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ABSTRACT
                   This hearing on educational technology includes statements
by the following individuals: Vice-Chairman Thomas E. Petri, Committee on
Education and the Workforce; Dr. James B. Thomas, Dean, School of Information
Sciences and Technology, Pennsylvania State University; Eva Cronin, teacher,
Hayes Elementary School (Georgia); Janet Guge, art and French teacher,
Franklin Public Schools (Nebraska); Rhett Dawson, President, Information
Technology Industry Council (District of Columbia); Claudia Mansfield Sutton,
Senior Vice President, Compass Learning (California); and Michael Kaufman,
CEO and Chairman, Tequity (California). The appendices contain written
statements by these individuals, as well as Ranking Democrat Member William
Clay, Committee on Education and the Workforce. Also appended is the ITI
(Information Technology Industry Council) High-Tech Education Report. (MES)

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USING TECHNOLOGY TO LEARN AND LEARNING TO USE TECHNOLOGY

HEARING

BEFORE THE

COMMITTEE ON EDUCATION AND THE WORKFORCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTH CONGRESS

SECOND SESSION

HEARING HELD IN WASHINGTON, DC, SEPTEMBER 22, 2000

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2

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(II)

3

Table of Contents

(III)

4

5

HEARING ON USING TECHNOLOGY TO LEARN
AND LEARNING TO USE TECHNOLOGY

Friday, September 22, 2000

House of Representatives,
Committee on Education and the Workforce,
Washington, D.C.

The committee met, pursuant to call, at 9:30 a.m., in Room 2175, Rayburn House Office Building, Hon. Thomas E. Petri [vice-chairman of the committee] presiding.

Present: Representatives Petri, Barrett, Isakson, and Owens.

Staff Present: Becky Campoverde, Deputy Chief of Staff for Strategic Planning and Communications; Linda Castleman, Office Manager; Cindy Herrle, Professional Staff Member; Patrick Lyden, Professional Staff Member; D'Arcy Philps, Professional Staff Member; Jo-Marie St. Martin, General Counsel; Bailey Wood, Legislative Assistant; Steven Solis, Legislative Fellow; and Alex Nock, Minority Legislative Associate/Education.

Mr. Petri. The committee will come to order.

We are meeting today to hear testimony on the use of technology in the classroom, and I am eager to hear from witnesses today. So I am going to limit opening statements to 5 minutes, and additional statements will be included in the record. I would ask unanimous consent for the hearing record to remain open 14 days to allow members' statements and other documents referenced during the hearing to be submitted in the official hearing record. And without objection, so ordered.

The Opening Statement of Vice-Chairman Thomas E. Petri, Committee on Education and the Workforce, Washington, DC

Mr. Petri. First, I would like to welcome everyone and especially all of our witnesses. Many of you I know have traveled considerable distances to attend today's hearings and we appreciate that as well as the work that went into your prepared statements and the summaries of them.

In the past we have had numerous hearings on the importance of using technology to learn. We have heard witnesses detail state and local efforts to integrate technology in the classroom. In fact, yesterday we heard from Alan Greenspan on technology and learning and some of his ideas.

Today we will hear from several teachers who are actually using technology on a daily basis to help their students learn. We will also hear from the private sector.

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Specifically, we will hear about their extensive efforts to ensure that all students have the technology skills to compete in today's workplace.

It is important to note that our panel of experts spans the range of all educational levels, from elementary school, high school and college, to the workplace.

Finally, it is my hope that this hearing will assist our committee in building upon the strong foundation that we have laid in the not-so-distant past by passing important legislation like the Education OPTIONS Act, which reforms the maze of current elementary and secondary education technology programs, the Teacher Empowerment Act, which emphasizes the use of technology in many areas, including the delivery of high quality professional development programs through such means as distance learning. This act also encourages the initiatives to train teachers to use technology to improve teaching and learning. The Higher Education Act amendments of 1998 which, among many other things, provides funds to partnerships between elementary and secondary schools and universities to develop models successfully integrating technology into teaching and learning.

> *See Appendix A For The Written Statement Of Vice-Chairman Thomas E. Petri, Committee On Education And The Workforce, Washington, DC*

And we will recognize the ranking or spokesman for the minority as soon as they arrive. At this time, I would like to see if there are other opening statements.

> *See Appendix B For The Written Statement Of Ranking Democrat Member William Clay, Committee On Education And The Workforce, Washington, DC*

Mr. Isakson.

Mr. Isakson. Thank you, Mr. Chairman. I won't take 5 minutes at all. But this coming week Senator Kerrey and myself, who are chair and vice chair of the Joint House-Senate Web-based Education Commission, will begin the final meetings to determine our recommendations to the next Congress and the next President on what role the Federal Government should have in Web-based education and the use of technology in the classroom as it relates to funding, as it relates to curriculum, as it relates to every aspect of schools.

And today is a very important hearing for me to be able to hear from practitioners that are actually out there using technology. I have had the privilege of seeing what is happening in one of the school systems in my district in terms of the use of technology to broaden the horizons and increase the reasoning and many other critical skills in the early learning years of K through 5th grade from one of our witnesses who I will introduce in just a little bit.

So I am delighted to be here today. I am delighted to have our panel of witnesses, and the subject we are talking about today is the next great revolution in America. The Industrial Revolution was a great one, technology is an even greater revolution, and what it can bring to broaden the access to quality learning for children all across this country is going to be amazing. I am delighted to have practitioners here today who are already in the field doing what others are talking about.

Thank you, Mr. Chairman.

Mr. Petri. Thank you.

Mr. Barrett.

Mr. Barrett. Thank you, Mr. Chairman. Like my colleague, Mr. Isakson, I too have a witness here today. I am very pleased to present to the committee Ms. Janet Guge from Franklin, Nebraska, which is a small community located in my congressional district. A 20-year teaching veteran, Mrs. Guge teaches art and French at the Franklin Public Schools, and for the last several years she has been a teacher participating in the Tri-Valley Distance Education Consortium, teaching French over full motion, two-way, interactive audio-video connectivity to students in an 18-county region out in central Nebraska.

She is a recognized leader in distance learning, and through distance learning technology she has been able to offer French classes to students who are attending those small schools out in rural Nebraska where such an opportunity would certainly not be available without this technology.

So I am anxious to hear Janet's testimony as well as the testimony of all of our witnesses here today, and I especially thank those of you who have come from a long distance to be with us here today to share with the committee. Thank you, Mr. Chairman.

Mr. Petri. Thank you. And Ms. Guge has been introduced. Mr. Isakson, would you like to introduce Ms. Cronin?

Mr. Isakson. I would appreciate it very much. I am very pleased to introduce from Hayes Elementary School in the Cobb County Public School System in my district, where all three of my children got a tremendous education before they went on to colleges and universities, Ms. Eva Cronin. Sitting behind her is Ms. Sue Brown. Ms. Brown, stand up if you will. Ms. Brown is the Director of Technology and Innovation Grants for the Cobb County Public School System, which is a school system of approximately 100,000 students in the northwest Atlanta suburbs and has a great track record and reputation.

Mr. Chairman, I had the opportunity at the National Education Computing Conference in June in Atlanta at the World Congress Center to first see what Ms. Cronin is going to talk about: the use of technology grants and their actual use in the classroom.

What they have done is to integrate an environmental learning throughout, across the curriculum, is terrific and now they have 27 schools participating in the program. I think they are in the beginning the fourth year of the application of this program.

I am just delighted to have Ms. Cronin here today. I had a real eye-opening experience when I saw just a taste of the demonstration at that conference, and I am just delighted they took the time to fly out of some very bad weather in Atlanta, Georgia yesterday to come and be with us today.

So welcome.

Mr. Petri. Thank you. Of our distinguished panel, two who have already been introduced. The lead-off witness will be Dr. James B. Thomas, who is the Dean of Pennsylvania State University School of Information Sciences and Technology and who holds a Ph.D. in strategic management from the University of Texas in Austin, a Master's in government from Florida State University and a Bachelor's from Penn State. Along with the countless publications, books, presentations, honors, he was instrumental in establishing the School of Information Sciences and Technology at Penn State University.

Ms. Eva Cronin, who has been introduced, and Ms. Janet Guge follow him. In addition, we will hear from Mr. Rhett Dawson, who serves as President of the Information Technology Industry Council. ITIC represents the interests of many of the most familiar names in the technology field. Mr. Dawson comes to us with a varied background that includes serving in the White House, Congress, the Pentagon, and business and legal arenas.

Ms. Claudia Mansfield Sutton is currently Senior Vice President for CompassLearning. CompassLearning, located in San Diego, is a leading provider of instructional software. Each year it serves nearly 14 million students. Ms. Mansfield Sutton has extensive experience in the field of education and business, having worked as a teacher administrator, a lobbyist for a major education association, and in marketing and sales for two instructional technology companies.

Finally, Mr. Michael Kaufman, who is the founder and CEO of Tequity in San Francisco, California. Tequity is a not-for-profit organization. It works with the Nation's schools and communities to provide education and training in information technologies. Throughout his career Mr. Kaufman has focused his professional energies assisting students, teachers and citizens to gain valuable understanding of technology for the future.

And, Dr. Thomas, would you like to begin?

STATEMENT OF DR. JAMES B. THOMAS, DEAN, SCHOOL OF INFORMATION SCIENCES AND TECHNOLOGY, PENNSYLVANIA STATE UNIVERSITY, UNIVERSITY PARK, PENNSYLVANIA

Dr. Thomas. Thank you, Mr. Chairman, members of the committee. I was asked to do two things here today: Brief you on the exciting new school around the information sciences and related technologies at Penn State and share how the corporate community has helped shape the design in the successful implementation of this school. I also think that you will see the kinds of thing we are doing in Web-based learning and e-learning, if you will, are also very exciting.

I guess the door . . . the sign over the door of a new school of information sciences and technology should read "building leaders for a digital-based global economy." If you went through that door, you would find some interesting things for information technology education at Penn State. You would find about 1300 students in just our second year, the beginning of our second year, across 19 campuses in the Penn

State system being taught by over 70 full and part-time faculty members.

You had see hundreds of learners in IST, the Information Sciences and Technology, learning certificates, both in the classroom and online, and those range from Web master certificates to data base and networking certificates. About 500 students, again, here at the beginning of our second year in the associate degree program, 700 students in a baccalaureate degree program. You would notice scores of students that are involved in IST classes online, including high school students that join us in the classroom virtually and students from other universities that come in again in the same manner.

You would see the plans for a professional Master's Degree, a Ph.D. Program, both of which will begin next fall, and a world-class research agenda conducted by a top faculty.

You would probably also notice that these programs were all built from the ground up. Over 50 new courses designed by over 125 faculty administrators. This was truly a Penn State effort to get this program into place. This all got started through a series of meetings that lasted over a year with top executives from Fortune 500 firms, government, smaller to mid-size technology companies, and they provided us with the following design advice, and I should add that they gave us this advice with great passion. And it started with the following: Build a program that is focused on educating leaders and problem solvers for the new economy. Don't necessarily send us more C++ programmers, send us folks that know what to do with it.

To that end educate students who understand the technology, but focus them on the application of technology as solution, and sensitize them to the people and policy issues that they will confront as leaders in this e-world.

Educate them using real world problems and require that they do an internship. In other words, engage the students in the realities of the information technology workplace. Make them become proficient in a foreign language, which I am sure the witness next to me will be very happy with, because it is truly a global economy. IST gets talked about in about 3700 languages in this world beyond English, and it would be a shame to miss out on all that conversation.

Put the students in teams to deal with their exploration and push them to build their oral and writing skills at the same time. Believe it or not, these are critical to any information technology education.

Now we took this advice to heart and designed the IST program with these attributes hard wired into every piece of it, not only in the classes that are in the classroom, but these attributes were also hard wired into our online classes as well. We did this all in 14 months, which is in itself probably the most amazing thing of all of this.

This whole unique package was deemed interesting enough to be placed this year in the permanent collection of the Smithsonian Institute for innovation and education. I want to get down and see it before I leave Washington today. It is an honor that we are deeply proud of at Penn State. It is an honor that is shared and should be shared by our corporate and state government partners who provided not only the design help that I spoke of earlier, but ongoing assistance as well. They provided membership to an active

and dedicated advisory board with members from IBM, Lockheed Martin, IO Infinity, P&C Bank, ACTV, Lucent. Their contribution, by the way, has been immeasurable. A host of companies and government agencies have provided guest speakers and course materials to directly impact our students in the classroom.

Some partners participate in the faculty recruiting process. And by the way, recruiting faculties into this area in any university is a tough job with the market that is out there. Our partners have helped us around the country in helping to attract faculty, explaining our performance and our potential to them when I couldn't get to them personally.

Others have served on design committees for new IST programs and courses and, yes, even though we are beginning the second year we already have new courses and programs that are beginning. Industry partners and individuals such as 3Com have contributed a total of almost $7 million in endowments, equipment and building support, and this just the end of the first year.

