorities' worst enemy is poor K-12 preparation and for some, K-16 preparation. California and Texas are majority/minority states. California and Texas have

the opportunity to show the nation the path to salvation or the path to destruction, the proper form of affirmative action, in my view.

Evaluate the evaluation criteria. Is it excluding individuals with talent to succeed? It's not that bad individuals are accepted. It's those very, very capable individuals who are excluded.

A fair use of standardized test scores. At Rice we used the threshold approach. We have a cutoff score and everybody below that score is not acceptable, but we won't differentiate between a 1600, a 1500, or a 1400. There's a cutoff point. I agree with Professor Sander that there's much more information at the bottom of the SAT than there is at the top. I can tell you somebody below 800 combined score at Rice will probably not be successful in any engineering and science. But I can tell you that someone at 1500 or 1600 or 1400 will be more successful, indeed.

Rice last year rejected several SAT scores that were perfect. Each year we reject perfect SAT scores, not because of that alone, but because that's not enough. The one thing that we do know about SAT scores and the College Board agrees with this is a

great predictor of family income and that's pretty close.

We must promote success and retention with safeguards and support programs. This has been our success. We must combat isolation and lack of critical mass through community building and peer/faculty mentoring. Isolation, not academics, is often the problem. For example, Rodrigo Banuelos, a distinguished Mexican-American mathematician, probably the most distinguished in the United States, chairs the Math Department at Purdue, tells me the following story. He was a UCLA Ph.D. student. He was isolated. He wasn't sure if he could make it. He didn't see other Mexican-Americans. A faculty member said Rodrigo, you're not the first Mexican-American student here, Richard Tapia was. He went to the library. He took out my thesis. He did not read it. He said it was 107 pages. He carried it around for seven days and seven nights. He sat it down and he finished.

Admission without retention is of negative value. Research universities must be responsible for providing programs that promote success rather than be let off the hook by saying that minority students should go to minority-serving institutions or less

prestigious schools.

STEM admissions. We value what we measure because we do not know how to measure what we really value, creativity. We just don't measure that. I'm talking about STEM. I would have different views if we're talking about a say a medical score alone. Under-represented minorities can be quite creative. For example, the Carl Hayden High School Robotic Team, five Mexican-American students from Carl Hayden High School is West Phoenix, beat MIT in the final in underwater robotics. They were not star students, but they were incredibly creative. They needed to be nurtured and this is a huge success.

Minority individuals with doctorates from elite schools are well positioned for national leadership. To start off, Shirley Ann Jackson, president of RPI, MIT Ph.D.; Ruth Simmons, president of Brown University, Ph.D. from Harvard, Houston Texas High School, Dillard undergraduate; William Massey, Ph.D. from Stanford, Princeton Professor; Arlie Petters, Ph.D. from MIT and Princeton, very successful leader, Professor at Duke University; Sylvester James Gates, Ph.D. from MIT, very strong leader in outreach physics activity; Hector Reese, Ph.D. from Rice,

recent CEO, Chairman of the Board, and President of AMD, one of the top CEOs of any technology company, probably the most famous under-represented minority.

I mentioned Rodrigo Banuelos. He's chair of the Math Department at Purdue. Francisco Cigueroa, young, Mexican-American from south Texas, Harvard educated, today he is President of the University of Texas Medical School in San Antonio and is doing great things. I also mentioned Richard Tapia. I'll leave it at that.

Do most of us have to overcome deficiency in preparation? Absolutely. We talk about it. Probably with the exception of Shirley Ann Jackson. I'm sure she was strong from the go.

The system is broken. Neither component, minority or majority institutions promote equitable representation. As an illustration, let's consider this, consider Texas Southern University, TSU, a historically black college and university, and Rice University, a selective, elite private university, both in Houston. So here's what I want for the big fix. Which national problem is easier to solve? Bring TSU up to the academic excellence of Rice so that capable, minority students will be competitive

with Rice students in the industrial job market; competitive, professional leadership positions and be accepted at professional schools. That's one. Build TSU up so it's competitive with Rice.

Two, here's a fix, too. Design and implement programs at Rice so that capable, minority students have the same retention rate as those at TSU and are able to maintain self-confidence. Retention has already been done.

Clearly, it's the latter. A by-product of the solution is the added bonus of enhancing training and opportunities and a greater likelihood for getting into leadership positions. It has taken a century to build this effective machine. Rice minority graduates are highly sought after, highly successful. My success in producing Ph.D.s has been mainly students who come from research universities as undergraduates. It's very hard to produce someone from a minority-serving institution or a lower level preparation school because with a less rigorous preparation.

So a student from a research school with a lesser transcript is stronger than a student from a minority-serving institution with all As. Rice minority undergraduates are the super stars. I take

them and we do great things with them.

A proof of feasibility, moving in the direction of the solution. Look at the University of Texas, Austin in their STEM program, their undergraduate programs. The activity there was called a Texas Top Ten Percent Rule. It was motivated by the Hopwood decision which was loss of Affirmative Action. Ten percent of the students in public education in Texas are accepted into University of Texas, automatically, the top ten percent. No board scores, just are you in the top 10 percent of your class? Now since Texas high schools are de facto segregated this leads to parity among minorities in the freshman class at UT Austin.

Now UT Austin, the Math Department, who are a lot of them are my friends, they could have said look, these students are not prepared well. They're dumped at our doorstep, let's leave them. They didn't. They built support programs, the most famous is the Emerging Scholars Program built by Uri Treisman at the University of Texas, where minorities are now at the University of Texas are retained and succeed at a level above the majority above the Asians, above the whites. It took a realization that here they are,

let's do something with them, and let's do it.

Okay, the UT Emerging Scholars Program, as I mentioned to you is now being adopted across the country. It probably has had the best impact of minority retention in mathematics of any other program in the country. Several of our Rice STEM graduate programs are doing the same thing. Rice minority graduates do extremely well and our retention is on par with the majority. The retention rate at Rice is the same for minority-majority.

Another example would be the Mathematics Department at the University of Iowa, led by David Manderschied. The University of Iowa said minorities in math are not making it. Let's put special efforts into programs which retain them. They are now being competitive with our programs, i.e., Rice programs that are producing under-represented minority Ph.D.s in mathematics.

VICE CHAIR THERNSTROM: Professor Tapia, I am afraid you are going to have to conclude.

MR. TAPIA: Okay, the consequence of doing nothing. We must make opportunities available for minorities at our lead schools. Anything less endangers the health of the nation. Everyone must be

treated well. Treating everyone the same is not good enough. Sink or swim has not and will not work. It pays to privilege not to talent. The so-called mismatch phenomenon reinforces my statements on this point of view. If we leave schools alone and don't fix them, then the disaster that is happening will continue.

Thank you.

VICE CHAIR THERNSTROM: Thank you very much and we turn to Dr. Elliott.

MR. ELLIOTT: I mis-estimated what the forum of this meeting was going to be like. Let me say this --

VICE CHAIR THERNSTROM: You do understand that what's missing from your oral presentation will be part of the written record.

MR. ELLIOTT: Right, I see my paper is in a book here somewhere.

VICE CHAIR THERNSTROM: It's a different context. But it will be part of the record of this briefing.

MR. ELLIOTT: Rick Sander has said pretty much, well, what he said I agree with, of course, partly because it included my data. My argument is

and was when I wrote in the paper -- with my colleagues -- that race preferences in admissions in the service of Affirmative Action are harming the aspirations particularly of blacks seeking to be scientists by creating this huge mismatch that Dr. Sander alluded to or has shown us.

It is too large to overcome or it certainly was when I did this. I'll try to get to the issue of what you can do about it which Professor Tapia has already brought up. The differences are largest at the most elite universities because they have very high levels in their admission standards, levels which minorities, especially again blacks, don't come close to meeting. Most of their students are two standard deviations above the mean of standard measures of developed ability, like the SAT or the ACT or achievement tests or high school grades, all of those.

And it just -- I'll give you an example, by the way, we took these data from '88 to '92 and the data represent the 5300 members of four Ivy League universities who started in '88 and graduated in '92, most of them, about 90 percent of them graduated then. The gaps that are illustrated in these data have not

gotten any better. They have, in fact, gotten a little bit worse, that is to say the gap in the SAT scores between blacks and whites which got to its smallest extent in about 1991, at about 194 points, is back to 209 since then. So whatever I say about the gap that existed then applies now.

Affirmative action in elite schools which they pursue vigorously and successfully, too, leaves a huge gap, probably bigger than it would be for Affirmative Action at sort of an average school. And that is what constitutes the problem.

Let me now, if you will give me slide one up, I don't think we can see it very well. Try slide two, which is simpler and maybe bigger. It is, but it's a little harder to read unless we all lie over on our left side.

There you go, okay. What it shows -- I put the whites and Asians together for this slide, although in the paper they're separate and you see what you've already seen before perhaps which is that about 43 or 44 percent of the students in all those groups, Hispanic, black and whites/Asian, intended to do science. They were asked when they came in what they wanted to major in and it was very easy to

categorize most of them into whether they wanted to do natural science or something else.

And then we had measures -- we had their high school transcripts and their college transcripts. We knew a great deal about these students. And there were differences, for example, in the number of high school science courses they took, but they weren't huge. The figures at the very right, for example, show you that under the column, headed black, that the blacks took about on average 9.5 high school science courses and that 35 means they were about the 35th percentile of the white/Asian distribution in terms of number of science courses they took.

Similarly, for the Hispanics, if you can see it.

If you look down to the next row I'll direct your attention to SATM. You see that the whites and white/Asian group had 715 for an average for those interested in science. It would have been lower for those -- it was lower -- for those not interested in science. And they were, of course, at the 50 -- the average one was at the 50th percentile of their distribution, necessarily.

The Hispanics on that score, and I'll show

you why that's an important signifier, were at the 16th percentile of the white/Asian distribution and the blacks at the fourth percentile which left them in a very bad competitive position.

The academic index sums up high school standing in terms of grades and rank, achievement test scores and SAT scores, all in one number. And the blacks were again at the fourth percentile of the white/Asian distribution, a very difficult position to deal with. That's the data on how well prepared they were for college. How they did in the first two years of college is listed in the next row in part B of that table called college performance, science grades. The white/Asian group had just about 2.98, just about a B. The Hispanic group, 2.46, a little bit farther down. They were at the 23rd percentile of the white/Asian distribution and the blacks 2.21 at the 14th percentile.

The first two years of science -- science is unlike -- it's really quite different from all these other things. It is hierarchical. If you're not ready for the first course, you might as well forget it. You've got to get ready for it and if you're not -- some of these minority kids who had

mostly As, their high school grades were 3.5, for example, or better, enough to get to Dartmouth or Brown or Cornell or Yale, these were the four schools we studied. They take their first course, let's say in chemistry, and 90 percent of the students in that course, at least 90 percent, are bright, motivated, often pre-med, highly competitive whites and Asians. And these minority kids aren't as well prepared. They're just not. And they may get their first C- or D in a course like that because the grading standards are rigorous and you have to start getting it from day one because it builds. It's not like taking English Literature where you can take courses in almost any order. Or Psych, you can do that too. You can't do it in Chemistry. And you can't do it in Physics, in Math.

So they drop out. They change. Mostly, they don't drop out so much although the termination rate was reasonably high at 14.6 for blacks and 10.5 for Hispanics, just about 4 percent for the others. They change. They just do something else. It's not going to be science. It doesn't only occur to minority students. We have a lot of kids that come to Dartmouth who want to do pre-med or science and a lot

of the kids I teach in Psych. started in Physics or Chemistry or something like that, of any race, and they just got blown away. They didn't like the competitiveness just simply.

Okay, so that's it. Now if you'll show me the next slide, please. This is -- this shows the probability of majoring in science as a function of the SAT math score. And you can see it goes up, but there are really two branches of it, one up to about 650 and one beyond 650. Six fifty is an interesting score because 90 percent of science majors are 650 or above. And about 80 percent of the entire white/Asian group are 650 or above, but only 25 percent of the black group have that score or better.

If they do have that score, just as Sander's slide showed, they do just as well in terms of retention. Right away, I should have pointed out the retention there, which was a better persistence in science. The percentage of people who had an initial interest in it who stayed in it and majored in it was 63 percent for the white/Asian group, but only about 33 percent for the black group. They did wash out in pretty harsh numbers. It was very good, by the way, for the Hispanic group. They had about 55 percent.

Again, Sander's data indicated the same thing. The Hispanics have an unusual retention in science or an unusual interest in it.

In any case, this 650 score is, as I said, a good signal and if you look at the most recent SAT data from 2008, what you find is that if you take -- see where in the black distribution of scores, a black kid would have to have a 650, he would have to at about 2.5 standard deviations above the black mean or 2.3 standard deviations above the mean. And that would leave only about 2,000 blacks in the entire nation with 650 or above. It's very hard to recruit for science with numbers that's low. It is very hard.

