



FOR SCIENCE AND MATHEMATICS EDUCATION
"Encouraging excellence in science and math education"

Moving Forward, not Backward, in STEM Education in Delaware

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The Delaware Foundation for Science and Mathematics Education (DFSME) enjoys a twenty-five-year history of promoting world-class Science, Technology, Engineering and Mathematics Education in Delaware, including working to ensure access to a state-of-the-art STEM education for all of Delaware's students. As a coalition of representatives from K-12 and higher education, business, and state government, we are deeply concerned about the potential damage the current pandemic crisis may be doing to efforts to achieve educational equity in STEM instruction. In response to ongoing horrific incidents of institutional violence against people of color in our country, we are even more aware of the imperative to achieve social justice in our education system. Indeed, we hope that our education system can respond to this moment as an inflection point by moving forward toward a fully equitable "new normal" in STEM education.

One of DFSME's core goals is to help build a coordinated STEM ecosystem by forging a stronger interface between the business and education communities in Delaware. We believe that this unique collaborative partnership should strive to envision the possibilities for creating a more powerful, intrinsically engaging STEM education for all of Delaware's K-12 students. As a concerned community, we should begin by assessing what Delaware educators have learned as they have attempted to provide effective online instruction this past spring and what essential elements of face-to-face interactions were missing. It would be a wasted opportunity if our educational system fails to develop a more equitable hybrid model of STEM education post-pandemic.

Data on our students' differential levels of connectivity makes it abundantly clear that it is imperative that we work to ensure broadband access for all of Delaware's students from north to south, in rural, suburban and urban communities. It has become painfully obvious during the past three months as schools and universities turned to a massive experiment in online instruction, just how unequal reliable access to the internet is in our state. Likewise, not all students have the devices they will need to power online learning in the future. Achieving equity in these two components of learning technology will require contributions from both private and public sectors and should build upon the early innovations already undertaken in our state such as wiring public libraries for local WIFI access and the strengthening of broadband access.

Although universal access to learning technologies is a necessary first step, it will not bring full equity. As a system, we need to leverage the best ideas that are emerging from the crucible of

experimentation in online learning by our K-16 teachers over the past three months and be open to learning from business and other communities as well. My personal experience in changing a UD mathematics class for K-8 teachers from in-person to online delivery hints at the possibility that synchronous online instruction can benefit some students who are normally underserved in a typical face-to-face classroom setting. For example, the purposeful use of online environments like “breakout rooms” and shared electronic “whiteboards” may benefit a number of otherwise marginalized students, who, in a traditional classroom setting are often reluctant to “come to the board.” There have been notable innovations in online teaching and learning pioneered here in Delaware as well as across the nation and we need to curate access to the best of these efforts. Certainly, Delaware’s educators will need a considerable amount of professional development before we can optimize the possibilities of online / hybrid learning for all students. That professional development should be a top priority for all of our educational institutions.

We must also maximize hands-on experiential instruction because “active learning” has been shown to support the achievement of all students, not just those who seem to prosper in lecture-based settings. We can imagine how our schools and universities might reconfigure the precious time that our teachers and smaller groups of students could have in face-to-face learning environments. This seems essential given the likelihood that, at least in the near term, Delaware may limit school-site learning hours to fewer days per week and fewer students per class. We at DFSME would like to encourage the development of a hybrid learning system in which online learning both precedes and follows rich technology-intensive onsite learning. It may well be that some teachers choose to manage this in-school learning while other teachers, who are becoming skilled at online instruction and for whom face-to-face instruction poses greater health risks, take on complementary roles in this new normal.

Finally, we must determine who will take the lead in this transition to a brighter future for STEM learning. It is obvious that collaboration is more important now than ever. Our partners from business have already begun to share their experiences about returning to work in safer spaces, and our STEM educators have learned many lessons, both positive and problematic, about engaging with their students online. Together, we must ensure that this more powerful, better-focused hybrid suite of STEM learning experiences is provided for all of our students, not just the fortunate few who have always benefited from enhanced STEM instruction. This way, all students will have access to greater economic opportunities, and the Delaware workforce and economy will continue to grow.

Please join us in this most pressing conversation about improving STEM education for all at this moment of national and global challenge and change given both the Covid-19 pandemic and a growing realization that people of color do not enjoy equal protections under the law nor equal advantages from our educational system. For further information and to participate in this important discussion, please go to our website at <https://dfsme.org/about-us/>.

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