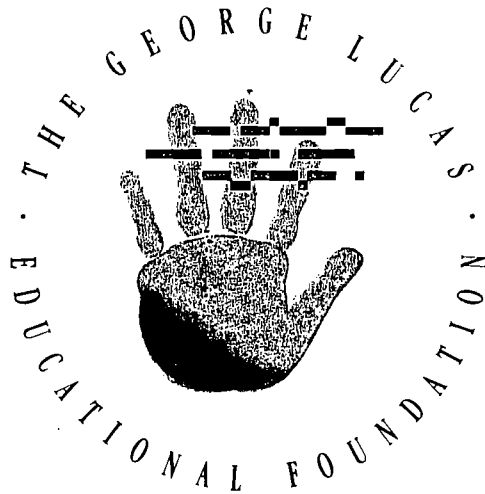




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EDUTOPIA

THE NEWSLETTER OF THE GEORGE LUCAS EDUCATIONAL FOUNDATION

TM

As we continue to talk with many of you about the work of transforming education, it becomes increasingly clear that collaborations are essential if this country is going to have a system that meets the needs of lifelong learners. Collaborations help us focus our attention and energies to achieve a shared vision. Whether it is students working together online to solve common problems, communities coordinating their services for children and families, businesses and schools developing dynamic programs, or elected officials striving to legislate the best possible policies, the need to work together is evident.

We find ourselves in the midst of an age of information and communication in which information and resources abound, yet the joint efforts that are necessary to provide access for all remain unsettled. The relationships made possible by telecommunication connections have great potential to challenge all learners. They have the ability to engage students, teachers, parents, experts, community leaders and others in solving common problems. Telecommunications can facilitate learning in all kinds of environments, giving learners the opportunity to express themselves and their ideas in a variety of ways. Recently, I have become involved in the national policy debate over the power of telecommunications to enhance education and the most effective ways to ensure its availability for educational purposes. With the appropriate infrastructure and policies, telecommunication technologies knit communities together, but they transform them into systems that support learning. Otherwise, however, without the ability to access the information, the technology is useless.

I firmly believe that the future of this country depends on our ability to articulate and achieve a shared vision. I urge you to join forces with others in your local and global communities to help realize an educational system that will lead us into the twenty-first century.



GEORGE LUCAS

LETTER FROM THE CHAIRMAN

STUDENTS' VIEWS ON LEARNING ONLINE INTERVIEW

Edutopia went online for a real-time conversation with six students at West Valley High School in Cottonwood, CA, a rural town north of San Francisco, about their collaborative work using Global Lab.

What is Global Lab?

Michele: Global Lab is a network designed to combine scientific knowledge for solutions to problems.

What was your first impression when you got online with Global Lab?

Michele: My first impression was that I thought it was a great opportunity to become more aware of advances in education and communication, and how they can be combined to increase learning.

Rebecca: The first time I used Global Lab I was amazed to see how many other people were involved and interested in the different subjects concerning our environment, such as pollution in the air and water.



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Children's Express

THE INDIANAPOLIS STAR

MONDAY, SEPTEMBER 26, 1994 • E8

INTERVIEW

Filmmaker George Lucas battles boredom in the classroom

■ He says technology is the key to revitalizing interest in learning.

Children's Express

As a child in Modesto, Calif., filmmaker George Lucas remembers sitting passively in classrooms and being bored beyond belief. It was not until he attended junior college that the creator of the blockbuster *Star Wars* and *Indiana Jones* movies excelled by taking classes that interested him.

Disappointed that his elementary and high school years weren't as exciting as they could have been, he wondered how to change the educational process to make it more stimulating.

"I began to realize that you can take some of the same techniques that I learned in telling stories on film and that I saw many of my favorite professors do in a classroom," Lucas said in a recent phone interview. "Using the new interactive technology... you could develop ways of learning that were much more engaging than the traditional use of the textbook and the teacher lecturing in front of the class."

Interactive firm

After graduating from University of Southern California and establishing Lucasfilm Ltd., a motion picture and television company committed to dramatic projects, Lucas' curiosity for changing educational trends led to the birth in 1987 of LucasArts Learning. This interac-

tive multimedia company makes games for Nintendo and Sega, and also for personal computers and CD-ROM.

In addition, LucasArts has developed interactive media applications for schools and homes, merging computer software with video, text, high-quality sound, animation and still images to teach history, science and other courses.

In 1991, he founded George Lucas Educational Foundation to work with LucasArts to promote high technology in schools.

"A while back at LucasArts, I decided that what I wanted to do was to show how you can make really good interactive educational tools," Lucas said. "I realized that the technology wasn't there for what I wanted to do. And as I got more into it, I realized that once you introduced technology into the school, it changes a lot of the ways that things are done."

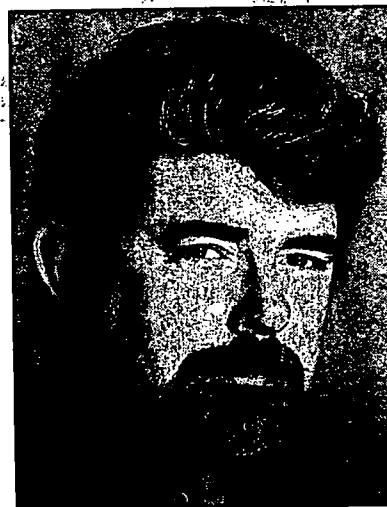
Lucas believes that the company and the foundation are trying to show what a school looks like across the curriculum.

"We do everything from physical education to history, humanities, language arts, math, science."

Programs for school

From his workplace at the Skywalker Ranch just north of San Francisco, Lucas helped create school programs such as *Life Story: The Race for the Double Helix*; *GTV: A Geographic Perspective on American History*; and *Paul Parkranger & The Mystery of the Disappearing Ducks*.

Another program called *MacMagic* is an experimental venture to explore ways to teach language and history skills to ethnically and academically diverse students



Lucasfilm Ltd

EYE ON EDUCATION: George Lucas provides alternative learning media.

using their personal experiences and backgrounds.

The foundation is developing a series of videos to illustrate how education can flourish with these types of programs.

Next year, Lucas plans to have the videos shown on television and distributed to schools and organizations that are working to make changes in the educational system.

"The videos really show what the schools will look like so that everyone involved in schools can see a different picture from the one that we've grown up with and the one that most people see,

which is kids lined up in desks in front of a teacher standing before a blackboard," Lucas said.

His goal for the videos is to show a world where students have telecommunications connected to all kinds of libraries, data banks, experts of all kinds and other students from around the world.

"The nature of textbooks and the nature of ways things are taught will be very different, and we're trying to get that picture out so as many people as possible know the alternatives to the way it is today."

Lucas believes the only way to bring about a dramatic change in education is to get a vision that is shared by a lot of people. He hopes the videos will help achieve this.

Vision of the future

And what would education look like if Lucas realizes his vision?

Lucas thinks that students will have much more control over the educational process if technology is intertwined with learning.

"You have control over your access to information," he said. "It's much easier to get the information that you need. You don't have to get on your bike and ride down to the library. It's instantly available to you."

"You are doing projects that relate more to real life, developing projects such as being an architect and building a house in order to learn math."

In Lucas' future, students will not be alone with their computers.

"The process encourages more cooperative learning, which means working with kids and the teacher in a more discussion-

oriented-type environment rather than students working individually by themselves.

According to Lucas, students will get to work at their own pace, and the class won't be working on the same level at the same time but have the opportunity to learn the subject more thoroughly.

"What the program stresses is a form of evaluation which depends on your work, rather than taking tests. . . . It will be much more a comprehensive kind of testing of your ability to use ideas than just being able to remember facts."

Lifelong process

"What this process of education expresses is: How do you gather information? Where do you go to find information? How do you evaluate that information to determine whether it's true or not, or true enough? And how do you use that information to solve whatever problem or create whatever it is you're trying to do?"

"It's a much more practical form of education, which is a lifelong process. It's not something that goes on for 12 years and then stops."

And one of the benefits for Lucas is feels he is learning just as much from this project as he hopes children are.

"One of the reasons I'm working in this area is that I learned so much," Lucas said. "It's pushing the boundaries of what we know, and it's very experimental. I enjoy trying to figure out new ways of learning and how we can become more effective as teachers and students."

EDITED BY: Robin Potasnik, 19
REPORTERS: Paul Bohnert, 12; Misty Moore, 11; Stephanie Dodge, 12

Access to Education

Connecting every public school classroom and library to the infobahn is a legitimate goal of public policy.

By George Lucas and Sen. Bob Kerrey

How to engineer the information superhighway so it benefits all in our society has become a burning issue.

Critics would leave it to cash-starved local communities and school systems to choose whether or not to pay the tolls for education on the information

superhighway. In their model, communities can decide either to increase teachers' salaries, buy new textbooks, or cruise the infobahn. This country should not accept such an either/or proposition.

Such a course would hobble American education, especially in rural communities and inner cities.

We strongly support moving rapidly away from central

regulation and toward a competitive market where customer choice drives the system. However, we also strongly believe that schools, teachers, and students will be left in the competitive dust unless we explicitly define and declare their needs.