When I go through this with my seminar each year, this sort of data, they say well, what can we do? What can we do? And by the time you get to college I know Professor Tapia has referred to programs that seem to be succeeding, but they don't -- I don't know -- I would love to see the data on what kind of scores these kids have coming into these programs. I mean there are such programs, but mostly they depend on the fact that you have to match people. If you'll show me the final slide, you ought to match people to the context in which they're competing and

they'll do better.

This is 11 institutions, the top one is Dartmouth. The bottom one, it's either Kenyon, Ohio Wesleyan, -- these are all private institutions. And what it shows us is the percent of science degrees as a function of what part of the SAT math distribution these kids are in at their institution. So they're in the top third of the SAT math distribution, the middle third, tercile 2, or the bottom third, tercile 3.

If you're in the top third, whatever your institution is then you have slightly better than 50 percent chance those people get more than half the science degrees from the top third of the distribution. If you're in the middle third, those people get about a third of the science degrees and if you're in the bottom third, those people only get 15 percent of the science degrees. Now look at the figure in the upper -- well, let's say the 581 figure in the upper right corner. That applies to Dartmouth. That means that people in the third, with 581, had a very low chance of getting a science degree, being among those who have got science degrees. But if you look down at the bottom, let's say institutions J and K, you would have had a better than 50 percent chance

of getting a degree because you're a star at J and K, and you're nothing much at A, all right?

And so now the bottom institutions don't give as many science degrees. The function is the higher the standard at the institution, the more science they tend to do. But they still do science and your chances of becoming a scientist are better down there for you than up here. Now obviously, there are differences. The higher institutions have eliteness going for them. They have prestige going for them and maybe getting a government degree from Dartmouth when you want to be a doctor will leave you better off in this world even though you're not doing the thing you started with as your aspiration.

So I mean I can't solve that problem, but I can tell you that most Ph.D.s, the biggest Ph.D. granting institutions for blacks in this country, 17 of the top 20 are HBCUs and none of them is a prestige university.

VICE CHAIR THERNSTROM: Thank you very much.

Dr. Fortmann.

MR. FORTMANN: Good morning. The Commission has posed two questions about STEM,

science, technology, engineering, and math.

Why minority students disproportionately abandon their aspirations for STEM and whether those students in institutions matched to their academic preparation are more likely to remain in STEM and succeed and to what degree affirmative action affects this.

So I'll attempt to answer the first question based on some on-the-ground experience. I don't have any data to present. And I'll comment briefly on the second one.

My background in this is somewhat unique. I have a physics degree from Stanford, a doctorate in electrical engineering from MIT. I taught for four years in university and then spent 24 years as a high-tech engineer and executive. I retired, I started teaching math as a volunteer to minority high school students in Boston in two high schools, discovered that the problems in math begin long before high school.

Although I will add parenthetically that the students I had in those high schools seemed to me to be perfectly normal adolescents, many of them quite bright, but just hopelessly behind in mathematical

preparation. So I founded a math institute for elementary teachers which in my opinion is where the root of the problem is. And more recently, I got appointed to the Massachusetts Board of Elementary and Secondary Education.

So why do minority students avoid or abandon STEM majors? I think it's largely for the same reason as non-minorities, insufficient preparation. Professor Elliott has mentioned this. Insufficient preparation during K-12, and the disproportionality is probably related to the lower quality of math and science and all other instruction, for that matter in minority and high poverty schools. Does Affirmative Action exacerbate that in college? Perhaps, but I'm here to tell you that the problem begins long before college. And it's most acute in math and math-related fields because math is more cumulative than say history or literature.

I quoted Steven Pinker here because he said this very eloquently. "Calculus teachers lament that students find the subject difficult, not because derivatives and integrals are abstruse concepts. They're just rate and accumulation. But because you can't do calculus unless algebraic operations are

second nature. And most students enter the course without having learned the algebra properly and need to concentrate every drop of mental energy on that. Mathematics is ruthlessly cumulative, all the way back to counting to ten."

He's right and I would add that the same is true of algebra. Students who don't understand fractions, who use a calculator to divide by ten and I've met many, many of them who do that, cannot make progress with algebra problems because they're bogged down in the arithmetic. I mean imagine trying to factor a polynomial and I've watched a student try to do this, if you don't have the times tables in your head. And so it goes right on down to first grade.

Now we clearly need more students of every classification, especially minorities and women in STEM and we have a program in Massachusetts called the STEM Pipeline Initiative that is attempting to help with this. It uses outreach and summer programs and internships and various marketing tactics to try to entice more people into STEM, especially minorities and women.

The problem, in my opinion, with this approach, it's not -- there's no problem with it, it's

a good thing to do, but if you have limited resources, in my view, the place to put the resources is increasing the pool of people for whom it's possible to go into STEM, rather than just recruiting harder from the same pool.

And the small proportion of students entering STEM, I think, reflects the state of mathematics learning in K-12, particularly among minorities. If you ask the college professors, a dean of engineering at a major state university told me that 50 percent of the people entering engineering as majors eventually switch to another major and he believes that in most cases that's because of -- they just don't have the math preparation to do it.

The math preparation in high school, ask the high school teachers why this is so. You'll often hear them say that the problem was in middle school and if you ask the middle school teachers, they'll tell you about the students' poor preparation in elementary school arithmetic. As far as I know, no one has yet attempted to blame the obstetricians.

So, this sort of cascade of blame is, in fact, based in reality. The root problem, as I've seen it and as I say I've been working intimately with

some of these people is the dearth of mathematics content knowledge among elementary teachers. It's really quite appalling and it extends to many middle school teachers as well. And until we solve that, improvements and innovations at the high school and college levels really can't have much effect. And the reason they can't have much effect is the cumulative nature of mathematics that I just mentioned.

Liping Ma was the first researcher to focus attention on this and if I could have that slide now. My experience shows that the problem is even worse than she describes. I do recommend the references there in my testimony and I do recommend, I gave you a reference to a summary of her book and I certainly recommend looking at it. But my experience is that the problem is worse than that. And here's an example from a math institute that I started from a cohort of fifth and sixth grade teachers. We're not talking second grade teachers. This is people, veteran teachers teaching fifth and sixth grade. We give them a precourse assessment before they start. And these two questions, 75 is 30 percent of what number? Forty-three percent of that group was able to answer that question.

The second question says find two numbers between 1-2/5ths and 1-41/100ths, a classic fractions question. Twenty-four percent of fifth and sixth grade teachers were able to answer that question.

What I've found is their attitudes about mathematics range from trepidation to full-blown math phobia and let me tell you math phobia is a contagious disease. You catch it from your teachers and you catch it from your parents. And none of this is the fault of the elementary teachers, but of the preparation programs and certification systems that virtually ignore mathematics. It also creates a vicious cycle. Each generation of teachers is recruited from people who left high school with even weaker math knowledge than the previous group and it just gets worse.

We've begun to address this in Massachusetts with new requirements which will begin in the spring. To get an elementary license from now on people will have to take a mathematics test and three appropriate mathematics courses in college.

So it's well known that teacher quality is the most important factor driving student achievement. There's plenty of research on that and teacher quality including math content knowledge is generally

lower in poor, urban districts serving minorities, so the disproportionality that the Commission notes is really no surprise.

And finally, let me comment on Affirmative Action. It seems self evident given the cumulative nature of mathematics that Affirmative Action is going to hinder some students' STEM aspirations, unless it's accompanied by some pretty serious and sustained efforts to remediate their math capacities as Professor Tapia mentioned earlier.

But in the absence of that sort of remediation, should those students be placed where their peers' proficiency is similarly lacking? It may result in more STEM majors, but I think it masks the underlying problem that the math deficits began back in K-12 where there was poor instruction, where there were math challenged teachers, where there was low standards and social promotion and too many of them were allowed to reach high school and to graduate without the math skills and understanding that they need.

So in other words, Affirmative Action comes into play pretty late in the game and it doesn't address the underlying math deficiencies that I've

described.

So I have a recommendation for the Commission. I encourage the Commission to investigate why so many minority kids arrive in college unprepared for STEM majors, i.e., why they need Affirmative Action at all, and what we can do about it. And I recommend that you investigate that as a civil rights issue and I refer you, if you haven't read Robert Moses' wonderful book called Radical Equations, about his civil rights experience and then his more recent experience running something called the Algebra Project where he says algebra is a civil right, if you haven't read that, I strongly recommend it.

The answers will go far beyond the scope of today's briefing. They'll get to the heart of education reform and teaching quality. That is, as you know, a can of worms, but it needs to be opened. It includes things like school choice and teacher preparation and certification, professionalizing teaching with career ladders and differentiated pay scales and incentives. It involves collective bargaining and accountability and standards-based testing and school leadership. So that's a tall order, but it really is necessary to get beyond the

symptoms that we're seeing and treat the disease.

Thank you.

VICE CHAIR THERNSTROM: Thank you very much and last but not least --

MS. WILLNER: Bringing up the rear here. Thank you.

Good morning. I'm Robin Willner and I'm a vice president at IBM. For full disclosure, I'm not a STEM professional. I'm a non-engineering IBMer, but I want to talk a little bit, to step back again, I don't have academic data on the specific questions that you've asked, but I think I can be helpful in putting this discussion in context. It's the context of IBM, a global company, with huge needs for talent and while I don't pretend in any way to speak for an industry or to speak for the private sector, our experience tells us that most of my colleagues would agree with the kinds of things that I'm going to put in front of you today, and the urgency to deal with this issue that you've raised, which is minorities in STEM careers.

And we are really beginning to look at a crisis in this area. We've always had widespread concern about future labor needs in growing areas of the economy and every major corporate leader

recognizes that the U.S. labor force must continue to provide the talent and leadership that we need for a robust economic future and to remain competitive in the global economy.

I want to talk a little bit more about that today in terms of global trends. I also want to share with you some of the work that we've done, particularly around Latino students and STEM careers at IBM with some activity that we began this year.

So let's think about some context. It's always been important to nurture a workforce in the U.S. with the necessary skills, as Professor Tapia discussed, but profound changes in the global economy that we've seen in the 21st century make this more important than ever. In a global economy, the world is not only smaller as we've come to learn, but it's fully connected, if you will. We are networked now. There will always be some businesses that don't need to worry about what is happening around the world. They have local customers. They have local markets. They have local suppliers. But they are becoming the rare situation. More and more successful businesses take the form of what we at IBM call the globally integrated enterprise. It's companies like IBM that

create great opportunities for American workers and generate important economic return in the U.S. precisely because we are globally integrated and functioning on a global scale.

But there are challenges with that.

And in a connected world, we have access to huge new markets. This is true. We can organize our business around the globe to optimize operations and improve productivity. However, the challenge is that when everything is connected, work flows throughout the network. And most importantly, work will flow where there is talent and that's where we come to the urgency of this issue.

Localities and states and other countries are realizing that they need to become places where knowledge is generated and transformed into new commercial and social value. And when we're talking about talent and this is a very important issue I think given the testimony that came before me, we're talking about talent. We're not talking about basic skills. We're talking about problem solvers. We're talking about creativity. We're talking about innovators. We're talking about creating the social value of the future.

It's not enough to make sure that we put minority students coming from poor backgrounds in elementary and secondary schools into not very challenging programs where they can get a degree. It's not just about getting a degree, it's not just about basic skills, it's about making sure that they have the skills to lead in an innovation economy. And for that, we have to make sure they get the right preparation; not just make sure that they get a credential.

A knowledge-based society creates jobs. It raises living standards and it generates growth that competitors can't duplicate rapidly. We need to be able to do that in the United States.

A recent report by the U.S. Labor Department suggests that over the next ten years the need for technical people –- innovators -– to fill jobs in this country is going to grow by 50 percent. STEM professionals are going to be the key to the growth of our economy in creating new opportunities.

There are plenty of reasons that we all know well and why we're all committed to make sure that every child in this country has the opportunity and access to be prepared to be an engineer, a

scientist, a mathematician or whatever their dreams dictate. That's our moral obligation to these children. But for our economy in this country, it's also an issue of survival. If the key to prosperity is having the right talent, then we must take advantage of the gifts and promise of every child. We ignore any community at our peril and that's something we've certainly been finding at IBM.

If the U.S. is to remain competitive, we need children from every ethnic and economic background prepared for STEM studies and potential careers in STEM disciplines.

I mentioned before that we've begun some work looking at Latino students and Latino young people in the United States. You've seen some of the data on the number of Latinos who are graduated from high school, who are going into STEM careers and their participation in STEM careers. For us, this is the tyranny of large and small numbers. Now let me explain.

In the next 40 years, the United States is the only developed country that is expected to grow its population. It's really an interesting piece of information. We're actually going to grow our

population in a developed country. Much of that growth is going to come from the Latino community which is estimated that it will soon be 25 percent of the U.S. population, a growth rate of 30 percent. Those are large numbers. If we don't find talent among those large numbers, we're not going to generate these STEM professionals we need.

Unfortunately, we have the small numbers. Latinos accounted for only 4.2 percent of engineering degrees awarded in 2005; only 1.5 percent of doctorate degrees. The dropout rates of Latino youths are twice as high as that for African-Americans and almost triple that for non-Hispanic whites, meaning that their graduation rates are abysmally low.

