

## Session 2: Diversity as Key to Innovation: STEM Education

*Summary of Proceeding by Jeffrey Adams*

*Presenter: Richard A. Tapia, University Professor at Rice University*

*Moderated by Steve Tapia, Distinguished Practitioner in Residence, Seattle University School of Law*

**Abstract:** Richard A. Tapia is a professor at Rice University, where he has taught since 1970. Tapi specializes in optimization theory and numerical analysis. It has been his lifelong work to help underrepresented minorities achieve academic success and success in life.

In this talk, Tapia emphasizes the importance of diversity in STEM fields and highlights the failures of the education system in supporting underrepresented minorities. Tapia opines that more efforts need to be made to bring domestic underrepresented minorities into STEM positions and to recognize the value they bring. Tapia believes that, to address the lack of minority representation in STEM fields in the United States, there is a need to overcome stereotypes and to ensure excellence among minority groups while also distinguishing between foreign and domestic minorities.

### I. Introduction

In Session Three of the 6th Annual Innovation and Technology Law Symposium: STEM Education, Professor Richard A. Tapia shared his journey from growing up in the barrio of Los Angeles to receiving the National Medal of Science. Despite facing challenges in a poorly ranked public school, Tapia pursued higher education after being encouraged by a coworker. Tapia excelled academically, eventually earning a Ph.D. Despite the instability caused by minority hiring practices in the 1970s, he joined Rice University, earned tenure, and dedicated himself to helping underrepresented students. He has since mentored many such students and has received recognition for his work. Tapia emphasizes the importance of speaking to diverse audiences and continues to give talks for the benefit of students of all backgrounds.

Tapia proceeded to explain how underrepresented minorities are crucial in science and engineering and how these fields are essential for uplifting underrepresented communities. The education system, however, has failed to recognize the importance of strong representation and careers for underrepresented minorities in science and technology. Tapia emphasized that while the United States is a global leader in scientific research, there is a lack of domestic Hispanics and African Americans in STEM professions despite STEM being a backbone activity of the nation. Universities often prioritize foreign minorities over domestic ones, which further marginalizes domestic minorities. Efforts should focus on bringing more domestic

underrepresented minorities into STEM positions and on targeting the right populations rather than relying solely on foreign talent.

The United States education system discourages people from choosing STEM fields, creating an institutional problem that pushes underrepresented minorities away. For example, women initially outperform men in math and science, but their performance declines in later grades. Universities contribute to this issue by failing to differentiate between poor talent and poor preparation, leading students to migrate away from STEM to friendlier areas like humanities. The failure to educate Black and brown students is evident in minority schools in cities such as Houston.

Overcoming these challenges requires recognizing that not all individuals who look different or speak another language are underrepresented minorities. Excellence in performance and breaking social stereotypes are crucial to overcoming these issues in education and diversity. Essentially, diversity in STEM cannot solely rely on foreign individuals. Awareness and distinction between foreign and domestic minorities are necessary to ensure that both contribute value and prevent a lack of domestic representation in STEM.

## **II. Professor Tapia's journey**

Professor Tapia was the first in his family to go to college and he had to overcome many challenges to get to where he is today. The first challenge was high school. He went to a poorly ranked public school in Los Angeles. It did not have any good counselors and had only a few good teachers. From there, Tapia went to work at a muffler factory where he met a fellow worker named Jim. Jim told Tapia that he was too smart to stay at the factory and encouraged Tapia to go to college. Consequently, Tapia signed up to go to a junior college, where he met a professor in mathematics named Stuart Friedman. Professor Friedman told a young Professor Tapia that he wanted him to go to UCLA. Professor Friedman told him not to go to one or another state school but to go to UCLA because Tapia was good, and UCLA would bring the best out of him.

While attending UCLA, Tapia finally ran into the “big dogs.” He was no longer a star student like he was in high school and community college. Tapia, however, knew that he could succeed even though he felt he was in over his head at UCLA. His mother also assured him that he could do well. Although Tapia was no longer a star student, he still managed to do okay during his time as an undergraduate.

Tapia attended graduate school after he graduated from UCLA. Tapia had been influenced to go to graduate school by two friends who had always talked about continuing their studies after obtaining their bachelor's degrees. Tapia thought these friends were not good enough to go to graduate school, but they were insistent. When the two friends went to graduate school, Tapia thought to himself that he was better than them, so the two friends challenged Tapia to prove it. Tapia and his friends spurred each other on through their academic careers until Tapia finally received a Ph.D. After he graduated with his doctorate, he felt as though he was wandering in the wilderness and didn't know where to go. It took another professor, David Sanchez, a Mexican American, to get a hold of Tapia and ask him a crucial question: What are

you doing? Professor Sanchez went on to facilitate Professor Tapia's postdoc at the University of Wisconsin Madison.

At the University of Wisconsin, doors opened everywhere for Tapia and people wanted to hire him. He found himself with the "big dogs" again, and was surrounded by people he considered to be his heroes. These heroes did not treat him as a student; rather, they treated him as a colleague. This treatment made the young Professor Tapia feel good and helped build his confidence.

One thing in the back of Tapia's mind, however, was that this was the seventies. People who were minorities were getting hired to be fired. As an example, Berkeley would hire five underrepresented minorities in one position, knowing they were not going to keep them, and the University would fire four. There were no downsides to this strategy because no one was keeping data on how many minorities were fired. The only data being kept was on how many minorities were hired, which allowed Berkeley's diversity practices to look good on paper. Consequently, Professor Tapia chose to focus on getting tenure when he was hired at Rice. This required him to teach, research, and generally be active in his department. Professor Tapia earned tenure in just two years and was able to avoid the risk of being fired.