Traditionally, subsidies have helped to extend basic phone service to include rural and low-income customers. Everyone benefited by having more users on the public switched telephone network. However, in the dawning of the information age – where access to information will be the currency of power and knowledge – the definition of access for educational institutions should be expanded to include multimedia technologies and services.

We support introducing competition into the local exchange market and using market-based theories and pricing. However, this doesn't mean that subsidies and public mandates should be abandoned entirely; some of them are justified. If we leave the market alone, we will not achieve universal access, the only way to attain equity of opportunity for teachers and students. Connecting every public school classroom and library to the developing superhighway is a legitimate goal of public policy. Adopting regulatory policies that will advance this cause is crucial.

Telephone lines should connect every classroom to the Internet and other electronic services. Students would then gain access to resources few schools can afford; they could then communicate with students and experts around the world. It also will support the teachers – perhaps the only group of professionals in our society expected to do their jobs with no office, no telephone, no privacy. Telephone lines in the classrooms would enable teachers to use the telephone and electronic services like other professionals do: to access information and communicate with community members, peers, parents, students, and experts.

This is only the first step, however. We have talked with students, parents, educators, and business, community, and political leaders to formulate a vision for education in the 21st century. This vision stresses lifelong learning and is student-centered, making teachers, families, and communities co-facilitators of learning. This vision takes advantage of new technologies to support the educational process.

Nationwide, momentum is building to transform our educational system, and the proper use of technologies can reinforce these efforts. But the benefits from educational technology ought to be part of the government's policies in determining overall telecommunications policy. A just part of our policy for improving the quality of education. Another benefit – which the private sector should appreciate – is that market demand for advanced telecommunications services will increase as more people have the capacity to communicate with these new media. As we increase the demand for advanced telecommunications services, the average costs of these services will go down, making them more affordable for everyone. All of these efforts must be an integral part of any cost-benefit

analysis in determining public policy.

Congress today is considering these interrelated issues. One of its major challenges is to figure out how to integrate the benefits of universal service policies based on service mandates while at the same time fashioning policies based on economic requirements and competition.

The communications paradigm used in this country for the past 60 years needs to be overhauled. Congress needs to break out of the traditional boxes lawyers and regulators have built over the years – policies that separate "voice-phone" service as basic and essential, but lists everything "new" (such as touch-tone service) as advanced and competitive and, therefore, a luxury and optional.

Yes, we do need a more competitive telecommunications industry. This can happen if Congress (1) creates incentives for all competitors to wire and connect schools, homes, and libraries with educational technology and products; and (2) encourages and permits all providers of telecommunications services to freely provide them. Of course, we need to monitor the process to see that our national objectives are being met by this market incentive approach.

Congress is currently considering legislation addressing these goals. In June, the US House of Representatives approved the National Communications Competition and Information Infrastructure Act of 1994, which calls for the FCC to promote the provision of advanced telecommunications services to schools, hospitals, and public libraries. (The House also approved another bill affecting telecommunications, the Antitrust Reform Act of 1993. For another perspective on Congressional legislation pending at *Wired's* presstime, see "Universal Service," page 102).

The US Senate will soon take up the Communications Act of 1994, which seeks to achieve many of these universal-service protection objectives. In particular, the bill would require all telecommunications carriers to contribute to preserving universal service. Importantly, the bill would require all telecommunications carriers to provide educational institutions – among other entities – interstate and intrastate access services at preferential rates. The FCC would establish rules to enforce this requirement. The bill also would require the FCC to ensure that all public elementary and secondary school classrooms and libraries have access to advanced telecommunications services.

We fully support these efforts, and call upon all educators and parents to speak up for policies that will support universal access to today's telecommunications services as well as to the interactive, broadband technologies of tomorrow. We must all work together to ensure that the information superhighway is the road to educational excellence in America.

George Lucas is a filmmaker and chair of the George Lucas Educational Foundation. Sen. Bob Kerrey, D-Nebr., is an original co-sponsor of the Communications Act of 1994.

Computers in School: Equal Access Sought

Legislation Proposed to Aid Education

By STEVE LOHR

As the nation moves beyond today's computers and communications toward the so-called information highway, the Clinton Administration and growing numbers of educators and lawmakers contend that the Government must insure equal access to technology for rich and poor.

Unless Washington steps in, they warn, the increasing power of technology could become a force that divides schools — and American society — even further into the haves and have-nots.

The gap is already present — the difference, say, between a school like the Lodge Grass High School on a Crow Indian reservation in Montana, where high-tech gadgetry is scarce, and the Glenbrook North High School in the affluent Chicago suburb of Northbrook, Ill., which is equipped with hundreds of computers, and where students routinely tap into the Internet, the worldwide network linked to millions of people and to resources like the Library of Congress.

Fears of a Widening Gap

It is this gap that some fear will widen unless steps are taken to make the new digital services available inexpensively to poorer schools and rural schools. At stake, policy analysts say, is whether the United States will be an information aristocracy or a digital democracy.

"Education is where we as a society can do the most good with this technology," said Reed Hundt, chairman of the Federal Communications Commission.

No one contends that technology is

an educational cure-all, but educators and policy experts, who predict that high-capacity computer networks will eventually become as basic to classrooms as textbooks and blackboards, argue that Government must insure that access to these networks does not go first and mainly to the affluent.

Legislation proposed in both the House and Senate and backed by the Clinton Administration would require communications companies to provide the nation's 110,000 primary and secondary schools and 20,000 public and university libraries with inexpensive links to the interactive networks.

The legislation, expected to come to a vote in Congress later this year, calls for telephone companies and cable-television suppliers to give schools cheap hookups.

The information highway might be imagined as today's electronic networks on steroids, far faster and more powerful than the state-of-the-art digital pipeline into the Glenbrook North school. It promises to give users ready access to everything from the London Library to Hollywood movies to two-way video links to experts in any field.

The suburban Chicago school clearly has a head start toward that technological future. Glenbrook North has more than 300 personal computers, many of them laptops that students can use at school or at home. In addition to being wired to the Internet, the students have a computer-equipped television studio. The school even has its own technology consultant, Alan November. "This school is a real model of technological affluence," he said.

Much farther back is the Lodge Grass school, whose students come from a region accustomed to unemployment and poverty. Three years ago, Vicki Gile, an enterprising librarian, applied for and won a small private grant, which finally gave her library a telephone and a personal computer able to send and receive electronic messages over the phone line. Since then, the school has added several more personal computers.

Ms. Gile's modest computer network has been a big help, she said, even though she had a half-dozen of the school's 100 students use it. "It's a starting point for us," she said.



Steve Kagan for The New York Times

Concern is rising that unless equal access to technology, is insured the gap between rich and poor will grow ever wider. At Glenbrook North High School in the Chicago suburb of Northbrook, Ill., personal computers are commonplace. Students worked in their own television editing room.

The crucial ground rules for building the new high-speed electronic thoroughfare will probably be drawn up in Washington over the next few months. And supplying service to schools is shaping up as the first big social equity issue.

"Schools are the real test case of whether this privately built digital network will be accessible and affordable to the public as a whole," said Jerry Berman, executive director of the Electronic Frontier Foundation, a technology policy group.

Opposition has been muted so far to the proposed legislation. Skeptics are less concerned about the mandated

wiring of schools than about the proposal's potential for a broader precedent: Washington meddling in high-technology markets in the name of social equity.

"The push for Government intervention to supposedly help the information have-nots is an area ripe for abuse," said Mark Stahlman, president of New Media Associates Inc., a research firm.

Despite some resistance from industry, several big phone and cable companies, notably the Bell Atlantic Corporation and Tele-Communications Inc., support the concept of paying to link schools to their planned

high-capacity digital networks.

The really thorny matter will probably be pricing the services. The proposed legislation calls for "reasonable" or "preferential" rates for schools, largely leaving it to the F.C.C. to determine what qualifies.

To some lawmakers and educators, reasonable means inexpensive indeed. Representative Edward J. Markey, chairman of the House telecommunications subcommittee and author of a bill that calls for wiring schools, says information services to classrooms should cost as little as a penny a minute.

Some advocates say even a penny is too much. For example, the George Lucas Educational Foundation, a nonprofit group set up by the film maker, recommends mandating that companies provide free services to schools.

Even without Federal mandates, schoolchildren are slowly being introduced to computer networks

A Broad Range of Equipment

But the range of today's network technology varies enormously. And computer networks are still used only sporadically in most American schools, where only one in every eight classrooms has a phone line and only one in 25 has a computer with a modem to send and receive data.

Even at the low end of the high-tech world, however, teachers often feel encouraged by the effect on students. At the Lodge Grass school in Montana, for example, Ms. Gale says the school's rudimentary electronic-network connection has opened new vistas for some students.

As part of its private grant, the school received free access to the AT&T Learning Network, which links classrooms in small groups. From the library computer, the Lodge Grass students can exchange messages and work on projects with students in Singapore, Canada, Germany and Italy.

