



September 16, 2013

Marlene H. Dortch, Esq.
Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, S.W.
Washington, D.C. 20554

Re: Modernizing the E-Rate Program for Schools and Libraries, WC Docket No.13-184

Dear Secretary Dortch:

I am writing to ask the Commission to re-position the E-rate program to include mobile broadband Internet access inside and outside of schools and libraries, and provide funding for mobile devices such as smartphones and tablets, so that America's lowest-income, most under-privileged students will enjoy equal access to, and fully benefit from, America's highest-performing educational institutions and services.

I am the Executive Director of an organization which works with nonprofits and NGOs in the US and worldwide to help them work together to achieve outcomes that they are unable to achieve acting individually. Much of our work is in higher education, but we also work with K-12 educational institutions and libraries, as well as museums and cultural heritage organizations, financial and social services organizations, healthcare, the performing arts, and wildlife conservation. Previously, I had the honor of helping manage the world's largest private-philanthropic funding program for open-licensed information technology, as The Andrew W. Mellon Foundation. Prior to that, I was a higher education researcher, administrator, and instructor as well as a manager in various for-profit technology and healthcare startup ventures. I hold a Masters and Ph.D. in Public and International Affairs from Princeton University, a Masters in Higher and Adult Continuing Education from the University of Michigan, and an A.B. in International Studies from the University of North Carolina, Chapel Hill.

As an American educator and taxpayer who is also CEO of a knowledge-intensive nonprofit, I care deeply about the economic efficiency and productivity of our education system. I am particularly concerned that our many education systems and institutions provide both equality of access and consistent superiority of results, for we need a consistently high-performing American workforce in order to maintain our global competitive edge. Consistently superior education of all of our children and adult learners is essential to sustain that performance.

The Commission's E-Rate Program has played an important role in bringing our nation's schools into the 21st century, particularly in terms of equal access to superior educational services for underprivileged and low-income students. Were it up to me, the entire program would have more funding. I am in substantial agreement with the changes documented in the recent Notice of Proposed Rulemaking, as far as they go. However, I must call to your attention the fact that those changes omit effective support for the availability of mobile, broadband Internet access to all US students. This is an omission with seriously adverse consequences. Mobile Internet access is to the next 20 years of education what tethered Internet access has been to the last 20 years—the foundation of educational innovation and improved performance. Moreover, the dissemination of mobile technologies to American learners is already following the same pattern of “digital divide” which led to the creation of E-Rate, and which only a program such as E-Rate can remedy effectively.

The case that mobile access is essential to educational success is easy to make. Mobile technologies have already begun to dominate large sectors of US educational innovation, beginning in postsecondary education and working “downward” into secondary and primary education as well. Moreover, the unequal patterns of access to mobile technologies today mirror almost perfectly the patterns of tethered (wire or fiber) access observed in the early 1990s. Wealthy urban and suburban students have effective access to state-of-the-art mobile devices and mobile broadband services; by contrast, low-income and rural students often have limited or no mobile bandwidth access outside their school buildings. Low-income students also tend to own less-capable mobile devices, or none at all. Either situation denies them access to the highest-performing services in contemporary education.

Today, this widening technology gap is already consequential for US postsecondary (higher and adult) education. The decades-long trends of exploding tuition and curricular costs coupled with flat performance are clearly unsustainable. US national educational debt recently surpassed one trillion dollars, an amount that is as corrosive to our nation's global competitiveness as it is to the futures of the underprivileged students who shoulder disproportionate amounts of that debt. Book-costs now exceed tuition costs in many college classrooms. Widening wage-gaps between high school and college graduates create a situation where a student who enters college and persists long-enough to accumulate substantial debt but fails to graduate may someday be able to pay back the debt, but will never be able, across his or her entire lifetime, to earn back the deficit.

Faced with these challenges and needing to substantially improve educational outcomes while also reducing educational costs, the leading edge of higher education innovation in America has already “left the building” in favor of utilizing mobile technologies, and the rest of higher education is following rapidly. Almost without exception, major policy and programmatic innovations targeted at reducing educational costs and/or improving educational outcomes feature reduced reliance on buildings and classrooms and instead use mobile Internet technologies to accomplish their results. Two of the most widely-praised innovations in low-cost, high-success higher education today—Western Governor's

University and Southern New Hampshire University—both operate almost entirely without classrooms. Another, Brigham Young University’s Idaho campus, requires students to study off-campus one term in three. The Kentucky Community and Technical College System’s award-winning “Learn on Demand” program is helping displaced workers and other adult learners to achieve essential workforce preparation and credentials entirely online, at low cost and with remarkable success. In addition to Kentucky, community colleges in Arizona, California, Florida, Massachusetts, and North Carolina (among many others) are also exploring diverse, innovative mobile pathways to producing more and better graduates, more quickly, at far less cost. Americans needing an affordable, reliable, efficient, successful education are turning increasingly to online and blended learning models, neither of which can achieve their full potential without widespread mobile access.

Education is also experiencing unprecedented levels of venture investment at present. Many of those ventures rely on mobile technologies in some important respect: some are wholly dependent upon mobile access. The point is not that E-Rate should support these ventures *per se*; rather, the point is that innovators across all types and forms of education have recognized that effective mobile access is a prerequisite for low-cost, high-productivity student outcomes. For example, adult learners who are seeking further education to overcome job displacement find it extremely difficult to accomplish the amount of learning they need, in the time they need it, entirely in a school-building or a library. They are mothers and fathers; they care for children and, increasingly, parents. Many live in areas remote from wired sites and lack in-home broadband access as well. If education cannot enable these strivers to use their kitchen tables and their work lunchrooms as their study-halls by supporting mobile technologies, their prospects for a better future will be blighted.

