Delaware Must Re-prioritize STEM Education!

An Op-Ed by Stephen E. Schwartz

The past months have seen unprecedented stress on our global society and especially on our schools resulting in huge but yet unquantified learning deficits. However, here in Delaware, there seems to be a resolve to "build back better" utilizing the huge influx of digital devices, the enhanced wi-fi access and the collective experience of hybrid combinations of virtual learning with face-to-face instruction. Nonetheless, even as a long-time English teacher, I see a huge need to broaden the curriculum to address the world-wide challenges we all currently face and that our children will face for the rest of the 21st century. Students of today need to know and use the "scientific method"— define the problem, make observations, form hypotheses, test those hypotheses, and draw conclusions.

Areas of Health Science, Environment, Data and Technology are addressed in this Op-Ed.

Health Science While we may get through the current COVID-19 crisis, the experience has certainly shown how much we do not know. Daily, we hear politicians, parents, and people on the street claiming that "the science clearly shows" all sorts of diametrically conflicting truths; most are showing how little they understand about health sciences -- biology, chemistry, the human body, or the disease process. One thing seems clear, however: the COVID-19 virus will NOT be the last such health risk we face. The mapping of the genome set the foundation for vast expansion of biological understandings, but even the average citizen needs to know more to make good decisions about food production and selection, nutrition, exercise, health care, immunotherapy, addiction, etc. We need deeper understandings of the science!

Environment Simultaneously – after the hottest July of recorded history -- our planet is facing huge stresses from climate change and the depletion/pollution of natural resources. Our children could be faced with Jeff Bezos' seemingly wild idea to mine and manufacture in outer space. Even today, we are

trusting mostly uninformed politicians to make decisions about harnessing solar, wind, and wave energy, the protection of land and forests, the disposal of waste products, along with the preservation and recycling of potable water; simultaneously, homeowners and regular citizens make daily decisions about pollution and resource preservation. We all need a better background in geology, soil science, physics, and climate science!

Data The press bombards us daily with statistics. Yet, we also find that much (most?) of the data is misused, mis-understood, or just plain wrong. As Benjamin Disraeli [later Mark Twain] said, "There are three kinds of lies: lies, damned lies, and statistics"; our future citizens need to be equipped to critically understand and examine how numbers are often distorted and misrepresented. Our democracy needs an informed citizenry who can analyze data, draw conclusions, and differentiate between propaganda and truth.

Technology During the pandemic, we've all been spending more time on our computers and we've been jolted into a realization of the frequency and potential devastation of computer hacking. Our electric grids, our banking system, and the basic provision of goods and services are all at risk. There is a real danger of cyber threats and hacks to the networks and devices we all use! Obviously, technological literacy is an ever-changing basic skill!

In the 1990s, Delaware made a commitment to the improvement of education in science, technology, engineering, and math (STEM). Initially, nine districts working with several businesses – most notably DuPont – collaborated on a 6-million-dollar grant from the National Science Foundation – an initiative known locally as the "Smithsonian Project" and nationally as the "Delaware Model." That project eventually went state-wide and provided high quality hands-on equipment and materials, circulated from a central warehouse (the Collette Center) in Dover. Professional development was provided to enable teachers to effectively use and evaluate the success of the new curriculum. Between 2000 and 2010,

Delaware students showed the greatest improvement on the National Assessment of Educational Progress (NAEP); further, Delaware ranked the highest in the nation for elementary students seeing science as their "favorite." Unfortunately, today Delaware rates well below most of the rest of the nation as the commitment to STEM education has wavered. The most recent (2020 – before the COVID shutdowns) NAEP tests showed over 80% of 4th graders had inquiry-based science only once or twice a month; 69% of elementary teachers do not feel adequately prepared to teach science today. A review of Delaware's Advanced Placement results – the top-level K-12 STEM course offerings – show that many Delaware high schools lack certified teachers for advanced courses in science and/or math.

As a student in the post-sputnik era, I benefited from the National Defense Education Act as the American society prioritized beating the Russians in the race to the moon. I took Chem Study (Chemistry), PSSC (Physics) and BSCS (Biology) -- all of which came from the National Science Foundation. As a nation, we won the space race! However, I believe that the challenges of today are far more serious than what we faced in the 60s; today we truly face an existential challenge! We must prioritize STEM education. The National Academies of Sciences, Engineering, and Medicine recently issued a "Call for Action" encouraging the focusing of resources to increase the quality and accessibility of science education from kindergarten through college, to eliminate gender, economic, racial, and geographic disparities of access. A positive byproduct of the COVID pandemic is the availability of large sums of money from the federal government to help in educational recovery. I urge Delaware lawmakers, the Delaware Department of Education, district school boards, and local schools to make a commitment to the drastic improvement of STEM education in Delaware. Both our American workforce and our way of life are at-risk!

Dr. Schwartz is a retired English teacher and administrator who lives in Seaford. He was the chairman of the Delaware Science Coalition in the 90s and is a current board member and a former president of the Delaware Foundation for Science and Math Education (DFSME).