Jonathan Deputee, a 17-year-old junior at Lodge Grass, has been impressed by how much students from different countries are alike, from shared anxieties about teenage relationships to common tastes in rock music from Metallica to Meat Loaf. "I thought they'd be more different than they are," he said.

Her students, Ms. Gale says, need more of that kind of technology-aided experience.

"I don't think our kids are have-nots," Ms. Gale said. "And while the network link we have may be small, it has made a world of difference in some of my kids in terms of self-esteem and interest in school."

EDUCATION WEEK

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Technology

Adding his voice to a growing chorus that warns that schools could be squeezed off the "information highway" by high tolls, the filmmaker George Lucas has called on Congressional lawmakers to push for a telecommunications-fee structure that would give all schools access to sophisticated computer networks.

Mr. Lucas last month stressed the importance of "universal access" to what the telecommunications industry calls "plain old telephone service" as a vital precursor to the information highway that Vice President Gore has said should be available to every student.

In written remarks submitted to the House Telecommunications and Finance Subcommittee, Mr. Lucas, in his role as the chairman of the George Lucas Education Foundation, called on lawmakers to "assure that every school is provided with free long-distance calls to access on-line services and the Internet."

Patty Burness, the executive director of the foundation, said Mr. Lucas does not believe businesses should be barred from selling services to schools.

But currently, she noted, schools seldom receive preferential rates for education ventures.

Mr. Lucas also pointed out that, according to the National Education Association, only 12 percent of the nation's classrooms have access to a telephone.

Universal classroom-telephone service, Mr. Lucas noted, is vital if schools hope to enter the "information age."

But, he added, "the challenge of equipping classrooms with the technology that's needed, and providing teachers with the curricula and operating budgets to operate that technology, cannot be underestima

Mr. Lucas, best known for his "Star Wars" and "Indiana Jones" movies, in recent years has shown a deep interest in K-12 education.

Lucasfilm Ltd., one of his many enterprises, has worked with the National Geographic Society to develop an American-history videodisk. (See *Education Week*, Jan. 17, 1990.)

Another of his companies, LucasArts Learning, based at Mr. Lucas's Skywalker Ranch in Marin County, Calif., develops interactive educational software.

And Mr. Lucas, who saluted his own teachers two years ago at the Academy Awards ceremony, noted that the foundation is preparing four 30-minute videos that describe his vision of "Edutopia," or student-centered, technology-assisted school reform.

—PETER WEST

TELECOMMUNICATIONS

Congress May Ask Companies To Wire Schools

By MARY LU CARNEVALE

Staff Reporter of THE WALL STREET JOURNAL

WASHINGTON — The nation's schools may hitch a cheap ride on the information superhighway.

Broad telecommunications legislation moving through Congress would require companies to provide inexpensive computer linkups to schools, nonprofit medical facilities, libraries and some other public buildings. The idea is supported by people ranging from Vice President Al Gore to filmmaker George Lucas.

Rep. Edward Markey, chairman of the House telecommunications subcommittee, envisions connecting students' home computers to their schools and linking the schools to the Library of Congress, the New York Public Library and other distant databases. The Massachusetts Democrat, a leading sponsor of the legislation, talks of charging students only a penny a minute to use such services.

The thought of cheap hookups — and especially cut-rate or free monthly service — unsettles most telephone and cable television companies. A survey by Rep. Markey of 20 companies early this year turned up only three — Bell Atlantic Corp., Tele-Communications Inc. and Cox Cable Communications — that were willing to pay for high-capacity links to elementary and secondary schools in their territories. The rest didn't say no, but they also didn't say yes. BellSouth Corp. told Mr. Markey that requiring free links to schools would burden the Atlanta-based Bell company "with a competitive disadvantage."

In January, Vice President Gore shook up the communications industry by challenging it "to connect all of our classrooms, all of our libraries and all of our hospitals and clinics by the year 2000." The next day, BellSouth amended its response to Mr. Markey's survey. On reconsideration, it suggested continuing efforts to work with state and local officials "to determine technological solutions and business arrangements that are more customized to the individual needs of each of the schools."

Other companies also have changed their tune. Giving away service "to schools

Please Turn to Page B7, Column 1

The Government May Require Companies To Wire Up Schools

Continued From Page B1

for anyone else], while superficially attractive, is not in the long-term public interest," responded Ameritech, the Chicago-based Baby Bell, to Mr. Markey's survey. In testimony earlier this month before Mr. Markey's panel, Richard Notebaert, the company's president, softened that stance. Ameritech, he said, "has committed to connect elementary and secondary schools to this advanced network before the end of the decade."

Mr. Lucas, the movie maker, has been pushing for free information-highway connections for students through his George Lucas Educational Foundation. "At some point, I hope we do the right thing," says Mr. Lucas. "Obviously, this is a big issue, and personal and corporate greed have to be put aside a little bit to focus on what is best for our country."

While the industry is softening its stance on building the links between schools and computer networks, the issue of paying for monthly service is a different matter. Even Bell Atlantic, TCI and Cox haven't promised to do that, though many companies suggest that schools are likely to get discounts.

Ronald Stowe, head of Pacific Telesis Group's Washington office, suggests that companies might work together to provide packages of equipment and services and train teachers and students how to use them. "It is not enough just to offer free connections to every school," he says. "Schools need hardware, software and training."

Meanwhile, the FCC's new chairman, Reed Hundt, is likely to put continued pressure on the companies. Mr. Hundt, who taught seventh grade in an inner-city school in Philadelphia before enrolling in law school, recalls how painful it was to have only 35 textbooks for five classes of 35 each.

"If students could be connected to networks," he says, "it would let them escape the classroom, escape the confines of their neighborhoods."

The New York Times

Education Life

Section 4A/ August 1, 1993

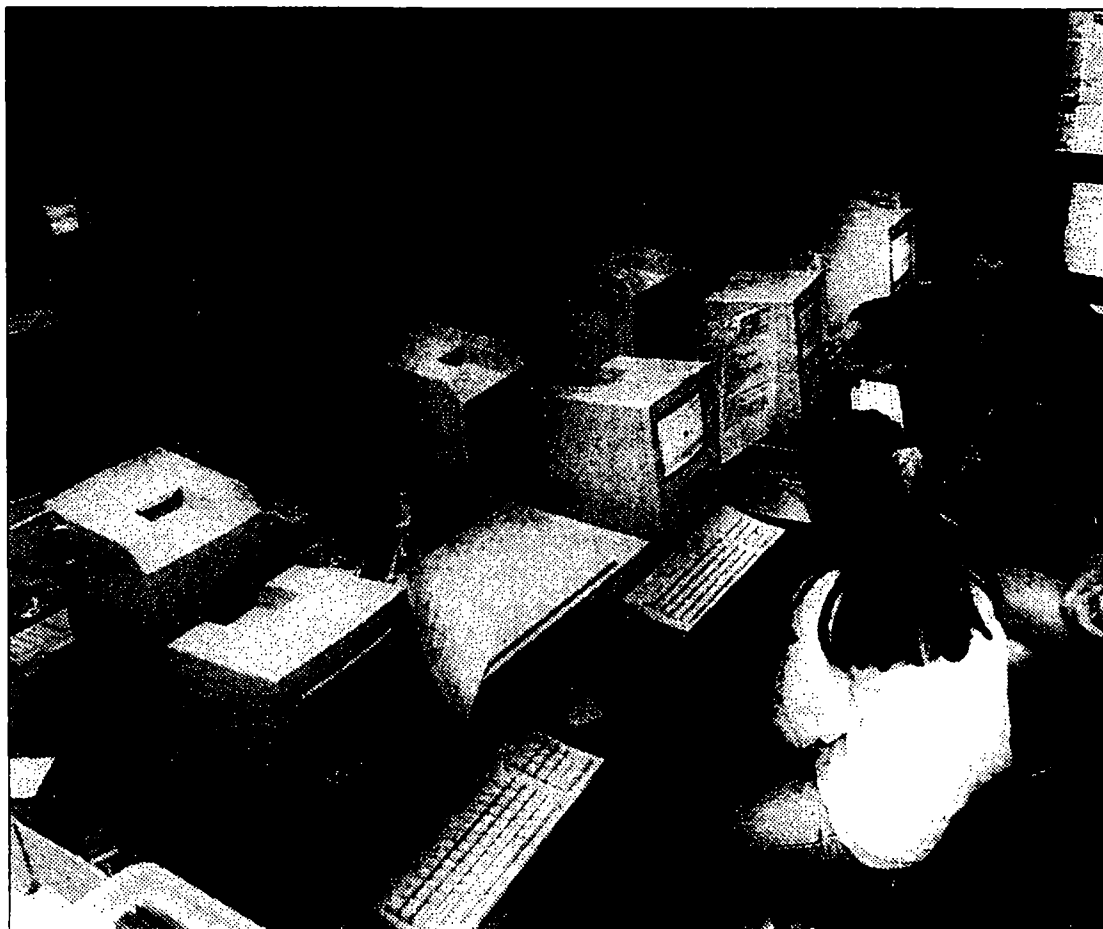
S O F T W A R E

Rescuing Children From Boredom

By Bernard Weinraub

Students at James B. Davidson Middle School in San Rafael, Calif., use "MacMagic" program of George Lucas, shown at Skywalker Ranch.

