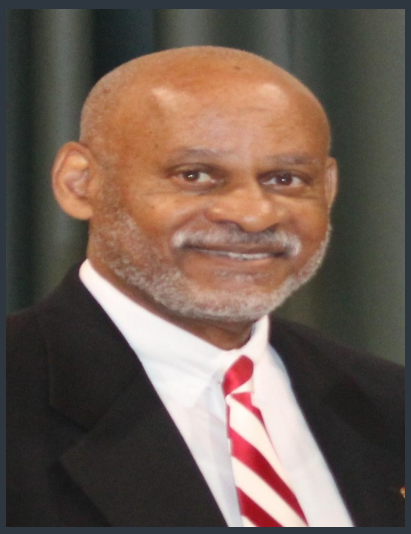
Volume 9 Issue 4

SPECIAL EDITION 2020



Lawrence P King

Publisher

The challenges to STEM from the scourge of coronavirus will remain for months.

The pending resistance to immunization may be formidable causing potential delays in recovery and prevention.

Lawrence P King

P.O BOX 2028

Mableton, Ga. 30126

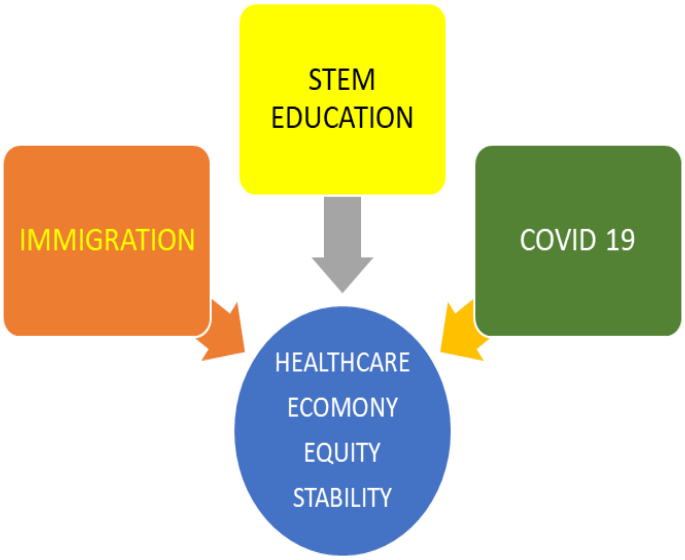
E-MAIL: info@snchronicle.com

PHONE: 770.262-9186

STEM NEWS CHRONICLE™

STEM NEWS CHRONICLE

Covid 19, Immigration, and STEM



All the issues in this graphic above are and will urgently challenge the expectations of systems, government, and technology based business over the next five years like nothing before in industrialized society. The interrelationships on several levels impact education, cultures, the future workforce, and politics.

The delivery of responsible and equitable healthcare, accommodating the movement of people, and adapting new science and engineering into work and lifestyles will engage us and our economies as we seek expanded diversity and inclusion and sustainability in the world order.

We are extremely appreciative to feature an article by Dr. David Satcher, former Surgeon General

IN THIS ISSUE

FEATURED ARTICLE

STEM Related Education

COVID-19 provides a challenge to education generally, but especially to STEM Education, which provides a challenge to so many of our children in and of itself. Because of challenges based on differences in languages and socio-cultural backgrounds, immigrant children are once again at a disadvantage.

At the Satcher Health Leadership Institute (SHLI) at the Morehouse School of Medicine (MSM), we decided that it is important to empower parents to support their children in dealing with STEM related learning.

We value the role of parents in childhood education. We have come to believe that parents can be empowered to better support their children in STEM Education starting very early. Among other things, parents were supported to better understand the brain and it's development and the impact of physical activity on improving blood circulation in the brain and to better interact with children in a way that expedited early communication and learning.

