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My name is George Lucas. As founder and chairman of The George Lucas Educational Foundation, I'm pleased to appear again before this Subcommittee and to submit this testimony.

A Vision for Education: Edutopia

I.   Nearly fifteen years ago, I testified before this Subcommittee and outlined my vision for education in our schools. I called it "Edutopia" to signify a more ideal learning environment. It included six themes:

1. A student-centered approach where students' individual curiosity and motivation is supported and personalized educational opportunities meet the needs of each student.
2. The family as an integral part of learning and the importance of schools reaching out to include parents as a positive force for children's learning.
3. The teacher changing from authoritarian subject-matter expert to facilitator of the learning process. Though teachers still need to be knowledgeable in their subject areas, their real gift is to help students find and interpret information and to learn the skills of communication and cooperation.
4. Communities—including local governments, nonprofit organizations, and businesses—as co-facilitators of learning for their young citizens. More learning is taking place outside of the classroom. Community members need to get more involved and share their expertise with students and teachers.
5. Schools as the gathering place for learning, with more flexible schedules and group work areas, rather than only large classrooms. Community members could also use the school facilities for their lifelong-learning activities.
6. The essential role of technology for students to locate and assess information, communicate with others, and create works expressing their knowledge.

These information-literacy skills are not narrow skills; rather, they encompass deeper learning across the traditional curriculum. Being able to locate, assess, and use information involves the ability to think critically about a variety of information and data and to think deeply about core concepts in different subject areas.

And developing products of one's knowledge should involve teams of students, rather than one student toiling alone. The ability to listen to and work well with others, to collaborate in teams to create a product greater than one person can achieve alone—this type of teamwork defines the modern workplace and should be the way schools organize the work of students.

Achieving Edutopia

How Far We've Come

Fifteen years ago, that vision could have been considered futuristic and unattainable, a pipe dream that would never come to pass. But now, especially with the growth of the Internet, this vision of Edutopia has become a movement. The features I described are now commonly incorporated in discussions of modern learning environments and twenty-first-century skills in educational conferences across the country and internationally.

Across the globe, ministries of education in many nations, including Australia, China, Singapore, and the United Kingdom, are moving ahead with plans to re-create their schools for fostering twenty-first-century skills. They are investing substantially in Internet access, hardware, and software for schools and training for teachers to enable their students to achieve at higher levels and fuel the economic growth of their countries.

According to a recent report from the Organization for Economic Cooperation and Development (OECD), in Paris, the United States ranks fifteenth in broadband Internet access and is outpaced by Canada, Denmark, Finland, France, Korea, and the Netherlands, among others.

Since its launch in 1998, the E-Rate program, administered by the Universal Service Administrative Company (USAC), has provided more than $20 billion in discounts for schools and libraries. According to a 2005 report from the National Coalition for Technology in Education and Training (NCTET), Internet access in public school classrooms jumped in one decade from 4 percent (1996) to 94 percent (2005). Connectivity is high in rural classrooms (95 percent), minority school districts (92 percent), and high-poverty districts (92 percent). Furthermore, almost 100 percent of public libraries provide Internet access.

These data, however, do not capture whether the connectivity is at broadband levels. We have come a long way, but we have a long road ahead to keep pace with how technology has advanced and can support learning. In its study of the Digital Economy in 2003, the U.S. Department of Commerce reported that out of fifty-five industries, education is dead last in its use of technology.

What Still Needs to Be Done

My vision for schools hasn't shifted, but technology has—dramatically. Two revolutionary changes in telecommunications technology have occurred in recent years: broadband and wireless technologies. The processing speed and memory of computers, following Moore's famous law, has continued to double roughly every two years.

In just the past four years, we have seen the explosive growth of multimedia on the Web. Multimedia content, including films, television, and music, is now routinely published, viewed, and shared on Web sites. This content includes excellent educational resources for our schools from our nation's museums, libraries (such as the Library of Congress's American Memory project), and government agencies (such as the NASA Web site, which brings space exploration into the classroom).