So how do we put these two things together and pave a way in the future to have the number of STEM professionals and the talent that we need for robust economy.

At IBM, we joined with our colleagues at Exxon Mobil, Lockheed Martin, and AMD -- as was mentioned earlier -- at the America's Competitiveness Summit; Hispanic Participation in Technology Careers last May. We commissioned a number of research papers from Public Agenda and the Thomas Rivera Policy

Institute.

I think the most compelling information came from Public Agenda. After conducting a series of interviews with national leaders from every sector, their title of the report tells the story. It's very much what we heard earlier from my colleague, Mr. Fortmann.

The title of the report is "Out Before the Game Begins." And let me just read from the summary. "Nearly all of the interviewees said that when it comes to Hispanic and Latino students, the educational pipeline is all but broken. Respondents across the board believe that the current educational system is not serving the Hispanic population well. This failure extends to all subject areas, not just science and math. Before these specific subjects can be taught well, most said the nation needs to bring basic education up to par. According to nearly all of those we spoke with the overall poverty, Hispanic Americans is perhaps the largest contributing factor to poor quality education. Hispanics tend to live in areas of concentrated poverty with struggling public schools and a less than adequate tech space for funding them. A wide swath of the Hispanic population also lacks the

necessary language skills, English language skills."

So it's not surprising that they come to college with a lack of preparation. They also have an to handle the absence of role models for Latino students, another major inhibitor. Parent involvement is a factor as well, because immigrant parents face several obstacles that include long work hours, language barriers, lack of sufficient formal schooling and cultural attitudes carried over from their home country.

IBM has made a commitment along with our colleagues and other companies to focus a number of our philanthropic efforts on communities that are serving Latino students to provide translation programming software that allows English speaking teachers to communicate with Spanish speaking parents. We provide a series of early childhood programs including reading companion for children to practice reading.

But let me focus on the four key recommendations that came out of our May meeting before I conclude. The first recommendation is to recruit, prepare and retain qualified math and science teachers. We need to create and fund new career

paths, a new way of thinking about teaching, that encourages the best and brightest to leverage industry experience and enhance their classroom skills and vice versa while developing more competitive salaries with a cross-industry career.

We also need more second career teachers. At IBM, we provide $15,000 to any math or science professional who is prepared to teach as a second career and we have 100 IBMers participating in transition to teaching, 8 of them teaching, one in Arlington, Texas, one in New York, one in North Carolina and they're our proudest IBMers as they work in the classroom. But that's a stop gap measure. We need to develop financial incentives for tuition and service, professional development and competitive salaries. At the same time, we need to redesign current teacher preparation programs, encouraging and indeed demanding that university state education departments, school districts and teacher unions work together to prepare and support excellent teachers.

The second recommendation is to find ways to reduce undergraduate attrition rates for Hispanics in STEM majors which has gotten quite a bit of attention this morning. Again, it's not just to move

them to institutions where they will again succeed, but not with the rigor that we need in our economy, but to make sure that they can succeed at the highest levels.

We need to focus on those young people who have expressed an interest in STEM careers and made it, whether it's into a community college, a college or university or an elite school and surround them with the necessary mentors, support services, and financial aid to stay the course and succeed. Other supports could include internships that expose them to STEM careers, job placement services, and other connections into the private sector to start their careers.

A third recommendation is to increase the popularity of STEM careers in the Hispanic community. Unfortunately, there is still a great lack of understanding about the power of the careers, exactly what engineers do and how one can become a leader in shaping our lives through STEM careers.

And the fourth recommendation is to increase the Hispanic high school graduation rate by preparing for STEM careers. We've talked quite a bit about making sure that high schools have standards and

not only standards for students, but standards for the schools themselves in terms of the programming that they provide and the standards for their performance, that all high schools should have to have mentors from industry that embody the best that STEM has to offer, as well as internship opportunities that encourage students to dream big and work hard.

America's goals must continue to be to raise the standard of living for our children. To do so we must take aggressive action. We must capture more minds, more hearts and more souls, more passion for the STEM disciplines if we are to retain our competitiveness and attain greater heights of leadership. It's an economic imperative as well as our moral imperative.

VICE CHAIR THERNSTROM: Thank you very much. This is obviously an excellent panel and I would invite before we go to Commissioners' questions, I would to invite any response or exchange of views. I mean obviously that can't go on forever, but between -- among the panelists themselves, responses to what you heard, questions from your fellow panelists and so forth.

MR. SANDER: Thank you, Commissioner. I

appreciate that and if I might just go first and make a couple of brief comments.

VICE CHAIR THERNSTROM: Go ahead.

MR. SANDER: I think first of all it's worth emphasizing the areas in which all of us agree. I think we all agree that the credentials gap across racial lines that exist at the end of high school is the single largest cause of problems that we're discussing. I don't think there's any disagreement on that.

And I think we also agree, Dr. Tapia might disagree with this, but it seemed like his focus and Dr. Fortmann's focus was to weigh how well mismatch effects might be counteracted by effective academic support. So the issue there might be what exactly to do with -- how to handle the mismatch problem rather than contending that it doesn't exist at all.

VICE CHAIR THERNSTROM: I think there was a slight difference between --

MR. SANDER: So follow this train of thought for a moment. Suppose if the entire science gap here, 70 percent is caused by credentials gap at the end of high school and say 20 to 25 percent is caused by mismatch effects for our most elite minority

students. Going back to that 70 percent credentials gap, how much of that is caused by K-12? Well, the best research that I'm familiar with is the research of Fryer and Levitt on this where they've tried to control for a whole range of factors, including early education and understand what is the credentials gap of students in first and second grade? And you know, the implication of their numbers is that over half of the credentials gap that we're talking about is not caused by K-12. Maybe 30, 40, 50 percent is caused by K-12, but a huge proportion is caused by other environmental factors, not directly a part of the school system. Those include everything from birth weight gaps that exist across racial lines to differences in parenting practices, socio-economic differences, differences in television watching behavior, reading behavior between parents and children, all those things have been shown to be statistically powerful predictors of test score gaps.

So if K-12 is explaining say 40 percent of the 70 percent, that's about 28 percent of the total. So my point is that K-12 is very important, but the mismatch effect is also pretty important. If -- again, speaking very roughly if say 25 to 30 percent

was caused by K-12, 20 and 25 percent was caused by mismatch effects, and another 30 or 40 percent was caused by other environmental factors, well, that suggests there is a broad range of things that we ought to be focusing on policy-wise.

The other general point that I'd like to make is that we need to separate out where race matters and where race doesn't matter. Fryer and Levitt in their analysis of credential score gaps find that race has no predictive power once you control for these other environmental factors. Socio-economic status, tremendously important. Race, not predictive. We ought to view that as good news because that means there's no intrinsic or genetic gap. So focusing in on race is helpful I think in terms of sort of alerting us there's a problem, but you need to look beyond race in terms of actually diagnosing who needs help.

Part of the problem with our preference programs is that they just single out race. The elite colleges almost universally use heavy racial preferences; almost never use socio-economic preferences. Well, why is that? I mean it seems to me that everything that Dr. Tapia was talking about or

that the other testifiers were talking about in terms of the needs of the population are really socio-economic needs, aren't they? Yet, if you look at the beneficiaries of preferences at elite schools, the degree of socio-economic eliteness among blacks receiving preferences is as great as the socio-economic eliteness of whites. They're coming from a very elite sector of the population.

With Hispanics, it's somewhat different. Hispanics are more representative, but even there, we're very heavily drawing on preference programs from the upper middle-class and upper-class Hispanics. Why is that? Does that make any sense?

So -- well, if you put those remarks together, I think there are a broad range of things we need to focus on. The mismatch phenomenon itself is going to be a very large part of the problem and part of the reason why mismatch may exist is this focus on college admissions on racial factors instead of focusing on socio-economic factors and then providing follow-up academic support.

MR. FORTMANN: Certainly, socio-economic factors are important and as a couple of you observed while I was speaking, parents are probably more

important than obstetricians, but I would like to make clear that and K-12 is not 100 percent the problem. But there are many examples, a lot of them are charter schools, some of them are very exceptional district schools that take kids from the worst socio-economic backgrounds and low birth weights and all of those other factors and work miracles with them.

And there's a wonderful book, I should have cited it in my testimony called It's Being Done, a case study of 15 schools where in spite of very disadvantaged demographics, the schools are succeeding with those kids, so I take your point, but I think one also has to realize that K-12 could, in fact, be doing a whole lot more.

MS. WILLNER: Just to follow up on that, I think that's so important because I think the question here is not just -- it's not enough to be descriptive, but to try to be prescriptive. I should mention that before coming to IBM I spent the first half of my career in education in the New York City Public Schools, so I don't pretend to have answers, but I have seen every problem that can happen in public education.

And the biggest problem is when we say

it's okay that schools don't make a difference. So I'm not challenging the statistics as you just put forward, but that to me is the major problem. It's not okay that schools that bring in motivated, well-prepared young people and allow them to take care of themselves and come out the other end well prepared and motivated. And schools that deal with a group of young people who need more assistance don't make a difference either.

That's not satisfactory and so I think you're describing a situation that is, but that's not the way we need to go forward. And as has been said, a good public school is a public school that moves -- adds some value. I mean that's the power behind a lot of the accountability measures today that are value-added is to say how do we make a difference and a school is a failure that takes kids at the top end and they take care of themselves, and it's certainly a failure if at the end of the day it hasn't made a difference in terms of kids who have come in with these host of other problems.

If we spend 12 years with a young person and we can't make up for some of those early childhood problems, we have failed. I take your description,

but the question is what do we do with it.

MR. TAPIA: No, I don't disagree on this. I think that K-12 has to be the broad spectrum, not just the teacher. I agree that the teacher is extremely important and in fact, I do want to mention here that in "Rising Above the Gathering Storm", the report that was mandated by Congress to the National Academies, there were two programs, to K-12 programs that were mentioned. They were both Texas programs, interestingly enough, Advanced Placement Institute by Peter O'Donnell and the University of Texas You Teach Program led by Maryann Rankin. They're incredibly effective in the state. They're doing great things, so I want to make sure that we know those two programs both and I'm involved a lot in both of them.

It's more than just a teacher, but the teachers help a lot. Hispanic, Hispanic is such a broad characteristic -- it's almost impossible to define it. If you look within the characteristics and you see if we're going to call Puerto Ricans from the island, that's a homogeneous culture. They do very well. Cuban Americans do very well. At the bottom are effectually called New YorRicans and Mexican-Americans which my wife is New YorRican and I'm

Mexican-American so we get to fight about who have the bottom. But a lot of it has to do with the attitude and culture of the parents. I think we have to work with those parents.

My mother did not graduate from high school and neither did my father. And yet there's five of us and four of us have graduate degrees and my younger brother went to Yale and my sister went to UCLA and I went to UCLA, so sure the culture issue is a thing that needs to be dealt with and I maintain that you have to show the parents the value while they're in elementary school of the education and I think that's incredibly important. So even though we tend to stay away from culture, understanding, working with the parents -- so I say K-12 is a whole broad thing.

Now I'll go back to community college. Sure I was a star in community college. I was a star. And sure I enjoyed it, okay? But UCLA is what took me where I wanted to go. I had to go to UCLA. One, was I a star? No. Not initially for sure. I learned coping mechanisms. I learned how to survive. And so when I went to UCLA and they first told me well, here you're supposed to take 16 to 18 hours, I said I'll be

in over my head I can't do that. I'm going to take 12. And they said you can't do that. So I did it and I took 12 and I slowly got up.

Happiness is being monotonically increasing. Unhappiness is monotonically decreasing. Okay? And all my life I was a better student each successive time. Community college, UCLA, from undergrad to faculty. Faculty was easiest of it all. That's no problem there, I can do that. But you had to survive and I learned how to do that at UCLA and I really thank UCLA for the education it gave me because I wouldn't be where I am without that. So I had to get there.

VICE CHAIR THERNSTROM: Let us start with Commissioner Kirsanow.

III. Questions by Commissioners and Staff Director

COMMISSIONER KIRSANOW: Thank you, Vice Chair, and thank you panelists. Again, we have another splendid array of panelists.

Just a couple of questions. The first is with respect to the nature of prestigious schools. This is at least, and Vice Chair, you can correct me if I'm wrong, the third or fourth briefing that I've been at where we've discussed issues that are in the

orbit of this particular issue and invariably the panelists come from almost invariably the panelists have either taught at or graduated from prestigious universities.

I think almost all of us here came from one of the elite schools and I'm not suggesting there's a certain chauvinism attached to that, but I also recognize that the statistics show that eight of the ten top STEM-producing schools are HBCUs. The question I have is is it that important from the standpoint of STEM, perhaps Ms. Willner could testify to this, are the folks that are coming from the Howards and the Hamptons and the Texas Southerns, so incompetent that they fail when they reach the private sector? Or is it that important that we have people coming from the Harvards and the Stanfords and the Cornells?

MR. SANDER: Do you want to go first? I'll go second.

MR. TAPIA: Sure. I spent a lot of time on this. I work a lot with the same. It isn't that they're incompetent. It's that they're not educated at the level to make them competitive with the student out of let's say Texas Southern University versus

Rice, okay?