But, perhaps a more important assessment is one that takes more time. With that in mind, we are now assessing the importance of early STEM challenge for parents and children on learning. For the goal is to have both parents and children comfortable with STEM education and communication. Parents who are comfortable with STEM communication are an important resource for their children. On the other hand, what we often find is a level of discomfort on the part of parents, especially mothers, often single mothers, in dealing with STEM related communication. This discomfort with STEM communication seems to be passed from mother to children – especially, in single parent households. In addition, of course, it is clear that single parents are sometimes overwhelmed and the demand that is placed on them even without dealing with the childhood learning, and that also must be taken into consideration. Thus, the goal of our Quality Parenting Program was to empower parents, including single parents, to help their children to develop a level of comfort in communication in STEM language. My own mother who only had a fifth-grade education, was determined to challenge us, her children, to take homework seriously, especially mathematics and science.

Clearly, we the children, did much better in our STEM related studies because she was not afraid of it and challenged us to do our best at home and at school. It was many years later before I appreciated the fact that she did not always understand what she was challenging me and my siblings to understand, but because of her challenge we grew in our understanding and comfort in dealing with STEM related topics.

Dr. David Satcher, an American physician, and the 16th Surgeon General of the United States.

COVID-19 Global Impact

Dealing with the unforeseen challenges caused by the COVID-19 pandemic has taken a significant toll on people all across the world. The COVID-19 pandemic has affected educational systems worldwide, leading to the near-total closures of schools, universities and colleges. Most governments around the world have temporarily closed educational institutions and installed constraints on commercial activity in an attempt to contain the spread of COVID-19.

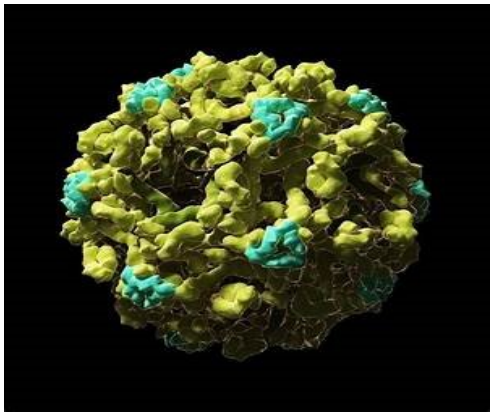
The past few months have been a very challenging time for almost everyone. We have seen daily how the coronavirus epidemic is disproportionately impacting the most vulnerable members of our society. Migrant communities have been among the most impacted In some nations the impact of Covid 19 has had a tremendous negative affect on education of immigrant communities

Will STEM skills become a casualty of COVID-19?

As science and technology are essential to the recovery from this crisis, the long-term future of our economy it is under threat. Universities and other research organizations have been impacted by the COVID-19 pandemic. Careers emerging from STEM are essential for the creation of future industries such as advanced manufacturing, energy, space science, and quantum technologies. Science underpins the delivery of many public sector services, including water management, new voting technology, land management, renewable energy sources, and health care.

As immigration policy limits normal technical workforce movement some technologists and scientists are finding their movement in performance of their jobs curtailed. In worst case scenarios, once absent from their resident university or corporate research employment location, their return may not be soon. These persons cannot be easily replaced because they don't grow on trees and our educational enterprise hasn't produced sufficient numbers from historically underrepresented groups and women.

Universities, agencies, and business need to ramp up programs that grow the future STEM workforce everywhere. Because without a thriving science and technology sector, staffed with new engineers and scientists, economies The engineering/ science enterprise will not generate the innovation that spurs growth. We need scientists despite Covid 19 and restrictive immigration policies more than ever to help develop the high-value industries that will secure and create future jobs and prosperity. When more skilled minority and women researchers and technical practitioners enter the market out of universities, there will be greater opportunities for industry and new businesses to take them on and increase overall diversity.



A Penn State Solution

Xin Ning moved to the US from Beihang University in China and is assistant professor of Aerospace Engineering. He has a NSF grant to apply his research to create a stretchable and foldable field hospital for use in Covid pandemic.

Sensors fit over the patients chest to monitor breathing, temperature, and coughing the vital signs of the disease. The sensors link with an antenna to remove the need for wires or batteries. Field hospital resources can be reduced by the use of this unit that can serve multiple patients. An undergraduate educational plan is included in the project.

