# POSSIBILITIES: KAMIL JBEILY-THE MAN AND HIS VISION FOR THE TEXAS REGIONAL COLLABORATIVES FOR EXCELLENCE IN SCIENCE AND MATHEMATICS TEACHING

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#### Introduction

Every year seems to bring another study that finds that students in the United States are behind other developed nations in science and mathematics. Students who do poorly in a subject rarely go on to major in that subject in college and so the number of students who choose to become teachers in those fields or who decide to pursue masters or doctorate degrees in them grows smaller and smaller. A few years ago, the authors worked on an NASA grant with Millie Matteau, then the director of education for NASA. Millie said that in a few years, NASA would not be able to replace the engineers and scientists who would be retiring. In 2002 U.S. Comptroller General David Walker testified that "Within five years about a quarter of NASA's scientists and engineers will be eligible for retirement while 'the pipeline of people with science and engineering skills is shrinking." For obvious reasons, only U.S. citizens are employed by NASA, and they are scrutinized carefully. With the majority of Ph.D.s in science being granted to persons from other countries, the pool of persons meeting the requirements is small.

As citizens of this country have become aware during the financial meltdown of the past year, we are not as secure in world dominance as we may have thought before. What does this have to do with educating future scientists? Well, one obvious point is the depleting supply of oil, which has led the country into several wars draining financial resources and placing it in a precarious position with regard to its independence. From 1973 to 2008, the U.S. "has gone from importing a third of our oil . . . to nearly three-quarters today." Our "friends" like Russia and Venezuela cannot be counted on to refrain from using such a powerful advantage in international affairs. We MUST become less energy dependent on foreign oil! We know that we have the best higher education system in the world. Thus, we have the ability to produce the scientists, mathematicians and engineers who can conduct the research to make us energy independent. Richard Monastersky states that we will have a 47% increase in available positions in science and mathematics by 2010. According to the U.S. Bureau of Labor and Statistics, we will also see a continued decline in U.S. born students receiving doctorates in those areas. At the same time foreign students who are receiving doctorates in the U.S. increasingly are leaving for positions in other countries.

#### According to an online publication of the National Science Board:

The United States has always benefitted from international science and engineering talent. However, the US S&E workforce has become increasingly dependent on the Nation's ability to attract scientists and engineers from other countries. Census-based estimates of the proportion of S&E occupations filled by scientists and engineers born abroad show steep increases at every degree level from 1990 and 2000, reflecting both the immigration patterns of the 1990s and the inflow of foreign specialists under various work visa categories. (These figures exclude US-educated scientists and engineers born in foreign countries hired by US firms into positions at their overseas affiliates.)

For all degree levels, the share of US S&E occupations filled by scientists or engineers who were born abroad increased from 14 to 22 percent. At the bachelor's degree level, the share increased from 11 to 17 percent; at the master's level, from 19 to 29 percent; and at the doctorate level, from 24 to 38 percent. The growing US dependence on international S&E talent, particularly on foreign nationals, has become problematic. The future US S&E workforce is imperiled by two long-term trends documented in this report:

- Global competition for S&E talent is intensifying, such that the United States may not be able to rely on the international S&E labor market to fill unmet skill needs;
- The number of native-born S&E graduates entering the workforce is likely to decline unless the Nation intervenes to improve success in educating S&E students from all demographic groups, especially those underrepresented in S&E careers.

The National Science Board has examined the issues and finds it imperative that the Federal Government lead an aggressive effort to better prepare the Nation's S&E workforce starting at the earliest years of education.<sup>4</sup> In 1957 the United States was shocked by the advent of Sputnik and began to make drastic changes in curriculum requirements, provided National Education Defense scholarships and loans, funded summer workshops for teachers and provided up to date equipment through grants for poor school districts. There is still time for this country to develop creative ways to tackle this problem and provide new preventative solutions as was done before.

One man, Kamil A. Jbeily, in Austin, Texas not only has developed a way to reach our future scientists, mathematicians, and engineers, he had slowly and methodically expanded his vision to serve a state which has one tenth of all of the independent school districts in the United States. Beginning in 1990–1991 his dreams have become reality, and his story explains how he came to be what he is and to do what he does so successfully.