While there is no correct model for education in this area and I don't pretend to bring this to you, we think we have a great formula for what to teach and how to deliver education that will help close the IT work force gap in the 21st century, not only in terms of numbers but in terms of the impact that those folks can have when they get to the organizations and the careers that they have chosen.

I also think that looking at companies in government as partners in the design of these kinds of programs and the implementation is a model for industry inclusion in IT education around the country.

Design assistance and financial support are critical but just as important is having the eyes and ears of top executives on what is current and important in this e-world that we live in. It is this insight that will keep the school fresh, will keep it exciting, and maybe important enough to be asked back again in a couple years to let you know how we are doing.

Thank you, Mr. Chairman.

See Appendix C For The Written Statement Of Dr. James B. Thomas, Dean, School Of Information Sciences And Technology, Pennsylvania State University, University Park, Pennsylvania

Mr. Petri. Thank you.

Ms. Cronin.

STATEMENT OF EVA CRONIN, TEACHER, HAYES ELEMENTARY SCHOOL, MARIETTA, GEORGIA

Ms. Cronin. Good morning, Mr. Chairman and members of the committee. It is an honor to appear before you today to discuss why technology is an integral part of my classroom, how it is utilized and what benefits result for students, their families and

teachers.

My name is Eva Cronin and I team teach at Hayes Elementary School, Cobb County School District, Georgia in a multi-age third, fourth and fifth grade setting.

Our students are quite diverse. They come not only from middle class households but also the country club and homeless shelters. We have bridged the digital divide at Hayes. My teammates and I also participate in the Education for a Sustainable Future project, a Technology Innovation Challenge Grant funded by the U.S. Department of Education and awarded to Cobb County School District and the Center for a Sustainable Future.

Participating in the ESF grant project has provided many hours of professional development both online and in hands-on meetings. We have also been provided with hardware and software for our classrooms through in-kind funding support of the grant project.

I would like to start with a person story that highlights the importance and versatility of technology and that would not have been possible for me even 2 years ago. This past spring I was out of school for four weeks to be with my mother who was dying of cancer. Because my students, their parents and I are so immersed in using technology it was natural for us to maintain daily contact through e-mail and instant messages. I was able to reassure my students that I was all right and that they could depend on me even though I was far away. In addition, I could support the substitute teacher and be by her side virtually. Technology literally allowed me to be in two places at once, the places I most needed to be.

We are part of an information driven global society, one that demands instant access to and analysis of data, immediacy of communication across great distances and multimodal avenues of presenting information. If our students are to become responsible citizens, able to meet the challenges of the 21st century, they must become technologically literate.

As I discuss how we use technology daily and the benefits it provides, I trust you will agree that this is an essential component of education for all of our students. Students, parents and teachers have utilized the technology in many ways. The benefits fall into four major categories: Communication, access to information, activities that promote higher-level thinking, and opportunities to address learning styles and needs. I see the ways technology transforms learning, and while it is impossible to share all of this in less than 5 minutes I will highlight a few stories from the classroom.

E-mail has proved to be an indispensable communication tool for us. This year an ESF colleague and I are utilizing e-mail for his high school current issues class to correspond with my students weekly. The older students write about current events of interest to our students who respond to the articles. This opportunity to provide virtual mentoring benefits both the older and younger students. Using the Internet provides access to up-to-date information so we often track current events. Right now we are watching the Olympics as they unfold and graphing information in the classroom. The opportunity to work with real time data opens up new worlds for students who can study history as it happens across the world.

Utilizing graphing software can allow students to concentrate on data analysis, a higher level thinking skill. As a third grader Scott had difficulty drawing graphs. In his frustration with making all those straight lines he missed the point of why and how graphs are used. Last year he was introduced to The Graph Club, a software program. Scott was so excited about it that for a month he used his recess time to survey his peers about different issues, create graphs and present his information to the class. Technology made a huge difference for this child.

We learn in different ways. Marguerite, a fourth grader, is a visual learner who was having difficulty remembering the meaning of the word "perseverance." She and three friends planned a series of digital pictures to illustrate its meaning and those pictures now hang on our classroom wall.

For Parents' Night the children helped produce a power point presentation, including digital pictures. Many parents commented that they truly gained a sense of what is happening in the classroom.

For every successful project we complete, four more come to mind. For example, when I told my students that I was coming to speak with you today, they wanted to know if one of you would be willing to correspond via e-mail or instant message during our study of government this fall. For those of you who have children, I am sure you know the tremendous impact one such message would have on a classroom.

Thank you again for the opportunity to bring a bit of the classroom to you.

See Appendix D For The Written Statement Of Eva Cronin, Teacher, Hayes Elementary School, Marietta, Georgia

Mr. Petri. Thank you.

Ms. Guge.

STATEMENT OF JANET GUGE, ART AND FRENCH TEACHER, FRANKLIN PUBLIC SCHOOLS, FRANKLIN, NEBRASKA

Ms. Guge. Bonjour and thank you. I teach high school French in a small town in Nebraska. I have been asked to speak about my experience with distance learning and how I provide French to two high schools through a two-way interactive network. The town of Franklin has about 1,200 people and the town of Minden that I also teach to 30 miles away has about 3,000 people. I want you to know that I am a classroom teacher and this is my second year using the distance education network, but my 12th year as a French teacher. I have also taught art for 22 years. I am not an expert on funding policy or the equipment, I am just a classroom teacher.

Our schools are part of the Tri-Valley Distance Education Consortium. This consortium serves over 35 schools and more are joining. This consortium is one of 11 in the State. I can connect to any of the 35 schools in our consortium, and this serves over 16,000 students in grades K through 12. The average size school district has 533

students, K through 12.

Among members of the consortium are three educational service units, the University of Nebraska at Kearney and the Central Community College system. This consortium provides full-motion, audio-video connectivity. And what all that means is I teach using four TV monitors in front of me, four behind me, I have two cameras that I can control and operate, I have microphones. I use a document camera instead of a chalkboard to write on. I use a VCR, a computer with a CD player and I have a fax machine at my fingertips.

All this sounds exciting, but it did take a lot of training and the consortium provided excellent training for me to do this and support personnel for when I had problems. One of the reasons this came about, Nebraska found that they had a need for using technology to provide classes that schools couldn't normally get. And some of these classes were foreign language. That was a very difficult subject to hire for. We also wanted classes that students could gain college credit for and advance placement classes. And because of the shortage of foreign language teachers in the State of Nebraska willing to work in a small town rural setting many schools lacked these instructors. Also schools that did have instructors didn't always have a full schedule for these teachers, and the enrollment was low at times. It is difficult to hire a teacher for two or three class periods a day. So the idea of sharing a teacher and resources seemed the ideal answer. They tried a variety of systems: Satellite, driving from school to school, but the method I use with the two-way audio-video interactive I feel is a wonderful way to teach.

The students I have, I have 8 students in my French II class and they are taking this to meet requirements for university admission. We offer Spanish. We do that and a lot of schools offer Spanish but sometimes students want to take another foreign language. And with the school I teach to in Minden with this arrangement, I have students that now can take a language that they want to take and usually excel at because they want to do this. So we are providing these services to area students.

We also provide advance placement, calculus, and automotive classes. There are a variety of ways to provide other classes that students want to take.

I mentioned this technology is exciting, but it can be a challenge because not everything works like you want it to. And as a teacher you need to be quick on your feet and be able to change the way you are going to present your lesson today. I have got a story where I came into class and turned on my system, and nothing came up. I could hear my students talking in Minden 30 miles away but they couldn't hear or see me. So I had to quickly think of a way to continue with my class that day. And I thought, okay, I can hear them, I know what they are doing, so I quickly wrote out some instructions, a lesson for the day, faxed it to them. And in a few minutes I could hear the fax machine working in the other room and they go over to the fax and read the lesson and they are like, oh, we have to do some work today. And so they started working on their French. And someone asked a question. I thought, okay, so I wrote out the answer, put it in the fax machine, pretty soon it starts coming through. So I am able to continue my lesson no matter if I don't have sound or if I don't have audio-video, we still have a class. So it is nice to be able to use the technology in any way that I need to provide these kinds of, you know, classes.

At this time there are over 250 sites across the State and the State of Nebraska would like to connect all of these sites so that we are not just limited to the 35 schools in our consortium, we are able to access all the schools across the State.

Let me conclude with the idea that distance learning is the way to provide small schools and their students a quality education. It also gives the students a sense of belonging to a bigger world yet allows them to remain in their hometown. Merci.

See Appendix E For The Written Statement Of Janet Guge, Art And French Teacher, Franklin Public Schools, Franklin, Nebraska

Mr. Petri. Thank you.

Mr. Dawson.

STATEMENT OF RHETT DAWSON, PRESIDENT, INFORMATION TECHNOLOGY INDUSTRY COUNCIL, WASHINGTON, D.C.

Mr. Dawson. Thank you, Mr. Chairman and members of the committee. I am Rhett Dawson, President of the Information Technology Industry Council, and we appreciate the opportunity today to talk about an issue that is important to the IT industry, extremely important to the IT industry: Education. ITI is the association of leading information technology, including hardware, software networking and Internet service companies. ITI member companies employ 1.2 million people around the United States.

We believe that the future success of our industry and America's current technological leadership is tied directly to our ability to prepare and educate our children for the digital world.

Education is an information technology issue, as the three previous witnesses have pointed out, and it has become an even more important tool in our educational process.

ITI member companies have a very strong record of working with local schools to introduce technology into the learning environment. They are committed to pursuing high academic standards and innovation in education based on output. To further these goals ITI's board of directors has approved a set of education principles that guide our policy efforts. They are increased technology integration into the curriculum and students' access to that technology, improve teacher training . . . excuse me professional development, strengthen math science and technology education programs. I would like to submit a full copy of ITI's education principles for the record.

See Appendix F for ITI High-Tech Education Report

Mr. Dawson. In addition, next week ITI will release a report that underlines the deep commitment our companies have to education. The 2000 ITI high tech education report will summarize the top education programs developed and funded by 20 of the Nation's leading IT companies. The report details initiatives ranging from teacher training to getting computers into the classroom. While the report is not a comprehensive listing of

all ITI member companies' education investments, it will provide policy makers such as you with a better picture of how seriously and creatively the high tech industry is investing in our education.

The report details dozens of innovative programs in K through 12, higher education and lifelong learning that bring technology to students, helping students and teachers make the most of this technology and promoting and improving math and science education.

Let me give you some highlights from that report. It will detail initiatives promoting math and science education from companies such as Agilent Technologies, Corning, Panasonic, StorageTek and Unisys. It will detail essential teacher training efforts from Intel, Microsoft, Compaq and Dell.

It will talk about ambitious efforts to integrate technology into the curriculum from Apple, IBM, NCR and Silicon Graphics. It will also discuss initiatives to expand technology access and the opportunities of the digital world to all from AOL, Hewlitt Packard, Kodak and Sony. It will also discuss network training from companies such as 3Com, who Dean Thomas mentioned, Cisco and Nortel Networks.

That is only a sample. We are busy finalizing reports, so disclosure of all the details is premature. However, I can tell you that the programs in our report involve innovative partnership with such organizations as the Boys and Girls Club of America, National Science Foundation, Plugged In, United Way, Urban League, the U.S. Department of Education, and the YWCA. We also provide specifics on major partnerships in education with dozens of school district, including Boston, Charlotte, Cincinnati, Detroit, Durham, Dayton, El Paso, L.A., San Francisco, San Jose, Thornton, Colorado, and the State of West Virginia.

My mission today is simple, that IT industry is committed to playing a role it the education of our children. That commitment does not end with the efforts detailed in our forthcoming report. We are also committed to working with government and education professionals to address the important policy issues in the education arena.

Mr. Chairman, I commend you for today's hearing, and be assured that we, our member companies stand ready to work with you and members of your committee to help ensure that our children get the education skills and training they need to succeed in the digital world.

See Appendix G For The Written Statement Of Rhett Dawson, President, Information Technology Industry Council, Washington, D.C.

Mr. Petri. Thank you, Mr. Dawson.

Ms. Mansfield Sutton.

STATEMENT OF CLAUDIA MANSFIELD SUTTON, SENIOR VICE PRESIDENT, COMPASS LEARNING, SAN DIEGO, CALIFORNIA

Ms. Mansfield Sutton. Mr. Chairman and members of the committee, thank you for this opportunity to talk to you this morning about learning to use technology and using technology and learning to use technology.

My name is Claudia Mansfield Sutton. I am the Senior Vice President of Marketing for CompassLearning. CompassLearning has more than 20 years of experience working with educators across the country to help them successfully implement technology into the curriculum. More than 20,000 schools serving more than 14 million students use CompassLearning programs to help teachers personalize learning, measure student performance and connect communities of learners.

WRC Media, Inc., CompassLearning's parent company, is the largest supplemental education provider in the world today. WRC Media has four principal operating subsidiaries: Weekly Reader, the World Almanac and Facts-on-File, American Guide and Service and CompassLearning.

This morning I am also pleased to represent the Software Information and Industry Association, the principal trade group of software and digital content publishers. In the next few moments I plan to highlight three points about using technology to learn and learning to use technology.