During the fall, with COVID-19 surging throughout the globe, many schools are reopening either entirely online, or with an online–in person hybrid schedule. Assuming full in-person instruction does not resume until spring or summer 2021, global consulting firm McKinsey & Company estimates that the students may fall behind nearly seven months on average. For white students, the average is six months. In comparison, Hispanic students would be set back more than nine months, Black students more than 10 months, and low-income students, over a year. Overall, existing racial and socioeconomic achievement gaps could expand by 15 to 20 percent, the group estimates. Education researchers fear that students who suffered the greatest learning losses in the spring may never catch up.

What the Coronavirus Revealed

I arrived as a child with my family as a political refugee to the United States. As a young boy growing up in Brooklyn, I enjoyed science and aspired to the life of a scientist. I am a Black man and a scientist because there were some in my life who encouraged that dream.

For most, the love of science comes early in life. Yet, among students of color, our educational systems leave much talent undeveloped. The COVID-19 pandemic shines a light on the inequities in health, education, economic stability, public safety, and in general, social justice. Rightly, we have invited talented minds from abroad to develop in our universities. But we neglect the discovery of our native daughters and sons and don't fully utilize the talent available to us in our local communities. To paraphrase Ralph Ellison's Invisible Man, it is a defect of our vision that fails to see the abundance of creativity and genius among the children of our own land. Too much talent is left on the table and, as a nation, we are poorer for it.

When we invest in a student of color, we invest in an entire community and in the nation. To enable students of color to persevere in higher education benefits not only the individual but also the larger communities they touch. It stimulates economies of cities, neighborhoods and families, and encourages the next generations of learners. As we confront deficits of social justice and fight a global pandemic disproportionately hurting those of color, we must close the gap in education facing Black and brown talent in America.

I lead Xavier University of Louisiana, an institution that has educated more African American graduates who become physicians than any other institution in the nation. Xavier also leads in sending black students to doctoral education in STEM, and we boast distinguished programs in the arts, humanities and social sciences as well. Yes, these are remarkable accomplishments by a remarkable faculty. However, given our relatively small size, it poses a question and challenge to much larger and wealthier higher learning institutions.

The United States takes pride in its diversity. Our scientific enterprise must reflect that diversity and receive the diverse perspectives and insights that the nation needs. Now is the time to support and develop the gifts that have been neglected. Educational equity is equity.

Dr. Reynold Verret, President

Xavier University of Louisiana

Disruption in Engineering Education: A Paradigm Shift

For Education Confirmation

The outbreak of the coronavirus has become a major disruption to colleges and universities. The pandemic threatens to significantly alter every aspect of college life. A discussion among college Deans of Engineering in September 2020 featured thoughts and comments on how Covid 19 has impacted their approach to engineering education in our new Covid world.

This discussion was organized and hosted by **ASME** and included registered participants from eight nations across the globe. As Publisher of STEM NEWS CHRONICLE, I was a listening participant and share in this issue some of what panelists had to say. **Lawrence King, Publisher**

Panelists

Dr. Oscar Barton, Dean Engineering Morgan State University where the College of Engineering has 1400 enrollees

Dr. Barbara Christe, Dean School of Engineering Technology Farmingdale State NJ, the 3rd largest enrollment of engineering technology students

Dr. Michael Green, Interim Dean Electrical Engineering & Computer Science, University of California Irvine where half of student population are first generation, and

Dr. Harriet Nembhard, Dean Engineering University of Iowa a majority white institution with 2000 engineering students

Note: The responses to the questions below are from my notes and not inclusive of the totality of panelist's statements.

Discussion question #1, How has your institution been affected?

Barton – "We have been engaged in a process of planning and then planning again constantly in response to the impact of reported infections among students, staff, and faculty. These demonstrate to us that we are truly in an uncertain environment and that everything is subject to change."

Nembhard – "We have virtualized all operations and functions in response. The most significant impact was the loss of casual conversations between and among students, staff, and faculty and the realization of how vitally important this communication is the efficient operation of the institution."

Green – "Our essential research was most immediately affected with the international movement of students and research staff curtailed and/or eliminated. Also, we did not anticipate the host of student residency issues and related challenges that surfaced. Moving in and moving out in response to changing guidance by state and federal health officials and the concerns of parents and students had us in an environment of managing continual variables."

Christe – "I would share most of what the other panelists say about students and faculty experience but different for our commuting students in some cases. Of course we don't conduct research so we didn't have that aspect."

