



**California Emerging Technology Fund  
Testimony to the Select Committee on Increasing the Integration of STEM Education  
Assembly Member Susan Bonilla, Chair  
Bay Area Regional STEM Education Summit:  
Advancing STEM through Public-Private Partnerships  
Thursday, October 23, 2014  
Mills College, Oakland**

**Background Information**

**Overview of the California Emerging Technology Fund**

The California Emerging Technology Fund (CETF) is a statewide non-profit organization that the California Public Utilities Commission (CPUC) ordered to be established in approving the mergers of SBC-AT&T and Verizon-MCI in 2005. AT&T and Verizon agreed to contribute \$60 million in seed capital to launch CETF in the mission to close the Digital Divide in California through accelerating the deployment and adoption of broadband technology—defined as high-speed access to the Internet—including both wireline and wireless infrastructure that are interfaced with a variety of consumer computing devices. CETF is technology neutral, defines “closing the Digital Divide” in terms of broadband access and use in the home, and adopted the goal of 98% broadband deployment and 80% broadband adoption within a 10-year period. Last year the Legislature adopted the 98% deployment goal in statute. CETF holds itself accountable for promoting policies, funding partners and programs, and facilitating actions to achieve these goals, fully recognizing that there are many factors that impact the ability to reach these goals in the target timeframe.

CETF operates according to a Strategic Action Plan developed in 2007 that is rooted in research about “best practices” for “what works”. Although there is no “silver bullet” to closing the Digital Divide—no one strategy or action will get the job done—fortunately there is “silver buckshot”—a “critical mass” of inter-related and mutually-reinforcing strategies and actions that do succeed. To achieve the optimal impact and a higher return on investment of the original seed capital, CETF employs 5 Overarching Strategies to drive progress on the broadband deployment and adoption goals:

- Civic Leader Engagement
- Venture Philanthropy Grantmaking
- Public Policy Initiatives
- Public Awareness and Education
- Strategic Partnerships

A major public policy initiative developed and managed by CETF is School2Home which is described below and is relevant experience for integrating STEM into education throughout California and in all communities.

## **The Digital Divide and “Wall of Poverty”**

CETF sponsors a statewide Annual Survey on Broadband Adoption which began in 2008 in partnership with the Public Policy Institute of California and is being continued as of 2014 with the Field Research Corporation. Attached are the results from the 2014 Annual Survey showing that broadband adoption (use of high-speed Internet access at home) is at 75% statewide (of which 8% is smart phone only), up from 55% in 2008. Broadband adoption increased from 33% to 67% for low-income households, from 34% to 63% for Latino families, and from 36% to 59% for people with disabilities. While these increases indicate significant progress, the sad news is that 25% of the households—a full quarter of the population—remain on the other side of the Digital Divide. These households are mostly in urban poor neighborhoods or remote rural areas. The last two Annual Surveys have confirmed we are up against the “wall of poverty”—inter-related factors and forces that constitute a huge barrier to overcome and escape—resulting in low-income households being left behind at an accelerating pace. The Digital Divide is another manifestation of the “Economic Divide” or “Opportunity Divide”—low-income families without home broadband access (which requires a computing device and Digital Literacy) can’t apply for most jobs, take an online course to improve workforce skills, bank on line, access online public services, or communicate with their child’s school. And, students without high-speed Internet access at home can’t complete homework, do research for assignments, or apply for college. Thus, the Digital Divide in our communities also contributes to the Achievement Gap in our schools.

## **School2Home and the Effective Use of Technology in Education**

School2Home is a statewide cost-effective initiative to close both the Achievement Gap and Digital Divide by integrating computing and broadband technologies into the teaching and learning in low-performing middle schools in California with an intense focus on parent engagement. School2Home has two major goals:

- To increase student achievement at low-performing middle schools in California to help close the Achievement Gap.
- To increase the adoption of computing skills and broadband service by the families of underserved middle school students to help close the Digital Divide.