In the education arena we have only begun to harness the power of technology. Secondly, technology is an effective tool for an image-based generation. And thirdly, professional development is essential to the success of an instructional technology implementation.

Technology by definition means different things to different people and is highly influenced by experience and perspective. How many of us still use the microwave to heat coffee and VCRs to play videocassettes when there is so much more potential to be tapped, and so it is with education.

The reality and the potential of technology are accelerating a revolution around the globe and indeed in our schools. Revolution is often regarded as negative but this is truly a positive revolution.

I share with you a quote about another positive revolution, and I quote, "Remarkable new technology is introduced into the school system and experts predict that education will be revolutionized. The technology will, as never before, allow the widespread dissemination of new concepts and ideas that stimulate young minds and free the teacher for more creative pursuits. Yet the magic fails to materialize, and within a few years articles appear in the popular press asserting that the failure obviously arises from teachers not being skilled enough in the new technology." The excerpts are from a New York Times article written by Peter Lewis in the 1840s about the introduction of the blackboard.

It is all a matter of perspective, and it is incumbent upon our generation to harness the potential power of technology in classrooms across America. The generation of

children in our schools today are often referred to as the image-based or "I" generation. They are interactive, impatient, informed, inquisitive and intelligent. Technology, which is an integral part of this generation's psyche, is a revolutionary tool through which teachers can transform education and improve educational opportunities for all children. By providing both access to quality education any time and anywhere while providing tools that facilitate active and engaged learning, technology can empower teachers to take control of and accept responsibility for their learning.

The technology itself is less important than the changes it brings about in substance, content and focus of the learner. Using technology to learn does not guarantee success. Successful technology implementations are tailored to the learner based upon sound pedagogy and tied to national and state and local standards. As with anything in life, there is not a silver bullet to address improving student achievement and any claim that technology might be that silver bullet is not correct. But it is an effective tool for the image-based generation.

Our country has made a commitment to our schools and subsidized the provision of telecommunications services. This has been a great beginning. As a part of the deal, States and local districts have committed to purchase computers and other hardware necessary to support the infusion of technology into the curriculum. We have made great strides forward. However, I suggest that we as a Nation need to make the necessary investments in an instructional software and professional development programs in order to realize the fruits of our investment in hardware.

A complete discussion of these points is contained in the attached testimony of the Software Information and Industry Association given to the Web-based Education Commission co-chaired by Congressman Isakson.

Thank you for this opportunity to talk to you today, and I am available to answer any questions. Thank you.

See Appendix H For The Written Statement Of Claudia Mansfield Sutton, Senior Vice President, CompassLearning, San Diego, California

Mr. Petri. Thank you.

Mr. Kaufman.

STATEMENT OF MICHAEL KAUFMAN, CEO AND CHAIRMAN, TEQUITY, CORTE MADERO, CALIFORNIA

Mr. Kaufman. Mr. Chairman and members of the committee, thank you for this opportunity. My name is Michael Kaufman. And more than six years ago I began to develop a volunteer project called NetDay to jump-start the connection of K-12 classrooms to the Internet. However, I am an educator, not a technology person, so my comments will be focused on what it takes to make technology work for education, especially in communities of need.

With the goal of including all communities, NetDay set a threshold for participation in this high tech barn raising so low that most communities could afford to participate for just a few hundred dollars. For example, more than three hundred parents and community members from our Nation's largest housing project came to 112th Street Elementary School in South Central Los Angeles on a sunny Saturday in 1996 to pull wires to connect their children to the Internet and their future.

They knew then that their children would need the technologies if they were to have access to the 21st century opportunities and the global economy. Unfortunately, for the 112th Street Elementary School and its students and other schools serving similar communities, the promise of these connections has yet to be realized and in many cases the wires are still dangling in the walls.

While there isn't enough time in these brief comments to outline much of what needs to be done to ensure that these technologies contribute to the opportunities of all students to achieve high standards and there is much more to be learned, please consider the following: In poor communities, where the technologies are neither in the home nor the workplace, the schools provide the best opportunity for access. The impact of these school resources is enhanced by after school and in home, creating like a family community feedback loop that accelerates change in education and schools. Congress should focus its technology investments in poverty communities in the K-12 schools, but ensure that the programs are complemented with opportunities after school and at home.

Tens of billions of dollars have been spent during the decade on implementing digital resources in K-12 schools. The challenge is to leverage the investments already made. And while the hardware and the software, the connections and the professional development are essential in this Information Age, it is the peopleware, the human infrastructure that make the difference, the champions to lead the charge and engage the constituents, the administrators to take the responsibility and the educators to make the change.

It is full time peer mentors who speak the educator's language and are comfortable enough with the technologies to meet the educators where they are and to explore with them the educational potentials. It is just in time, in-the-classroom support available to help teachers maximize the use of these resources with their students while minimizing the frustrations with the technologies' inevitable hiccups, as was pointed out by Ms. Guge. That is so important. It is an indeed digital community that extends the lessons beyond the classroom walls and the school day and provides work opportunities that warrant the education.

This peopleware is a new ware for national investment in educational technology, without which we will never see the full value of the outlays that we have already made.

All students need to see the light at the end of the tunnel if they are expected to invest themselves in the education required to get there. Certainly I don't need to go into the details of how at-risk students in at-risk communities are familiar with the concept of risk and reward. They take chances every day. Unfortunately, in many of these communities positive alternatives are not as apparent. New economy models and mentors are essential and programs that draw them into these challenging communities offer the promise of rewards that can motivate all students to take appropriate risks,

including the risk of doing well in school.

But all of these suggestions above and more lose their value if the lessons learned aren't leveraged for the future advantage of the community, for ultimately all externally funded programs are terminal, be they government, NGO or business. And too often when the external support ends, even though there is still much work to be done, unless there is community leadership the program itself will die.

And although program participants understood from the beginning what the rules of engagement were to be, rarely do they initiate the activity with an exit strategy in mind. Resources and time must also be dedicated to developing local leadership and building community capacity to ensure that the investments made are continually tailored to meet the changing requirements sustainable for the future and scalable beyond the original sites.

In response to the above considerations I established the Tequity organization to bring together the peopleware required to make hardware and software work for learning and teaching, including national experts, local activists, a coalition of education, government, business, labor and nonprofit organization. Tequity dedicated itself to making the Web truly worldwide and the economy global by working with empowerment zone and enterprise communities to help them use digital resources, to help them improve the education of their children, the skills of their parents and the viability of their communities.

For the new generations growing up in America's disadvantaged communities, Tequity is an essential human right. It is increasingly required for communications and commerce and will soon be essential to access services, earn a living and to fully participate in a democratic society. The Tequity organization is dedicated to Tequity for all.

Thank you.

See Appendix I For The Written Statement Of Michael Kaufman, Ceo And Chairman, Tequity, Corte Madero, California

Mr. Petri. Thank you.

And now, Mr. Isakson are there any questions?

Mr. Isakson. Thank you, Mr. Chairman.

First of all, I want to compliment Dr. Thomas on the approach they took on forming the institute by getting the private sector to tell them what they are looking for. I have found so many times in higher education they tend not to engage the people that actually end up using the ultimate product.

It is interesting, your list of things like building a focus on leaders, problem solvers, critical thinking, were almost exactly what Ms. Cronin stated they were doing in K through 5 at Hayes Elementary, which I compliment you on that.

But I have a question. In the classical university setting, degrees are granted at the institution or at some physical extension. You stated you are getting ready to deliver both a Ph.D. And Master's over the web next year. In the classical setting, there is a professor who is responsible for the teaching. In a normal institution, those professors, if they are tenured, are normally required to write and create intellectual property as a part of their job. The web creates a challenge and an opportunity.

First of all, who owns the intellectual property? Does the university through its tuition on web-based delivery of a course get the total revenue or does the professor own the intellectual property that they created that is now distributed over a medium that is not a physical classroom building but in fact is a wireless environment? I would like for you to tell me if you have given any thought to this intellectual property issue as it relates to delivering high-level degrees over the Internet by universities and what the relationship of the professor and the university should be.

Dr. Thomas. I don't think it is a level of degree issue as much as it is the faculty ownership of the content. You have backed into a very interesting subject I think for all universities right now, how this works. Right now what we have in terms of our web-based delivery is the Penn State world campus, and they are the single delivery portal for anything that is a Penn State course or certificate. They work with the faculty member and the department and/or the college to develop the course. But Penn State owns that course in the sense that if it is sold or if it is out beyond the bounds of the university.

The faculty member has a significant role in the research or the revenue stream that comes back from that. So, that varies by department and by certificate versus level, of course, versus number of credits and so on and so on.

At the end of the day they, the faculty member, owns the content but Penn State, through the world campus, will own that course. And that works pretty well for us in terms of trying to figure out where all the boundary lines are and so on and so on.

We also are doing this and, I might add, in a number of different ways with respect to how the online learning environment takes place. One way is sort of the traditional on the web. You are by yourself, so you are the lone wolf trying to work through the oftentimes PowerPoint slides on the web education. We have gone well beyond that in terms of the way that we treat the student and how the student interacts with that course.

There are physical residency requirements for all this. The students despite, whether they are on the web or in the classroom, are working in teams. It is based around problems. So that our courses, for example, in the information sciences and technology, those courses on the web are in modules, and each module has a problem, and the team has to attack that problem. They have to report and defend that problem solution to the professor and the other teams. So they don't meet every day as in the traditional classroom experience. But the web becomes the main delivery focus.

That involves all sorts of different people and also allows us to sort of distinguish who owns what when and how and where, and it becomes an excellent learning event as much as it is a scaling event as we have so much demand for our courses.

So that is one of the things that we have done. And with that, having to deal with the intellectual property issues, as most universities are right now, we are coming together with that I think quite well.

Mr. Isakson. I really appreciate your going to the web site of the web-based commission and submitting what you just said to testimony on that commission. Because we are in the process of dealing with that entire issue.

I think that was an excellent answer as how the professor of the institution, the degree and delivery all interact.

I would assume that in the university setting if more research money flows with more creative thinking that at Penn State and in the university system of Pennsylvania that professors are awarded accordingly for their productivity in bringing money to the university, is that correct?

Dr. Thomas. Absolutely.

Mr. Isakson. Secondly, I would like to tell Ms. Cronin how proud I am of Hayes and how proud I am of her and Ms. Brown. They make me look good by coming here and testifying today.

I want to ask Ms. Cronin a question. I will ask for slightly more time, if I can, Mr. Chairman.

Your testimony was great, but in your example of your difficult time when being with your mother took you away from the students but yet e-mail let you communicate with them. You do have upper class, you have middle class and you have those that are in some degree of poverty or even in, as you testified, some cases homelessness.

The biggest issue we deal with is the issue you talked about which was the digital divide, and you talked about how Hayes had closed it in your example I think of your communication with your class was a part of it. But for the student who can't, one who comes from the homeless shelter who is poor, there are those that think that the digital divide will exist as long as that person does not own a computer.

Mr. Kaufman made an excellent point, that our schools and Boys and Girls Clubs, which I think Mr. Dawson might have mentioned, or YMCAs, having more accessibility in areas like that, would allow those who might not have the resources to access the Internet. I am wondering, Ms. Cronin, about your poorest student in your classroom, tell me about the digital divide, tell me about accessibility that in those off hours when they are not in the classroom they might be just as involved as the kid who has the financial resources to have a computer.

Ms. Cronin. That is an issue that we are dealing with right now. I know that we do have an after-school program, and they do have computer access there. I know there is a program where they have kiosks put into stores where people can have computer access, Internet access. So we are hoping that that will be something that happens in Cobb County as well.

I know that the library has access. It is a difficult issue for some of these students, and I know that after school often and during the nighttime their parents do not have the access.

So I don't have an answer to that right now. But it is something that we do need to look at for our students. I do know that during the classroom day they have become as adept at using the technology as the students who do not have it available to them, and I truly believe that that is a start for these students.

Mr. Isakson. So would it would be fair to say that the digital divide is not an intellectual divide between the poor student but it is merely a resource divide?

Ms. Cronin. Yes.

Mr. Isakson. One last thing I would like to say for the members of the committee and for the record, what Ms. Guge expressed was tremendous value in Georgia. Although I represent a dense urban area, Georgia is basically a rural State once you get out of metropolitan Atlanta. I think I heard you say there are now students in Nebraska who are able to get AP classroom instruction that would not have been able to get in the past because of an unavailability of teachers in the rural setting. The application of what you describe of your ability is going to go a long way towards improving learning and environment. That is because of time and distance and, in certain cases, economics don't allow teachers of the type of quality really to be there. So I commend you on what you are doing and Nebraska. Mr. Barrett is very lucky to have you there.

Thank you, Mr. Chairman.

Mr. Petri. Thank you.

Mr. Owens. Any questions?

Mr. Owens. Yes. Mr. Chairman, I want to congratulate the committee on holding this hearing and thank our very knowledgeable guests for appearing. I have two basic questions.