Continued next page

Disruption in Engineering Education: A Paradigm Shift

For Education Confirmation

Discussion question #2, what were the issued faced in blending virtual and person to person instruction?

Nembhard – "We began a journey on a steep learning curve in response. We had to acquire and deploy new technology and the training that comes with it and to put in place new communication practices, roles and responsibilities."

Green – "Our entire teaching and testing schedule was upended. We needed to establish unique ways to communicate with our international students, those here and those traveling. We had to set up new exam proctors and grading schemes. Our native born students of color naturally had heightened concern for Covid since they were disproportionally affected".

Christe – "Remote accommodations were a big challenge and we had to experiment with different approaches."

Barton – "As an HBCU, we had to deal with students feelings of isolation on campus being away from home."

Discussion question #3, how has your institution made accommodations for faculty at both personal and professional levels?

Green – "Faculty work/life balance accommodations were particularly vexing at times."

Nembhard – "There were many inequities that surfaced that were previously unknown to our team that we had to deal with. We soon recognized that the future would be unknown and difficult to plan for."

Discussion question #4, with the noted educational disparities across gender, geographic, and racial lines what were some ways they are being accommodated?

Christe – We had to find ways of exhibiting empathy for all the different situations our commuting students had to deal with.

Barton – "Our students in too many instances bring with them food and housing insecurity. Our counseling services were stressed and we had to ramp up".

Green – "I concur with Dr. Barton because we shared the same set of challenges that extended to faculty as well."

Nembhard – "Our summer programs were eliminated and our recruiting outreach was cut as well. We had to reduce dorm density. Online learning is easier for academically strong students and more challenging for those not as equally prepared".

Continued on next page

What each campus administrator presented in the discussion experience was the loss of revenue which directly impacted programming and budgeting and the cancellation of all travel.

This summery of discussions does not capture every exchange between panelists. Highlights of some of those additional discussions included expansions of these issues.

- Delayed school and start of some programs
- The lack of clarity of all issues during the period
- Reductions in dorm density
- Online learning easier for academically strong students
- Covid impact on local community

We also have not included much of the change management experiences at each institution.

Covid-19 and Higher Education UK

In the UK coronovirus has affected the higher education sector immensely and is having a deep, and potentially long-lasting effect, on all aspects of the student journey. Current students have been forced to make a rapid switch to fully online learning, meaning in many cases projects, dissertations and assessments have halted or had to be adapted to being carried out online.

A survey conducted by the consultancy London Economics estimated that about 17% of prospective UK students would not enroll in September if coronavirus restrictions remained, costing the sector £763m in lost tuition fees and teaching grants. Alongside this, UK universities' financial reliance on international students will have huge repercussions as many will choose defer or cancel places due to travel restrictions and concerns around safety

UK Student Impact Mirror US Student Impact

Many students do not feel they are receiving enough support from their school for their university applications (35% are not satisfied overall).

43% of university applicants studying for A levels feel that the new assessment procedure will have a negative impact on their grades. While most feel that the impact will be small, 72% felt that the new grading system is less fair than in a normal year.

Over half (52%) say they would be likely to take a replacement exam in the autumn if they don't get the grades they hope for. 60% of those attending private schools would be likely to resist, compared to 52% at state schools.

Applicants from working class backgrounds were twice as likely to have insufficient access to internet access, devices for learning or a suitable place to study, compared to those from middle class homes.

Private schools are almost twice as likely to be still teaching A Level content as state schools (57% v 30% receiving regular work and feedback from teachers).

Engineers Rock and Meet the Covid Challenge

The current COVID-19 crisis has separated us physically but also has compelled us to work together to address related societal and economic challenges, ranging from arresting the contagion to relieving stress on the health care system, production of vaccines, and reimagining life in today's remote working and learning environment.

As a global community, we are experiencing unprecedented change on what seems like a daily basis. Here is where the problem-solving nature of engineers has stepped up. There are thousands of collaborative engineering efforts against COVID-19 taking place each and every day around the globe.

From 3D printed masks to mechanical ventilators, the engineering community is putting up a solid fight back against the coronavirus.