School2Home provides the essential framework anchored in best practices to turn around low-performing schools and the requisite platform to support STEM, Common Core Standards, innovative pedagogy, or other school-improvement initiatives. School2Home is a partnership planned with purpose in collaboration with districts and tailored to each school. Today, CETF is implementing School2Home in 14 schools in 6 districts with more than 290 teachers and reaching more than 6,400 students and their parents.

Once School2Home has been fully implemented in all grades such that the culture of using technology to engage parents and drive education improvement has been “rooted”, participating schools are showing significant gains in academic performance that outpace comparable schools and exceed district and statewide averages. It is cost-effective compared to other education improvement programs and can be sustained with existing school resources after full implementation at a school. Attached is the School2Home Overview.

## Answers to Hearing Questions

The following sections respond to the questions posed to the Business Panel for this Hearing. The answers reflect the experience of the California Emerging Technology Fund (CETF) in working throughout California, particularly in very disadvantaged communities, to: (a) close the Digital Divide by accelerating broadband deployment and adoption; and (b) close the Achievement Gap by implementing School2Home to turn around low-performing middle schools using technology in the teaching and learning processes and to achieve significant parent engagement with schools.

### Questions for Business Panel

1. What are your thoughts about the current direction of our educational system, specifically the adoption of the Common Core and Next Generation Science Standards?
2. Will the new standards adequately prepare our students for the 21<sup>st</sup> Century Workforce?
3. Are the Common Core and NGSS changing how you engage with public education?
4. What opportunities for public-private partnerships are provided by recent reforms?
5. How can business engage in the Local Control Accountability Plan (LCAP) process to ensure the integration of successful STEM programs?
6. What makes a successful public-private partnership? (a) Do you have examples? Have you participated in any? (b) What makes it challenging to participate?
7. What can business, the state, and schools do to encourage the development of more industry-academic collaboration to prepare the STEM workforce?
8. What is the role of business, government, and education leaders in supporting STEM integration?
9. What state policies could help facilitate the successful integration of STEM?
10. Females and African-American and Hispanic minorities are under-represented in STEM fields. What more can be done to bring under-represented groups into STEM fields?

### **Transforming Education with the Effective Use of Technology: Lessons Learned from School2Home to Integrate STEM**

School2Home is an innovative initiative to close both the Digital Divide and Achievement Gap by successfully integrating broadband-enabled computing technologies (1:1 ratio of computing device to student) into teaching and learning with significant parent engagement and education in low-performing middle schools. School2Home provides a framework to turn around schools and the platform to use technology to support STEM, Common Core, and other innovative pedagogy. Although School2Home provides 24 hours of teacher professional development and 6 hours of parent training in the use of computing technologies and Internet navigation, curriculum content is the domain of the districts and schools. School2Home has 10 Core Components (see attached School2Home Overview) that research and experience show are important for the successful use of technology in education. This comprehensive approach is key to “rooting the culture” of using technology in schools, and, therefore, to the success of integrating Science, Technology, Engineering and Math (STEM) into education. (There also is value in advancing “STEAM”—adding the “A” for arts back into education.)

Based on feedback from our school partners and observations on the ground, it appears that Common Core and Next Generation Science Standards are steps in the right direction to articulate essential proficiencies and skills that students need to be prepared for 21<sup>st</sup> century jobs in California and the United States. These standards promote problem solving, critical thinking, and finding common principles or “cross-cutting concepts” that various fields of science and engineering share, emphasizing big ideas and systemic analysis (the “scientific method”) over memorization. However, while standards are necessary for quality education, they are not sufficient for successful learning. Successful learning requires a supportive “ecology” of several components—a culture that works for each student.