One is, given the fact that we have sort of an exploding, expanding culture with demands for people and the information technology area who are, you know, highly theoretical . . . the Ph.D.s and the scientists and the engineering people to apply it and technicians and mechanics and managers. You have an exploding number of levels of need out there. Do you think that we have the pool of people either in our high education institutions who are going to be able to meet these needs? Is the pool sufficiently large?

We still need doctors, lawyers, engineers and MBAs; and people in higher education have all those choices. I understand that we got a great shortage right now of information technology workers. And the anticipation is when you look at the colleges and universities and what they have coming out that shortage is going to be there for a long time. Do we need some kind of Marshall Plan, a mobile station?

I know that industry is solving the problem . . . looking to solve the problem immediately with imports from outside the country. We have H1-B that is going to be on the floor I guess some time soon. And that will bring in, you know, hundreds of

thousands of foreign people who can qualify for those positions in the short term. But in the long term do we need some kind of Marshall Plan to really deal with the products that are coming out of our secondary institutions and going into our higher education institutions? It just seems to me too few qualified going in. Question one.

Dr. Thomas. I guess everybody is looking at me, so I will take that one on.

Indeed, there is an explosion of demand. And you are absolutely correct, it sometimes gets lost, that there are so many different levels in that demand. At Penn State we have taken the approach that you invest in a program that is linked across virtually all of Pennsylvania, and the investment is to try and close that gap. But the gap between what is needed and what is out there in terms of the demand . . . and we feel that that is a pretty good way to go about doing this. So that we have the potential over the next 5 years to graduate anywhere between 2,000 and 4,000 students a year that would go into this area at various levels. And that doesn't include the folks, for example, in the certificate area which we have hundreds, even now, that are demanding and participating with us in the certificate programs that we offer both in the classroom and online.

That is an investment . . . you can couch it in a Marshall Plan or whatever kind of support would be appropriate. But that is the kind of investment that, over the long run, would really make a difference in this technology gap.

Now, I have seen so many different numbers as to the size of the gap or even recent reports that are suggesting that . . . do we really have a gap? And I don't know the answers to those. I do know that any time that we talk with a company about the school, almost literally at the end of that conversation they will say to me, how long before we can hire all of your graduates? Can we sign a piece of paper right now that will give all your graduates a ticket to our company? So the anecdotal evidence that I see is that the demand is real.

What Penn State is doing to attack that demand is to create a program that virtually touches . . . Penn State right now touches educationwise about one in every three families in Pennsylvania. The IST has probably been the faster growing and the most program in demand, if you will, around Pennsylvania. So investment in that I think in the long run will help with that.

Mr. Owens. In my question I think I forgot the most important part with all these positions and occupations within this so-called cyber-civilization that we are going into, what is the likelihood that we will be able to recruit teachers who are knowledgeable? They have all these other alternatives. In fact, I have had the experience that was alluded to before, NetDay. We have wired schools, about 22 schools in my district; and we got everything in place with varying degrees of follow-up. But some, we got everything in place and hooked it up, got a T-1 even; and the person who in that school happened to be volunteering to take charge of the technology got an offer of a better job somewhere. And they left, and everything was put in a box and put away in the closet, and nothing happened after that person left. It is that critical that that one person be there.

So if you don't have the teachers and you don't have folks in the schools, that is not going to go forward to produce the flow of graduates from the schools that are going to flow into higher education institutions and fill your positions. How does the e-rate impact upon this? Are you familiar with the e-rate and the fact that we really don't have

to do NetDays anymore because the e-rate makes it so inexpensive to wire schools? The basic wiring as well as the telecommunications costs, ongoing telecommunications costs, can be subsidized by the e-rate. What is the impact of e-rate as you see it?

Mr. Kaufman. Well, the impact of e-rate has been substantial. The investment was large. It certainly did do to a lot to obviate for the need of a volunteer organization like NetAid to stir things up and that is what it was designed to do.

But when all is said and done, there are many schools that remain unconnected. I am concerned about the schools that are in your district that are on the other side of the digital divide. And the fact of the matter is many of those classrooms statistically are way behind the more advanced communities even in the connections, even with the e-rate available. It has a lot to do with how districts and cities and States are making application for the e-rate and how they distribute those resources out to the different schools.

So although there is a resource there, it is affecting the poorest communities the least, whereas it was designed to affect the poorest communities the most.

Mr. Owens. It moves the necessity for investment in the capital expenditures to get wired, and it also takes away the necessity for the ongoing expenditures. Schools in my district have a 90 percent discount. That means they are only paying a dollar . . . for every dollar they only pay 10 cents for the services or whatever they receive; and the library has an 85 percent e-rate, which means they only pay 15 cents for ongoing telecommunications services or the initial cost of wiring. So it frees up that money, it seems to me, that they would have used to go into personnel.

I was just wondering is it happening better elsewhere than it is in New York City? Because I don't see . . .

Mr. Kaufman. In urban cities it is happening pretty much like it is happening in New York City, in fact. People are still trying to learn how to effectively apply the E rate. But I want to bring a couple of the issues that you have raised together. The first issue that you have raised, there is no question that there is need for higher education and to respond to the demand for new technology workers. But the requirements in the technology field are not all at the higher education level, and there are a number of positions that are very well-paying that would work . . . that young people can enter and do enter today without that degree. And we need to be much more effective in preparing young people who want to take a course that does not necessarily take them to a higher education, but does take them into the new economy, does take them into the advantage of the jobs that are becoming available. Whatever the number is, there are jobs out there, and you do not necessarily need a degree to get those jobs.

In reference to the investment that the E rate allows to free up in technologies, there is no question that this had a major impact on freeing up some of the resources. As a matter of fact, as I said, there are some estimates that go as high as $40 billion that have been invested in K-12 education over the last decade, much of it by people in these buildings and by business and by NGOs.

But the bottom line is if I were a business and I were looking at $40 billion invested and seeing the return that I had gotten on that investment, I would be out of

business. The return has not been what it needs to be.

So going into what you were saying, Representative Owens, the need for people to support the technologies, the need for . . . in the case of teachers, for somebody to help teachers change their habits of instruction so that they can effectively use these technologies to improve what they are doing in the classroom is very high.

Mr. Petri. Thank you.

Mr. Barrett.

Mr. Barrett. Thank you, Mr. Chairman. And I, too, want to thank the panel for some excellent testimony, interesting and, more specifically, very informative. And I compliment the committee and the Chairman for the appropriate name for this hearing: Using Technology to Learn and Learning to Use Technology. I think it is most appropriate.

Like my colleague from Georgia, my district is basically rural, and we do have problems that certainly some other parts of this country do not have. This is why this model, this technology is becoming so terribly important out in Middle America.

Mr. Kaufman, I was particularly interested in some of your comments about low-income school districts and so forth. We often hear that technology isn't worth anything if you don't know how to use it when it is placed in a school. And from your vantage point, what training do you provide is available, what oversight? What training specifically is available?

Mr. Kaufman. Well, I think the schools are recognizing the importance of professional development training, and the universities are stepping up to the plate as well. We are dealing with a difficult environment, and it is a great opportunity to be in front of the books. There is a lot of pressure on teachers to meet standards. There is a lot of pressure on teachers to fulfill the testing requirements. So technology slid off the table, and they are not ready to incorporate it at this point in time. Most teachers won't do what Ms. Guge did when technology fails; that is, start faxing things back and forth. Most of them will shove the technology off to the side.

It is important to help the teachers use the training they have got, use the technologies that are available, leverage what they have so they can comfortably use them in classrooms, so that when it does give up, that somebody is there to help them make sure it works. There is good training out there, and I think the teachers are moving in the right direction, but without the in-classroom support and under the pressures that they are working under today, they are not going to use this as effectively as it needs to be.

Mr. Barrett. Then in your opinion in the schools that you are familiar with and are working with, do you feel that you are at a disadvantage with some of your brethren in perhaps urban areas or not?

Mr. Kaufman. Am I disadvantaged compared to people working in urban areas?

Mr. Barrett. Yes, in terms of training and some of the tools that are available.

Mr. Kaufman. Well, again, there is an increasing number of schools available online not only for training students, but also for training teachers. The gentleman from Penn State is a good example of that. There are many not only universities, but commercial organizations that are stepping up to the plate to help train teachers to better . . . .

Mr. Petri. Excuse me. Your microphone is not picking up.

Mr. Kaufman. Okay. I'm sorry. I didn't realize that it was off.

Mr. Barrett. Thank you.

Again, a moment ago you used the term "leverage," and earlier you used "concentration" and so forth, which was appealing to me. From the standpoint of teachers themselves, from those that are on the ground, and maybe specifically Ms. Cronin and Ms. Guge, what should Congress know at this point; what should Congress be doing specifically to move this technology forward, to make it become so critical? I know in Nebraska I think it is fair to say we are at the cutting edge, are we not, Ms. Guge, in this type of technology? What more can we be doing specifically? And Ms. Cronin, anyone, as well.

Ms. Guge. If I had not had the training, I would not be as comfortable being in the classroom. The technology is important. I use it every day. But I want that to be secondary and want my lessons to be the primary focus. And there was another teacher who was also teaching this way and did not have the training, and she struggled all year long.

And so whenever training can be provided, it also has to be financed. I probably wouldn't want to spend my money on something that I wasn't sure I was going to like. So when I was asked to do this and was told I was going to be paid for my training, I thought, oh, well, okay, I can't lose. So, you know, being supported by my school district, being supported financially and then having training and support personnel behind me so if something did happen, I could, you know, run for expert help, was very beneficial, and it was nice to have that in the background to know that I had someone to help me.

Our consortium, of 35 schools, provided excellent training, and I have talked to other people in other consortiums, and all across the State, I believe, teachers are being trained to use this effectively and continue.

This is only my second year doing it, and so I don't feel like I am an expert on how this all works, but I think it is going to be the wave of the future for the rural schools having more teachers involved. When I get back Sunday, I am training another teacher so she can teach it, an ACT preparation class. And, you know, so I am trying to encourage other teachers to be interested in this type of technology to expand their classroom.

Our classes are not very large. We are not a very large school, and so we don't teach to a lot of students, but if we have got an excellent teacher who only teaches to 15 students in our school, it is nice to be able to take that excellent teacher and make him

available to other schools who may not have a good teacher.

Mr. Barrett. Ms. Cronin, would you care to respond?

Ms. Cronin. I agree that the financial backing is very important. What we have found is that very often in education, your training tends to be a one-shot deal. You learn how to use a particular computer program in the classroom, and then there is not support over time because . . . that piece, I think, as far as the ESF grant, has really been solved for us. We have had ongoing training, we had online opportunities so that we could complete courses whenever it was convenient for us, and we had the support online. We have had meetings every year, we are now going into our fourth year, so that we have been able to really develop a network of teachers, and we work with experts both online and in hands-on meetings so that we have that support over time.

And what tends to happen is you start off trying out a few things, and at that point you need to make that decision, am I going to continue with this, is it working for me, or is it not working. And if it is not working, and there is no one there to help you out to make that next step in your application, it does tend to end up as the computer being unplugged in the classroom.

But because we have had continuing support, we have been able to network, we have been able to apply, we have been able to adapt to different lessons, different uses of technology, and, in fact, we see as well that very often teachers will kind of walk down to my classroom at the end of the day and say, you know, I heard you were doing such and such with your students today, could you take 10 minutes to show me how? It is that type of opportunity where you have the time to work over a period of years that you really find the technology becomes an everyday part of your classroom.

Mr. Barrett. Thank you.

Mr. Chairman, may I indulge you for another moment or two?

Mr. Petri. Yes.

Mr. Barrett. Thank you.

How do you two classroom teachers handle the quizzes, the homework, the discipline and so forth?

Ms. Guge. Okay, homework. We work on it daily. If it is something that I don't mind a few days' lag time, they mail it to me, so we rely on snail mail. If it is something I want very fast, I can grade papers in class using a document camera, and I just have them put it on their camera, and I look at it on the TVs and grade it that way, or fax machine. So I have a student gather up all their homework, put it in the fax machine, 3 minutes later I get it in my room, I read it over and say thank you. And so technology there is very important.

Quizzes and tests I need to have a proctor or a room supervisor in the other room mainly because I can't really tell if they are cheating. I can zoom in on the camera quite a bit, but it is nice to have another adult in the other room, and plus liability. But usually just a day-to-day lesson I don't have a proctor in there with me, but for tests and quizzes

we do that, and they mail them to me.

Mr. Barrett. Thank you.

Ms. Cronin, how about discipline?

Ms. Cronin. I was going to say I don't have the issue with the homework and the quizzes. As far as discipline, I think what you have to have, again, is training, because we are really changing the way our classroom looks. If you were to walk into my classroom, for example, yesterday during math I had six or seven children working on the computers. They were finding some data on the Olympics. I had other students working on a different project, and so you have to really be flexible, and you have to trust your students. I tell them they need to be trustworthy and complete their work.