# Kamil Jbeily's Story

Influence of Family

The Jbeily family in Beirut, Lebanon was a large extended family with an interesting composition. His father and his uncle married sisters. They lived in the same building in apartments across the hall from each other, and when the uncle and his wife found that they could not have children, it was decided that Kamil Jbeily's parents would have many children so that there would be children for all to love. So, growing up, Jbeily had two fathers and two mothers. While none of the parents had much education (his biological father had a fifth grade education and his mother a second grade education), they worked very hard—determined to provide the best education for the nine children. The brothers owned a very small grocery store which provided the means for that education at the Anglican Good Shepherd School. The parents were hard working, selfless, devout Catholics, and lived by a high ethical code. The children lived a healthy, sheltered, ethical life at home and at school. From his upbringing Jbeily learned that he had added so much to the continuity of who he is now because, he says, "Just like the roots of a tree you must never forget your roots. I am in awe even now when I sit next to a president of a university or any highly accomplished person: That I am here. I preach and practice the Golden Rule, especially when it comes to serving others. This country has given me so much and I want to give back. Never forget where you came from. Never ever forget your roots."

#### Education

At the Good Shepherd School, Kamil met a teacher who would have a strong influence on his future. This teacher loved America and over and over told the children that it was the greatest land on Earth, the *Land of Opportunity*. He credits that teacher for his ever burning desire to come to America. He attributes the secret of his success to a hymn that was sung every day in that school, one which was important in forming his positive attitude and culture of service. The words of the song are, "We want everybody to be happy, we want everybody to be glad, we want everybody to be happy in the Lord, and we don't want anybody sad." He says, "It is amazing how transformational this hymn is because we become what we think about in selflessness to others, serving others. We must resist surrendering to the egocentric tendencies we have as human beings. Yes, you want yourself to be happy but equally important, you want everyone to be happy because happiness is best when it is shared. In my view there is no happiness without giving. A study observed this and found the happiest were the people giving, the next people witnessing the giving and then the person receiving. The lesson is—We have to share with others."

In that school, the teachers also instilled a sense of high expectations, a sense of goal setting, and a sense of excitement, a sense of concern and responsibility to others. The closest of those "others" were his siblings. On a school day, very young Kamil and his brothers and sisters walked to the grocery store for lunch. He tells a story that reveals his early gift of keen observation and concern for others. One day, over lunch, mistaken for olive oil, storestocked highly poisonous sulfuric acid was poured over a plate to be served for lunch. Kamil observes the fuming acid and curiously exclaims to his uncle who immediately realizes the mistake and removes the plate, avoiding major injuries and danger to the lives of the young children.

Back in school, Jbeily's elementary teacher told him that America was the greatest country on Earth. So since elementary school, he dreamed of coming to America, the Land of Opportunity. He says, "In the 1960s and 70s the image of America as portrayed in movies and other media outlets was incredible, the image of highways, the image of luxury, beautiful girls, California tall girls, abundance! Even without the enticement from the teacher, the reputation of America was irresistible to any young man with a strong desire and ambition to achieve. Everyone wanted to come to America. Why? Reason: *Opportunity* to be the best you can be, to serve, and to be whatever you wish." Almost 20 years after arriving in the US, Jbeily articulates that reason in a keynote speech at San Antonio's Institute of Texan Culture to over 300 new citizens among whom was his own mother who took the Oath at the age of 72. Reporting on the event, the August 29, 1999 edition of the San Antonio Express-News states:

Kamil Jbeily, a walking, talking advertisement for the American dream, said nowhere else in the world do people find such an abundance of rights and privileges. "What makes America so great? The answer is deceptively simple," he told the gathering.

"Opportunity. Opportunity for everyone to grow, develop, achieve their goals and realize their dreams. Opportunity for all to enjoy liberty and justice. Opportunity to be protected by the law from oppression and illegitimate execution." (For full newspaper article, see the link: http://thetrc.org/jbeily/press/express.htm)

After graduation from high school, Jbeily received a bachelor's in Chemistry and a master's degree in Chemistry and Chemistry Education. He taught at secondary schools in Lebanon for several years during the Lebanese Civil War. These were challenging times, for the students would fight all night and then come to school exhausted, check their weapons at the door or give them to their brothers and come to class. His creativity as a teacher was important during those times. Excelling in his Master's degree, Jbeily was awarded a scholarship to pursue a Ph.D. in Science Education in Europe or the United States. He says, in that moment my elementary teacher's stories and hymns flashed in my mind. That was my opportunity to come to America! On August 30, 1980, my plane landed in Houston Intercontinental airport at 1:30 AM. One of the very important milestones of my life." At age twenty-six he had come to the land where opportunity was possible.