A SA YOUNGSTER in Modesto, Calif., George Lucas detested school. "Up through high school I was bored silly," he recalled. "I didn't seem to fit into the educational system as it was functioning. Then when I got to college and had more freedom and more control over my life I suddenly enjoyed it enormously. The contrast between my early education and my later education was so dramatic that I was constantly pondering, 'Why did it have to be that way?' Why was I robbed?" Mr. Lucas, the filmmaker, creator of the "Star Wars" saga, has the money and clout, and perhaps the vision, to find some answers.



'I Was Robbed'

"My primal motivating factor is I feel I was robbed of a lot of great educational opportunities; I could have learned a lot more," he said, sitting in the dining room of his workplace, the lavishly idyllic Skywalker Ranch, home of the LucasArts Entertainment Company, in the hills of Marin County just north of San Francisco. "The only adaptation mechanism that we have as an animal or species is our brain. If we don't use it wisely, we don't survive."

"Occasionally, in school, you stumble across a teacher that lights your fire and gets you going and it becomes one of those great moments," he said. "It happens once or twice in your life. And I keep thinking, why can't education be as exciting all the time?"

Like some of his Hollywood friends, the 49-year-old Mr. Lucas could easily have repeated himself as a film maker year after year, making big-budget fantasies and accumulating piles of money. Instead he has poured much of his energy and resources into developing innovative education techniques at Skywalker Ranch — which he virtually acknowledges has consumed him, to the sacrifice, perhaps, of making movies.

LucasArts Learning, established in 1987, has emerged as one of the leading developers of interactive media applications for schools and homes, merging computer software with video, text, high-quality sound, animation and still images to teach history, science and other courses. His George Lucas Educational Foundation, set up in 1991, focuses on advancing teaching and learning through the creation of a vision for an educational system burgeoning with technology.

Patty Burness, executive director of the foundation, said, "This will be accomplished through the production of four dramatic films that depict the future of a technology-rich educational system through the points of view of different-age students as well as a teacher." Production starts in 1994.

"We will disseminate them widely throughout the country," said Ms. Burness, "to education and community and business leaders as well as officials. Right now what we're lacking in the national debate is a vision of what a great educational system can look like. The point is to put a vision out there that can be a catalyst for conversation among all the players who have a stake in how we educate our children."

Mr. Lucas, who is divorced and has two young daughters, put it another way: "We're trying to develop a vision of what education will look like in the future because high technology forces a kind of systemic change in the entire system."

An Education Tool

LucasArts Learning has made interactive video a prime education tool. Its most significant effort so far is "GTV: A Geographic Perspective on American History," an interactive multimedia product made with the National Geographic Society and the California State Department of Education and Apple Computers. Its tools are computers, television and laser disks. "GTV" is designed for students in grades 5 to 12, and explores the nation's history through video footage, historical images, maps and photographs. There's even a "Map Rap," in which the nation's history of acquiring territory is told in hip-hop rhyme.

The program, which costs \$795, meets virtually all state curriculum guidelines for American history; about 5,000 schools across the nation have ordered it.

LucasArts Learning has also made a second, prototype multimedia program for high schools and junior colleges, "Life Story: The Race for the Double Helix." It has been co-developed with Apple's Multimedia Lab, the Smithsonian Institution and Adrian Malone Productions, based in Washington. This examines the discovery of the structure of DNA, the basic genetic material of life.



Photographs by Jim Wilson/The New York Times

Their most recent interactive project, "Paul Parkranger & The Mystery of the Disappearing Ducks," has been developed with, among others, the National Audubon Society, and will be issued this summer by Coronet/MTI Films. It examines environmental problems and is geared for students in grades 5 to 9.

"MacMagic" is an experimental venture shaped by LucasArts Learning, the Marin Community Foundation, the San Rafael, Calif., School District and Apple Computers to

explore ways to teach language and history skills to ethnically and academically diverse students, using their personal experiences and backgrounds. The students, some of them recent arrivals from Mexico and elsewhere, employ, at their own pace, computers, laser disk players, video cameras, scanners and tape recorders. The program, in its fourth year, won a "Point of Light" award from President Bush in January, less than two weeks before he left the White House.

Mr. Lucas's ambition to leave a mark on education hardly diminishes an unassailable, if bleak, prospect: that his innovative efforts, while welcomed and even encouraged in wealthy Marin County and other regions, may prove too threatening, too creative, too costly and too daring for the entrenched education bureaucracies and often-warring constituencies in the school systems of, say, New York, Los Angeles or Chicago.

Mr. Lucas addresses this possibility a bit vaguely. "All I'm doing is presenting a group of

ideas and it's up to the educational system to take these ideas and make them real," he said. "You need the support of parents, teachers, legislators and all the people in the chain to make it happen."

But what's true for northern California may not quite be the same for Harlem or Watts. Isn't his vision, perhaps, idyllic?

"Well, idealistic," Mr. Lucas said. "You can't have anything unless you dream it first. To say something is not possible isn't something that's woven into the fabric of my nature. I've gone my whole life doing things that were seemingly impossible at the time. And the way to make something happen is to imagine something is possible. I'm idealistic, yes, but I believe this is possible. I'm convinced it will happen anyway in the next 50 years. I'm hoping to make things happen in the next 20 years."

"My ideas aren't controversial ideas and they aren't my ideas," said Mr. Lucas. "These are the ideas of great thinkers in education. All I'm trying to do is to put them in a form that is then communicated. I look at the situation and I say, 'What kind of effect can I make?' It's just hard for people to accept it, especially when it's dark, when it's kind of murky and you can't quite see what it is," he said. "All I'm trying to do is light a little candle and say, 'It isn't quite so scary.'"

Popularizing an Idea

"All I'm trying to do is popularize an idea," he added emphatically. "Hey, if people don't want to do it, they won't do it. But I have a feeling these are extremely good ideas and the enlightened school systems that are looking for ways to improve will put forth the energy and emotions to make it happen. Some school systems will delay it, all school systems will eventually have it. And you know why? Because you'll have school systems that have proven their success so dramatically over a period of time that the other school systems can't help but do it too."

"What's happening in interactivity," he said, "has sparked kids so dramatically that you can't help but walk into a classroom and see how much more alive the kids are, how much more they're learning. It's really the technology — it's the freedom. They have more control over their lives, more control over the learning process. They're not dealing with abstract ideas for some abstract reason that they don't understand. They're working in the real world, with real problems, accomplishing real things, and not just getting grades. They're dealing with reality."

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EDUTOPIA

THE NEWSLETTER OF THE GEORGE LUCAS EDUCATION FOUNDATION

LETTER FROM THE CHAIRMAN

When I make a film, I am always experimenting with new ways to tell my stories. It is exciting to see how rapidly technological changes are changing the way I do my work. Computers are changing the way feathers float through the air, and dinosaurs co-exist with dinosaurs. I am able to have special effects done in my living room, and I am able to view the finished product on my computer in Connecticut. I am able to have scenes digitized on computers at our studio at Skywalker Ranch; and I am able to have video conferences with my producer on location in North Carolina. The film industry, just like education, is feeling the impact of the digital revolution.

Making a movie is a collaborative effort among many people who have a clear idea of their roles. All members of the cast and crew bring their unique and varied experiences to the tasks and play a significant role in the success of a production. The investment we make in people and technological resources is an essential part of a comprehensive plan to bring together all of the various elements of filmmaking. Changes do not necessarily happen easily for any of us, but the technological revolution has changed forever the way movies are made. And many filmmakers are embracing these changes as we understand how we are able to reshape and advance our craft.

Even though the educational system is much more complex than movie production, the integration of technology with teaching and learning can have the same profound and rapid effect that it has had on filmmaking. For a variety of reasons, the educational community has not embraced the capabilities of the new technologies in the same way, and many people still question its value. I think much of the problem is caused by the fact that we don't have a shared vision of the potential nor do we have a clear set

of expectations for its use. Much of society is moving into the Age of Information and Communication, but we are leaving our children and teachers in the Industrial Age. We need to ensure that everyone in education is able to expand their learning through access to interactive multimedia and telecommunications technologies.

As we continue our work to create and document a vision of a technologically-enriched educational system, myriad changes are shaping the way our children are thinking and learning right now. I am encouraged when I hear about the numerous programs that are challenging our traditional ideas about how school should be. And I applaud the hard work in which so many of you are involved. I want all children to feel as empowered and creative in their work as I am in mine. Education is at the root of everything we do; together, I hope we are able to transform the system into one that will meet the needs of a society of lifelong learners.