We spend a lot of time on procedures in our classroom: What are the proper procedures for using the computer? What are the proper procedures when the teacher is not standing next to you? And they really handle it well; even 8, 9 and 10 years old are very responsible. Rarely in my classroom will you see everyone sitting down doing the same thing at the same time.

So that has taken a lot of training as well to be able to move from being the person standing in front of the classroom and lecturing and giving instructions to working side by side with my students, but it works. They are just learning incredible things, and I would love to have anyone come and visit any time.

Mr. Barrett. Thank you. I appreciate that.

Ms. Guge. May I comment on discipline? In my classroom my students sign a contract saying that they will be on camera at all times. So they need to sit in front of me, and in the contract, if they don't follow those rules, we can send a letter home to their parents like a warning, and then after that it is like you are out. So they understand that they have to have more responsibility for taking this type of class.

Mr. Barrett. Thank you. I appreciate that.

And finally, Mr. Chairman, Ms. Mansfield Sutton, what kind of training do you provide, your company provide, what kind of support to those schools using your software?

Ms. Mansfield Sutton. Well, fortunately for us, Mr. Barrett, we have been in business for over 20 years, so we have had lot of experience with professional development for teachers. And I agree with both of the ladies at the table with me that technology is a very important tool to use in a classroom, but it is only as good as the teachers who are able and know how to implement that instruction.

We have a cadre right now of about 120 educational consultants who are across the country who go in and work with teachers on a daily basis where they have our products and services, and we offer everything from initial training, this is the program, this is . . . in some places this is the computer, this is the terminal, et cetera, to very sophisticated classes on how to successfully implement the technology into the curriculum. So we provide educators with a continuum of kind of courses that they can

29

select to meet the needs of their students and their teachers.

Mr. Barrett. Thank you very much, and thank you again, Mr. Chairman.

Mr. Petri. Thank you.

Any other questions?

Thank you.

Just one or two things to wrap up. I am not sure that Mr. Isakson mentioned it, but he accepted your challenge and said that your students could contact his office.

Mr. Isakson. Mr. Chairman, we are going to go back up to my office after this is over and e-mail them and let them know how good Mrs. Cronin did so we can start the dialogue.

Ms. Cronin. Thank you.

Mr. Petri. The one final question if anyone would care to respond to it or not, this is inspired partly by your testimony or the hearing that we had yesterday on the subject that Representative Owens referred to, and that is math and science education in the United States, and the need to have a competent citizenry in that area to sustain the high level, and accelerating technical change that is working through our system. And Mr. Greenspan, who was the lead witness, testified that we really can't as a national strategy rely on importing talent, though; that is a temporary expedient because that's not under our control. Sometimes people may want to come here. Other times they may not. And right now a lot of people do, and that is very good.

But I thought maybe the answer wasn't technology and that somehow we could use communications and computers and so on to help people learn, and he thought not. He thought it is a tool. But knowing science being somewhat unforgiving, people tend not to like to be wrong, so they really do not like to go through all the work they have to do and make a lot of mistakes. But once you overcome that, it is often very satisfying to be able to accomplish something and do it.

He thought a pencil and paper and a good teacher was the basis, in fact he thought it was a danger to use computers too soon with kids because that would be a crutch, and they would never really learn the fundamentals. Once they do, he said, he couldn't do his work without a calculator now, but he had to learn to add, subtract and divide as a kid, and it is a basis for understanding numbers, and I suppose the same is true in many other areas.

Would you care to comment on that? We are always looking for a magic ball and a quick fix. Is this a quick fix? Is this another tool? How does it fit in? Should we be careful about relying too much on technology even though it is a wonderful opportunity?

Dr. Thomas. I will begin the response, I am sure there is a number of people who would like to, and I will speak from the college level. We came into this convinced, I had mentioned earlier, that a learning event is just a series of Power Point slides that are

posted to the Web, and calling that Web-based or E learning is not really a learning event.

There are so many different variations on the theme of Web-based instruction in the sciences or the social sciences. We have to be very careful about that. The tack that we have taken is you have to have face-to-face contact with the professor. That physical contact, there is a lot of things that happen, and it is very focused. It also indicates to us in experiences we have had with this that it is appropriate especially for the sciences, because there is . . . that kind of interaction, as you say, needs to be rich enough to promote that kind of education. And so we have done it in sort of, as you say, a mixed bag, if you will, both physical contact as well as the Web.

Now the professor goes from being in some sense the sage on the stage and moves now to a little bit more of a guide on the side. And the students are working in teams and are in a sense help each other now much more than they would be doing so in a traditional classroom environment. The Web then becomes a resource tool for providing them with information even above and beyond what possibly the professor could provide. And then you come back together with the professor to see what you have done and to get the correction and to be motivated to move into the next series, be a module or topic or whatever.

So it is, in our way of thinking at IST, that you need a little bit of both, but that the computer, the Web-based, the Internet, if you will, can be used as a wonderful tool for getting the information to the students. But it still is in the realm of the student with interaction with the professor to really make a quality learning experience.

Ms. Mansfield Sutton. I would like to take a moment and add to that. Technology is definitely a tool that is well positioned for the I generation child, the child who is interactive, imaginative, excited about learning. It is a very effective tool, and it does need the appropriate professional development to support its success in a classroom.

Many implementations of technology are not successful because of the lack of professional development, and one of the things about the Web-based education is there is a lot of confusion, perhaps is the best word. And I come from an education background, I have been a teacher as well, and there is a big difference between content and curriculum. And what you find on the Web is content for the most part, and it is a teacher's job to pull that content in and put a framework around it so the students can learn from it. I am speaking from a K-12 environment rather than the higher ed environment. But it is definitely a tool that is used successfully and has been used successfully, and we have many research studies to show those results.

Ms. Cronin. I think there is absolutely no substitute for a human being in working with students. They need to have that bond with a person. And to use technology just to say "I am using technology in my classroom" is not the answer. I agree that the professional development is vital because as a teacher I need to know when during the curriculum technology best fits in as a tool. There are times when the Internet is not the answer.

Last year my students really wanted to get on line all the time, and so we did just a short little activity where I said, who can find the capital of . . . I think we used New York, because that is where I am from originally, the capital of New York most quickly? And what happened was I had students who raced for the computer, and then a couple of them thought the social studies is book is right over there, and they found the answer in 1

minute. And it was a real dramatic example for the students to see that, yes, there are times you need to use the Internet, that technology is a good tool to use, but there are times when it is not the best tool. As a professional I need to make that decision through the curriculum and activities that we do and also for individual students.

I had a learning-disabled student last year who really struggled with reading, and for him to be able to complete a project using an encyclopedia on line that would read the information to him just was an incredible experience to him because he felt that he was able to be produce a report of very high quality, which it was, with the support of technology. So it is a matter of seeing when it is the best tool to use and for which students at which times.

Mr. Petri. Well, thank you very much. And it has been a very interesting session. We appreciate the work that you put into the testimony and the answers you have provided today. With that, this hearing is adjourned.

[Whereupon, at 10:54 a.m., the committee was adjourned.]

Appendix A-The Written Statement Of Vice-Chairman Thomas E. Petri, Committee On Education And The Workforce, Washington, DC

33

STATEMENT BY VICE CHAIRMAN
THOMAS E. PETRICOMMITTEE ON EDUCATION AND THE WORKFORCE"
Using Technology to Learn and Learning to Use Technology" Hearing
September 22, 2000

Good morning.

First, I would like to welcome everyone and especially all of our witnesses – many of whom have traveled considerable distances to attend today's hearing. In the past, we have held numerous hearings on the importance of using technology to learn, and we have heard witnesses detail state and local efforts to integrate technology in the classroom. Today, we will hear from several teachers who are actually using technology on a daily basis to help their students learn.

We will also hear from the private sector. Specifically, we will hear about their extensive efforts to ensure that all students have the technological skills to compete in today's workplace. It is important to note that our panel of experts spans the range of all educational levels, from elementary school, high school, and college, to the workplace.

Finally, it is my hope that this hearing will assist our committee in building upon the strong foundation that we have laid in the in the not so distant past by passing important legislation like: the Education OPTIONS Act, which reforms the maze of current elementary and secondary education technology programs; the Teacher Empowerment Act, which emphasizes the use of technology in many areas, including the delivery of high quality professional development programs through such means as distance learning. This act also encourages initiatives to train teachers to use technology to improve teaching and learning; and the Higher Education Act Amendments of 1998, which among many other things, provides funds to partnerships between elementary and secondary schools and universities, to develop models successfully integrating technology into teaching and learning.

Appendix B-The Written Statement Of Ranking Democrat
Member William Clay, Committee On Education And The
Workforce, Washington, DC

GOOD MORNING, I AM PLEASED TO JOIN CHAIRMAN GOODLING AT THIS

HEARING ON EDUCATION TECHNOLOGY AND ITS FOCUS IMPACT ON HOW OUR

CHILDREN LEARN. DURING THE PAST EIGHT YEARS, PRESIDENT CLINTON AND

VICE PRESIDENT GORE HAVE MADE EDUCATION TECHNOLOGY A TOP PRIORITY.

THEY HAVE INCREASED OVERALL INVESTMENTS IN EDUCATION TECHOLOGY FROM

23 MILLION DOLLARS IN 1993 TO 769 MILLION DOLLARS IN FY2000, AND HAVE

TRIPLED FUNDING FOR EDUCATION TECHNOLOGY CENTERS TO REACH AT LEAST

120 LOW INCOME COMMUNITIES. THROUGH THE E-RATE PROGRAM, THEY HAVE

SECURED LOW-COST CONNECTIONS TO THE INTERNET FOR SCHOOLS AND

LIBRARIES HELPING MORE THAN 80 PERCENT OF OUR PUBLIC SCHOOLS.

TECHNOLOGY IN OUR CLASSROOMS AND INCREASING ITS ACCESS TO

DISADVANTAGED CHILDREN IS AN ESSENTIAL COMPONENT IN RAISING THE

EDUCATIONAL ACHIEVEMENT OF OUR NATION'S STUDENTS.

IT HAS BEEN DEMONSTRATED THAT DISADVANTAGED CHILDREN SHOW THE

LARGEST GAINS IN STUDENT ACHIEVEMENT WHEN SUBSTANTIAL EDUCATION

TECHNOLOGY RESOURCES ARE PROVIDED. COUPLED WITH THE NEED TO PLACE

TECHNOLOGY IN OUR CLASSROOMS IS ENSURING THAT TEACHERS HAVE THE

KNOWLEDGE AND SKILLS TO INTEGRATE TECHNOLOGY INTO EVERYDAY

INSTRUCTION AND TEACHING. PROFESSIONAL DEVELOPMENT IN THIS AREA IS

(35)

CRITICAL TO TECHNOLOGY HAVING POSITIVE IMPACTS ON STUDENT

ACHIEVEMENT.

LASTLY, WE CAN AND MUST DO MORE TO ENSURE EDUCATIONAL

OPPORTUNITY BY CLOSING THE DIGITAL DIVIDE. OFTEN WHEN SCHOOLS HAVE

BEEN WIRED FOR THE INTERNET AND HARDWARE AND SOFTWARE INSTALLED,

THERE IS STILL A NEED FOR COMMUNITIES TO REALIZE THE POTENTIAL FOR

TECHNOLOGY AND INVEST THEMSELVES AND THEIR TEACHERS IN INTEGRATING IT

ACROSS THE CURRICULUM.

CLOSING THE DIGITAL DIVIDE AT ITS CORE IS A CIVIL RIGHTS ISSUE –

WITHOUT ACCESS TO TECHNOLOGY AND THE INTERNET, WE ARE GOING TO LEAVE

GENERATIONS OF PRIMARILY MINORITY AND LOW-INCOME CHILDREN BEHIND.

2

Appendix C-The Written Statement Of Dr. James B. Thomas,
Dean, School Of Information Sciences And Technology,
Pennsylvania State University, University Park, Pennsylvania

Penn State School of Information Sciences and Technology:

Building Leaders for a Digital-Based, Global Economy

Written Statement
Submitted by Dr. James B. Thomas, Dean
Penn State School of Information Sciences and Technology

To the Committee on Education and the Workforce
U.S. House of Representatives

September 22, 2000

(39)

School of Information Sciences and Technology:
Building Leaders for a Digital-Based, Global Economy

Penn State's undergraduate degrees in Information Sciences and Technology (IST) are structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new "Information Age." Specifically, these degrees were developed to provide a learning experience that builds an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All of this will be done with considerable interdisciplinary integration in order to expose students to the cognitive, social, institutional, and global environments of Information Sciences and Technology. At the undergraduate level, team projects in most courses, a required internship, foreign language and culture requirements, and a capstone experience provide additional focused venues for involving students in the cutting-edge issues and technologies of the field.

Planned for introduction in 2001, the school's graduate degree programs are being designed to foster academic leadership in Information Sciences and Technology as well as develop and hone the IT management knowledge of practicing executives. Penn State will offer a one-year professional master's degree meant to build information technology competence in mid-career professionals with exploration of the concepts and applications of e-commerce, databases,

enterprise integration, IT policy and law, as well as other topics. The master of science and Ph.D. degrees are aimed at producing individuals interested in careers in teaching and scholarship in Information Sciences and Technology.