#### The Collaboratives

Opportunity was waiting at The University of Texas at Austin in the guise of Dr. James P. Barufaldi who now holds the chair as the Ruben E. Hinojosa Regents Professor and serves as Director of the Center for Science and Mathematics Education and was at that time Director of the Science Education Center and who invited Jbeily to stay at his home during the doctoral interview process. Barufaldi was to become Jbeily's friend and mentor and one who helped him make the most of his opportunities. Jbeily enrolled in The University of Texas in Austin Texas and received his Ph.D. in Science Education in 1986. During the time Jbeily was a student, he spent five years supervising student teachers for the College of Education at U.T. After graduation, he began his U.S. career at the Texas Education Agency (TEA)<sup>11</sup> and began teaching Chemistry at Austin Community College. While at TEA, Jbeily became increasingly involved in science education reforms. In his first week at TEA in March 1987, while on a school accreditation assignment, Jbeily begins serving Texas teachers. He meets, assists, and advises teacher Carol Garcia in her chemistry laboratory at Kilgore Independent School District in East Texas. The one-day assistance and passion to serve left a lasting impression and led to a lifetime friendship and a poem, written by Garcia, titled "His Journey of Opportunity" and published in the 2000 edition of International House of Poetry. (See poem and photos on Jbeily's website link: http://thetrc.org/jbeily/American.htm)

The official brochure of the Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching (TRC) gives a brief history of the development of the TRC under Jbeily's leadership. The brief history is as follows: In 1990–91, major science education reform activities were underway in Texas. Changes necessitated that teachers adopt new methods of teaching and teach a wide variety of sciences for which they were not prepared. Dr. Kamil A. Jbeily, then at the Texas Education Agency (TEA), initiated a series of regional meetings across the state to explore ways to create ongoing regional support systems of professional development for Texas science teachers. The meetings included representatives from education service centers, colleges and universities, school districts, and community leadership. The goal was to create partnerships that are built on collaboration, costsharing (using Eisenhower funds as seed money), and synergistic relationships to provide science teachers with relevant, meaningful, sustained, and high-intensity professional development that will have positive impact on student achievement. The partnerships gave birth to the Texas Regional Collaboratives for Excellence in Science Teaching.

On March 2, 1996, with the reorganization of the Texas Education Agency, and under a TEA-UT partnership agreement, the statewide administrative office of the Texas Regional Collaboratives was moved to the Science Education Center (now Center for Science and Mathematics Education) at The University of Texas at Austin. The program now enjoys support from a wide spectrum of local, state, and national partners. In July 2006, the Texas Regional Collaboratives (TRC) launched a new initiative funded by the Texas Education Agency to provide high quality professional development for Texas mathematics teachers. After a competitive process, grants were awarded to 20 partnerships across Texas to establish the Texas Regional Collaboratives for Excellence in Mathematics Teaching. [More recently the Louisiana Outreach Project has included LSU/Southern University Regional Collaborative and Louisiana Tech University/Grambling State University Regional Collaborative both funded through the Shell-TRC Partnership.]

#### The Teacher Is the Kev

In explaining his emphasis on the teacher, Jbeily says that there is no possibility to transform the achievements of students unless there is an investment in the teachers. When the teacher closes the door, it is what they know, how they teach it, their high expectations, their strong beliefs, their confidence, their healthy attitude, and their creation of an environment of love for and curiosity about science, that will inspire the students to learn, excel, and think about pursuing science or technology related careers. "The best investment we make is in our teachers." As Jbeily began to work with a changing curriculum, he also began to provide a support system for teachers through professional development opportunities and tuition grants which were provided through the TRC's state, federal and corporate partners. Jbeily declared the following value system for the program:

- Serves its teachers
- Treasures its people
- Operates with integrity
- Rewards its partners
- Contributes to the community and systemic reform<sup>13</sup>

In order to reach as many teachers and students as possible, Jbeily developed a mentoring system which has made it possible to serve almost all of 254 Texas counties, and train over 40,000 science and mathematics teachers, many of whom mentor and support other teachers in their districts and regions. The examples below show how in one year only, hundreds of thousands of students can be the recipients of the expertise of these teachers and mentors.<sup>14</sup>

The impact of the TRC on one specific region can be demonstrated in its impact on the University of Texas-Pan American (UTPA) Regional Science Collaborative though