Similarly, innovative efforts to educate large numbers of students online at minimal cost, such as massively open online courses (MOOCs), cannot and do not expect students to do all their work in the same building each day and only during that building’s business hours. For example, Georgia Tech recently launched a MOOC enabling qualified students to complete a Computer Science Masters degree for approximately \$6,500, compared to roughly \$45,000 for the on-campus version. Mobile access enables students in such offerings to reach their full potential at a fraction of the cost, in ways that tethered access simply does not.

Traditional residential higher education institutions also rely increasingly on mobile devices. Today’s curricular materials are moving toward technology-enhanced, “adaptive curriculum” that resembles software more than traditional books. With such materials, study outside the classroom becomes more-and-more dependent upon persistent, interactive mobile broadband access. Wiring the classroom is not enough; even wiring the library and the dormitory will not suffice for students who live off-campus. The unavailability of 24/7 mobile Internet access becomes tantamount to denial of access to study materials for some significant portion of the student’s day. In this new curricular environment, mobile

broadband access must become universal in order for all students to have equal access to educational opportunity.

These changes are occurring at every level of higher education. For example, mobile technologies are helping to train America's next generation of health professionals. A.T. Still University (ATSU, with campuses in Arizona and Missouri), the nation's founding and leading osteopathic medical school, has a long, proud tradition of producing physicians who work with low-income and rural populations. As part of their medical training, certain ATSU students are embedded individually in local Community Health Centers. If their educational resources and services could not follow them to their *in situ* learning experiences, such programs could not exist, and our nation's future prospects for adequate rural and low-income healthcare service-provision would become more fragile. At the other extreme, community colleges are using mobile-enhanced curricular innovations to help prison populations obtain GEDs and other life-transforming workforce credentials.

My own organization, CollaborationSource, is working with higher education campuses and other education leaders in four states (California, Kentucky, Massachusetts, and North Carolina) on a project to improve student attainment and reduce student debt by giving students access to low-cost, leading-edge curricular materials and instructional practices. The pilot data strongly support the conclusion that early, ready 24/7 access to those materials—which of course implies access outside-of-school—has direct, important implications for student success (passing courses) and student persistence to graduation. Those effects are most dramatic among the most at-risk students: under-prepared students; low-income students; first-generation college students; and displaced adult workers. In many cases, mobile access is effectively a prerequisite for student success because these students' access to formal educational sites such as schools and libraries is limited to just a few hours per week at most. We have found that 24/7 access is particularly important for marginalized populations, especially in rural areas. Efforts to reach these populations essentially require the redefinition of the idea of a "classroom" to encompass repurposed storefronts in rural communities and virtual classrooms supported by mobile technologies such as eReaders, tablets, and smartphones.

It is also worth noting that many other nations are prioritizing mobile infrastructure deployment today, usually ahead-of and sometimes to the exclusion of tethered infrastructure. The story of Singapore, which bypassed fiber to invest primarily in mobile technologies, is well-known internationally and is being copied by many emerging economies. The four-state project mentioned above has drawn interest from a number of other nations, primarily emerging economies in Asia and the Middle East. Without exception, those discussions anticipate a primarily mobile Internet infrastructure.

I would not wish to leave you with the impression that mobile access matters only to postsecondary students and not to K-12 students and teachers. Let me offer two of many potential examples that illustrate how mobile learning also is penetrating secondary education in ways that improve performance at sharply reduced cost. First, community

colleges around the country are partnering with K-12 districts to offer a variety of Advanced Placement courses remotely, into rural or low-income districts which otherwise could not afford to deliver them or could not staff them. These courses use state-of-the-art curricular and instructional practices, including personalized, self-paced learning, which benefit greatly from mobile access. The same collaborative approach enables districts to teach other advanced subjects (e.g., foreign languages, arts and music) that they can no longer afford to staff individually. The pattern is becoming so common that states such as Alabama, Florida, and Michigan are requiring every high school student to take at least one online course before graduation. Whatever one thinks of the merits of this requirement, it shows the extent to which mobile-enhanced instruction is already pervading the middle and upper levels of K-12 education today.

Second, a variety of K-12 science-education and citizen-science initiatives use mobile broadband to bring the classroom to the field; the most sophisticated use mobile technologies to bring K-12 students and working scientists together virtually *in* the field. In Maine, for example, the Vital Signs program, operated by the nonprofit Gulf of Maine Research Institute, enables middle-school students around the state to conduct field research in their home-towns in order to discover and monitor potentially habitat-destroying invasive plant and animal species, to report their findings to working conservation scientists for verification, and to learn from those experts as well as their teachers while also collecting valuable scientific data that it would be cost-prohibitive to collect by other means. Without mobile access, both the educational and the scientific value of such programs would be diminished, if not lost.

If the current restructuring of E-Rate proceeds without incorporating wide area mobile connectivity, E-Rate will end up building a Maginot Line of fiber fortresses which the current and next-generation of educational innovations will readily bypass. Because mobile initiatives will proceed without E-Rate's equality-of-access influence, the Digital Divide that E-Rate has been successful in reducing will again widen. Unquestionably, it is important that every school and library have high-bandwidth Internet access. E-Rate's efforts to that end cannot be sufficiently praised. However, it is *equally* important that such access should *not* be tethered to the walls of those buildings. If we are to position US education for global competitiveness over the next two decades, all schools and libraries should *also* enable mobile broadband access, and all students should *also* have reasonable, equitable access to high-quality mobile devices. The FCC should thus modify the E-rate program to prioritize funding for mobile broadband Internet access and devices.

Sincerely,

A handwritten signature in cursive script, appearing to read "Christopher J. Mackie".

Christopher J. Mackie
Executive Director, CollaborationSource