Critical Success Factors

Penn State's cutting-edge approaches to the design and implementation of the School of Information Sciences and Technology have created an organization that already is establishing an international reputation and that has been recognized for innovation by the Smithsonian Institution. Some of the factors critical to this early success include:

- Incorporating the advice of more than twenty-five top executives from Fortune 500 firms, government, not-for-profit organizations, and small- to mid-sized technology firms into the design of the program;

- Developing programs and courses through the collaborative efforts of more than 125 faculty members and administrators working in thirty committees and subcommittees;

- Working to assure that IST programs were built around all new curricula new courses (forty-three);

- Per the advice of partners and collaborators, including experiences in teamwork, oral and written skill development, real-world problem solving, and leadership in each course in the new curricula;

- Incorporating a strong technology foundation in the programs, but always stressing the application and solution potential of technology;

- Building strong collaborative programs with other departments at Penn State (e.g., joint faculty and minors) as well as with institutions outside the University;

- Attracting a world-class faculty as well as involving top executives in the classroom experience;

- Capitalizing on Web technology to roll out "On-Line IST" to provide workforce development and demand scaling; and

- Implementing the school in an unprecedentedly short period of time. Slightly more than a year separated concept approval and the time students first took their seats in the classroom.

Current Status

Enrollment, faculty growth. As the school begins its second year, it has a statewide faculty of more than seventy members (ten in full-time, tenure-track positions at the University Park campus). Nearly 1,300 undergraduate students are enrolled at nineteen Penn State campuses statewide. Additionally, a significant number of non-degree students are enrolled in the school's classrooms (physically and virtually) taking part in

seven different IST certificate programs, including the completely on-line Webmaster Certification program.

Educational innovation. "On-Line IST" was inaugurated this fall through offering the school's basic course (IST 110, Introduction to Information Sciences and Technology) for the first time over the World Wide Web. One or two courses per semester will follow and soon the school's undergraduate core will be available in an on-line environment through Penn State's Web-based outreach arm, World Campus. This means that anyone with a computer and an Internet hookup can access basic literacy for the digital global economy. But, delivery of these courses is only half the innovation story with "On-Line IST." Learning in IST 110 and other offerings involves real-world issues and topics. Students gain knowledge by leveraging IT to seek out solutions and answers. Furthermore, database technology is being applied in unique ways to provide instructors a new range of freedom and resources, enriching the on-line classroom experience. The critical success factors were not sacrificed for the sake of on-line delivery (see below for further details.)

Collaboration. The school continues its collaborative activities with the creation of new minors in partnership with other Penn State departments. Three of these new minors, developed with the College of Earth and Mineral Sciences and the departments of Speech Communication and Health Policy Administration, are to be offered in the spring and more are expected soon. Other partnership efforts are under way with ten institutions outside Penn State involving curriculum sharing and skill development efforts.

In August, the University was host to more than 200 faculty members from more than 50 other institutions across the Commonwealth of Pennsylvania for a two-day Faculty Academy. The conference—"Roadmap for Success in the 21st Century Classroom"— helped provide faculty members and administrators the tools and knowledge they need to effectively use cutting-edge learning technologies. Participants examined the new learning opportunities presented by emerging technologies; discussed various technology strategies, infrastructure, and support systems; explored implementation issues raised by institutional culture and policies; and gained new skills and understanding, informational resources, and a support network.

IST building. A new IST building at Penn State's University Park campus is being designed through a partnership between the internationally acclaimed firms Rafael Viñoly Architects, PC, and Perfido Weiskopf Architects. It will house both the School of Information Sciences and Technology and the Department of Computer Science and Engineering.

Connecting the east and west sections of the campus and spanning a four-lane highway, the building will be a meeting place for students and their teachers and a hub for activities involving government leaders and partners from industry and other educational institutions. On either end will be learning and experimental laboratories, classrooms, and offices for members of the faculty and staff. A 150-seat, state-of-the-art cybertorium will be a feature location for programs and conferences. The IST building will be a true showcase of technology and the applications of technology. Its electronic infrastructure will be the most forward-thinking possible, with wireless links and communications nets

internally, to the rest of the campus, to the Penn State system, and to the world. It will give the University the focal point necessary for leaders from education, industry, and government to chart the future of information technology together. And, it will be an enduring new symbol of Penn State's commitment to a field that promises fundamental growth and positive change in our society.

Short History

In his 1997 "State-of-the-University Address," Penn State President Graham B. Spanier asked if the University was organized in the most effective way to prepare students for the Information Age. To help answer that question, then-Executive Vice President and Provost John Brighton appointed the Information Sciences and Technology Strategic Planning Group within weeks of the President's address. Chaired by vice president for research and dean of the Graduate School, Rodney A. Erickson (the current Provost), this group recommended in May 1998 that a School of Information Sciences and Technology be formed. The school would serve as a focal point for offering and coordinating educational activities associated with the various information-based sciences and related technologies across the University. Rather than replace existing programs at the University, the group recommended that the new school work to strengthen these programs by fostering strong collaborative efforts with existing academic units. Where appropriate, new courses and focused tracks of study should be developed that break new ground or complement and build upon existing programs. Together with existing strengths at Penn State, the IST program would help position the University as a national leader in the curricular integration of information sciences and technology.

The school opened its doors August 24, 1999, to 428 students across the Commonwealth of Pennsylvania. With five full-time faculty at University Park and forty-five full- and part-time instructors at thirteen other Penn State campuses, this formally launched the University's major effort to attack the huge workforce deficit in the information sciences and to deliver critical knowledge to organizations in all sectors of the economy struggling with technology issues.

Undertaking newly created associate and bachelor of science degrees, IST students now are being prepared to help meet an estimated 1.2 million workforce shortfall in the information sciences and technology by 2003. The goal of these two degree programs is not simply to train technologists; it is to educate rounded professionals to strategically leverage technology in organizations throughout the economy statewide, nationally, and internationally. Over the next five years of operation, the programs of the school will grow to accommodate 3,000 students statewide at the undergraduate and graduate levels, with thirty to thirty-five tenure-track positions at University Park and possibly twice that many at other Penn State locations across the Commonwealth.

Because of the seriousness of technology demands faced by business, industry, and government, Penn State's School of IST has moved aggressively on a broad front. One of the keys to these efforts is the development of the IST Solutions Institute, an administrative arm of the school that will be the driver of higher education institutional cooperation around the Commonwealth, knowledge transfer, business solutions, and educational program development and delivery.

The institute is serving as an academic liaison for partnerships among Pennsylvania's colleges and universities to further education and research in the information sciences. Further support for economic growth in the Commonwealth will be provided through initiatives in business incubation and technology transfer. The Solutions Institute will provide an interface with numerous information science-related research centers based at Penn State, such as the eBusiness Research Center (discussed below). Educational programs for leaders in business and government are being developed in cooperation with the highly respected Penn State Executive Programs. At the same time, experts within the institute are rolling out World Wide Web-based versions of IST courses for delivery through the University's World Campus. The IST Solutions Institute also is administering the new Pennsylvania Governor's School for Information Technology in collaboration with Drexel University (discussed below). The Governor's School for IT just completed its second year of operation in July.

Pennsylvania Governor Tom Ridge views the launching of IST as a major part of the University's contribution to the development of our society: "Pennsylvania led the American Revolution. We led the Industrial Revolution. Today, it's a revolution of technology—and Penn State University is leading the way. Penn State's new School of Information Sciences and Technology is a world-class learning laboratory—part of Penn State's cutting-edge research in semiconductor and hardware design and development of the next generation of the Internet...."

IST Industry Partners

The University listened carefully to the skill set the marketplace wanted from the next generation of information/information technology personnel. In fact, nearly thirty industry representatives played a crucial part in the formative stages of IST, representing Fortune 500 firms with international reach as well as successful and innovative organizations based in Pennsylvania. Meeting with the IST Strategic Planning Group (described earlier), these individuals helped the University identify common concerns, issues and recommendations. Observed Larry Kittelberger, chief information officer of Lucent and advisory group member, during this process, "I think that the IST (school) is probably the best concept that I have seen anywhere, and I deal with a lot of universities .... Penn State has really stepped up to it and is really blazing the trail."

Further, this advisory group examined workforce needs, curricular opportunities, and the feasibility of new kinds of partnerships between Penn State, industry, and government. And, a concerted effort was made to do a "reality-check" of the appropriateness of many of the technology-related issues commonly raised in public forms and the news media for inclusion in the IST curricula. What emerged was a solid set of principles and directions for IST's educational programs.

Corporate partners have contributed close to $7 million in endowments, equipment, and cash during the first year of the school's operation. Indeed, early proofs of the success of Penn State's IST concept lie in generous grants of external financial support from a wide range of businesses. For example, 3Com Corporation has donated $1.25 million toward

the development of the proposed new IST building and its technological infrastructure.
PNC Bank Corp. has pledged $1 million for student scholarships and faculty
development and numerous other corporations have contributed between $25,000 and
$300,000. Two individual donors have contributed $1 million and $1.5 million,
respectively, and scores of others have contributed various amounts.

Speaking at a press conference announcing the bank's gift of $1 million on Oct. 20, 1999,
PNC Bank Corp. Chairman Thomas O'Brien said in part: "We are here to dedicate
ourselves to meeting the challenges of the next millennium to declare that Pennsylvania
will achieve its vision of leadership in technology .... I know that the School of
Information Sciences and Technology will be a key advantage as we work together to
bring that vision to life.... The IST School will ensure that our own Commonwealth will
be a key source of the technology innovators and leaders for generations to come."

Industry support for the school has more dimensions than early program
conceptualization and financial backing. There are ongoing interactions that directly
benefit the student body both in the classroom and beyond.

Representatives from partner organizations regularly appear in the school's classrooms to
present real-world problems and issues, field student questions, and enter into meaningful
discussions. As well, executives have met informally with student organizations to
provide career information and mentoring. Such valuable contacts are expected to
continue and expand as new student groups, such as Women in IST, come on-line and
corporate awareness of the school builds. The Governor's School for Information

Technology (discussed below) also has been the beneficiary of these relationships as firms have opened their doors for high-tech factory-floor tours.

Finally, high-level executives are continuing to work with the school's administration and staff on the strategic-planning level through the IST Advisory Board. This blue-ribbon panel serves as a chief source of business and industry expertise to assure that the school's programs of teaching, research, and outreach are in tune with current and future trends in information sciences and technology. The board also assists in developing career opportunities for students, and partnerships with industry and the government. Furthermore, the board looks for ways to enhance the educational experience of IST students through internships and learning opportunities based on real-world problems.

IST as a Pennsylvania Asset

President Graham Spanier has identified several areas that the school would be involved in as it worked to become a nationally-recognized program and a Pennsylvania asset. These areas and the progress that has been made to date in addressing them are discussed below:

Workforce needs and the curriculum. The IST curriculum is being implemented in various ways to contribute to the workforce needs of the Commonwealth of Pennsylvania and beyond. Degree curricula were designed to help eliminate the workforce shortage of qualified information science and technology professionals. However, Commonwealth citizens do not have to be degree-seeking students to benefit from these curricula. As

mentioned earlier, IST has already implemented seven certificates that are based on courses in the IST degree programs and are accessible to non-students at many of our campuses. These certificates range from our Information Technology Novice Certificate to Network Technologies and beyond. Further, through the IST Solutions Institute (discussed above), IST courses are being designed for Web-based delivery. Thus, they will be made available to individuals, companies, other institutions of higher education, government agencies, etc. Further, these courses have been designed in a modular fashion so that a given course can be broken down and customized to the educational needs of any constituent. IST core courses (IST 110, 210, and 220 – see below for descriptions) will be available by the end of the 2000-2001 academic year.

Broadening the reach of IT education at Penn State into other fields has been signaled by the launch of the first IST joint minors (discussed earlier). The University believes that students in all fields should be trained as knowledge professionals, be their major in the sciences, the arts, or the humanities. The IT workforce gap is not only deep; it is broad in scope—cutting across all sectors of our economy and society. These minors are an effort to address this broader dimension of the problem. Additional workforce needs, as well as the educator of future generations of IT scholars and teachers will be supported by the launching of the IST graduate programs in 2001.

Intellectual property and technology transfer. Penn State has articulated its commitment and plan to support technology transfer in the School of IST. For example, the University has committed to establishing Technology Transfer and Intellectual Property Specialists to deal with the anticipated needs of IST. The Penn State Research

Foundation, Intellectual Property Office, and Research Commercialization Office (in cooperation with the Ben Franklin Technology Center and PENNTAP) are all involved in helping to support, assess, and develop IST-related opportunities. Combined with the continued investment in Penn State's Research Park facilities for IST-related activities, Web site development efforts to help users identify technology transfer opportunities and procedures, the soon-to-be-released report from the Task Force on Intellectual Property Policies and Procedures, and the new position of assistant vice president for research and director of technology transfer, Penn State has quickly become a national model for technology transfer in IST and beyond.