- 1. Educational Opportunity for Teachers
  Through resources provided by the TRC, the UTPA Collaborative has been able to bring approximately 160 elementary, middle school and high school teachers into masters degree programs and help them complete their degrees. TRC resources have provided these teachers with tuition scholarships which enabled many of them to complete degrees that would have been impossible for many of them to do without this support.
- 2. In-service Opportunity and Instructional Materials for Teachers
  TRC resources have also enabled the UTPA Science Collaborative to provide their teachers with many inservice opportunities to strengthen their pedagogical skills. It has also provided the instructional materials needed for the in-services and sets of instructional materials for the teachers to take back to their classrooms. These materials have included science equipment such as those items necessary for teachers to be able to effectively teach the Texas Educational Knowledge and Skills [TEKS]. This is important because the TEKS form the basis for the state assessment system. The TRC has also provided teachers with commercially prepared science kits that include all the curriculum materials and science equipment needed to teach science effectively and provided the in-service training necessary to use them effectively.
- 3. Leadership development of teachers
  Many of the teachers who have participated in the UTPA Science Collaborative and completed their master's degrees have become leaders in their schools and districts. For example, six of the local school districts have science coordinators who are members of the UTPA Science Collaborative and completed their master's degrees in the Collaborative program. A large number of Collaborative teachers currently serve as department chairs in their high schools or grade-level leaders in their middle or elementary schools. Several others have moved on to complete doctoral programs. Three are currently pursuing doctoral degrees and one has completed a doctorate at UTPA and is now a university lecturer. 15

# The Results

Some of the indicators of the successful statewide impact of the Collaboratives include

- Elementary campuses with at least one Grade 5 TRC teacher each year during 2002–2005 scored higher on the Elementary Science TAKS (Texas Assessment of Knowledge and Skills), than the state average.
   Differences in student achievement were demonstrated both in the percentage of students that met state standards as well as the percentage of students that achieved a Commendable Performance
- On average, scores for Collaborative teachers on tests of science content knowledge increased from a mean of 52 before TRC training to a mean of 67 after TRC participation.

 Students taught by teachers in the Rice University Regional Collaborative showed significant improvement compared to nonparticipant teachers in the same school district on a test consisting of items from the Third International Math and Science Study (TIMSS), and released state test items.<sup>16</sup>

In the UTPA Collaborative, a large number of Collaborative teachers have been selected as teachers of the year in their schools or district. Many of the Collaborative teachers have succeeded in raising the TAKS scores of their students. For example, one teacher who was very successful in raising the test scores of her students was asked by her superintendent to become a curriculum specialist and focus on four elementary schools whose science scores were not acceptable and whose student population was predominantly Mexican America and low a socioeconomic group. She worked with each school and within a two-year period brought all of them up to an acceptable or commended pass rate. <sup>17</sup>

# The Partners and Collaboration

Kamil A. Jbeily has been successful because he not only believed that cooperation and sharing were important, he believed that the participants in that cooperation and sharing should be as inclusive as possible. Ibeily's enthusiasm for these Collaboratives and what they are accomplishing is contagious. He never seems to see a negative. Negatives are delightful challenges to be met with courage, commitment and determination. His personality sparkles. However, charisma alone will not convince corporate and government sponsors to pledge monetary and other support. Kamil A. [beily is brilliant, and he can answer questions and address issues in a down to earth way with clarity and excitement. Since that first seed grant from the Eisenhower Program, Jbeily has gained support from community leaders, the Texas Education Agency (TEA), the Texas State Board of Education, the State Commissioners of Education, The University of Texas Presidents and administrators, State political leaders, and corporate leaders from industry. They not only support but also participate with teachers, other educators at special Honoring the Teachers events, and at TRC annual meetings where educational excellence is celebrated and outstanding service is awarded. The TRC is a dynamic partnership where the partners have many opportunities to get to know each other and to form trust, respect, and lifelong friendships and relationships. State, federal, corporate and foundation partners include TEA, the U.S. Department of Education, the National Science Foundation, the Texas Higher Education Coordinating Board, Shell, AT&T Foundation, El Paso Corporation, Toyota USA Foundation, and The Cynthia and George Mitchell Foundation. In addition to over fifty regional corporate and community partners, TRC project contributors include Abilene Education Foundation, Advanced Micro Devices, the Bob Bullock Texas State History Museum, Central West Texas Charitable Foundation, Iack Ramsey, Community Foundation of Abilene, Bob and Maggy Morford, Dian Graves Owen Foundation, Eleanor and Robert Hoppe Endowment DA Fund, J.E. Connally, Virginia H. Boyd, Kenedy Memorial Foundation, Morehead-Welborn LLP, Robert Gooch, Rockwell Fund, Sam E. and Ann Barshop, Scott Taliaferro, Jr., Sydney E. Niblo, Walter F. Johnson, William Wright Jr., Zachry Group, Inc. 18

Recognition of Jbeily's accomplishments came in 2000 when he was inducted into the Texas Science Hall of Fame as a Charter Member along with such other notables as Dr. Denton Cooley, Dr. Michael DeBakey, Astronaut John Blaha, and Microchip Inventor Jack Kilby. This man who came to the Land of Opportunity has in fact used that opportunity to bring opportunity to thousands of teachers and millions of Texas school children and will leave a legacy of inspiring thousands of young people interested enough in science and mathematics to choose them as careers.