GEORGE LUCAS

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DISSEMINATION

1st Tier

ORGANIZATION	MEMBERSHIP INFORMATION
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BUSINESS	
Business Council, The	275 members
Business Roundtable, The	200 members
California Business Roundtable	88 members
Committee for Economic Development	250 trustees (pres or CEO's of large companies & pres of univer)
Conference Board, The	2000 members
Council for Aid to Education	260 members
National Alliance of Business	3500 members

COMMUNITY ORGANIZATIONS	
Congress of National Black Churches	65,000 members
Junior League	283 leagues
National Council of LaRaza	150 affiliates
National Urban League	113 affiliates
Quality Education for Minorities Network	

ELECTED OFFICIALS	
Education Commission of the States	370 Commissioners
National Conference of State Legislatures	7,600 nationwide; 300 education and training
National Governors Association (NGA)	50 states and five territories
State Legislative Leaders Foundation	366 - presiding officers, Majority/Minority Leaders
U.S. Conference of Mayors	1050 representing cities of 30,000+

GOVERNMENT	
President/Vice President/Cabinet Secretaries	16
Members of Congress	435 House and 100 Senators

OTHER	
Council of Chief State School Officers (CCSSO)	57
Public Education Foundation Network	80 foundations representing 20-30 each

PARENTS	
Parent Teacher Association	27,000 Local Chapters; 3,600 (1,500 councils/2,100 State Boards)

SCHOOL BOARDS	
National Assoc of State Boards of Education	44 states (not WY, NH, ND, ID, FL)

TECHNOLOGY	
Institute for the Transfer of Technology to Ed (NSBA)	340 districts/3200 people

MEDIA	
Education, Business, Technology, Political Writers	3,000

ORG DISSEMINATION

2nd Tier

ORGANIZATION	MEMBERSHIP INFORMATION
--------------	------------------------

ADMINISTRATORS	
American Assoc of School Administrators (AASA)	18,000-19,000 members; 3,600 superintendents
Nat'l Assoc of Elementary School Principals (NAESP)	26,000 incl public, private, parochial; 4% urban, 60% of schools
Nat'l Assoc of Secondary School Principals (NASSP)	43,000 incl public, private, parochial

BUSINESS	
Chambers of Commerce	215,000 nationwide (3,000 state & local; 1400 assoc & trade; bal are biz members)

COMMUNITY ORGANIZATIONS	
League of Women Voters	100,000 national, state & local level (LA City = 900)
Coalition for America's Children	35 member organizations

CURRICULUM	
Assoc for Supervision & Curriculum Develop (ASCD)	187,000; 73,000 mail only; 30,000 reg; 85,000 comprehen; 64 affiliates

PRIVATE	
Council for American Private Education	26,000 (70 percent of schools)
National Assoc of Independent Schools (NAIS)	1,000 schools (state and regional associations)

SCHOOL BOARDS	
National School Boards Association (NSBA)	can mail to 2,000 largest directly

TEACHERS	
American Federation of Teachers (AFT)	700,000 members; 1,000 local unions with presidents
Holmes Group	94 institutions (3,200 schools in MI)
Impact II - Teachers' Network	20,000 members (not union members in TX)
National Education Association (NEA) (NFIE)	2 million members
National Educator Award Winners	900 - teachers, principals, curr. specialists in 25 states
Recruiting New Teachers	500 precollegiate programs including future teacher clubs
Teach for America	2,400 (add 600/year)

TECHNOLOGY	
Assoc for Computing Machinery (ACM)	90,000 members
Computer Using Educators (CUE)	5,000 members
National Educational Computing Assoc. (NECC)	15 Societies (nonprofit ed and tech supporting, i.e., ISTE)

DISSEMINATION

3rd Tier

ORGANIZATION	MEMBERSHIP INFORMATION
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CURRICULUM	
National Assembly of Local Art Agencies	1,000 members
National Assembly of State Art Agencies	56 members (50 states: Wisconsin and NM do not belong); 6 territories
National Coalition of Education in the Arts	24 members (all from art organizations)
National Council for Teachers of English (NCTE)	90,000 individual and institutional (12,000)
National Council of Teachers of Math (NCTM)	100,000 individual (71,800) and institutional
National Council for the Social Studies (NCSS)	22,000 individual (16,000) and institutional
National Science Teachers Association (NSTA)	50,000 individual and institutional (15,277)

GOVERNMENT	
Department of Labor	

OTHER	
American Assoc for Higher Education (AAHE)	K-16 councils, 8-15 people/council (college pres/bus, comm, etc.)
American Assoc of Community and Junior Colleges	1,300 members (institutional, individ, ed, fdn, corp and int'l ed)
American Assoc of University Women (AAUW)	135,000 members
American Association of School Librarians (AASL)	
Foundation for Technology Access	
NASA	

TECHNOLOGY	
International Society for Technology in Ed (ISTE)	6,000 individual members, 44 organizational members
Software Publishers Assoc (SPA)	

DISSEMINATION

4th Tier

ORGANIZATION	MEMBERSHIP INFORMATION
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ADMINISTRATORS	
Association of CA School Administrators (ACSA)	
Council of Great City Schools	47 Urban School Districts

BUSINESS	
American Institute of Architects	
Apple ACOT Programs	
Bay Area Council	
California Manufacturing Association	
Industry Educational Council of California	
Kiwanis Club	
Los Angeles Chamber of Commerce	

COMMUNITY ORGANIZATIONS	
Boy Scouts	
Child Welfare League of America	
Future Farmers of America	
Girl Scouts	
United Way	

GOVERNMENT	
Department of Defense Schools	

LOCAL	
Education for Tomorrow Alliance	Houston Business/Ed Consortium

OTHER	
Council for Educational Development & Research	
GTE	
National Science Foundation	

PARENTS	
Parents for Public Schools	5,000 members in 12 states

SCHOOL BOARDS	
California School Boards Association (CSBA)	

TEACHERS	
California Federation of Teachers (CFT)	
California Teachers Association (CTA)	
Exploratorium Network	

DISSEMINATION

4th Tier

ORGANIZATION	MEMBERSHIP INFORMATION
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TECHNOLOGY	
Alliance for Public Technology (APT)	
Association for Advancement of Computing in Ed (AACE)	
Association for Education Communications & Tech (AECT)	
California Technology Project (CTP)	
Forum on Technology in Education	
Information Technology Foundation	
Internat'l Technology Education Association (ITEA)	
National Education Telecom Organization (NETO)	
Society for Applied Learning Technology (SALT)	
Society for Technology and Teacher Education (STATE)	
Technology Coordinators	
US Distance Learning Association (USDLA)	

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EACH CHAPTER WILL INCLUDE THE FOLLOWING:

Anonymous Narratives

Narratives of transformation process; what it took to change

Exemplars:

Examples of exemplary programs, projects & schools, annotated

Resources:

Annotated list of:

Recommended Readings

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Organizations

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EACH TAB WILL INCLUDE THE FOLLOWING:

A Big Idea Piece:

Expert ties together the key issues

March 3, 1995

MEMORANDUM TO BILL GALSTON

FROM: KIM ROSS

SUBJECT: Meeting w/ George Lucas Foundation Representative

I went ahead and tentatively set up a meeting with Patty Burness for March 7, 2:45-3:00. She works for the George Lucas Educational Foundation and would like to give you a brief overview of their project to create a film that will demonstrate what a great education system would really look like. They are also putting together a resource document detailing various programs around the country that currently exist.

The attached information packet provides more details on their efforts. George Lucas has been working closely with the Department of Education and has discussed these projects with the Vice President.



THE GEORGE LUCAS EDUCATIONAL FOUNDATION

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Osamu Yamada

George Lucas has long held a concern about education -- a concern which centers on heightening the vast imagination and curiosity of children. Emerging interactive multimedia and telecommunications technologies provide outlets for imagination and engage students in explorations never before possible; this capability can help transform education. Technology can be used to create rich multisensory experiences that enable all students to construct knowledge from information. The George Lucas Educational Foundation, a tax-exempt, charitable organization based in Nicasio, California, was established to facilitate the innovative uses of multimedia technologies to enhance teaching and learning. "Education is one of the most important tools the human race has to ensure its own survival, and creative uses of interactive technologies can have a major impact on education," says Lucas. Multimedia and telecommunications "... expand the sense of wonder we experience as children, and that is the most powerful way to learn."

Students of today interpret and use a staggering amount of information. To be effective in our society, individuals need to be lifelong learners making it incumbent upon the schools to focus on learning to learn. Today's students are increasingly diverse in their backgrounds, their abilities, and the amount of information they bring to a learning experience. To challenge and engage them, new resources, new methods of teaching and learning, and new ways to present information must be developed.

To facilitate the innovative uses of interactive multimedia technologies for learning, The George Lucas Educational Foundation's current projects include:

- **Creating a vision of a technology-enriched educational system**
- **Disseminating information about educational change and facilitating the exchange of ideas**

CREATING A VISION OF A TECHNOLOGY-ENRICHED EDUCATIONAL SYSTEM

Since its founding in 1991, the Foundation has explored numerous ways that technology can transform teaching and learning. In 1995, production is beginning on a dramatic video that demonstrates a vision of what an effective educational system could be like in the future. The video will be a dramatic story from the points of view of students and a teacher. It will show how the roles of teachers, students, parents, and the community must change if education is to keep pace with our rapidly-changing, highly technological society.

