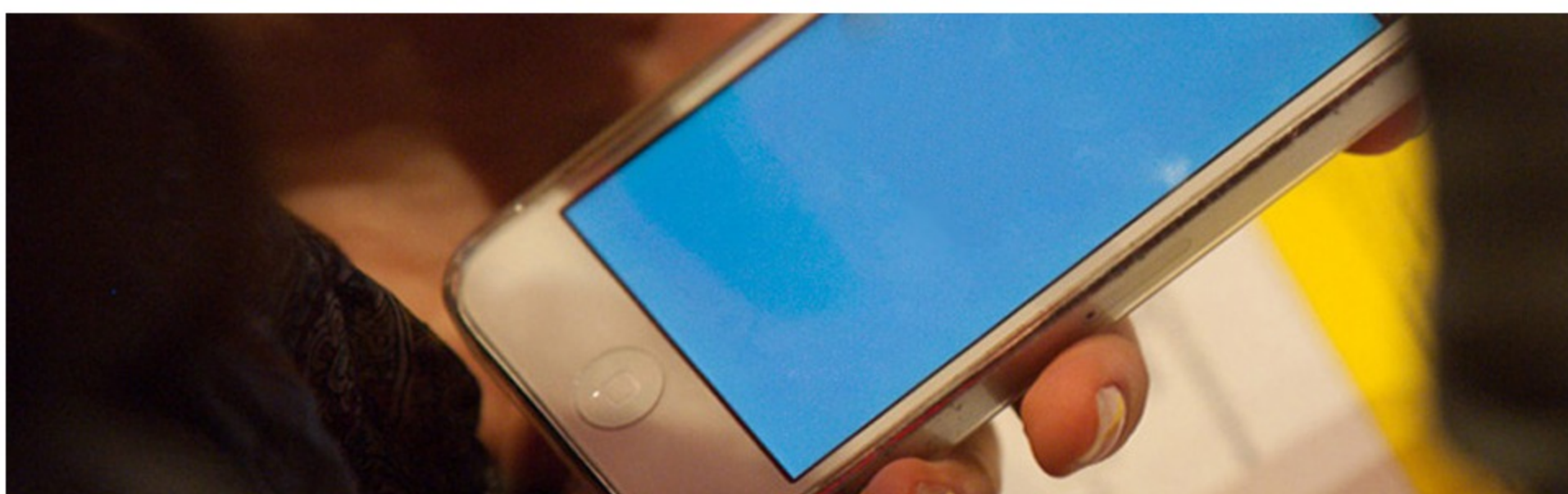


Dr. Flowers: "STEM: An Economic Essential for this Generation"

Learning and Behavioural Sciences

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Emerging STEM industries hold great rewards for those who are well-educated and properly socialized to take advantage of related opportunities. However, large segments of the population, remain ill-equipped, un-empowered, under-prepared, and are underexposed to STEM opportunities. STEM education is an economic imperative for all of us going forward because it rests at the center of creation of jobs of the future.

Within P-12 education systems there is a disruption occurring—learning is inhibited by the delay of information, access to technology, and innovative resources that allow for evolution of knowledge to occur at the same warp speed of computing, mass communication, and the World Wide Web. Education leaders are challenged with having to re-examine priorities and re-set them to create student pipelines that will advance our STEM future. In the United States, the employment opportunities, which allowed high school and college graduates to enjoy a middle class lifestyle without being overly educated, are a thing of the past. Information technology is creating new jobs, eliminating old ones, and requiring fewer people to yield the same production. Entrepreneurship and innovation are creating new STEM jobs. It will only be through the application of knowledge by properly prepared students in STEM that communities are better able to respond to the direct and indirect work demands being supported by information technology advancements.

Targeted collaborative efforts from both public and private sectors could prove to have a significant impact on global economies if they were to engage underutilized groups in STEM.

In attempting to bridge this gap, taking advantage of technology innovations becomes essential to increasing interest levels in STEM and breaking existing barriers. At the onset of globalization, education systems had little grasp of the implications of the concept of the world being "flat", often times, because related conversations led by industry are held separate and apart from education leaders. While the information technology revolution is aiding globalization for business sectors, education systems should be rethinking STEM education and the linkages to innovation and entrepreneurship. Present evidence suggests that in the 21st century, the low attainment of students in STEM areas will have a negative impact on businesses performance and overall economic competitiveness. In this knowledge age, the business solution to the shortage of a skilled STEM workforce has been outsourcing and/or importation of foreign skilled labor.

As a scientist, I appreciate the theory of survival of the fittest, where those that are best suited are most able to adapt. However, adaptation can take time, and businesses require a more immediate response from education systems to increase the STEM talent pipeline. The new technological age that has been created is requiring a collective effort to adapt to the new knowledge era. In the United States alone, there is a shortage of hundreds of thousands of employees in STEM career fields to fuel the growth that will maintain the economy, and provide the innovation necessary to keep ahead of the competition. In an environment requiring a more skilled and knowledgeable workforce, education systems are faced with adapting to meet these demands in order to prepare students so they can pursue technical careers to land good paying jobs. This demand also requires a mental paradigm shift for students, particularly those demographics that are disengaged from STEM opportunities, who have to be willing to do the work that is required and make the sacrifices necessary to be competitive.

Collaborative partnering between industry, education systems, government and non-profit agencies that are able to leverage new and emerging technologies is a step in the right direction. To advance STEM education, collaborations must be flexible and more customized. STEM pipelines should be developed vertically within P-16 systems to ensure rigor and relevance. There must be equitable access to high quality STEM resources, a base level that can be achieved through strategic partnering and adopting a futurist mindset of preparation in education systems. An example of such are the efforts of SRI International—a research and development non-profit organization for both government and business. SRI International partnership with Build IT (information technology) and TERC (Technology as Entrepreneurial Environmental Engineers) has helped thousands of middle and high school girls develop information technology fluency, interest in mathematics, and knowledge of STEM careers. As can be seen through SRI collaborative partnerships, STEM education must capture the creative and innovative potential of students in the present and catapult them into the future.

In essence, the greatest economic challenges for the foreseeable future are related to global trade deficits, rising energy consumption, and a decline in workforce preparedness. These are all challenges solvable through development and diversification of our STEM workforce talent; hence there is an immediate need to commit to a collective STEM education agenda that is impactful, inclusive, and imaginative.

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