It is now possible for students to look at simulations of planetary movement NASA provides. We have produced a film in which students videoconference with surgeons who are performing heart-bypass surgery. Online simulations have been produced to help students experience ancient civilizations. All these online media require high-bandwidth connections beyond what was anticipated in the 1990s.

Now, our goal of universal service must be redefined to include much faster, broadband access to current multimedia content and address the next generation of broadband technologies to come. I encourage the Subcommittee to anticipate broadband speeds that enable current applications and plan for the much higher-speed networks now available only in universities and research centers.

The other major transformation in Internet access has been wireless networks and mobile computing. Now, students can access the world's knowledge without being tethered to a wire at schools and libraries. Teachers tell the staff at my foundation of students who sit in cars in high school parking lots in order to access the wireless Internet hub inside. While the school doors are closed, their minds are still open.

Schools still operate on the agrarian calendar: open nine months a year, six hours a day, five days a week. Those three months used to be important for children to help harvest the crops, but the summer could now be valuable time for planting and harvesting new seeds for learning. In this broadband, wireless world, information is always on, ready for students to exercise their curiosity and broaden their minds. Now, it is possible to conceive of a world where students can learn 24/7/365, anytime, anywhere.

Extend Universal Service to Broadband at the Desktop
In order to support this vision of twenty-first-century schools, it is very important that we not rest on the accomplishments of the E-Rate funding and the Telecommunications Act of 1996. We should not simply declare that the program has been a success and end it. Instead, we must recognize the even greater possibilities made possible by broadband and wireless and expand the program to keep pace with technology.

I urge the subcommittee to go beyond the current E-Rate discounts for public schools and libraries. Our goal should be to extend the definition of universal access to include modern broadband connectivity. We also need to define speed and bandwidth in terms of what students see on their computer, not just one connection to a school or library that must be divided among many users.

The current cap on E-Rate needs to be increased. I note that, as reported by the Education and Library Networks Coalition (EdLiNC), the administrator for the E-Rate program, E-Rate discount requests for 2008 totaled $4.3 billion but were capped at $2.25 billion. So we still have work to do to achieve the goal of universal access. I agree with EdLiNC's 2005 statement that "all students, educators, and library patrons should have high-speed Internet connectivity to fully participate and learn in an information-dominated economy and world."

Provide Free Internet Access for Schools
I applaud the program of E-Rate discounts to schools and libraries, ranging from 20 percent to 90 percent based on the economic status of communities. But I believe that the eventual goal should be to make these connections free for all schools and libraries. This goal is as ambitious and as important as the creation of free public schools and libraries themselves, free and open to all.

Telecommunications provides the new learning platform of this century and is replacing the textbook as the medium through which a modern education is provided. The world's knowledge is now available online, far beyond what books and materials can provide in schools and libraries themselves.

In affluent Marin County, one middle school has a laptop program where each student has his or her own computer and is able to access the Internet via a wireless hub in the school. But just over the Golden Gate Bridge, only 10 miles away, some San Francisco high school students do not have access to even basic computers and Internet access to go online and do research for class assignments. Teachers in San Francisco tell us that they feel they cannot in good conscience assign students to use computers and the Internet when five students in a classroom of twenty-five do not have access in school or at home.

Just as access to a high-quality education is a civil right, access to modern telecommunications tools for education should be viewed as a digital civil right. We should seek to guarantee that right to every student, regardless of ability to pay.

Connect Telecommunications Infrastructure to Teacher Professional Development
Although I recognize that teacher development does not come under the purview of this Subcommittee, I do want to note the importance of educating teachers about how Internet resources can be used for learning. A report issued recently by the National Education Association, titled "Access, Adequacy, and Equity in Education Technology," points to this critical relationship. Many educators feel that technical assistance and training support is inadequate, especially on how to incorporate technology in instruction.