Internships. The IST internship and recruiting office has established a foothold in a number of companies with either a Pennsylvania base or a significant workforce presence. These include Bell Atlantic, Hershey, AMP, Lockheed Martin, PNC, Armstrong World Industries, Raytheon, Unisys, Westinghouse, SAP, Cigna Insurance, and Air Products along with approximately fifty others. The internship involvement does not just include major corporations. The school is working with state and local government officials, non-profit associations, entrepreneurial/small company start-ups, and even University operations to identify exciting and productive intern experiences for IST students. The school has been in operation for just over a year and already the intern list is very impressive.

Collaboration in Pennsylvania higher education. As noted, Penn State's initiatives in information sciences and technology have attracted attention across Pennsylvania. The potential need is great and the potential demand is even greater. It is clear that to meet the

academic and workforce development expectations, that many institutions of higher education across the state must be involved in design and delivery processes. Residence courses for non-traditional delivery, certificate programs, skill-based training opportunities, and executive seminars must be developed and administered.

To help make IST a tool to meet the state's aggressive goals in the technological arena, Penn State has begun reaching out to other academic institutions across the state to share the academic and workforce development strategies and insights through programs such as the IST Faculty Academy. Accordingly, IST administrators have developed collaborations with other academic institutions and the faculty at those institutions. These include partnerships with schools in the State System of Higher Education, the state-related universities, and private institutions in a manner that will help Pennsylvania be a leading information technology state. Opportunities for cooperation and collaboration among these institutions include sharing of curricula and curricular materials, faculty and student exchanges, development of alternative modes of curricula delivery (for example, Web-based instruction), certificate programs, and other potential partnership areas. Additionally, the executive director of the IST Solutions Institute serves in the role as full-time Commonwealth Liaison to all colleges and universities based in Pennsylvania.

Economic development in Pennsylvania. While all of this serves to promote the School of IST as a Pennsylvania asset and Pennsylvania as a leader in IT, other initiatives not in the categories discussed above should also be mentioned as having impact on economic development in the Commonwealth. The school is the academic home of the

Pennsylvania Governor's School for Information Technology (PGSIT) at Penn State. This is an intensive, five-week summer program for talented high school students that immerses them in the information sciences and related technologies. The Governor's School is offered in partnership with Drexel University, with half the PGSIT scholars in residence at each university. In its inaugural year, PGSIT attracted 128 attendees. In 2000, that number increased to 148. This past summer, scholars attending the program at Penn State undertook a wide range of exciting learning projects. One team produced Webcasts of the National Governors Association conference, held concurrently with PGSIT at University Park. Other scholars taught senior citizens how use information technology and yet another team designed a model business to help the handicapped.

Additionally, the school is an important part of the e-Commerce Center jointly sponsored by Microsoft, the Commonwealth, and Penn State. Located in Harrisburg, Pennsylvania, the center is becoming a focal point for e-government initiatives and skill-based training for Pennsylvania government.

Also, plans have begun for a Women in IST program that would have a statewide impact and perhaps be jointly sponsored with a number of our university partners. This program is designed to examine the gender gap in the information sciences and the causes and effects of such a gap.

IST is also the home, along with Penn State's Smeal College of Business Administration, of the new eBusiness Research Center (eBRC). The center was initially supported by a $300,000 founding partnership with IBM and now has support from several leading

companies, including Unisys, Xerox, and AT&T Wireless. Located on Penn State's University Park campus, eBRC has vital links to many technology transfer offices—Ben Franklin, Industrial Research, Intellectual Property, PENNTAP, Research Commercialization, and the Small Business Development Center. The eBRC also is a partner in the e-Commerce Center initiative.

"On-line IST"

In August 2000, the IST Solutions Institute opened a brand-new learning environment for students when the core course IST 110 went on-line. Those enrolled in the pilot, e-version of Introduction to Information Sciences and Technology are now experiencing course content as never before. Their learning materials are presented in a dynamic manner for an experience much richer the mere reading of a textbook on-line. The focus is on issues and case studies that managers and leaders in the information sciences deal with on a daily basis. This connection to the real world gives students not only more up-to-date content, but also a solid basis for solving problems that they will encounter when they ultimately enter the workforce.

Initial class sessions were held in a traditional face-to-face setting with instructors, but from then on—save for planned team meeting or presentations—learning was to occur primarily on the World Wide Web. Working in teams, the students in the course are tackling several case studies developed by faculty members with major corporate experience, as well as through the school's corporate partners. Electronic discussion

forums, chat, e-mail, an on-line calendar, and dynamic interactions employing the latest technologies will supplement the exercises they face.

The inaugural section of IST 110 on-line was being "attended" not only by Penn State students, but students from the State College Area High School and students from the Indiana University of Pennsylvania as well. This is being done to demonstrate the effectiveness of on-line course delivery at multiple physical locations as well as to students of different learning backgrounds.

Additional sections of IST 110 on-line will be added in spring 2001 and additional courses in the IST undergraduate core will be introduced one or two per semester over the near term.

Program Descriptions for Undergraduate Residency Degrees

Both the bachelor's and associate degree programs in IST are predicated on building leadership capabilities in students as well as helping to provide them with the tools they need to put information technology to work in a wide variety of settings.

Baccalaureate Degree in IST. The bachelor's degree program in IST was developed to serve the needs and schedules of individuals who plan to make a full-time, four-year commitment to their education and will be entering the professional career market for the first time upon graduation. The bachelor's degree program is being offered at nine Penn State locations during the 2000-2001 academic year with two more scheduled to join the

group in the fall 2001. There are approximately 800 students enrolled in the IST bachelor's degree program throughout the state (275 at University Park).

Students take a 16-credit core of courses during their freshman and sophomore years. Theses courses include a 4-credit introduction and courses in networking, databases, discrete mathematics, and computer languages. The bachelor's degree core includes:

IST 110 Introduction to Information Sciences and Technology

> Introduction to information systems including social implications, and the creation, organization, analysis, storage, retrieval, and communication of information.

IST 210 Organization of Data

> Introduction to the concept of databases including the storage manipulation, evaluation, and display of data and related issues.

IST 220 Networking and Telecommunications

> Introduction to digital network topologies; transmission media; signal modulation; digital packet switching and routing; systems integration; communications management; security.

IST 230 Language, Logic, and Discrete Mathematics

> Introduction to formal languages, mathematical logic, and discrete mathematics, with applications to information sciences and technology.

IST 240 Introduction to Computer Languages

Introduction to the specification and application of languages and language

paradigms which interact with computers.

Beginning in their junior year, students may then choose from among three options and

take advanced courses that build skill sets along lines of career interest:

Information Systems Development Option: This option is focused on

expanding the skills needed to develop advanced information technology

systems using state-of-the-art tools and techniques. The emphasis is on

providing the student with both knowledge in the design, implementation,

testing and evolution of complex software systems as well as a set of project-

oriented, team-programming experiences.

Information Technology Integration Option: This option is designed to

prepare students to use information technology to realize a variety of system-

based goals (e.g., reliability, accessibility, efficiency, etc.). It is focused on

developing a theoretical foundation and the skill set needed for integrating

information technology into different systems for the purpose of enhancing

system performance. The emphasis is on providing the student with both the

theoretical frameworks needed to use information technology as a system

attribute as well as a set of application-oriented experiences and skills.

Information, Society, and Public Policy Option: This option focuses on how information technology affects social change and the delivery of information to the consumer. This includes the human-machine interface; organization and retrieval of information; digital libraries; information and telecommunications services; information and media industry structures; software services and intermediaries; telecommunications and information law and policy; sociological aspects of technology change; multimedia; and art, design, and aesthetics.

Associate Degree in IST. The associate degree of science in Information Sciences and Technology (2IST) is structured to prepare graduates for immediate and continuing employment opportunities in the broad disciplines of information science and technology. This includes positions such as application programmers, associate systems designers, network managers, web designers and administrators, or information systems support specialists. Specifically, the major is designed to ensure a thorough knowledge of information systems and includes extensive practice using contemporary technologies in the creation, organization, storage, analysis, evaluation, communication, and transmission of information. The major fosters communications, interpersonal, and group interaction skills through appropriate collaborative and active learning projects and experiences. Technical material covers the structure of database systems, web and multi-media systems, and considerations in the design of information systems. During the fall semester of 2000, nearly 500 students were enrolled in the IST associate degree program at Penn State locations across the Commonwealth.

After a 16-credit core of courses similar to that in the bachelor's degree program, IST students may choose one of the following options for the associate degree.

Baccalaureate Option: This option provides maximum articulation with the baccalaureate degree. Students who complete this option will meet all lower division requirements for the baccalaureate degree. This is not the case with the remaining options, although the degree of articulation is quite high for all associate degree options.

Generalized Business Option: This option enables students to specialize in the general business areas of accounting, marketing, and management.

Individualized Option: This option enables students to work closely with an advisor to develop a plan of study that meets the dual objectives of allowing a flexible academic program and providing breadth of technical specialization. An example would be a program where a student would take some of the courses listed in the Web Administration Option and the remainder in the Software Option.

Software Option: This option prepares graduates for entry-level programming support positions in industry. Students take courses in Web programming, database programming, and other contemporary programming environments.

Web Administration Option: This option prepares graduates for positions as Web administrators and Web programmers.

Networking Option: This option prepares graduates for positions as entry-level computer network administrators. Students take courses in personal computer hardware, networking essentials, and network administration.

Data/Information Option: This option prepares graduates for entry-level database support positions. Students take courses in relational database systems and database management.

Industrial /Manufacturing Option: This option prepares graduates for entry-level manufacturing information systems positions. Students take courses in electrical and mechanical systems, and business and industrial processes.

Telecommunications Option: This option prepares graduates for entry- level positions in the telecommunications industry. Students take courses in voice and data communications, protocols, networks, and wireless systems.

Program Descriptions for Graduate Degrees

Master of information sciences and technology. Penn State plans to introduce a one-year professional master's degree program during the 2001-2002 academic year. It is being structured to be of benefit to three types of working executive or manager:

individuals who hold credentials in their profession, such as medicine or banking, but who want to learn how the tools and technology of the Digital Age may apply to their field; persons who hold a bachelor's degree and wish to transition into a career involving the information sciences and technology; and management information science professionals who wish to update and hone their skill base.

As currently conceived the program would require the completion of 36 credits, including a basic set of core courses, elective courses as appropriate, and an integrative capstone experience. It is anticipated that completion of this program will involve both on-line learning and residency instruction. It also will emphasize teamwork, offer opportunities for scholarly and technical writing, and have both case-based and project oriented exercises. Instructors will include both academics and IT practitioners. And, there will be opportunities to study and work in a technology enhanced collaborative learning environment.

Ph.D. and master of science in information sciences and technology. The University also plans to introduce doctoral and master of science degrees in fall 2001. While details of the master's program are currently being sketched out, the concept of the Ph.D. program is in a more mature stage of development.

The purpose of the proposed Ph.D. program in IST is to produce world-class scholars who will serve the academic community and society as researchers and teachers focused on the challenges of a digital-based, global economy. The information sciences and the technologies they encompass relate to a broad range of disciplines that examine, in

various combinations as well as in the collective, three major constructs: information, the user, and related information technologies. New proposed courses in the program are being designed to explore the theoretical and methodological issues associated with these constructs and their interactions. Research around the interrelationships of these constructs includes work on human-computer interaction, information behavior (individual and group), technology application to user needs, information policy, and systems (both information and organization-based). While dissertation work will focus on developing expertise and research around a particular theoretical path, students will receive course work that provides grounding in the theory and dynamics of all these areas. The program will admit only 5-10 students per year thereby leaving space in the classroom for students from other disciplines.

The faculty of the School of Information Sciences and Technology are, and will continue to be, very interdisciplinary. The research and curricular needs of this diverse and complex field require a faculty membership that matches those needs. The same will be true for the next generation of scholars in IST. It is anticipated that future doctoral candidates in IST could pursue a range of dissertation topics (both actual and contemplated) including:

- Group Decision Making in Computer-Supported Cooperative Work Environments
- Biomedical Multimedia Information Retrieval
- Neural Network Models for Criminal Analysis and Prediction.
- An Examination of the Variation in Information Systems Project Costs Estimates: The Case of the Year 2000 Compliance Projects
- The Role of Language Engineering for Multilingual Knowledge Management in

Global E-Commerce

- Mining of Electronic Medical Record Databases

- The Infusion of Software-Process Innovations among Information Systems Professionals

- An Empirical Study of Determinants for Network Security.

Candidates will be required to complete a core which addresses the theoretical and methodological underpinnings of the field's critical constructs; a research methodological component that facilitates the development of expertise in research design and assessment; a support area that enables the student to build an appropriate depth of understanding given the research problem of the dissertation; and the research dissertation. Students will be expected to complete a minimum of 67 credits. Reflecting the interdisciplinary nature of the program, a 12-credit support area must be taken outside the school.