The sad commentary on education today is that too many schools are low-performing. The California Department of Education (CDE) listed 4,394 schools in Program Improvement (PI) for 2013-14 (1,622 in Year 5 of PI or longer) out of about 10,366 public schools in California. That is an astounding high percentage of schools that are not working for millions of students. Although CETF works in some of the lowest-performing middle schools in the state in some of the poorest neighborhoods, we observe many educators who are very dedicated and impressively competent—teachers, principals, superintendents, school board members really striving to make a difference. So, what is the problem and why aren’t all schools be high-performing? The challenge goes beyond forces and factors that are controlled by the schools that demand a whole different approach and strategy. Not only can all schools be high-performing, that must be the official policy of the State of California and our shared commitment to students, their parents, and taxpayers.

To be sure, quality education depends on committed executive school leaders, well-trained and valued teachers with commensurate compensation, strategic investments to catalyze change, sufficient funding to sustain academic achievement, and accountability for results. But, it also requires an understanding of this stark reality: every low-performing school sits in the middle of a low-income neighborhood. The students and families in these neighborhoods are confronted daily by a “wall of poverty” that constitutes a high barrier to getting a good education than for residents in higher-income communities. However, it can be overcome if counties, cities, special districts, employers, and community organizations work together with schools in true public-private partnerships. The foundation for successful participation by the private sector must be more effective and efficient collaboration among government agencies to integrate existing resources to focus on better outcomes for children and their families who use public human services. CETF calls this approach “Neighborhood Transformation” (see attached Framework) which aims to increase sufficiency for all families and households with accountability for 5 Big Outcomes: Improving Education, Increasing Jobs, Decreasing Poverty, Reducing Crime, and Improving Health.

The School2Home experience and results confirms that high-speed broadband Internet connectivity and computing technologies are a key part of an effective approach to turning around low-performing schools, not only because of the benefits to students but also because it is a powerful way for low-income parents to participate in their child’s learning and to be engaged with the school. Access to technology is even more transforming for low-income households than those with higher incomes. Without access to the Internet and computing devices, students in low-income neighborhoods cannot keep up with students who have that access both at school and at home. But, the dynamic changes when students do have access.

Just as important, low-income parents, who may not be able to take off from work to attend a conventional parent-teacher conference during the day, or may not speak the same language as the teacher, or may be intimidated by the school site, are able to be connected and involved through technology—communicating with the teachers, checking on homework, and monitoring grades. However, just dropping technology into a school is not sufficient—effective use requires a focus on results and a culture of accountability that is fostered through leadership training, planning, professional development, coaching support for teachers, facilitation of “learning communities”, and reinforcement through evaluation.

While CETF focuses on low-performing schools, it should be underscored that the vast majority of schools and libraries in California have significant needs to upgrade broadband infrastructure to achieve sufficient bandwidth and points of presence for access in every classroom and in all rooms of libraries. Further, it would be wise strategic investments to make schools and libraries “wireless hotspots”—especially in low-income neighborhoods—so that students can do their homework in the vicinities of these buildings after the doors close if they don’t have access at home. While the Federal Communications Commission (FCC) action this year to modernize E-rate to subsidize telecommunications and broadband infrastructure for schools and libraries, it still won’t be sufficient to achieve 21<sup>st</sup> century connectivity. And, past additional funding for schools to implement Common Core and the modest \$26 million authorized this year in the State Budget are a help, but insufficient to meet needs. Schools have been preoccupied with installing connections and buying computing devices to support the Smarter Balanced Assessment Consortium (SBAC) testing, which misses the point: the objective shouldn’t be to take tests, but rather to confirm through the testing that California has restored excellence in education. Further, trying to promote and teach STEM without every student having a computing device and high-speed Internet access both in the classroom and at home produces cognitive dissonance. This holds true for the STEAM rubric.

The California Broadband Council (CBC) adopted in 2013 a Statement on Broadband in Schools (attached) which should be incorporated into official State policy on broadband infrastructure and computing technologies for 21<sup>st</sup> century education/ The CBC Statement is consistent with the CDE Technology Task Force Blueprint and STEM reports. In order to implement these policies and plans, the State of California needs to set qualitative and quantitative goals for high-speed Internet connectivity for all schools and libraries and access to computing technologies for all students, advocate for continued E-rate reform with adequate funding, and make State investments to augment and complement E-rate to meet those goals.