A resource document will accompany the video and feature information designed to complement the filmed images. Chapters will explore emerging technologies, student learning, facility design, parent involvement, teacher preparation, governance issues, lifelong learning, authentic assessment, the changing role of teachers, business and community involvement, and other elements of a system of teaching and learning. In the future, the video and the resource document will form the basis for interactive multimedia tools. Additionally, the Foundation will continue to publish its newsletter, "Edutopia," which connects people with ideas and programs, and maintain an active presence on the Internet.

DISSEMINATING INFORMATION ABOUT EDUCATIONAL CHANGE AND FACILITATING THE EXCHANGE OF IDEAS

The video, resource document, and newsletters will be widely disseminated to educators, business and community leaders, parents, policy makers, and other interested parties. With these materials, the Foundation hopes to act as a catalyst to help others envision what is possible, and to help them focus on what is essential if all children are going to realize their individual potential and become intelligent citizens in the 21st Century. Information contained in the document and the newsletters will highlight exemplary programs, resources, experts, and research which exist today and which help make the vision a reality. This information will be reinforced through the Foundation's various Internet sites. The Foundation will continue to link people interested in the future of education and emerging technologies.

CONCLUSION

The George Lucas Educational Foundation was established to enhance the innovative uses of multimedia technologies in education – where teachers, students, parents, and others are more actively engaged in lifelong learning. This transformation is essential if all students are going to be prepared for the complex and demanding world of the future. Technology offers powerful tools with tremendous potential to change radically how teachers teach and children learn. Through the development of dramatic models of the uses of emerging technologies, the Foundation hopes to help further the cause of those working to reinvigorate the learning process, stimulate teachers to become real facilitators of learning, and prepare all students to meet the challenges of the global society of the 21st Century.

A National Board of Advisors, comprised of leaders in education, technology, and business will continue to provide assistance and guidance in all aspects of the Foundation's work. In addition, the Board of Directors of the Foundation is enhanced by business and technology executives, and the staff of the Foundation brings experience in education, teaching, technology, research, and production.

George Lucas is an innovator and visionary in the film industry. He is a pioneer in the development of special effects, editing and sound technologies. The same creative talents he employs to advance the art of filmmaking are now being turned to create a dramatic vision of the future of teaching and learning enriched by the integration of emerging technologies.

January 1995

Written Testimony of
George Lucas, Chairman
The George Lucas Educational Foundation
on H.R. 3626 and H.R. 3636

Submitted to the
Subcommittee on Telecommunications and Finance
Committee on Energy and Commerce
U.S. House of Representatives
March 7, 1994

My name is George Lucas, and as Chairman of the George Lucas Educational Foundation, I am pleased to submit this testimony. The Foundation was established in 1991 to facilitate the innovative uses of multimedia technologies in teaching and learning. Working with students, parents, educators, and business, community, and political leaders, we are developing an exciting vision for the future of education in this country. In this testimony I will describe our vision, and the telecommunications infrastructure that will be needed to support it. I will also explain how I see H.R. 3626 and H.R. 3636 supporting the development of that infrastructure.

I. Vision for Education: Edutopia

When you think back to your public school experiences, what do you remember? If you are like me, you found school somewhat frustrating. I remember being bored much of the time, except with a few teachers who engaged my curiosity and got me excited about learning. Those were the teachers I really loved, and I often resented the fact that there were not more like them.

Now that I understand the educational system better, I can see that there are many factors determining whether school is engaging or not. Teachers still play a central role, but there are also administrative and institutional barriers to developing an effective educational system, as well as legal constraints, the lack of a technological infrastructure, and, most importantly, a lack of common vision about what it is we want our children to learn. However, because I still hold on to my fundamental belief that children are naturally curious, self-motivated learners, I think it is incumbent upon us to devise ways to tap into that creative energy, and help students channel their excitement and ideas into productive educational experiences.

Today, many people--including teachers, parents, administrators, students, school board members, community members, and business leaders are wrestling with how to transform the educational

system. Educators all over the country are re-thinking the missions of schools and adopting innovative approaches to teaching and learning. Some are taking education out of the classroom and into the world; still others are experimenting with multi-age classes; others are looking at new forms of assessment. There are literally hundreds of experiments going on, and they are providing the sparks that will energize the evolution of education.

As the Foundation has looked at these efforts to transform schools and talked to hundreds of experts throughout the education community, we have begun to formulate a vision of what education in the 21st Century could be for students. Education is a lifelong endeavor, involving a cooperative process of gathering, interpreting, sharing, and applying information for personal growth and pursuit of individual and common goals. Some of its elements include:

1. **A student-centered approach.** Students' individual curiosity and motivation need to be supported, and personalized educational opportunities that meet the needs of each student must be developed.
2. **The family as an integral part of learning.** Families, in all of their alternative forms, are the student's first circle of information, support and motivation. In some cases this helps the student thrive; in other cases, it thwarts the student's progress. The educational process must include ways for families to be a positive force in all children's learning.
3. **Change in the role of teachers, from authoritarian subject matter experts to facilitators of the learning process.** Teachers still need to be knowledgeable in various subject areas, in order to facilitate and motivate their students' learning. However, their real gift is their ability to help students find the information they want, interpret and share that information, and apply that information to solve

- problems. They also need to help students develop the communication and cooperation skills they will need to learn with and from each other.
4. **Communities—including local governments, non-profits, and businesses—are co-facilitators of learning for their citizens.** More learning takes place outside the classroom, and community members need to contribute much more of their time to sharing their expertise and working with students and each other.
 5. **Schools are the gathering points of education.** They are only one place where learning occurs, and they will be set up to facilitate the kind of learning previously described. There might be fewer classrooms as we know them today, and more “work areas,” more places for small groups of students to congregate, and more flexible scheduling. Teachers will work *out of* schools, but not always *at* schools. Schools will also be set up to serve the needs for life-long education in the community; students at various life stages will come to schools, not just young people ages 5 to 18.
 6. **Technologies play an essential role in the learning environment.** Alongside the traditional colored blocks and construction paper, computer-based technologies are used for processing information, communicating with others, and creating works of self-expression. The idea is not just to give students some experience with computers in order to prepare them to operate computers when they graduate—indeed, the technology they will encounter ten years from now will look very little like what they have right now. Rather, the idea is to give the students experience in adapting computer-based tools to meet their own needs and projects, which is exactly the skill they will need when they enter the work world. Technologies can

also support the more traditional processes of education—gathering information, talking with experts, working in groups, etc.

Many of the elements I've described currently exist around the country; they just don't come together all in one place. That is why I am helping to create the vision of Edutopia: an effective educational system in a world with ubiquitous technology. The Foundation is in the process of producing four half-hour videos that depict Edutopia. We plan to disseminate them widely to encourage discussion about new technologies and education. I would encourage members of this Committee to look at our videos and get involved in the discussions about the roles of technology in education.

The George Lucas Educational Foundation is particularly focused on the technology dimension of transforming the educational system. My expertise is in filmmaking and multi-media entertainment, and I believe that the tools we use in our commercial work have great potential to engage and challenge students in education, as well. The real power of these new technologies is three-fold:

- They have the ability to make more information available, and to help students sort through and interpret that information.
- They have the ability to support communication—among students, teachers, subject matter experts, parents, community members, etc.
- They have authoring potential: 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 that feed my creative spirit.

The Foundation's mission, then, is to create a vision of how teaching and learning can be

transformed through the innovative uses of multimedia technologies. There's a revolution going on in education, and I firmly believe that the vitality of this country depends on our ability to achieve the vision of Edutopia.

II. Achieving Edutopia.

What does the transformation of education have to do with telecommunications policy? I think it is important to demonstrate the stakes involved in the decisions that the Congress is now making about the nation's telecommunications infrastructure, particularly about universal service. We need an infrastructure that supports communication among students, teachers, parents and experts, that facilitates learning in all kinds of environments, that gives students the opportunity to express themselves and their ideas in a variety of styles, and that knits communities together into systems that support all citizens' learning.

A. How Far We Have Come

We have already made great strides. We have a high-quality public telephone network that reaches 94% of the homes and businesses in this country. Not only do these connections support personal and business communication; they currently serve as the on- and off-ramps to the "information superhighway"--high-speed data networks like the Internet. Teachers, students, and administrators use modems to dial into a plethora of information services, electronic mail systems, computer conferences, computing resources, etc. In addition, educational networks that link schools and universities have mushroomed, with every state having at least one such network.

With these facilities, students from around the world are cooperating to collect and analyze environmental data. Students are creating multi-media histories of their communities and using them to teach other students about their own heritage. They are participating in government

forums, and learning how to be active citizens. They are learning each others' languages, sharing each others' experiences, and getting all the little "life" lessons that go along with working in teams to create a product.

The technologies are supporting teachers, as well, by breaking down the isolation that many teachers feel, and by bringing new resources to the classroom. The Internet supports several computer conferences devoted to aspects of school restructuring, where teachers and administrators can share their ideas, frustrations, and successes. Teachers also use electronic communication to coordinate curriculum planning and share classroom ideas. School districts are using electronic networks to facilitate communication among teachers, parents, community leaders and volunteers, so that all can become more effective facilitators of learning.