Tapia started doing outreach after he obtained tenure. He made a commitment to find people like him, who were floundering and who he knew that he could help, whether they were undergraduates or graduate students. His commitment grew out of his understanding that he was in a position to help others. Now, Tapia is proud to say that he has directed the Ph.D. dissertation of sixteen women and fifteen under-represented minorities.

Though Tapia does not know if he has deserved the recognition he has received — such as the Medal of Science — he has found that these credentials have been helpful. He is a Mexican American, and even though people may have looked at him with low expectations, they give him respect when they see the awards he has been given.

Now, when educational institutions ask Tapia to talk, he has one constraint. Tapia will give a talk only if the University's president introduces him. A common response to this request is, "Well, that was not the plan." Nevertheless, Tapia is insistent because that introduction gives visibility and validation to his talk. He does not want his presentations to be solely for minorities. He wants to speak to and for everybody. Even though some may view this as arrogance, this strategy has enabled Professor Tapia to get the presidents of Caltech and MIT to introduce him as a speaker at their institutions.

Currently, Professor Tapia gives up to three talks a week. His presentations are given through the Tapia Center at Rice University, where he works with up to 600 middle school kids. In the winter years of his life, Tapia gets to enjoy reaching out and helping people who need help. Tapia says he is good with students of all types: minorities, women, Black and brown people, but also those that are white.

### III. The importance of underrepresented minorities in STEM

Underrepresented minorities have a reciprocal relationship with science and engineering: These underrepresented individuals are important to the success of science and engineering, and science and engineering are important in helping these individuals get better representation in society. Nevertheless, at all levels of education, the system has failed to recognize the importance of having underrepresented minorities with strong backgrounds and careers in science and technology.

Across the world, the U.S. is number-one in science research. People come to the U.S. from all over the world because our programs are well respected. Even though people come to the U.S. from all over the world, however, the U.S. does not need to hire people from other countries to take jobs in places like the Silicon Valley. The U.S. can hire its own people.

When people talk about diversity, it often takes its most basic form, meaning people with different attributes. Specifically, when most people talk about diversity, they think of Black and brown individuals. It is important, however, to really dig into the meaning of diversity. While it is generally true that when you have a lot of different people you have a better team to solve your problems, that is not necessarily the case in STEM. For instance, in mathematics, if you must solve a difficult problem, it's not necessarily true that diversity, in its most basic form, is going to help. Diversity in that area means having people who have different *professional* backgrounds, such as algebra artists, anthropologists, and analysts.

One of the major failures of the United States is the lack of domestic Hispanic and Black individuals in STEM professions. Diversity must become about addressing the fact that it's not just that minorities are underrepresented in STEM — rather, domestic Hispanic and Black individuals have been left out of these fields.

Individuals with computer science degrees are guaranteed a job. Unfortunately, Hispanics and Black individuals are underrepresented in fields like computer science and in other STEM areas. Universities fail in meeting their diversity needs by not focusing on those born and raised in the U.S. Universities take advantage of their lack of diversity by hiring anyone that fits a general ethnic classification. For instance, a university will find anyone who classifies as Hispanic, including people from Colombia, Argentina, and Chile, not just Hispanic individuals from the U.S.

When these institutions hire foreign minorities as faculty, they hurt the problem at issue. Domestic minorities get further marginalized because foreign minorities are more competitive. Foreign minorities tend to come from the very best schools, with PhDs from Princeton, Harvard, Yale, Stanford, etc. They get hired because they are more competitive, and most people look at them and see them as being the same as domestic Hispanics. Furthermore, when these universities hire people from other countries, they claim to have improved underrepresentation when that is not the case.

Schools need to target domestic populations. To highlight the problem, Tapia points out that he is a domestic Hispanic and that if he was on today's job market, he does not believe he

would be hired. That is because schools would find someone else with a Ph.D. from Stanford or Princeton. Schools are substituting their efforts and attention away from domestic minorities and letting their attention drift to foreign minorities.

#### **IV. Overcoming underrepresentation**

Women outperform men in math and science until the eighth grade. After that, women start to underperform in both subjects. The same thing happens with all minorities in high school and college. There is something in the domestic education system that dissuades people from choosing STEM.

For example, in universities, professors fail to distinguish between poor talent and poor preparation. When a student enters their first math class and does not do well, the professor assumes the student does not have talent. They tell the student that they do not belong in that area. As a result, that student, and others like them, migrate away from STEM areas into areas like the humanities. Professors and institutions need to realize that they do not always recognize talent when all they see is preparation.

Further, the problem does not arise only in the highest levels of education. The problem persists even in big city high schools. For example, in the Houston School District, every single poorly ranked school has a minority-dominant population. Therefore, the U.S. is failing to educate Black and brown people even before college.

And while diversity comes in many forms, the realm of STEM education cannot simply rely on filling the void with people from other countries. There cannot be zero domestic minorities in STEM, which is what will happen if awareness regarding diversity does not grow to distinguish between foreign and domestic because both bring value to the table. The domestic community cannot be left behind.

Finally, the onus is on the minority group to be excellent. Excellence means executing perfectly and presenting well. People of minority backgrounds do not have the luxury of giving mathematics presentations in their t-shirts. A suit and tie, or the equivalent, are a requisite part of presenting well. Additionally, when a minority individual speaks, the content of their presentation needs to make the audience look past their complexion and see the value in their words. Only then can domestic minority groups earn their place in the community and forge a path for others in STEM.