There also needs to be a special assistance to low-performing schools in low-income neighborhoods (which are majority residents of color) because it is the students in these schools that are the most disadvantaged and less likely to learn the requisite fundamentals to pursue careers in STEM. This is the basis of the problem with disproportionate representation of African-Americans and Latinos in STEM careers. There is a disproportionate representation of these populations for both males and females in every higher-wage career and industry. And, the evidence is clear that for all students whether or not an individual considers a career in a given field of study depends on whether or not: they learn the fundamentals required to pursue more advanced learning; are encouraged to (without prejudices and differences in expectations based on gender or race); see role models; have opportunities to become familiar with the career; and have financial assistance and incentives to pursue it.

An alignment of goals, policies and programs will increase representation of females and under-represented segments of the population in STEM if there is a commitment to high-performing schools in low-income neighborhoods and an integration of effort to tackle the challenges presented by the “wall of poverty” through the kind of integrated effort set forth in the CETF Neighborhood Transformation Framework. This kind of collaboration among government agencies—a “public-public partnership”—can have even greater success if coupled with the innovation and resources of the private sector in public-private partnerships.

### **The Power of Public-Private Partnerships**

In a sense, the California Emerging Technology Fund is a kind of public-private partnership in that it resulted from a government directive but is a non-government non-profit public-purpose foundation with a statutory obligation to report to the Legislature through the CPUC. CETF by design and management works in partnership with the spectrum of stakeholders, including the State and federal Administrations, Legislature and Congressional Delegation, regional consortia, local government, providers and a network of community-based organizations (CBOs) to implement strategies and programs to close the Digital Divide, each making an essential contribution of what only they can do. In fact, that is the essence of a public-private partnership—each partner contributes what they do best to complement and augment the strengths and core competence of the others. Most successful public-private partnerships usually require a catalyst to coalesce and launch in the form of leadership and seed capital to help reorganize the way each partner does business. In many instances, CETF has served as that catalyst in forging the essential collaboration and partnerships to close the Digital Divide in California. However, my personal enthusiasm for public-private partnerships stems from three decades of experience beginning with the establishment and chairing of a Council on Public-Private Partnerships in 1982 by the California State Association of Counties (CSAC) and the participation in several partnerships since then. Some of the most relevant examples to this Hearing are from my tenure as President and CEO of the Bay Area Council: (a) capitalization of privately-funded equity funds to invest in low-and-moderate-income neighborhoods to achieve “triple bottom-line” returns as a stimulus for Neighborhood Transformation; and (b) formation of the School Executive Leadership Institute to support and assist principals in low-performing schools increase their leadership skills in developing and implementing school improvement plans by sharing the expertise of business executives.

CETF continues to be a champion for fostering public-private partnerships to accelerate broadband deployment and adoption and urges policymakers to make it an explicit strategy in government policy. As CETF testified last year to the U.S. Senate Subcommittee on Communications, Technology and the Internet: “There is no substitute for the innovation and efficiency of the private sector when engaged as sincere partners motivated to achieve explicit goals. Public-private partnerships can significantly leverage public resources for a higher return on investment to taxpayers and ratepayers.” Improving academic performance and advancing STEM can be accelerated through public-private partnerships, ranging from major “catalyst” investments by charitable foundations to specialized STEM curriculum and internships from employers. However, the contributions from the private sector will have far greater impact if the public sector first gets its act together through collaboration among government agencies to optimize the efficiency and effectiveness of existing resources.

## Conclusions

The following conclusions are based on the work of the California Emerging Technology Fund throughout California to close the Digital Divide and the experiences and “lessons learned” from implementing School2Home in low-performing schools in low-income neighborhoods.