So it's not that they're incompetent, it's not that. And it's a cumulative effect that Tom was talking about. So you get the student and they have to really catch up at the last minute and that's really, really hard.

A big issue, a big issue that I see, and in fact, in two weeks I'll report to another Commission on this issue and that's the role of minority-serving institutions. First of all, the HBCUs are significantly different than the Hispanic-serving institutions. One is regional. And University of Texas-El Paso is -- I think everybody in El Paso is Mexican-American.

But here's what I'm going to say with the HBCUs. If you -- here's an extreme point. If you get a Ph.D. from Jackson State or from one of these schools, you will never be hired as a faculty member in any of the schools including probably a lot of the minority-serving institutions. Pedigree, unfortunately, is an incredible issue. So are the students who come from these minority-serving institutions incompetent? No. There's a level of them that are incredibly good and will succeed

wherever they go. And usually Stanford and Berkeley and Cornell will get those. Then there's a level below that you can work with. I produced many Ph.D.s who came from minority-serving institutions.

Is there a gap in training? Absolutely. One of my students who came from Prairie View, her name was Julia, she said Dr. Tapia, I was never taught how to run above 50 percent and now you're asking me to run at 100 and I don't know how to do it. So usually what I'll do is I'll take extra time with it. But there is pedigree and just think of it, if we're going to get equitable distribution in graduate schools and faculty, and the minority-serving institutions have to say -- see, one of the criticisms is that minority-serving institutions try to be everything to everybody. You take let's take Spellman or you take Morehouse or you take -- if some of them would say we're going to be good prep schools and send our students -- our students are going to be really well-prepared to a Berkeley or a Stanford, something like that, that might work. But they tend to be open admissions, they let everybody in.

I have a friend at Texas Southern University who is a chemist. And he was called down

by the provost at Texas Southern University for failing too many -- he's African-American, teaching African-Americans -- he was called down by the provost for failing too many and he said all I failed were the ones that didn't come to class. I didn't fail the ones who came and tried.

VICE CHAIR THERNSTROM: I didn't hear that, the ones who came?

MR. TAPIA: The ones who didn't come to class. So there is such a gap right now and we need to deal with that issue. We need to deal with that issue. What should be the role of Historically Black Colleges and Universities?

But if you think you get a Ph.D. at a HBCU and you're going to get a faculty position at Wisconsin, Michigan, Illinois, no way. Down. Questionable if you'll get it at an HBCU. HBCUs tend to have faculty that come from majority institutions.

What's the synergy between the two? That's the key issue. I'm going to push at the next meeting that HBCUs should focus on what's their main purpose. There was a time in history, as you know, that that's the only place African-Americans could go. Is it time to reevaluate that position? The answer is

yes.

COMMISSIONER KIRSANOW: If I could just interject real quickly. I understand that there may be a difference between the percentage of STEM graduates from elite schools that go on to become faculty versus those who come from say HBCUs. Although we had a briefing here about a year ago that suggested that when minority students went to elite schools they very often did poorly and poor performing students were less likely to become faculty members as opposed to those who went to HBCUs who felt pretty good about themselves because they were performing at a good level at that institution and were more likely to become faculty members.

Set that aside.

Faculty is important, but I'm wondering if at Ms. Willner's level, if STEM students from HBCUs or not even HBCUs, maybe second-tier schools that are majority schools or third-tier schools, are they hired by an IBM? Do they perform well? Is this simply the province of those that come from the Ivies and I say that because right now it appears that those that go to elite schools are more subject to the mismatch effect, less likely to graduate than those from other

schools, so I am wondering if it's so important that we siphon or just funnel people into Ivy schools where they're more likely to fail or is it more important to make sure people go to schools where, if Professor Sander is correct, more likely to succeed at least at that level, graduate, and become productive members of society.

VICE CHAIR THERNSTROM: Can I just add a sentence to that?

COMMISSIONER KIRSANOW: I don't think those are mutually exclusive though.

VICE CHAIR THERNSTROM: It's the same point. I mean it really boils down to are you better off in terms of, for instance, employment at IBM? Let's forget about faculty. If you are a top student at a second tier school, are you better off than being a mediocre student at a prestigious school? When IBM looks at potential hires, is it taking that into account? It's part of the same point.

MS. WILLNER: I would reframe the question a little bit. And first of all, I think that the question isn't HBCUs versus other schools. It's the level of selectivity of the school, because HBCUs, getting into Spellman is not like getting into some of

the other schools, so I think we're talking about selectivity.

And I would reframe the question. At IBM we recruit from a huge number of schools as you can imagine and all over the world. And we have university-relations programs in more than a hundred countries and all over this country. But I think the question isn't it better to graduate from somewhere that's less selective. Rather than frame the question as, “is it better to be at the top of your class at a mediocre school than in the middle of your class at a selective school?” I think the issue for us is what have you learned and what can you do?

So what we're looking for is the skill level and the reason that we go to the more selective schools and pedigree has something to do with it. The important issue is what I refer to as innovation. We're looking for the skill level, we're looking for the kind of training they had. We're looking for their ability to be creative and to be leaders. We don't need lots of people at IBM that can put tops on bottoms. That's what we used to do. We used to run assembly lines and we needed people who could put tops on bottoms. We don't need that now. We need people

who can invent. We need people who can work at IBM research. We need people who can create new software.

So if the less selective schools were as rigorous it wouldn't matter, then admissions wouldn't matter. The reason admissions matter is because the training is different at these schools, the preparation, the kind of courses. And that's what we're looking for.

VICE CHAIR THERNSTROM: So you don't have your own sifting out testing process or other ways of sifting out?

MS. WILLNER: Well, we do, but we also to some extent use as a proxy some of the schools because we know the programs they have.

And I think earlier Dr. Tapia mentioned you have two things you want to do. You want to make all the schools better, right, and then also want to make sure that those schools that are at the top are places where all kinds of young people can succeed. I think that's still on the table. I think that the less selective schools, some of them actually offer terrific training and we have to be looking at that issue as well. I'm making the problem even bigger.

VICE CHAIR THERNSTROM: Professor Sander?

MR. SANDER: Okay, so going back to Commissioner Kirsanow's questions, there are some complex layers here. I think the underlying pattern is very clear, but let me take apart a couple of different things. Is this close enough? Okay.

So first of all, the statistics about the huge numbers of scientists coming out of the HBCUs can be easily misunderstood because they're not per capita figures. One reason why HBCUs produce lots of black scientists is because they have lots of black students. It's really important for us to try to talk about per capita rates. And when you do that they still have a good record, but you wouldn't get as stark a contrast as we tend to in a lot of the reported statistics.

Secondly, there's an important distinction between what's going on at the bachelor degree level and what's going on at the doctorate degree level. I think Dr. Tapia and I would agree that in terms of academic placement, your Ph.D. is far more important than your bachelor's degree. If a university is considering you for a scientific faculty position, they care enormously about well, what they really care about is who you have worked with, what eminent

scientists you've worked with, both in your post-doc and your doctoral program. Those -- the eminent scientists they know best tend to be at very elite institutions.

But there are others, not only institutions, and if you've had those experiences, then that will still be tremendously valuable. But at the bachelor's level, it's incredibly important to keep in mind that several things are happening at the bachelor's level. First of all, a huge number of minorities are dropping out of science, so they never get in the pool, they never get in the job pool of scientists because they never get a science degree. So something we clearly have to be concerned about is keeping minorities in science. And that, I think Dr. Elliott's data and my data both show pretty overwhelmingly that mismatch has a lot to do with minority persistence in those concentrations. It may be that if you got a very effective intervention of the kind that our other panelists have talked about you can offset that. But most schools clearly aren't doing that now. So they've either got to fix -- well, they've got to fix the mismatch problem one way or another. I think everyone ought to agree with that.

Good. Great.

Secondly --

COMMISSIONER YAKI: I don't.

MR. SANDER: That doesn't surprise me, Commissioner Yaki.

(Laughter.)

Secondly, how are you doing in those programs? What's your performance? Your GPA performance is very important. Studies that have -- it's very hard to sort of compare doing badly at Harvard and doing well at Howard, because even somebody who does well at Howard may have much lower credentials than the person who did badly at Harvard. You've got to control for these things. You've got to do something like a regression analysis or a matching analysis.

When you do those things several social scientists have found that the HCBU graduates or anyone who goes to a less elite school with higher performance tends to have slightly better outcomes over 5, 10, 15 years than students who go to more elite schools and perform badly.

Now I'm not aware of any studies that look specifically at science careers. They've looked at

earnings. They've looked at eventual degree attainment, things like that. And those patterns hold, and they make sense. It's much easier for doctorate programs to evaluate someone, they're much more interested than say a black candidate who went to a second tier school and did very well than someone who went to an Ivy League school and had a 2.7. So the bachelor's distinction is really important. That's where the mismatch effect is having its most corrosive effects. At the doctoral level, it's much more a factor of what is the type of intervention that individual faculty members are doing?

Dr. Tapia's success sounds largely attributable to the fact that he makes extraordinary interventions with his students.

MR. TAPIA: And I add that UCLA used to do a good job. They don't any more.

VICE CHAIR THERNSTROM: Commissioner Gaziano.

COMMISSIONER GAZIANO: I want to thank the panel for all your testimonies. It was very interesting, so I apologize in advance that I don't ask each of you several of the questions that I have in mind, but I'll try to cherry pick one or two. And

this relates to the -- my first one relates to the last exchange.

Certainly understand that all else being equal, it's better to get your Ph.D. and be top in the class at the most prestigious institution than one at the bottom, but that's not the kind of comparison that I think the universities in the real world presented. So I'm just going to try to put it in a hypothetical. Certainly, I understand in most things Berkeley and UCLA are considered better than Santa Barbara and Davis, but Santa Barbara and Davis have world class science programs.

MR. TAPIA: No, I don't agree with that. You're correct, you're right. I'm agreeing with you. I'm just saying compare it to Riverside --

COMMISSIONER GAZIANO: Okay, but I'm going to take Santa Barbara and Davis and just ask the most harsh hypothetical of you, Dr. Tapia, if I could. Is it worth it if Berkeley graduates one more Ph.D. in math, but as a result 100 Berkeley students drop out of the sciences completely who would have gotten a doctorate degree at Santa Barbara or Davis?

MR. TAPIA: No, it's not worth it, absolutely.

COMMISSIONER GAZIANO: Then I'll skip the rest of the hypothetical

MR. TAPIA: No, that's okay.

COMMISSIONER GAZIANO: But the implication is then --

MR. TAPIA: No --

COMMISSIONER GAZIANO: Go ahead, I just want to finish my thought -- then the rubber hits the road and how much of a mismatch we should tolerate? What effect we should tolerate, if any, because I think Commissioner Kirsanow's question is right that maybe it doesn't even help the faculty creation process if we have a lot more drop out of the Davises and the Santa Barbaras. But please go ahead.

MR. TAPIA: It's an excellent point. I want to say Johnny Guzman who I worked with as an undergraduate just got a Ph.D. from Cornell in mathematics, was just hired by Brown University in the Math Department, the first under-represented minority on the faculty of a Math Department in an Ivy.

I will not send -- Rice undergraduates -- my success, I have a lot of Ph.D. students, but I had a lot of success with B students out of UCLA, B students out of Berkeley, B students out of say

Stanford, probably more success than A students out of HBCUs.

But no, in fact, this is on record and I'm going to say it anyway because I think it's appropriate. Last year, I was asked to evaluate the Math Department at Berkeley. It's clearly one of the top Math Departments in the world. Okay? In terms of under representation in faculty and graduate students, they did a miserable job. UCLA is next in line, okay? The minorities go to Davis, not to Davis, to UC-Irvine or to Riverside.

I will not send a good Rice undergraduate minority student to mathematics at Berkeley or computer science at Stanford. The retention rate there is 50 percent for the people who are some of the best in the country. So I want to take it back and I want to blame and fault universities that say we are a public institution, like the University of California-Berkeley who just don't care about this issue. I spent eight days last year at Berkeley. I was Regent's Lecturer and I can tell you about the greatness of the faculty, but the mismatch and the fit, I mean I don't want to know why people in California allow Berkeley to do what it's doing if

it's a public institution. And then second, UCLA.

COMMISSIONER GAZIANO: Great response. If you don't mind me switching to another question or I could yield to someone else, first. Since I have the mic -- does someone else want to come in on this question?

MR. ELLIOTT: Yes, on this one I do. You asked to what degree of mismatch is tolerable and I surveyed a lot of these data.

COMMISSIONER GAZIANO: Assuming it's constitutional and moral and all those other things anyway, which I also question.

MR. ELLIOTT: I think pragmatically useful and socially useful. And I came to the conclusion that if Harvard, instead of taking let's say 7.5 percent blacks which they do plus or minus most years and we do too, took 3.5 percent and let the other 3 or 4 percent come down to Dartmouth, then we would shuffle off our bottom three and send them down to Rochester and they would shuffle off theirs and send them down to I don't know where. You would have competitive, you would have a black population not at the 4th percentile, but at the 30th percentile, if you just kept the top half. This is politically and

entirely impossible, but it still intrigued me enough to work it out.