I understand that teacher training is a focus of the Achievement Through Technology and Innovation (ATTAIN) legislation being discussed as part of the reauthorization of the No Child Left Behind Act. ATTAIN is supported by the Consortium for School Networking (CoSN), the International Society for Technology in Education (ISTE), and the State Educational Technology Directors Association (SETDA). ATTAIN's funding of professional development for educators on how to use technology is a vital complement to E-Rate connectivity.

I hope this Subcommittee will continue to coordinate its funding and policies with your colleagues on the House Education and Labor Committee. Your policies could encourage school districts and states to adopt an integrated telecommunications platform for schools, teachers, and students. Teachers and principals could use such a network as a platform for their own communications, sharing, and training.

We already see signs of such school networks in the United States, where new teachers are sharing their experiences with each other and their mentor teachers. This year, in our *Edutopia* magazine and on our *Edutopia.org* Web site, we described a project from Scotland called Glow, the first national schools intranet, which provides every Scottish school with a common e-platform for student and teacher email, for parents to have regular communication with their schools, for publishing school Web sites, and for features such as online courses and videoconferencing between schools.

This kind of common platform makes perfect sense. As companies and government agencies do, school districts and states should invest in ensuring that each of their locations has the same suite of online tools for their work and communications. But school districts and states have been slow to invest at the level the Scottish government has done for its schools. For a nation of five million people, the system cost $75 million and took four years to develop.

Students as Producers, Not Just Consumers, of Internet Content
Today's students desperately want to use technology and the Internet for their learning. It is ironic that nearly all students participate in this digital generation outside of school—talking on cell phones, playing video games, or socializing via Facebook—but many are disconnected from the educational benefits of telecommunications during the school day.

Students tell us that technology provides the kind of choice and engagement that would keep them in school and motivate them to go on to higher levels of learning. This is the new frontier in telecommunications, where students can share the multimedia products of their knowledge.

In one of our *Edutopia* magazine articles, one high school student from Florida said, "You think of technology as a tool. We think of it as a foundation—it's the basis of everything we do." Another student, from Albany, New York, said, "If it's the way we want to learn, and the way we can learn, you should let us do it!" A third student, from West Virginia, added, "If I were using simulation in school, that would be the sweetest thing ever!" The students "get it" and are moving ahead. It's up to our schools to catch up with them.

In 1994, I talked to this Subcommittee about students as authors of their own learning and said, "I don't want to make educational movies. I want kids to make their own movies, programs, and presentations. I want them to have the experiences I have when I create; those are the experiences that help me continue to learn and feed my creative spirit." We have reached an era in telecommunications when students can now do this via the Internet, but they will need the increased bandwidth to do so.

Harnessing Telecommunications at This Moment in Our Nation's History
We pride ourselves on being a nation of laws. Why shouldn't we also be a nation of learning? Americans were pioneers in creating the truly wondrous technology we are talking about today. Innovation is in our DNA. Now, we need to make sure it is also in our classrooms and that every American child grows up knowing how to use the Internet and how to benefit from its rich and powerful resources.

There was a time in our history when only the privileged few enjoyed literacy. The Industrial Revolution made paper and books more readily available, and reading was soon a requirement to getting ahead. The technology revolution we are living in today is another historic opportunity for advances in learning that arrive every few decades. We simply cannot afford to miss it.

Back in 1994, the United States was enjoying an era of prosperity. Now, fourteen years later, we see a much different world and much harsher realities confronting our nation. The climate crisis, soaring fuel and food costs, and terrorism are high among the threats to our future economic and political security. This Subcommittee can put in place crucial legislation to answer whether we confront these challenges successfully as a nation, because all these challenges require much more highly educated citizens and a much better-prepared workforce. Telecommunications and the Internet hold valuable keys to unlocking our brighter future.

I thank the Subcommittee for inviting me here today to share my thoughts about the critical role of telecommunications in the future of education.