- There is a need for increased investments in broadband connectivity and computing technologies in all schools and libraries. While E-Rate modernization by the Federal Communications Commission and augmented school funding in State Budgets are a help, they will not be sufficient to provide 21<sup>st</sup> century broadband connectivity and computing devices for all students. The State of California will need to make additional investments.
- Special focus and attention are needed to assist low-performing schools in low-income neighborhoods to overcome the “wall of poverty” that daily confronts the students and residents in these communities, making it more difficult to succeed in school than for those who live in high-income areas. A key to tackling the inter-related factors and forces contributing to concentrated and persistent poverty is for local government agencies (counties, cities, special districts and schools) to better coordinate the delivery of human services with accountability for improved outcomes for families and their children. There needs to be a collaborative effort to “transform neighborhoods” with turning around schools as the centerpiece.
- High-speed Internet access and broadband connectivity in all classrooms and libraries coupled with computing devices for all students are an essential part of 21st century education. The technology can be particularly powerful in turning around low-performing schools because it not only helps develop essential skills for students but it also provides the mechanism for significant parent engagement.
- However, it is not sufficient to just drop technology into schools. It must be embedded in a comprehensive, integrated approach (such as School2Home) in order to optimize its benefits in the teaching and learning processes.
- Trying to teach STEM curriculum without the support of technology is an anachronism—cognitive dissonance. Thus, advancing STEM and bringing more African Americans and Latinos (who are disproportionately represented in low-performing schools) into STEM studies and careers requires a special focus on and targeted resources to low-performing schools and low-income neighborhoods. While students in higher-income communities generally have computing devices and high-speed Internet access at home and routinely use technology in school, that is not the case for students from low-income households.
- A comprehensive program such as School2Home is a cost-effective strategy for turning around low-performing schools. And, once fully implemented to “root the culture” of successfully integrating technology into teaching and learning, it can be sustained with existing education resources. Of course, it must be noted that a widely-available affordable broadband rate for low-income households is pivotal to optimize success.

- There are sufficient standards and substantial foundational reports to serve as a policy framework and roadmap for a major initiative to invest in 21<sup>st</sup> century broadband connectivity and computing technologies in all schools and libraries, including the California Department of Education (CDE) Technology Task Force Blueprint and STEM reports and the California Broadband Council Statement on Broadband in Schools. What is required to translate these plans into action is leadership and enlightened investments.

## **Recommendations**

- The California Legislature should embrace through formal action (Joint Resolution and/or statute) the California Broadband Council Statement on Broadband in Schools and the recommendations from CDE. It is important to officially recognize the need and declare the commitment for 21<sup>st</sup> century broadband connectivity for all schools and libraries and computing technologies for all students to advance STEM (and STEAM).
- The State of California (Administration, Legislature, CDE, and State Board of Education in consultation with districts, schools, educators and other stakeholders) should:
  - Set qualitative and quantitative goals for high-speed Internet connectivity for all schools and libraries and access to computing technologies for all students.
  - Advocate for continued E-rate reform with adequate funding. and
  - Make investments to augment and complement E-rate to meet those goals.
- Direct a comprehensive approach such as School2Home to optimize the benefits and successfully integrate technology into teaching and learning and achieve significant parent engagement, especially in low-performing schools in low-income neighborhoods. Consider encouraging “learning academies” for leadership teams from these schools.
- Acknowledge the importance of tackling the “wall of poverty” through better coordination of human services with accountability for better results for children and their families to “transform neighborhoods” to close the Achievement Gap and support STEM. Call upon local government organizations and stakeholders to help design and lead this initiative.
- Foster public-private partnerships to harness the innovation and expertise from technology companies and employers to advance STEM (STEAM) and close both the Achievement Gap and Digital Divide. Establish in policy an explicit intent to leverage public investments through private-sector resources and designate a lead entity.

## **Attachments**

1. 2014 Annual Survey on Broadband Adoption and Graphs
2. School2Home Overview
3. Neighborhood Transformation Framework
4. California Broadband Council Statement on Broadband in Schools
5. Testimony to U.S. Senate Subcommittee, October 29, 2013  
(Excerpts on Conclusions and Recommendations Regarding  
U.S. Department of Education and Public-Private Partnerships)