And what you'd have is a competitive group, 30th percentile, that's better than most of the athletes there. It's probably close to many of the alumni legacies and so on. And their conscientiousness, ambition, and hard work can make up for a lot. And so if you're the 30th percentile in terms of admission variables, developed ability, you've still got a shot. At the fourth, you really don't have much. But if you did that, the only flaw I saw in this mechanism from my point of view which I saw, even I saw as a flaw which was that by the time you shuffled all these people down they're going to schools that aren't very wealthy and it's only wealthy schools that can provide the kind of financial support that many of these students need. So what you've really done is take 2,000 blacks and put them in schools where they're getting some aid or a lot of aid and they're going to have to go to schools where they don't get any, or they get a lot less. And so, I saw, if I could have figured it out the financial aspect of that scheme I would have pushed it a little farther, at least for myself. But I could -- I still think

though that cutting down just lowering the mismatch stats would do wonders for everybody.

In the first year at Berkeley after Proposition 209 was passed, the number of black students at Berkeley and UCLA dropped drastically, but the -- as I understand it, the Vice Chairman here has done this work for us, the graduation rates have improved enormously as well. If that's true, that is a gain.

And so you're trying to balance this cost of the huge mismatch we now -- and the universities that do it, as somebody pointed out, they're doing it -- they're not helping poor blacks or poor Hispanics or poor anybody. They're certainly not helping poor whites when they're doing it this way. At Harvard, about half the black students at least in some years are from Africa. They satisfy the blackness, but they don't satisfy the Americanness.

I think some Affirmative Action is a good thing. I think some -- that is to say race preference, to use that term, that taboo term -- if only because we need -- especially in public institutions, we need representation of the population and we need it to the degree that a higher education

institute is not a theater of performance. I mean do you really care if the math department is all Asian or all white or all anything? If you want the best math department in the world you shouldn't care about that. It's a theater of performance. You want them to perform.

But educational institutions, the lower you go with them, the more they're concerned about development and change. At what point in our system, as you go from K-12 through the undergraduate years and into graduate years does it become less development and more performance. Elite institutions are very performance oriented. They deliberately take people at a very high level to begin with with a few exceptions and then they make them perform and they do a pretty good job of it. My students tell me all the time every year, much of what they learn at Dartmouth they learned from each other in discussion and so on. And they learn from each other so much because they're all pretty smart and it's performance orientation that they have and not so much growth and development orientation. But to the degree that there is some of that left, to that degree you ease up on performance criteria. You can't ease up too much or you don't

have much left of your school.

VICE CHAIR THERNSTROM: Professor Tapia?

MR. TAPIA: I agree with most of what you're saying. We can't have a Math Department that is all Asian or is all -- IBM has a product and you can measure success, you're accountable. You're held accountable because you produce a product to make money.

What happens with education, public education in particular, if we forgot that we do have a product. We're supposed to educate the constituencies, i.e., the people in the country and that's where I fall --

MR. SANDER: Or at least the people you admit.

MR. TAPIA: Yes, at least the people you admit, but more than that, if you said -- if we said okay, Harvard can do what it wants. Stanford can, they're private schools, but Berkeley can't and neither can UCLA. And so what I'm saying is that if we have the obligation and the moral right and I think it's more than just moral to educate the people of the country, then we're not going to end up with departments that are just doing research only. In

fact, I'll take a department like a Math Department and say it is not enough just to do the research. That's the way it was 40 years ago, 50 years ago. And now you have to be sensitive to the needs. I ask a department to be sensitive. Here they characterize a Math Department. Be sensitive to a larger unit, i.e., a division, oh, okay, not just a department? No, the division. How about the university? Oh yes, what a big thought. How about the United States? Incredible. Should we be sensitive to those issues? And I'm saying if departments like Berkeley Math Department would just align themselves with what the presidents and the chancellors say it would be okay. But they don't. The chancellors say things and then say I can't micromanage a department, so I'm going to let it do what it wants and that's how Math Departments have become so terrible.

VICE CHAIR THERNSTROM: I'm sorry, I mean there is an interesting question there in response to you, however, which is suppose these universities were to get real tough on their standards and say whatever the diversity consequences, we're going to have uniform standards for admission across the board, whatever those standards are. What impact would it

have on the Tom Fortmann problem of schools that are not educating kids and teachers who are ill-equipped to educate them.

At what point -- at what point -- how are we going to create the kind of pressure on K-12 education that we don't have today? They pass the buck on.

MR. SANDER: Commissioner Thernstrom?

VICE CHAIR THERNSTROM: Yes.

MR. SANDER: I want to try to address that, but I wanted to add on to what Dr. Elliott said in response to Commissioner Gaziano. I think this is an incredibly important point. There are many issues raised by Affirmative Action, but if we're talking about the mismatch effect, the mismatch effect is concentrated on the students who receive the largest preferences. There is a range of moderate preference where I haven't found strong evidence of substantial mismatch effect. So it's not a linear phenomenon.

And it's particularly the case -- I don't think this is completely nailed down, but I have found a lot of evidence consistent with this and it sounds like a theme other panelists have found, that socio-economic preferences, in particular, are less likely

to produce mismatch effects because when you give a socio-economic preference (a), if it's moderate; and (b) if you're finding the student who has really come from a disadvantaged background that student by virtue of the fact that he's gotten to that point has -- is likely to have unusual drive and you know great determination to succeed.

And if they're coming in at the 25th or 30th percentile rather than the 5th or 10th percentile they can reap more of that benefit from going to an institution that has all the special advantages that more elite institutions have. So I really think there is kind of consensus emerging here on many aspects of where this problem lies.

MS. WILLNER: If I could just raise two quick points. I think that you raised a really important issue which is the level of preference. Letting somebody -- accepting somebody in who is so far different, so far lacking in preparation is different from having some leeway. It goes back to what Professor Tapia said. We know somebody with an 800 SAT is not going to succeed, but the difference between 1400, 1450 and 1500, we're pretending that there's a difference. So that's a really important

issue there as how wide you cast the net.

But I think the second issue and it's exactly what I said about K-12 and it's what Dr. Tapia said about public universities. It's not enough just to let somebody in. You have to say we brought you into our community and we have some commitment and we have to start thinking about why these schools only work for certain kinds of young people and they don't work for others. And that's part of the responsibility and I think that it's not just at admissions. We can't stop there. That is -- when we talk about solving the mismatch, part of solving it is coming up with the kinds of interventions that we've both been talking about and that's very, very critical.

And the last thing I would say and this may not apply to every career. Perhaps you can sit in a biology lab and maybe it doesn't matter what your experience is around the rest of the world. But I will tell you for engineering, which is part of the STEM careers, I'll tell you for engineering that if all of our engineers look the same, come from the same culture, come from the same kind of families, live in the same kind of communities, think the same way, IBM

will go into the toilet immediately because we won't be able to create products for our customers. And one of the reasons why places like -- IBM take diversity so seriously is that we understand that we want everyone to be our customer. And if we want everyone to be our customer, we have to know what they need. We have to know what they're looking for. We have to know how they're thinking. We have to -- they have to feel comfortable buying from us.

So there are other economic pressures that make it really important that we have diverse learning experiences and we have the highest level of education and encouragement for everybody in this country.

MR. TAPIA: There's another issue here. We're not just -- we are statistics in a sense. We're people. How many of my students, undergraduates, graduates, come to me and say I really feel good seeing somebody just like me, okay? How many come and say somebody who has been successful, it can be done. It's a feasibility point.

It's really hard when I was at UCLA to say okay, there's no faculty like me. There's no graduate students like me. Just the point of saying ah, feasibility has been established. There are people

that look like me and act like me and feel like me. We can't minimize that. I told you -- Rodrigo Banuelos was probably the best Mexican-American mathematician in the country was having problems at UCLA, not academic problems. He just didn't feel he belonged until someone told him, you're not the first. Go look at Tapia. And he has.

I'm saying it's more to it than just numbers. There's more to it than just academic preparation. It's about people and I think that's why.

COMMISSIONER GAZIANO: I had a second question, if I could -- to the right side of the table and this is maybe the take to partial remedy on the credentials issue. I was sort of moved and saddened by Mr. Fortmann's comment about math phobia is a contagious disease. And it seems like certainly at small, or at least transitional part of the solution to get those math-phobic teachers teaching something else, I don't know, is this second career teacher program, but as you know many states and this is what I'd like you to kind of elaborate on, require teaching degrees or similar before someone can -- with just a mere Ph.D. can come in and teach a math or science

course in the K-12 level.

So what kind of minimum certifications do you think is required, you know, what do you think is more important that teaching the kids that the teacher not have math phobia or the teacher have a math certification or math degree. How do we solve that transition? What has your experience been in that regard?

MR. FORTMANN: Your question about career changers is an important one.

COMMISSIONER GAZIANO: Or second careers.

MR. FORTMANN: Second careers --

COMMISSIONER GAZIANO: Who are taking on something extra.

MR. FORTMANN: And I would add to that people who go to college in some arts and sciences area and then decide in their junior year that they might be interested in teaching. That's another category of person that it's difficult to get in.

Those are all people who are going to end up teaching mostly in high schools and middle schools. And that's a good thing. It varies a lot from state to state how you can do it. In Massachusetts, you can come in. There are various programs in districts and

there are various ways for those people to get into teaching, not always -- the most common way is to go and take a year education program, but in fact, there are ways --

COMMISSIONER GAZIANO: That's difficult for a lot of people.

MR. FORTMANN: That's true and --

COMMISSIONER GAZIANO: If they have to support a family, especially.

MR. FORTMANN: And ed. schools, in general, would like to keep it that way, but there are other alternatives. You can get a provisional license in Massachusetts and start teaching immediately. It's not easy. You talk to people who do it and they say I really needed a course in classroom management and things like that, but we do have programs where people can learn on the job. They're not well enough advertised, in my opinion. And I can't speak for other states. It varies all over the map.

On the math phobia, I was really referring mostly to elementary teachers, although I've met some middle school teachers in the same category and that's a little bit different problem. You don't get too many career changers or second career people going

into elementary. You do get some. But you really have to solve this problem with the teaching force that we have.

Now another solution that's often proposed is let's have math specialists in elementary schools. That's a good idea in theory, but it is expensive and finding people qualified to do that is extremely difficult and what I have learned from working with elementary teachers is that most of them, given the opportunity, in a summer course or some other format, will really step up and work very hard and be happy for the opportunity because they know that they're weak in math. They know that their students are suffering and when given the opportunity they will seize it and make some serious changes in that. I can supply you with more information about that off line if you like.

COMMISSIONER GAZIANO: Thank you. I would.

Ms. Willner?

MS. WILLNER: As I had mentioned we have a program called Transition to Teaching and based on the research we had done going into it, retention rates of people who go through alternate route programs and our

own work with professional development and with IBMers, it's clear that it's not enough to know your content area. It's not enough to be brilliant in your content area. There are real skills. People talk about being born to be a teacher, but you can learn to be a good teacher. And even if you were born to be a teacher, I strongly believe that before you are the only adult in that classroom and you are responsible and there are 25 kids who whether they learn math this year is going to be dependent on you, you should have been in a classroom before. This should not be your first day walking in to be the only teacher, the only adult in the classroom.

We need to give people the opportunity to learn to be comfortable teaching. That's why at IBM we provided them $15,000 and a special leave of absence so they can do student teaching before they leave. Not every company can do that. There are a lot of very interesting programs that have sprouted up. There's a great program in Boston that's run by The Boston Plan that prepares second career teachers. In California, there's a program that Sherry Lansing started called EnCorps, where they provide the support for math and science professionals during the first

year as they're moving into teaching.

I don't think that anybody needs to go through a 60-credit School of Education master's degree, but I think we have to come up with that core of what is everything I need to do to be prepared. Nothing more, I don't want to waste an extra day, but nothing less because those are real kids and they only get to go through the 9th grade or the 8th grade or whatever.

VICE CHAIR THERNSTROM: Well, but the Teach for America students who are basically after summer program plunged not the classroom, you know a lot of them are teaching in the most successful charter schools. On the other hand those charter schools are headed by really superb principals who are in the classroom all the time and they've got therefore a lot of on-the-job training. I mean what you're talking about can take a lot of forms.

MS. WILLNER: It certainly can. And Teach for America, a lot of them are wonderful teachers and almost to a one they will all tell you that their first year was hell and incredibly difficult and it doesn't have to be hell for the teacher and not as terrific for their students as for those students

lucky enough to have them in their second year. So we have to figure out how to do that. And they have an incredible summer program, ten weeks is a good start, but it comes back to figuring out what is everything I need to know to prepare to be ready to teach? I don't want to waste an extra day getting ready, but I don't want to miss out on anything before I walk in the classroom.

VICE CHAIR THERNSTROM: But those TFA participants are not going to spend a year in an Ed. school.

MS. WILLNER: It doesn't have to be an Ed. school, but I think we have to figure out how to make their first year successful for everybody. And we haven't quite gotten that formula yet.