For those who are interested in more information about the Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching: the following is from the Texas Regional Collaboratives' web site (http://thetrc.org/trc/).

#### **Our Mission**

To provide Texas science and mathematics teachers with support systems of scientifically researched, sustained and high intensity professional development and mentoring, to assist them in the implementation of the Texas Essential Knowledge and Skills (TEKS). Our programs equip teachers with the necessary knowledge and skills to engage students in meaningful science and mathematics learning experiences. Activities are designed to improve students' scientific thinking, their mathematical and technological literacy, and interest to pursue science and engineering related careers.

#### Achievements

- 1. Served over 1.5 million students across Texas through improved instruction and performance of participating teachers.
- 2. Developed the leadership capacity of approximately 16,000 Science Teachers Mentors (STMs) through sustained and high intensity professional development. These STMs are in turn sharing their experiences with thousands of teachers through mentoring, peer coaching, technical assistance, and workshops at the campus, district, and regional levels. In addition, over 16,500 mathematics teachers have received training in mathematics professional development modules sponsored by the Texas Education Agency. Science and Mathematics teachers in almost all of the State's 254 counties have been the beneficiaries of this extensive statewide support system.
- 3. Received commendation from U.S. Department of Education, National Science Foundation, policy makers, legislators, and business partners; inducted into the Texas Science Hall of Fame, and recognized by the Governor, the Senate and House of Representatives for distinguished achievements and contributions to supporting science education.

#### Activities

- Professional Development Academies (PDAs) are provided to Instructional Teams that consist of professors of science, mathematics, and engineering education, instructional specialists and master teachers.
- Professional Development Programs designed by instructional teams at each Regional Collaborative provide 75 to 105 contact hours of TEKS-based professional development to prepare teachers to become Science Teacher Mentors (STMs), and Mathematics Teacher Mentors (MTMs).
- Honoring the Teachers events, recognize and honor participating teachers and engage policy makers, legislators, and state leaders in the program.
- The Annual Meeting brings together teacher leaders, education and business leaders, policy makers, and legislators to share, network, communicate, and celebrate the achievements of the Collaboratives.

#### **ENDNOTES**

- 1. Audret T. Leath, "Concerns Over the Future of NASA's S&T Workforce," FYI Number 95, August 12, 2002, accessed September 23, 2009 from http://www.aip.org/enews/fyi/2002/095.html.
- 2. Shirley Ann Jackson, "You Cannot Get There from Here: Why the U.S. Needs a Comprehensive Energy Security Road Map," accessed September 23, 2009 from http://www.rpi.edu/homepage/quietcrisis/ps072208-commonwealth.html. 3 Richard Monastersky, "Is There a Science crisis? Maybe Not," The Chronicle of Higher Education, July 9, 2004, accessed from http://chronicle.com/cgi2-bin/printable.cgi?article=http://chronicle.com/free/v50/i44/44a01001.htm.
- 4. National Science Board, "The Science and Engineering Workforce Realizing America's Potential," 1. http://www.nsf.gov/nsb/documents/2003/nsb0369/nsb0369 7.pdf.
- 5. Kamil Jbeily, interview by Martha Tevis and John McBride, University of Texas-Pan American, Borderlands Room, May 19, 2009.
- 6. Ibid.
- 7. Ibid.
- 8. Ibid.
- 9. Ibid.
- 10. Ibid.
- 11. After several years at TEA he traveled back for a visit to Beirut. While there he was introduced to a recent law school graduate who was both brilliant and beautiful. Being a man of action, he proposed in the first five minutes of conversation, and they were married seven days later. Today Kamil and Sana Jbeily are the proud parents of a son, Mark, and two daughters, Laura and Stephanie.
- 12. "Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching: Dynamic Partnerships for Twenty First-Century Science and Mathematics Education," Accessed September 23, 2009 http://thetrc.org/trc/download/about/09 TRC Brochure.pdf.
- 13. Ibid.
- 14. "The TRC Fact Sheet," http://thetrc.org/trc/download/TRC\_Fact\_Sheet\_02\_13\_09.pdf. Accessed September 23, 2009
- 15. John W. McBride, Director of UTPA Regional Science and Mathematics Collaborative, and Martha May Tevis, Associate Director.
- 16. "The TRC Fact Sheet."
- 17. McBride and Tevis.
- 18. TRC brochure.

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