B. What Still Needs to be Done

To continue to take advantage of these new technologies and the educational innovations they make possible, there is still much to be done. Below is a list of several steps that I see as essential to our progress, the most basic of which concerns universal service. As the technologies and marketplace of telecommunications evolve, we will need new definitions of universal service and a renewed commitment to protecting universal service. We should also look for ways to improve the processes through which universal service is defined and implemented, to assure that all the affected parties have an opportunity to voice their needs and concerns.

We must start with telephones, which are probably the most basic technology necessary to achieving our vision. Telephones are integral to enriching the educational experience by eliminating the isolation of classrooms and by providing access to information, experts and other resources as well as enabling joint projects with students and adults around the block, across the nation and around the world. While our national average of 94% penetration is certainly impressive, it

downplays the fact that about 5 million households currently lack **basic telephone service**. Fifteen percent of black and Hispanic households, and twenty percent of Native American households, don't have telephone service. Without this most basic form of connection, these families cannot participate effectively in the education revolution we're talking about.

That's just the start, however. While we're bringing telephone service to those 5 million homes, we also need to work on our schools, where telephone service is woefully inadequate. A recent study funded by the National Education Association found that, in 1993, 52% of K-12 classrooms had at least one computer, 41% had a television, and only 12% had a telephone. Those without a **classroom telephone** usually relied on the phone in the school office to make calls, and almost half of those reported that the office phone did not allow for private communication with parents or fellow professionals.

Telephone service in every home and classroom is the first step to building the learning environments I have described. The second is to begin providing teachers and students with the hardware, software, and curriculum materials to take advantage of those links to the outside world. Some schools are way ahead on this, with computers and modems in every classroom, district- and state-wide networks that link them to other schools, and software and curricula that incorporate the principles of Edutopia. Other schools are behind; the NEA study mentioned above, for example, found that 43% of teachers have no access to modems at school.

The challenge of **equipping classrooms with the technology** that's needed and providing teachers with the curricula and operating budgets to operate that technology successfully cannot be underestimated. Many of the schools at the forefront of these innovations have taken advantage of demonstration grants and seed money, but these technologies are no longer in the demonstrations stage: they are proven. We need to come up with funding mechanisms and a policy structure that

assures that all schools, not just the leaders, will have access to this equipment.

At the same time that we are disseminating today's technologies to all schools, we also need to keep working on improving and expanding the multimedia technologies to be used in tomorrow's schools. For example, video cameras and editing facilities that cost hundreds of thousands of dollars just ten years ago are now available in hand-held and desktop systems for less than \$10,000. As technologies like this come down in price, we need to be examining their potential uses in education, and working with teachers and students to develop appropriate supplementary materials. While I believe that it is up to the private sector to take the lead on this, policy-makers should also be looking for ways that they can facilitate such research and development, for example, by removing barriers that discourage R & D investment.

We also need to find ways to give teachers the training and the time to incorporate new technologies into their lesson plans and their own professional and administrative activities. This will involve familiarizing them with all kinds of new equipment and software and helping them work together to figure out good ways to use it. It will also require a re-thinking of their relationships with their students and with each other. A recent dissertation by Scott Williams at Indiana University, for example, found that teacher isolation is a key stumbling block to school restructuring, and that teacher isolation is reinforced by all kinds of organizational and physical factors. While communication technologies could help break down teacher isolation, we will have to help teachers address those other factors as well, if we want to achieve the Edutopia vision.

In addition to all of these suggestions, there are several aspects of the new "information superhighway" that will affect our ability to achieve Edutopia. Because the Internet now serves as the most important backbone network for teachers and students, it is essential that all schools get "plugged in" to this network as soon as possible. I urge the Congress to immediately adopt policies

to assure that every school is provided with free long-distance calls to access on-line services and the Internet and to establish interactive learning and instructional opportunities with other schools. These connections will be stepping stones to more widespread communication and integration in the future.

Furthermore, as it becomes clearer how the nation's information superhighway will be provided and administered, I hope that Congress will make sure that a portion of the information superhighway's capacity is set aside for educational uses. This capacity should be available free to students, parents, teachers and communities for education-related communication.

The information superhighway should also be provided according to "open platform" principles. Consumer groups such as the Alliance for Public Technology and the Electronic Frontier Foundation have offered various perspectives on these principles, but they share the basic concept that all content-providers should have access to the information superhighway. This means that technical standards should not be allowed to close the networks to certain types of equipment, services or content, and that network providers should treat all service providers according to the same rules. This will minimize entry barriers for service providers and maximize the innovative applications that will appear on the network.

III. How H.R. 3626 and H.R. 3636 Will Contribute to Edutopia

In the preceding section, I have outlined several steps that must be taken if our vision of Edutopia is to be achieved. Some of these steps will be taken by individual school districts, and others are the province of private industry and state education agencies. However, it is clear that there is an important role to be played by federal telecommunications policy-makers, as I have described. By

taking a lead in planning the information superhighway, and removing barriers to private industry's investment in that infrastructure and its attendant equipment and software, Congress can help us achieve our vision of Edutopia. H.R. 3626 and H.R. 3636 are clear steps in that direction.

The bills are essential because they address the challenges raised by technological change and increasing competition in telecommunications markets. One of the most pressing challenges involves universal service. Marketplace competition is undercutting the cross-subsidies that have allowed us to keep basic rates low. In addition, market and technological changes are limiting policymakers' leverage over rates and service offerings. In this environment, how can we upgrade our definitions of basic service, and guarantee that level of service to all residences and schools? We need a new regulatory model to meet this challenge.

H.R. 3626 and H.R. 3636 articulate such a model. They rely on competition and consumer demand to drive the development of infrastructure and services, while instituting appropriate consumer safeguards. The bills will enhance competition in the telecommunications industry, especially in local and long-distance telephone service, giving consumers and school districts more choices for equipment and services and greater access to the information superhighway. Because the bills remove most of the barriers separating sectors of the telecommunications industry, it will be easier for school districts to find packages of services tailored to their needs and to develop the multi-media applications that I have described above.

In addition to enhancing competition in local and long-distance telephone service, the bills will introduce more competition in telecommunications equipment manufacturing. This will bring us more innovative tools, and it will make them available more quickly. The regional Bell companies are already active in many education-oriented projects, and their experience will allow them to build network equipment and customer premises equipment that meets the needs of educators, students,

and communities. H.R. 3626 contains language requiring the regional Bell companies to invest resources in education-oriented research and applications projects.

Other manufacturers and software developers will also be able to partner with the Bells at all stages of the development process. By removing barriers to these strategic partnerships, the bills not only encourage innovation; they also help provide the financial incentives needed to encourage investment in the telecommunications infrastructure. When the nation's largest telecommunications companies are working together to develop telecommunications products, services, and infrastructure, other firms can jump on the bandwagon, knowing that there will be demand for their products and services. This will speed development of the infrastructure, and the sooner that we can bring digital, interactive, broadband connections to every home and school, the sooner our vision of lifelong, student-driven learning will be realized.

The same logic stands with regard to competition in long-distance service and video programming and transmission. If more companies are allowed into these industries, their entry will help jumpstart the infrastructure-building process. While the Foundation, and most educators, don't personally care *which* providers bring those interactive, broadband connections to homes and schools, we do want to make sure that *someone* does it. I believe that allowing the largest telecommunications companies into those sectors is essential to creating the momentum and markets that will build the infrastructure we need. We look forward to working with a variety of providers, and I firmly believe that we cannot continue to lock out any companies that possess the experience, the R & D capacity, and the capital to help make the information superhighway a reality.

IV. Conclusion

As an expert in filmmaking and multimedia technologies, I long ago became convinced of the

power of new technologies to excite people's imagination. In recent years, I have devoted some of my energies to bringing the power of these technologies to education. The George Lucas Educational Foundation is committed to the belief that, with the innovative use of new technologies, we can infuse education with the energy and spirit that children naturally bring to learning. With the help of hundreds of education professionals, parents, students and others, we are developing a vision of education that is focused on the learner and is technology-rich. I have sketched that vision here in hopes of demonstrating the high stakes involved in this Committee's decisions about our telecommunications infrastructure.

At the same time that we are witnessing this revolution in telecommunications and multimedia technologies, there is a revolution going on in the telecommunications marketplace, as well. To expand and protect universal service, we need new a new model of telecommunications regulation, one that relies on competition while safeguarding consumers' interests.