VICE CHAIR THERNSTROM: Other people?

MR. FORTMANN: I just want to agree with what Robin said. People, and I've met some of these people who get dropped directly into a classroom, have a problem, but there is an enormous amount of room between that and spending a year and taking 15 pedagogy courses and it's very healthy that we have things like Teach for America and UTeach and Math for America and there are many other examples that are

sort of filling in this spectrum in between.

The unfortunate thing is that in many states the certification requirements are so tight that many of those possibilities don't exist.

VICE CHAIR THERNSTROM: Commissioner Kirsanow?

COMMISSIONER KIRSANOW: This question goes to something Professor Tapia said in terms of I think it is a desirable thing for many minority students to go to a school where faculty kind of looks like them. But that strikes -- my daughter says if that was my criteria I would go to a school with a helluva scary-looking faculty. But that goes, bumps up against the legal requirements with respect to Affirmative Action. We've been just talking kind of for lack of a better term cavalierly as if the mismatch effect is something that we can tolerate within the context of the law and we've got the Grutter decision which is very specific about the extent to which racial and ethnic preferences can be implemented.

That was in law school and there were four components justifying why you could have a preference. One of them goes to something that Ms. Willner talked about and that is preparing students for a global

marketplace. An institution like IBM wants people who can be facile with all types of cultures. One was breaking down stereotypes. Another one was that it was gaining perspectives from different students, different perspectives, the presumption being that a student who comes from say inner-city Cleveland may have a different perspective than somebody who come from some place in the middle of Indiana.

But that had to do with law school where you might say yes, the inner-city black student in criminal law class might have a different perspective than the guy who came from French Lick, Indiana. When it comes to STEM, I'm not sure there's a black perspective on gradient derivatives, the Heisenberg Uncertainty Principle, or the speed of light. So the question is and this goes to something Professor Elliott said a while ago that students were learning from one another. To what extent does race per se or ethnicity per se have a salutary effect on the learning process when it comes to STEM?

MR. TAPIA: I had a class, a graduate class last year at Rice. It was 24 people, 12 of the 24 were under represented minorities. It probably never happened before, okay? What did they learn

about it?

They broke the stereotype of what a minority student might be like. They found that minority students sit in the front row. They sit in the back row. They ask good questions. They ask bad questions. They do well on the exam. They don't do well on the exam.

A significant number, and Rice students are very good at this, the white Rice students who said wow, African-Americans, Hispanic-Americans are kind of like me. We come in all different flavors and we do different things. So that means when they go off and they become -- let's say they go to IBM and became a manager, or they go someplace else and get hired, how many students have I had come back and say that in my managerial position I've learned so much about how to deal with women and minorities at Rice and when I went to this company it was all white and I'm trying -- and these are white people I'm talking about. One of them went to the University of Michigan as a professor and said wow.

So no, I'm not going to argue that -- in fact, in my talks I'm not going to argue that mathematics is going to be unhealthy or it's

endangered because there's not blacks and there's not women, no. But the community that you build which will last you a lifetime in how you work with people and how you respect and how you learn. When I was on the National Science Board I had two roles, okay? One of them was to say to young people in Houston, oh, President Clinton appointed Richard Tapia to the National Science Board, but my more important role was to have all the white people on the Board say Richard Tapia, as a Mexican-American, is an extremely important member of this Board. That's what I had to do and that's what I did.

The other thing, in fact, Professor Sander referred to this recently. On my web page, if you just Google Richard Tapia and look at my web page, I have an op-ed piece that just appeared in the Chronicle of Higher Education saying diversity does not come from aboard. Now what's happening is Affirmative Action is dying. If you look at the history of the Courts, you'll see they've been cutting back and back and back; Affirmative Action in the sense of trying to improve the situation for under represented minorities. Diversity is the in word. Affirmative Action is the bad word. And universities

are implementing diversity in the way they always have and do very well. That's how many people can we get from China and how many from India and how many from Colombia and how many from Bolivia. I have faculty that are very knowledgeable who know no difference between a New YoRican raised in the Bronx, a Mexican-American raised in the barrios of LA or somebody with an elitist from Argentina or Colombia. That's my big part right now.

So diversity has replaced Affirmative Action and that's the concern. I want us to live and be educated in that world that we were working and the world that we can promote.

No, I just want everybody to see that we can be representative in all places and that's been an important part of my life. I'm on all kinds of boards where I'm the only under represented minority so I want everybody to see that aspect of it.

So that's what I say. My answer to your question is it is really nice to see, like one of the faculties in our department is African-American and pretty soon all Rice students will just say they don't think about it any more after the first week. He's really good. I like him. He's a good teacher.

That's all I want to see. That's the same with me.

My success hasn't just been with minority students. I have foreign students come back and just love me. And they say oh yeah, Tapia, under represented minority. No problem.

MR. SANDER: I'm sorry. I want to add some comments to that. Thank you.

I just want to say three things. One is that I would put a different gloss on Dr. Tapia's statements about Affirmative Action dying. I think what's dying is sort of the knowledge to use Affirmative Action per se and the substitution of diversity lingo. And it may well be true that in some Science Departments there's now so many foreign students that I think there is frequently in these science programs a lack of focus on recruiting blacks and Hispanics, but in terms of broad undergraduate education which is a lot of our focus here, preferences do not change materially.

Private schools use them exactly the way they always have. Grutter preference bans have not had any impact on practices aside from maybe the way that they're described. Even in states like California that have passed preference bans, diversity

efforts are still very aggressive and the use of race does not disappear.

COMMISSIONER YAKI: Do you have a stat for that?

MR. SANDER: Yes, I do. Can I come back to that one? I want to say my two points and then we can go exclusively into that, is that all right?

COMMISSIONER YAKI: We can do whatever you want to do.

MR. SANDER: Okay, so on the question of the issues Commissioner Kirsanow is raising, I just want to emphasize that the use of preference is an extremely sharp-edged double-edged sword. There are two things that are often raised. One is this issue of combatting negative stereotypes by having diversity. You can combat negative stereotypes with diversity, but if you have aggressive preferences you run a tremendous danger of reinforcing negative stereotypes. If students -- if there's a two standard deviation gap between your one black student in a class, students are going to notice that.

Secondly, what's the peer effect? Undoubtedly, there are very important things to be achieved in terms of increasing the comfort level of

minority students or low SES students in a college environment. But you can also have the reverse effect. Peter Arcidiacono who is an Economics Professor at Duke has done a study with the College and Beyond data from Bowen and Bok where he's looked at the socializing effects of large preferences. He finds again if preferences go beyond a certain point then what happens is you start having greater racial segregation than you do when preferences are smaller.

I've done a study of study groups in law school which kind of fleshes out why that is. What happens is that if you have a large preference gap, whites and Asians tend to avoid study groups with blacks and Hispanics because they want to get the strongest students they can in their study group and they don't go around and ask everyone what their credentials are. They just assume that race is going to be a good correlate of how strong their study group will be.

And the consequence is that minorities end up overwhelmingly in minority study groups. They're getting the benefit from integration and they're not getting a benefit from the study groups. Study groups for whites and Asians improve their law school GPA.

Study groups for blacks and Hispanics don't improve their GPA. So positive things can happen, but it's very treacherous ground.

Do you want to go back to the 209 issue, Commissioner?

VICE CHAIR THERNSTROM: I actually have a Commissioner that wants to speak, but let me just -- I think the point made before, sorry -- I think a point made before I think it was by Ms. Willner, there are preferences and preferences. There's some that are large, some that are small. In the Bakke decision held up Harvard as some sort of model. Harvard gives negligible preferences it’s not a model for anything.

(Off the record comments.)

VICE CHAIR THERNSTROM: In the college, yes. Sorry about that.

(Off the record comments.)

VICE CHAIR THERNSTROM: Someone rudely interrupting from the audience who just happens to have my last name.

But before the ban on preferences in California, that is as Professor Sander said not quite working as advertised in terms of the disappearance of preferences, the gap between SAT scores -- for

instance, for Berkeley undergraduates, between the under represented minorities and Asians and whites was enormous. So I just wanted to second to your point. Yes, you've got to make distinctions.

But one of the consequences, of course, is of the small pool of minority students, blacks and Hispanic students who have high SAT scores and so forth. One of the consequences is such a large number of them are taken by a very few schools. I mean Harvard takes an enormous percentage of those with SAT scores, I don't know what the cutoff is, but you know, top SAT scores. That school alone, which has an effect, of course, all the way down the line.

Commissioner Taylor?

COMMISSIONER TAYLOR: Thank you, Madam Vice Chair.

I've got to be honest with you, I appreciate everything you all have said, but, frankly, I am really disturbed. From my perspective, there seems to be a lack of an appreciation of the importance of my fundamental question and purpose of joining this Commission: What is in the best interest of, in my case, black folks?

I appreciate the importance of the

academic institutions and the faculty, and I appreciate the importance of the world view and I appreciate the importance of the commercial view. And Lord knows, I love the invisible hand.

But if you are at a picnic and you were to present this panel discussion to black folks at the picnic, the black folks would say this mismatch issue -- what I hear is, you need to tell me whether or not I'm within that range before I go to school. If I'm outside that range, no additional support is going to help me. No additional support is really going to help me if I'm outside that range. That's what I hear. But if I'm within that range, some additional support may help me.

But what I don't hear is an emphasis on informing the communities about the decisions that are being made. Because if the communities collectively, I think, were in the position to have this information and make a decision as to what is in the best interest of our community over a 20-year period, when you are sitting down with your child and you say, "Where should you go to school? Where is it most likely you will succeed? Do we want to take that risk as a community?" -- I hear that lacking in this discussion.

From a public policy perspective, to me that's what is important. I want to focus on what it is going to take for the communities that are at risk to move forward.

MR. SANDER: Commissioner Taylor, can I --

COMMISSIONER TAYLOR: Please.

MR. SANDER: I think there are four policies at the college-level that would serve the public well, and I believe there is consensus for them on this panel.

No. 1 is transparency. African-American students and any other minority ought to know going into college what are the ultimate outcomes for students at that college who have their profile.

COMMISSIONER TAYLOR: Is that something folks can all agree with?

MR. TAPIA: Absolutely.

COMMISSIONER TAYLOR: Yes, okay.

MR. SANDER: No. 2 --

COMMISSIONER TAYLOR: Which seems to be lacking. It's completely lacking.

MS. WILLNER: And you should know if this school has no intention of helping you.

COMMISSIONER TAYLOR: That's right. I

will tell you, Professor Tapia --

VICE CHAIR THERNSTROM: Hold on, everybody. The court reporter is having a problem.

MS. WILLNER: I'm sorry. A piece of important information is, is there evidence that this school will help you to succeed if they accept you?

COMMISSIONER TAYLOR: And before you go on to your second point, Professor Tapia, what you said is no different than recruiting in sports. I don't care what the name of the school is; show me the coach, and in your situation you're the coach.

So if I have a child and I'm deciding where I am going to send my child, and they want an advanced degree in this area, I am looking at the coach and what the coach has produced over the past 10 years. I don't, frankly, care what the name of the school is because you show me the coach and the product, and then I can back-track into the name of the school.

So telling me Berkeley doesn't tell me anything. You show me the coach. That's the information that I don't hear at the community level when black folks are trying to make these decisions. If you have a smart B student at a very good school,

they are not in the position today to have this discussion and to make these decisions.

What troubles me is I don't feel a sense of urgency to make sure that we have an open process where these issues are discussed and a way where that kid and the parents can make good, sound decisions. We are more concerned about emphasizing policies and how many black faces and how many Hispanic names we have in the entering class than whether or not that student is able to make a good decision.

I apologize.

VICE CHAIR THERNSTROM: I think Professor Sander had more to say.

MR. SANDER: So there certainly seems to be urgency among the panelists on this idea of transparency. So that is No. 1.

No. 2, accountability, and accountability follows transparency. If schools have to start disclosing that they have a miserable track record in retaining scientists, then they will either change their admission practices or they will take ownership of the students they admit, or both.

COMMISSIONER TAYLOR: Or both.

MR. SANDER: And that's all to the good.

So accountability is No. 2.

No. 3 is let's emphasize socioeconomic preferences more. We need to look at individual circumstances and try to make sure that that is an important driving factor in deciding where we're going to reach out helping hands.

No. 4 is trying to curtail mismatch at a point where it is so extreme that it is clearly going to have negative effects.

I think those are all things that would clearly benefit outcomes.

COMMISSIONER KIRSANOW: Professor Sander, to what extent is there currently transparency and accountability?

VICE CHAIR THERNSTROM: Hold on a minute.

MR. SANDER: Vice Chair, shall I address that?

VICE CHAIR THERNSTROM: Well, that's fine. Professor Tapia wanted to make a comment.

MR. SANDER: Okay. On a scale of zero to 100, I would say we are at about three.

COMMISSIONER KIRSANOW: Zero to 100, it's now at a three in terms of transparency and accountability.

MR. TAPIA: What does this scale measure?