Along with the medical and scientific expertise that is being brought to bear on this challenge, the engineering community is ideally suited to address these challenges by sharing knowledge, skills, systems

Immigrants and STEM Out of Balance

Immigrants play an increasingly important role in global STEM education and employment. The United States, followed by the United Kingdom, Canada, and Australia, is the number one destination of global STEM talent. Most immigrants coming to the United States are highly skilled. Among highly skilled immigrants, a significant number come to the United States with expertise in STEM. The most salient STEM hotspot in the U.S. depends on immigrants: *"56 percent of STEM workers and 70 percent of software engineers in Silicon Valley in 2013 were foreign born."*

The mixture of immigrants and American born workers is a powerful catalyst for creativity and innovation in STEM fields, both in academia and business, but do immigration avenues act to inhibit encouragement of Black and Brown students born in America from consideration as the remedy for the science/engineering workforce shortage? Certainly it is a cultural impediment for native born women who aspire to have a career in science or engineering.

Research show immigrants are critical to science and technology in the US, fueling technological innovation and growth that benefit all living here. There is no argument here. However this dependence has created a generational feeling among Black and Brown technologists and scientists that Blacks and Latinos are less welcome in STEM careers. Although they enter careers enthusiastic about their jobs, significant number of these individuals and especially women end up leaving the field.For decades, advocates have preached to African Americans and Latino youth, that STEM disciplines are highly recommended as the most direct path between an education and a good, high-wage career. From public policy to student career counseling, encouraging STEM studies, skills, and degrees has been at the center of American educational platform for employment and economic security. Sadly, results have yet to meet equity, inclusion, and diversity expectations.

Creative school plans could counter inequities exposed by COVID-19

By Sujata Gupta, Science News September, 8, 2020

The emergency pivot to remote learning for K–12 students last spring illuminated longstanding educational fault lines in the United States. The most vulnerable students — children with disabilities, English language learners and children from marginalized Black, Hispanic and Native American communities — were less likely than their affluent and mostly white peers to have basic necessities such as regular meals, a quiet place to work, computer access, guidance on how to get online and even online access itself.

Even before the COVID-19 pandemic, education researchers were sounding the alarm that the country's achievement gap between students from low- and high-income households had remained unchanged for almost half a century, with the poorest students performing at academic levels three to four years below that of the wealthiest students .

Spring's events may have pushed disadvantaged students even further behind. In a May working paper, researchers at Brown University in Providence, R.I., used typical rates of learning loss that occur over summer vacation to estimate learning losses incurred by spring school closures. Their calculations suggest that students, on average, will return to school this fall having retained only about a third to half of the math skills acquired during a normal school year, and 63 to 68 percent of their reading skills. But those learning losses are uneven, with readers in the top third proficiency level potentially even accelerating their rate of learning during school closures.

This fall, with COVID-19 still surging throughout the country, many schools are reopening either entirely online, or with an online–in person hybrid schedule. Assuming full in-person instruction does not resume until January 2021, global consulting firm McKinsey & Company estimates that the students may fall behind nearly seven months on average. For white students, the average is six months. In comparison, Hispanic students would be set back more than nine months, Black students more than 10 months, and low-income students, over a year. Overall, existing racial and socioeconomic achievement gaps could expand by 15 to 20 percent, the group estimates. Education researchers fear that students who suffered the greatest learning losses in the spring may never catch up.

Diversity Still Matters

COVID-19 is confronting companies around the world with a daunting degree of disruption. In the immediate term, some face devastating losses of revenue, dislocations to operations and supply chains, and challenges to liquidity and solvency. Others are coping with enormous unexpected spikes in demand. In the medium term, we can expect material and lasting shifts in customer markets, regulatory environments, and workforce deployments. Leaders and managers will need a great deal of resolve and resilience as they seek to navigate an economically and socially viable path toward a "next normal."

The lessons from previous crises tell us there is a very real risk that inclusion and diversity (I&D) may now recede as a strategic priority for organizations.1 This may be quite unintentional: companies will focus on their most pressing basic needs—such as urgent measures to adapt to new ways of working; consolidate workforce capacity; and maintain productivity, a sense of connection, and the physical and mental health of their employees. We agree with those who would argue that companies pulling back on I&D now may be placing themselves at a disadvantage

McKinsey & Company Report