Throughout my testimony I have made many specific suggestions for how our vision of Edutopia could be achieved in this environment. They can be summarized in one, over-arching recommendation:

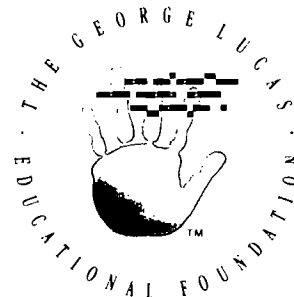
that the CONGRESS FORMULATE POLICIES TO ENCOURAGE THE DEVELOPMENT OF
A TELECOMMUNICATIONS INFRASTRUCTURE THAT IS BASED ON BUILDING AN
INTERACTIVE, BROADBAND PUBLIC NETWORK THAT CONNECTS EVERY HOME AND
SCHOOL IN THIS COUNTRY AND ALLOWS FOR FREE LONG-DISTANCE PHONE CALLS
FOR EDUCATIONAL PURPOSES.

The two bills currently before the Committee, H.R. 3626 and H.R. 3636, are blueprints for creating the marketplace in which our vision of Edutopia can be achieved. They free the regional Bell companies to participate in the manufacture of needed equipment and software, and they

remove barriers that keep the Bells from investing in infrastructure improvements. They open up local telephone service to new competition from cable operators, long-distance providers and others. They also assure that the nation's largest telecommunications companies will be active in the long-distance and cable television businesses, giving educators more choices of providers and more outlets for their educational programming and communication.

H.R. 3626 and H.R. 3636 set the stage for modernizing telecommunications policy by allowing it to keep pace with the whirlwind of marketplace and technology developments that leading to the convergence of heretofore distinct sectors of the telecommunications industry. The old ball park refrain, "you can't tell the players without a program," is increasingly applicable to the industry. Hardly a week goes by that we do not read of a new merger, acquisition or partnership aimed at developing the infrastructure for of the applications of the information superhighway. AT&T-McCaw, US West-Time Warner, MCI-Jones Intercable; old competitors are becoming new allies. H.R. 3626 and H.R. 3636 modernize telecommunications law and promote the public interest by lifting antiquated barriers to competition and defining the universal service obligations of all industry players.

I strongly encourage the Committee to support these bills and incorporate our recommendations for free and open access for education to ensure that the information superhighway is the road to educational excellence in America.



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George Lucas, Chairman of the Board

George Lucas has long held a concern about how to improve education -- a concern which focuses on heightening the vast imagination and curiosity of a child. Lucas grew up in the small town of Modesto, California, and attended the University of Southern California film school. As a storyteller, visionary and innovator, his imagination reached into the galaxy with the phenomenally successful *Star Wars* saga. Creator of six of the top box office hits of all time, including the *Indiana Jones* series, George Lucas is a recent recipient of the Irving G. Thalberg Award, the highest award a film producer can receive from the Academy. He most recently completed production on the TV series *The Young Indiana Jones Chronicles*, where Lucas served as both story author and executive producer.

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Stephen D. Arnold, Vice Chairman/CFO

Stephen D. Arnold has spent over ten years as an executive in organizations pioneering interactive media & technology in education and entertainment. He is currently a special advisor to Burr, Egan, Deleage & Co., a venture capital investment firm. Previously, he was vice president of broadband media applications in the Advanced Technology Division of Microsoft Corporation. Prior positions included President and CEO of Continuum Productions and Vice President of the New Media Group at LucasArts Entertainment.

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Patty Burness, Secretary

Patty Burness serves as the Executive Director of The George Lucas Educational Foundation. Prior to joining the Foundation, she was Chief of Staff to Bill Honig, former California Superintendent of Public Instruction, where she was integrally involved in the educational reform efforts that have been sweeping this country for the past decade.

Kim Meredith

Kate Nyegaard

Marshall Turner

Osamu Yamada

Kim Meredith, Director

Kim Meredith serves on the board of several Bay Area community organizations, including those that focus on education and children's health. She has also chaired numerous fundraising events to benefit children's music programs. Prior to her nonprofit work, Kim worked for AT&T in sales management.

Kate Nyegaard, Director

Kate Nyegaard is a successful businesswoman having managed a medical practice for the past 30 years. She currently serves as the Vice President of the Modesto City School Board, as well as being an active community member involved with numerous organizations for youth.

Marshall Turner, Jr., Director

Marshall Turner is a general partner and co-founder of Taylor & Turner Associates, Ltd., a venture capital investment firm that invests in and develops new technology-related companies. He previously served as chairman of the board of public stations KQED/KQEC-TV/FM, San Francisco, as well as the Corporation for Public Broadcasting. He was most recently appointed to serve on the Board of Directors of the Public Broadcasting Service. His long-term interest in education includes service as an elected trustee and chairman of his local school district.

Osamu Yamada, Director

Osamu Yamada is an advisor to The Mitsubishi Bank, Ltd., Tokyo. He recently retired as the Chairman of the Board of The Bank of California and Chairman and Chief Executive Officer of BanCal Tri-State Corporation. He joined The Mitsubishi Bank, Ltd. in 1953, and became Senior Managing Director in 1989. In June 1983, he was elected a Director of The Bank of California.



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February 1995

EDUTOPIA

A community learning center is an ideal setting for teaching and learning in the year 2020. In the center, students, educators, parents, health and social service providers, and others work together to assure the intellectual, social, emotional and physical well being of each member of the community. The goal of the center is to encourage lifelong learning; this is made possible by a flexible schedule that extends the use of the facility and its resources. Envision the learning center as the hub of a wheel with its spokes leading to the community where you find experts, visual and performing arts facilities, and recreational activities. Services like transportation and child care are provided. There are opportunities for apprenticeships, community service, and business partnerships. The community and the learning center are inextricably linked; each sharing the resources of the other.

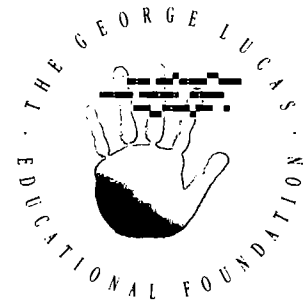
Technology is ubiquitous in this environment. Computers, interactive multimedia and telecommunications technologies fundamentally change the way students learn and teachers teach. Educational policies assure students equal access to these technologies for they are the bridge between education and the rest of the world.

The entire community is equipped to handle information via fiber optic networks and wireless communications. These telecommunications technologies transmit massive amounts of information linking learning centers and homes to a world of ideas through a variety of media. Distance education and telecommunications connect remote locations and provide a platform for forums among students, educators, administrators, and other experts; facilitate conferences with parents; encourage communication among students and others internationally, and provide opportunities to build relationships that are otherwise impossible. Connecting libraries, research centers, museums, and other entities with community learning centers creates a new sort of information infrastructure.

Operating within a flexible schedule that includes adequate staffing, teachers have the time for collaborative interdisciplinary planning, networking, and other opportunities for collegial interaction. The schedule frees teachers to attend conferences or seminars, and participate in professional development programs including apprenticeships. The teacher's role is one of coach, guide and advisor, working individually and in teams, to help students learn to think, work cooperatively and solve problems. Mentoring preservice teachers and parent or community volunteers is also part of the professional educator's job.

Curriculum and instruction is student centered, designed to help construct knowledge from vast amounts of information. Much of the curriculum requires students to perform tasks similar to those they are likely to face in the real world. With a firm belief that all students can learn, an interdisciplinary, project oriented curriculum challenges each student to achieve high standards. Because standards are used to measure success, all students understand before beginning a task what is expected of them. Assessment is linked to the curriculum and is integral to the learning experience. A governance system provides for shared decision making among administrators, educators, parents, and the community to set policy that encourages and supports quality instruction and learning. An accountability system across the system focuses on agreed upon standards to assure that all students are successful learners, teachers are instructional leaders, and community centers meet the needs of lifelong learners.

In a complex world where demands are constantly changing, people need to be lifelong learners able to think, work cooperatively, solve problem, and be responsible citizens. They must manage and analyze vast amounts of information and apply it to a multitude of situations. A comprehensive, accessible technological infrastructure will facilitate this for everyone.



**GEORGE LUCAS
Irving G. Thalberg Award
Acceptance Speech
Presented at the 64th Annual Academy Awards
March 30, 1992**

Board of Directors

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Marshall Turner

Osamu Yamada

"I'd like to thank the Academy Members and the Board of Governors for this tremendous honor. Not only for myself, but for the thousands of talented men and women, robots and aliens, and others with whom I've been lucky enough to share the creative experience in the last few years.

"Movies are not made in isolation, it's a group activity. And it's only because of the work, the very hard work, of many actors, writers, directors, producers, and creative technicians, thousands of assistants of all kinds and projectionists that I'm able to stand here and accept this award. I'm very, very grateful to them all.

"I'd especially like to thank a group of devoted individuals who, apart from my parents, have done the most to shape my life – my teachers. From kindergarten through college, their struggle – and it was a struggle – to help me learn to grow and learn was not in vain. And it is greatly appreciated.

"I've always tried to be aware of what I say in my films because all of us who make motion pictures are teachers. Teachers with very loud voices. But we will never match the power of the teacher who is able to whisper in a student's ear.

"Thank you, Francis, for being my mentor.

"And finally, thanks to my current and most important teachers, my two daughters. They have taught me more and enriched my life beyond anything imaginable.

"After 20 years, this award comes at what I hope is the halfway point of my career. I assure you that I will strive to be worthy of all it signifies.

"Thank you very, very much."