COMMISSIONER KIRSANOW: Commissioner Taylor is talking about, what are the probabilities that somebody with my SATs, grade point average, and other extracurriculars is going to graduate from Berkeley if I attend. Getting that information from Berkeley is like pulling teeth.

MR. TAPIA: That's a good point. I want to agree with you. I say your point is excellent. Then I want to give two little anecdotes.

I had an African-American woman who visited us last year into our Department. It doesn't matter; her name was Pam.

"I don't want to go to school in Texas."

"Okay, Pam, I'll show you what we have." Goes away.

A month later, "I've accepted Rice" because of what she saw.

I let the students recruit. I don't just do it. She saw.

"I'm coming to Rice." She did very well.

I had another student -- this is a Rice undergraduate who was valedictorian at a local minority school. His name was Cesar. He said to me,

he said, "When I came here and I was valedictorian, I thought I would be competitive across the board, but I'm not, but that doesn't bother me as much as the fact that my teachers didn't know it." See, "My teachers thought...." "So right now I'm really upset, but I'm more upset that my teachers didn't tell me what to expect."

I had a student that I was recruiting in San Antonio who had a 940 SAT and he was going to Princeton.

I said, "Do you know what the average at Princeton is?"

He said, "Well, my teachers told me it was about 950."

I said, "Well, I think you'd better check it out."

COMMISSIONER TAYLOR: I am going to pick up on this point. I oppose any public policy which masks this discussion. I think there are a lot of public policies and the discussion about those public policies that mask -- and I think intentionally mask -- this discussion.

MR. ELLIOTT: I think you're right. Look --

VICE CHAIR THERNSTROM: Hold on. Somebody didn't have their microphone on.

MR. ELLIOTT: Oh, sorry.

No, I mean it's hard to get a school to look at the data that we've seen, particularly from Professor Sander, about mismatch effects. The school knows that they are there, but the school has another agenda, which is to suit what are implicit, never really explicit anymore, affirmative action goals, usually almost numerical -- or call them at least guidelines.

You can't be transparent about what you're doing to some of these kids -- but that's a good goal; I agree with it -- and still satisfy the other one because it makes everybody see the terrible inconsistency of your goals.

VICE CHAIR THERNSTROM: And would you be willing to add another sentence to that, which is that, in general, when you're talking about undergraduate admissions at least, that what these schools care about is having a freshman class look right and being able to advertise the diversity of the freshman class, and they care very little about what the senior class looks like and what happens to the

students when they're at the college in terms of percentage of minorities who concentrate in math, and so forth?

MS. WILLNER: But that is the most critical issue because they are not doing the hard work. Letting a kid in, sending them an acceptance letter, that's not hard to do. It is being willing, if you bring this kid in, if you bring this young person in, and whether they are at an extreme deficit or a moderate deficit -- or maybe they're not at any academic deficit; they just look different because there's only three people like them.

Dr. Elliott talked about the social environment and learning from their friends. Those are all things that need to be attended to, and we have to defend that.

I think this K-12 link is absolutely essential. We have to be telling 10th-graders and 11th-graders and 12th-graders and their parents, "This is what it requires to get into these schools. This is what it requires to get these jobs."

MR. TAPIA: I visit Berkeley a lot and UCLA a lot. I'm not only saddened, it's more than that, to see the impact that Proposition 209 has had.

Essentially, I think it has killed -- you know I agree with you on this thing.

I had meetings with the Chancellor at Berkeley and he says, "Well, I really feel bad about this, but our hands are tied. There's nothing that we can do."

I was commencement speaker at UCLA. I said the UCLA that I grew up with was not the UCLA of today, I'm very disappointed to think.

But I want to turn the coin over. So when the Hopwood decision, the Fifth Circuit Hopwood decision came into Texas, Louisiana, and Mississippi, our politicians, not our academics -- if you had asked any academic, would the top 10 percent rule work, we would all say no -- no, because they're not prepared. But the politicians did it, and it was mostly the minority politicians out of Houston.

The top 10 percent, anybody that graduates in the top 10 percent of a public school in Texas is accepted automatically at the University of Texas. The University of Texas is 30 percent underrepresented in minority math majors. It's the highest of any research one in the United States, and it's working.

Now why is it working? Because they came

to the door? No, because the mathematicians there all said, "What are we going to do with all these people who are not properly prepared? Let's build some support programs."

I go back to Professor Sander about study groups. Uri Treisman, who was first at Berkeley and then wasn't treated well enough to stay at Berkeley -- they came to UT Austin -- has a thing called Emerging Scholars Program. It's legendary, and UT success rates are legendary, and they're retaining minorities with a lot of extra effort.

So there's an example of we academics would never have supported that, but it's working. It is working so well that it is going to have to be dismantled, because what is happening is that you have a legacy, mother, father, grandparents who went to UT Austin, they go to Bel Air High School, which is one of the top high schools in the State of Texas, and you're 11 percent; you don't get into UT.

VICE CHAIR THERNSTROM: Uri Treisman was supposed to be here, by the way, and ended up not being able to make it. We did want to hear from him.

I have a question for Professor Sander. I don't understand quite why we're ahead with

socioeconomic preferences. That is, if you are admitting students who are not prepared and the source of their under-preparation, inadequate preparation, is because the deck was stacked against them in terms of family background, and so forth, the bottom line is you're still admitting students who are inadequately prepared to do the rigorous work demanded at the most competitive colleges.

MR. SANDER: Okay. Here's how I think it works:

First of all, if you use socioeconomic preferences instead of racial preferences -- or I'm sorry -- if you use socioeconomic preferences in combination with racial preferences, that means that the size of preference that you need in either category to achieve a fair amount of diversity is smaller because you're creating a broader definition of diversity.

VICE CHAIR THERNSTROM: And giving Asians, of course, a lot of Asians, who are --

MR. SANDER: Some Asians.

VICE CHAIR THERNSTROM: -- bumping into an Asian ceiling, giving --

MR. SANDER: Some Asians benefit; some

whites benefit, yes. That kind of goes with the logic of the whole thing.

But you're broadening the definition of diversity. Therefore, the size of preferences that you give generally will be smaller. That's No. 1.

No. 2 is the factor I mentioned before, which is that a lot of the data I am looking at indicates that credentials are most likely to understate potential when you're dealing with someone with low socioeconomic status. That's not terribly surprising.

Dr. Tapia will point out the correlation between SAT scores and family income, and so on. There are partly sensible, valid reasons for that, but there are also disadvantaged reasons for that. So those students receiving that kind of preference are most likely to perform.

Third, we're talking about a range where preferences are not from a social standpoint, a social science standpoint, not having demonstrably bad effects. So after Prop 209 passed, my law school, UCLA Law School, adopted a very aggressive set of socioeconomic preferences. We totally eliminated the use of race during that first year of experimentation.

We produced the most diverse class of any law school in the country, whether you looked at it socioeconomically or racially. The preferences, the average preference that we gave was about a third the size of the preferences we had been using before.

MR. ELLIOTT: Are you still doing that?

MR. SANDER: No. No. The program was gutted because it was not thought to produce enough African-Americans.

So we went to a variety of subterfuges that actually produced even fewer African-Americans, but made some faculty feel better.

COMMISSIONER GAZIANO: What kind of subterfuges?

MR. SANDER: Well, most notoriously, we started a program on critical race studies, where we admitted students to a track where they could major in critical race studies. The first year of that program we had 30 white applicants with a median LSAT score of about 163, and none of them got admitted. We had 30 black applicants with a median LSAT of 154, and eight of them got admitted. I would call that a subterfuge.

COMMISSIONER GAZIANO: Not just the program, but how the program operated, right?

MR. SANDER: Yes, yes.

MR. TAPIA: But you did produce Johnny Cochran, right?

MR. SANDER: We did produce Johnny Cochran in a race-neutral area. Our preference programs of all types have had many spectacular successes. You could point to a lot of individual successes.

But using very large preferences -- well, I'm not really here to talk about law schools anyway. I have another hearing for that.

But really large preferences clearly have counterproductive effects for all graduates.

VICE CHAIR THERNSTROM: Well, wouldn't you want to add that, look, you look at the Bok and Bowen Study, it's colleges only; it's not professional schools, but about half the underrepresented minority students did not need preferences. It is important to remember that, sure, you've got very successful minority students and a lot of them, most of them probably, came in not needing preferences.

MR. SANDER: Right, Barack Obama being a notable example.

VICE CHAIR THERNSTROM: Yes, right.

MR. TAPIA: In fact, Bowen and Bok was

only African-American, no Hispanics.

VICE CHAIR THERNSTROM: Right. That's correct.

MR. TAPIA: And Rice was in the study, I think.

VICE CHAIR THERNSTROM: Yes. Yes.

Commissioner Yaki, you still don't want to come in on this? I'm about to call on Commissioner Kirsanow, but he, of course, has spoken before.

COMMISSIONER KIRSANOW: We've been talking about efforts to get more Hispanics and blacks in STEM programs. In your second slide, Professor Sander, it appears as if PhDs in science, Asians are seven times more likely to obtain than whites and forty-two times more likely than blacks to obtain them, and twenty-eight times more likely than Hispanics to obtain them.

Have you seen in any work that you have done any indication that schools, as opposed to taking efforts to increase the representation of blacks and minorities, are either overtly or inadvertently discouraging the participation of Asians in STEM programs?

MR. SANDER: No, although I think that is an interesting issue, and I hope to study that in the

future.

MR. TAPIA: On the Asian, if you look at domestic Asians, they are starting to get more and more underrepresented. If you look at the graduate student population in science and engineering, and if you look at faculty in particular, Donna Nelson, University of Oklahoma, has just done a study on faculty representation at the top 50 schools in the particular discipline and distribution.

Her point is, yes, women are on the short end, African-Americans, Hispanic-Americans, and she shows that Asian-Americans are also there; that what faculty are doing and graduate schools are doing is bringing in Asians from Asia.

I walked into my class the other day. I had 22 people. Over half were Asians from Asia.

So Asian-Americans are notably declining in terms of graduate representation. The University of California, Berkeley, which I visited and evaluated their Math Department, depending on the discipline, between 50 and 55 percent Asian-Americans undergraduate, not one Asian-American faculty in the Math Department at Berkeley. Of course, no blacks and, of course, no browns, but also no yellow.

COMMISSIONER KIRSANOW: What do you think is the reason? If there is a decline among Asian-Americans, what's propelling that?

MR. TAPIA: Well, I could do a funny answer. The funny answer is go to east LA, and that's where I grew up. The Asians that came into east LA -- now this is funny, but it is not supposed to be completely funny -- they started to sort of emulate the Mexican-Americans and the African-Americans, of course, you know, going to schools that had large percentages, because they saw that that was the component that was accepted as sort of the leadership of the school.

So there's two things that happen. The longer they are in this country, the less chance you have of being well-represented.

There was a study done by Angela Valenzuela, faculty at Rice, and it's called, "Subtractive Education". She studied Austin High School in Houston, Texas. She showed that the individuals whose parents were born in Mexico and they were born in Mexico did the best. Next was the next generation. The longer you were in Houston, which I've generalized to the United States, or at least to

Texas, the poorer you did.

So Asian-Americans are assimilating. They are acting like the general population. It is harder for them to maintain the culture that their parents brought with them and want.

My best friend/colleague is from China. His son went to Rice undergraduate, went to UT Austin, and got a job at a master's degree level. He is working for Apple. He's doing very well. Both the parents are very upset that he didn't get a PhD. He chose not to get it. He wanted to go to work at the master's degree level. They feel that he has embarrassed them.

So if you say culture isn't an issue, it is. I say that the fact is that there is a correlation that the Asian-Americans are assimilating more. I think the longer they stay in this country, the more they lose the traditional value system, as happens with Mexican-Americans and Cuban-Americans.

You referred to the Nigerian thing. There were times when Harvard, if you looked at the African-American, significantly, the number of Nigerians.

I'll tell you this: If you look at Hispanics at elite schools, Cuban-Americans, Puerto

Ricans from the island, and Salvadoreans. If you want to say, what's common about them, it's a political reason. We, the Mexican-American and the New Yorkican came for economic reasons. We were so poor, we needed jobs -- not for the Cubans, not for the Salvadoreans, for political reasons, and you will see that split.

The longer you are in this country, the harder it is for you.

MR. SANDER: Let me just throw one quick thing in. I just want to partly agree and partly disagree with Professor Tapia on this, which is that those data up there on the chart are just for U.S. residents.

It is true, it is absolutely true that something like 30 percent of all PhDs in science in America are being granted to non-resident aliens, but those data are for U.S. residents. As you can see, Asians are still very healthily represented in that.

That data is from a 2003 survey done by the Census Bureau, college graduates, and it is restricted -- I'm only looking at population that I think is born in 1960 or later. So this is all capturing the current cohort.

I'm not sure if you are suggesting this,

but there is not a crisis in Asians in science.

COMMISSIONER KIRSANOW: Is there any data that would --

MR. SANDER: And on the immigrant issue, I think we both agree that ivy league undergraduate admissions of blacks include about 30 percent non-native blacks.

VICE CHAIR THERNSTROM: Well, but also, two things: one, the College Board -- we just got in the mail yesterday -- just came out with students taking AP courses broken down by race and ethnicity, and there's a huge up-tick in the percentage of Hispanics taking --

MR. TAPIA: That's correct.

VICE CHAIR THERNSTROM: -- AP courses.

MR. ELLIOTT: But not in science.

VICE CHAIR THERNSTROM: Not in science? Okay. I didn't look carefully enough at that.

But, also, I'm a little puzzled, Professor Tapia, at one of your answers. Am I correct to say at Berkeley and UCLA the undergraduates are approximately half Asian, maybe a little under, but close to it, in any case? Couldn't you explain the paucity of Asians in graduate schools by simply saying they are not

choosing to go ahead with academic careers; they are going into business? I mean many of them come from families that have no wealth. They are fairly recent immigrants to this country. They are going for other professions, as blacks are.

MR. TAPIA: Sure. Commissioner, sure. That's always used about blacks, about Hispanics. There is a component there, without a doubt.

But I think if it were more attractive, if faculty positions were more attractive, if graduate school were more attractive, and they saw more people liked to go into it, then it wouldn't be that bad.

I often have an African-American or, say, there's a Mexican-American student, undergraduate, I say, "Have you considered going to graduate school?"

VICE CHAIR THERNSTROM: Are you including medical school in that?

MR. TAPIA: No.

VICE CHAIR THERNSTROM: No, but the numbers in medical school are very, very high.

MR. TAPIA: Sure, but I don't deal with those people.

(Laughter.)

But what I say -- and the person will say

to me, "No one has ever suggested that to me ever. You're the first person." Then they say, "But I had two C's."

"When? It doesn't matter. Go."

I had one student recently who got a PhD in three years who is now at Texas Instruments. He did very well. He said, "Everybody else but you told me that I couldn't go to graduate school because of my grades." He was Mexican-American from San Antonio.

Yes, that's an issue. I don't think that accounts for it.

If you look at the way the Math Department at Berkeley hires, the way they hire, I mean, I'll tell you, and I know I'm talking too long, but I want to say something. The Math Department at the four top schools in mathematics, which would be probably Harvard, Princeton, Berkeley, and maybe Stanford, they just hire the best person they can find independent of position. They don't say, well, let's hire an assistant professor. They say, here's the person who is the very best in any area; let's go.

So they hire people who are considered the best in the country. So what happens? They don't get women. They don't get Asians, I mean Asian-Americans.

They don't get Hispanic-Americans, and they don't get African-Americans. That kind of a model.

So what I suggested to Berkeley was that they bring in -- because they have a lot of post-docs -- they bring in these individuals in their post-doctoral positions and then evaluate and see if they move in, and they just hired two women.

VICE CHAIR THERNSTROM: But, look, if you're an Asian undergraduate and you don't come from a family with any particular wealth, you're really first-generation that has a chance to climb the ladder of social mobility in America, why wouldn't you go to medical school? Why wouldn't you go into a profession where you would earn more money and is more prestigious?

COMMISSIONER YAKI: Professor Tapia, before you answer that, let me interject just slightly on this. That is, it is somewhat misleading and a misnomer to just sort of toss out the word "Asian". There are any number of different groups within that. There are great disparities within the Asian-American community among the new immigrant population, the more first-generation that you're talking about, Commissioner Thernstrom, versus the Japanese/Chinese-

American populations, which have been here two, three, four, in my case four generations.

So I think we have to be very careful when we toss that out in terms of who's going where or what because it doesn't really capture the very distinct differences in terms of which of the subpopulations within the term "Asian" track toward which profession, which degree, scoring, et cetera. I just want to throw that out there because it bugs me.

MR. TAPIA: I agree with you.

VICE CHAIR THERNSTROM: Well, I agree with that.

MR. TAPIA: But what I want to say to you is I agree with you, but just think how much more terrible it is the way we talk about Hispanics. They're the extremes. I mean that's the extreme situation, you know, from the Chicano in the barrios of LA to the aristocratic Argentine. What do they have in common? Not even the language.

COMMISSIONER YAKI: Right.

VICE CHAIR THERNSTROM: They count for diversity. That's what they have in common.

MR. TAPIA: Yes, that's correct. I understand that. I understand that point.

But I go back to the story of my colleague whose son decided to go to work at the master's degree level, and my colleague and his wife are very, very disappointed that their son did not go for the PhD, that he went to work for Apple. It wasn't a money issue with the parents. So there's a culture there --

VICE CHAIR THERNSTROM: Why is that a bad decision?

MR. TAPIA: I'm not saying it's bad.

VICE CHAIR THERNSTROM: I mean, your parents --

MR. TAPIA: I'm not telling you that it is bad.

VICE CHAIR THERNSTROM: We have one versus another.

MR. TAPIA: I'm relating to you the culture.

Now my daughter, who is now in her early twenties, but who was not long ago a teenager, all her friends -- she's Hispanic -- their parents were quite happy when they went to work and didn't even go to college, or got married or had kids. "Now we're going to be grandparents. Wow, that's the greatest thing that could ever happen to us."

VICE CHAIR THERNSTROM: No, I understand that, but I just was addressing the question of the very high percentage of Asian undergraduates. I agree that these umbrella terms are awful, and it's a particularly --

COMMISSIONER YAKI: In particular, since Prop 209, the number of foreign Asian students who pay full tuition and are there for a much more attractive financial commodity to the UC system has greatly increased. So that is another point to make in terms of what is Asian in terms of the UC system because the fact that you can bring people in who are going to pay full board is a whole different calculus in terms of admitting someone who you essentially have to subsidize through the UC system.

MR. SANDER: I would like to just seize the opportunity to agree with Commissioner Yaki on both his point about the UC system with maximizing its tuition revenue and with the diversity of the Asian population.

The poorest and most segregated population in metropolitan Los Angeles is neither the black population nor the Hispanic population nor the Mexican-American population, but the Cambodian

population.

VICE CHAIR THERNSTROM: Sure.

MR. SANDER: We are reduced to using generalizations, but we should always keep in mind their limitations.

VICE CHAIR THERNSTROM: Right. Right. But my only point before was, look, it is not clearly more in the public interest that undergraduates, whatever their color, go into the academy than go work for Apple or IBM or whatever.

MR. TAPIA: Right. Everyone agrees with that.

My only point is this: there's millions of reasons why people go, but I see, if I say, okay, African-American mathematicians, and I take all the branches of the University of California, and I take all the ivy leagues, and I look at only math departments, how many African-American faculty do I have? I have zero. I'm saying zeroes are bad.

Earlier we were talking about percentage improvements. One thing as a mathematician that I see people use is, what's the improvement from zero to one? It is infinite improvement. You can never do better than that. Okay? You can never do better than

that.

So here's what a department will do: zero to one, infinite improvement. "We have ours; we have our one; now you go get yours." And I say one is not enough.

VICE CHAIR THERNSTROM: Commissioner Kirsanow.

COMMISSIONER KIRSANOW: Professor Sander, are there any mismatch -- or how does the mismatch differential in STEM among minorities differ, if at all, from the mismatch differentials in other disciplines such as law?

MR. SANDER: Well, I think, you know, the STEM issues at the undergraduate level are probably uniquely severe. In other words, the statistics that we have looked at for attrition and switching out are going to be worse for science and engineering majors, especially those in the physical sciences, than they would be if we looked at, say, political science majors because of all the reasons that we have talked about: the linearity of science curricula and the fact that you've got to get past threshold A to get to threshold B, and the merciless weeding out, and the curved grading, all those things.

All those things militate against being able to sort of flexibly adjust the curricula to permit --

COMMISSIONER GAZIANO: "Flexibly adjust", that's a good euphemism.

MR. SANDER: -- yes -- to permit graduation. It is much more rigid. Therefore, it is much less within general administrative discretion to sort of gloss over the issue of learning.

Law school I think is similar to science because it's got this bar exam that has to be passed to become a practicing lawyer. The bar exam, for all its imperfections, is a serious attempt to measure one's learning and one's proficiency as a lawyer.

So that, too, kind of provides something analogous to science curricula in terms of creating a very clear barrier and threshold that sort of can't be glossed over.

So if you try to look at mismatch effects, say, among English majors, it is very hard to measure because we don't have very good outcome measures aside from graduation rates, which are considerably under the control of the undergraduate presidents.

So, in that sense, I think science and law

are both good analogies to each other. There are other areas, like science PhDs or medical schools, where you have other mismatch problems, but there is either the potential to use mentoring or the actual use, and at medical schools it is much more aggressive mentoring, that ameliorates the problem.

VICE CHAIR THERNSTROM: I want to make Commissioner Yaki the last -- we really are out of time.

MR. TAPIA: Can I comment on what he just said?

VICE CHAIR THERNSTROM: Very quickly.

MR. TAPIA: Okay, quickly. I work a lot with lawyers. I do a lot of expert witness in federal court. Here's what I was going to say:

Recently, a lawyer defined the following thing: a lawyer is an intelligent person with no talent. Now a scientist is an inarticulate person with considerable creativity.

So when I deal with the two, I could see, when I first read your thing on law, I said, yes, I can see it there, but science there's another component. I have had so many successful scientists who were probably, if you had seen them in a class,

they would be inarticulate or wouldn't handle themselves well or don't handle themselves well, but they had a creativity component.

I maintain I have that. I have been a very creative mathematician. Yet, it was never measured correctly. It was never measured. Only in my later career did I show it.

I go back to the story about the Hayden High School students, the ones who won this robotics thing. So I see it as there's another component there to look for, but, anyway, I don't know. Law, I don't know. I don't know.

VICE CHAIR THERNSTROM: We need to move on to the last question because we really are out of time here. Last, but not least ever, Commissioner Yaki.

COMMISSIONER YAKI: Thank you very much, Madam Vice Chair.

I guess I have far too many comments to talk about. So I am just going to briefly state, as Professor Sander and I agreed early on, he and I don't agree with each other on even the impact of whether the mismatch as alleged exists or not, simply because, as I was watching what he was saying earlier, he seems to have now narrowed what he defines as mismatch to a

large gradient of differential that may be attributable to factors other than what we were talking about here.

Then when Professor Sander said that affirmative action is dying, I thought that was a rather interesting statement, given that it is not dying of its own; it's dying because people are passing initiatives left and right across this country to kill affirmative action as a component of higher education.

I think one thing that Professor Tapia said, and I do want to make this one statement: I have said it before, and I'll say it again for the record, that I am so alarmed at the fact that -- and this is not a criticism of any of you people here, but just that I do not see a real sense of balance in terms of the witnesses here with regard to the issue of mismatch, with regard to some of the other issues.

I know that former Secretary O'Leary canceled from the HBCU, but I am actually kind of glad she did because one of the things that I saw early on, and have seen throughout my tenure at this Commission, has been a usage of the HBCUs as sort of the -- well, using the HBCUs as an excuse as to why we can do away

with all affirmative action, because, of course, any person who could not get in under their own criteria could, of course, go to an HBCU. But then, interestingly enough, we heard what Professor Tapia has said about what the realities are in terms of the success in STEM with regard to the HBCUs.

I think we needed more of that. I think we needed more of that kind of balance. I think that, as a country, we should and do care about what our faculties look like, who are our role models.

I have now been, unfortunately, around long enough on this earth that I once heard someone say, and I am sure that they were probably on some hallucinogenic medicine, that I was a role model in terms of just the fact that when I was in college, I was one of the few Asian-Americans who was not in Chem 1A, I was not in Math 1A at Cal, and went resolutely toward a career in politics, which was what I had always wanted to be. Now many others are coming up along those ranks.

But I just say, for the record, I am concerned about balance in these hearings. I hear a statement about how there may be general agreement on this panel about the existence of mismatch. I don't

know if it is all on the same definition of mismatch. But I also know that there are many people out there who are not part of this panel who would not agree that mismatch does occur, who would not agree that the HBCUs are sort of the catch ground for the folks who would not otherwise be in there.

I think that Professor Sander and I will have to agree to discuss at some other time our probably very differing, wildly different data, on the student makeup of the UC system since Prop 209 and what that has meant to the educational aspirations and careers.

Ultimately, part of what we are talking about here is the potentiality of human beings. That is not something you can really measure. You can capture bits of it in standardized tests. You can capture bits of it in terms of how someone stands out in an innercity classroom, that maybe they have the ability to go on to the next level.

But, to me, affirmative action has never been about giving someone a place that someone else deserved. It is more about how do you measure potentiality in human beings and their potential and their ability to grow and succeed. By forever closing

that door, or using statistics to close that door, we close off potentiality to so many deserving people of color in this country that it is just something that I fear for and one that continues to be why, despite all the difficulties, I sit here once a month at this Commission.

But, again, for what you brought to the discussion, thank you very much. It was enlightening. It was very interesting. I enjoyed the debate back and forth, but there are other voices that could also have been at this table, and those voices need to be heard as well.

VICE CHAIR THERNSTROM: Thank you very much.

I am going to cut off discussion at this point. We need to go to lunch.

Thank you so much for really a great panel.

(Whereupon, at 12:44 p.m., the briefing was concluded.)