Conclusion

While there may not be one correct model for education in this area, Penn State's School of Information Sciences and Technology has a pretty good formula for the makeup and delivery of educational programs that will help close the gap between the workforce demand of the twenty-first century and the trained IT worker supply. The formula includes multiple levels of training, many venues, and multiple media for access and delivery. And no matter what the IST course or program, critical factors are built in to assure that more than just the technology needs of the e-world are being met. These

factors include: teamwork, oral and written skills development, problem solving, and leadership.

Treating industry and government as partners in the design and refinement, implementation and support of the school is a model that has significantly benefited Penn State. Design and financial support are critical, but just as important are the eyes and ears of top executives on what is innovative, new, and representative of both the opportunities and the threats of the e-world. It is this insight that will help keep the school fresh and exciting.

Committee on Education and the Workforce
Witness Disclosure Requirement – "Truth in Testimony"
Required by House Rule XI. Clause 2(g)

Your Name:	James B. Thomas		

	Yes	No
1. Will you be representing a federal. State. or local government entity? (If the answer is yes please contact the Committee).		X

2. Please list any federal grants or contracts (including subgrants or subcontracts) which <u>you</u> have received since October 1. 1997:

      None

	Yes	No
3. Will you be representing an entity other than a Government entity?	X	

4. Other than yourself. please list what entity or entities you will be representing:

      School of Information Sciences and Techonogy
      The Pennsylvania State University

5. Please list any offices or elected positions held or briefly describe your representational capacity with each of the entities you listed in response to question 4:

      Dean

6. Please list any federal grants or contracts (including subgrants or subcontracts) received by the entities you listed in response to question 4 since October 1. 1997. including the source and amount of each grant or contract:

      None

	Yes	No
7. Are there parent organizations. subsidiaries. or partnerships to the entities you disclosed in response to question number 4 that you will not be representing?		X

Signature: _____ Date: 9/28/00

Please attach this sheet to your written testimony.

JAMES B. THOMAS

The Pennsylvania State University
School of Information Sciences and Technology
Office of the Dean
504 Rider
University Park, Pa. 16802-3008
Phone: (814) 865-3528
Fax: (814) 865-5604
E-mail: jthomas@ist.psu.edu

1357 Vineyard Haven
State College, Pa. 16803
(814) 234-0535

Current Positions

Dean, School of Information Sciences and Technology
Professor of Information Sciences, Technology, and Management

Education

Ph.D., Strategic Management
Minors: Decision Theory, Political Science
The University of Texas at Austin, 1988

M.S., Government
Minor: Quantitative Analysis
Florida State University, 1979

B.A., Pre-Law
The Pennsylvania State University, 1974

Selective Journal Publications

Gioia, Dennis A., and Thomas J. B. "Institutional identity, image, and issue interpretation: Sensemaking during strategic change in academia," *Administrative Science Quarterly*, 41, 3, 1996, 370-403.

Ketchen, Jr., David C., Thomas, J. B., and McDaniel, Jr., Reuben R. "Process, content, and context: Synergistic effects on organizational performance," *Journal of Management*, 22, 2, 1996, 231-257.

Lindsley, Dana H., Brass, Daniel J., and Thomas, J. B. "Efficacy-performance spirals: A multilevel perspective," *Academy of Management Review*, 20, 3, 1995, 645-678.

Thomas, J. B., Shankster, Laura J., and Mathieu, John E. "Antecedents to organizational issue interpretation: The role of single-level, cross-level, and content cues," *Academy of Management Journal*, 37, 5, 1994, 1252-1284.

Gioia, Dennis A., Thomas, J. B., Clark, Shawn M., and Chittipeddi, Kumar. "Symbolism and strategic change in academia: The dynamics of sensemaking and influence," *Organization Science-Special Issue on Cognition*, 5, 3, 1994, 363-383.

Snow, Charles C., and Thomas, J. B. "Field research methods in strategic management: Contributions to theory building and testing," *Journal of Management Studies*, 31, 4, 1994, 457-480.

Ketchen, Jr., David J., Thomas, J. B., and Snow, Charles C. "Organizational configuration and performance: A comparison of theoretical approaches," Academy of Management Journal -- Special Issue on Configuration, 36, 6, 1993, 1278-1313

Thomas, J. B., Clark, Shawn M., and Gioia, Dennis A. "Strategic sensemaking and organizational performance: Linkages among scanning, interpretation, action, and outcomes," Academy of Management Journal, 36, 2, 1993, 239-270.

Thomas, J. B., and Trevino, Linda K. "Information processing in strategic alliance building: A multiple-case approach," Journal of Management Studies, 30, 5, 1993, 779-814.

Thomas, J. B., Ketchen, Jr., David J., Trevino, Linda K., and McDaniel, Jr., Reuben R. "Developing interorganizational relationships in the health sector," Health Care Management Review, 17, 2, 1992, 7-19.

Henderson, John C., and Thomas, J. B. "The alignment of business and information technology domains: Perspectives of strategic planning in hospitals," Hospital and Health Services Administration, 37, 1, 1992, 71-87.

Thomas, J. B., McDaniel, Jr., Reuben R., and Anderson, Ruth A. "Hospitals as interpretation systems," Health Services Research, 25, 6, 1991, 859-880.

Anderson, Ruth A., and Thomas, J. B. "The thinking hospital," Health Progress, 72, 7, 1991, 16-18.

Thomas, J., B., and McDaniel, Jr., Reuben R. "Interpreting strategic issues: Effects of strategy and top management team information processing structure," Academy of Management Journal, 33, 2, 1990, 286-306.

Ketchen, Jr., David J., and Thomas, J. B. "Dividing and conquering strategic issues," Health Progress, 71, 7, 1990, 64-68.

Thomas, J. B., McDaniel, Jr., Reuben R., and Dooris, Michael L. "Strategic issue analysis: NGT + decision analysis for resolving strategic issues," Journal of Applied Behavioral Science, 25, 2, 1989, 189-200.

Carsrud, Alan L., Olm, Kenneth W., and Thomas, J. B. "Predicting entrepreneurial success: Achievement motivation, personality traits, and contextual factors," Journal of Entrepreneurship and Regional Development, 1, 2, 1989, 237-244.

Elam, Joyce J., and Thomas, J. B. "Evaluating the productivity of information system organizations in state government," Public Productivity Review, 12, 3, 1989, 262-277.

Kleinmuntz, Don N., and Thomas, J. B. "The value of action and inference in dynamic decision making," Organizational Behavior and Human Decision Processes, 39, April, 1987, 341-364.

McDaniel, Jr., Reuben R., Thomas, J. B., Ashmos, Donde P., and Smith, Judith P. "The use of decision analysis for organizational design: Reorganizing a community hospital," Journal of Applied Behavioral Science, 23, 3, 1987, 337-350.

Dinitto, Diana, M., McDaniel, Jr., Reuben, R., Ruefli, Timothy W., and Thomas, J. B. "The use of ordinal time series analysis in assessing policy inputs and impacts," Journal of Applied Behavioral Science, 22, 1, 1986, 77-93.

Proceedings

Youndt, Mark, Thomas, J.B., and Fairbank, James, "A multi-theoretical and configurational approach to assessing organizational effectiveness," Proceedings, Annual Meeting of the Southern Management Association, Orlando, Fla., November, 1995.

Thomas, J.B., and McDaniel, Jr., Reuben R. "Organizational antecedents to strategic issue formulation," Proceedings, Academy of Management 48th Annual Meeting, Anaheim, Calif., August, 1988.

Olm, Kenneth, W., Carsrud, Alan L., and Thomas, J.B. "Predicting entrepreneurial success: Effects of multi-dimensional achievement motivation, levels of ownership, and cooperative relationships," Proceedings, Twenty-ninth World Conference of the International Council for Small Businesses, Chicago, June, 1984. Recipient: Outstanding Paper of Conference Award.

Book Chapters

Thomas, J.B., and DeWitt, Rocki-Lee. "Strategic alignment research and practice: A review and agenda," In J. Luftman, (Ed.), Strategic Alignment in Practice, Oxford University Press, 1996. 385-403.

Gioia, D.A., Thomas, J.B., Clark, S.M., & Chittipeddi, K. " Symbolism and strategic change in Academia: The dynamics of sensemaking and influence." In Meindl, Stubhart, & Porac (Eds), Cognition within and between organizations, 1996, 207-244. A version originally appeared as an article in Organization Science, 1994.

Thomas, J.B., Gioia, D.A., and Ketchen, David. "Strategic sensemaking: Learning through scanning, interpretation, action, and performance." In A. Huff and J. Walsh (Eds.), Advances in strategic management, JAI Press, 1997.

Thomas, J.B., Ketchen, D.J., Trevino, L.K., & McDaniel, R.R. "Developing interorganizational relationships in the health sector: A multi-case study." In Brown Montague (Ed.) Integrated health care delivery: Theory, practice, evaluation and prognosis, Gaithersburg, MD: Aspen, 1996, 135-147. A version originally appeared as an article in Health Care Management Review, 1992.

Snow, Charles C., and Thomas, J.B. "Building networks: Broker roles and behaviors," In P. Lorange, B. Chakravarthy, J. Roos, and A. Van de Ven (Eds.), Strategic processes: Learning, adaptation and innovation, Basil Blackwell, 1993, 271-238.

Book Reviews

Thomas, J.B. "Process/outcome linkages: The art of problem solving," Review in Contemporary Psychology of Janis, L. L. (1989) Crucial decisions: Leadership in policy making and crisis management, 36, 6, 1991, 381.

Cases

Ketchen, David, and Thomas, J.B., "Montgomery Hospital" in R. Daft and M. Sharfman (Eds.), Organization theory, 4th Ed., 1994.

Thomas, J.B., Trevino, Linda K., Cramer, John S., and Lafferty, Jr., William J. "Midwest Health System," in R. Daft and M. Sharfman (Eds.), Organization theory, 3rd Ed., 1990.

Olm, Kenneth W., Eddy, George, and Thomas, J.B. "The Southland Corporation—Formulating an acquisition strategy," and "The Southland Corporation—Implementing an acquisition strategy," in G. Steiner, J. Miner and

...

E. Grey (Eds.), **Management policy and strategy**, Third Ed., Macmillan: New York, 1986. Also in G. Smith, D. Arnold, and B. Birzell (Eds.), **Strategy and business policy**, Houghton Mifflin: Boston, 1986.

Papers Under Review

Watts, Stephanie A., Thomas, J.B., and Henderson, John C., "Understanding Strategic learning: Linking organizational learning, sensemaking, and knowledge management." Organizational Science.

Labianca, Giuseppe, Fairbank, James F., Thomas, J.B., and Gioia, Dennis A. "Image, identity, and industry structure: Cognitive isomorphism in an interorganizational emulation network." Academy of Management Journal.

Selective Paper Presentations

Watts, S.A., Thomas, J.B., and Henderson, J.C., "Understanding strategic learning: Linking organizational learning, sensitivity, and knowledge management." *Academy of Management Annual Meeting*, Boston, Mass., August, 1997.

Thomas, J. B., "High performance profiles: Characteristics of global top firms," presented at the *1997 IBM Multi-Client Symposium* titled, *Positioning for success in a networked world*, Barcelona, Spain, March 3-5, 1997.

Snow, Charles and Thomas, J.B., "MESO studies: The strategy perspective", MESO Conference, Hanover, NH, April, 1997 (presented by Snow).

Thomas, J.B., "Governance: Concepts and trends," *IBM Strategic Options Symposium*, Stuttgart, Germany, May, 1996.

Thomas, J.B., "Identifying and developing core competencies: Theory and process," *Strategic Choice Workshop*, IBM, Dallas, Tex., February, 1996.

Thomas, J.B., "Aligning environment, strategy, and infrastructure: Secondary data base sources of measurement," *IBM Competency Conference*, Dallas, Tex., December, 1995.

Thomas, J.B., Keynote address: "Thinking, doing, and performing" *Southwest Academy of Management Meeting*, Program on creative thinking in health care. Houston, Tex., March, 1995.

Faculty Leader, "Teaching strategies: Striving for continuous improvement." Health care Administration Division, Doctoral and Junior Faculty Consortium, *Academy of Management Annual Meeting*, Dallas, Tex., August, 1994.

Anderson, Ruth A., Ketchen, David, McDaniel, Jr., Reuben R., and Thomas, J. B., "Defining the task environment: The effects of organizational context and environmental labeling," *Academy of Management Annual Meeting*, Dallas, Tex., August, 1994.

Thomas, J. B. "Alignment in Hospitals," *Decision Sciences Institute Annual Meeting*, Washington, D.C., November, 1993.

Ketchen, Jr., David J., Thomas, J. B., and McDaniel, Jr., Reuben R. "The strategy-performance relationship: Process, content, and fit," *Strategic Management Society Conference*, Chicago, IL, September, 1993.

Thomas, J. B., Shankster, Laura J., and Mathieu, John E. "Interpretation environments: The role of cognition, content, and context," *Academy of Management Annual Meeting*, Atlanta, Ga., August, 1993.

Ketchen, Jr., David J. and Thomas, J. B. "Strategic groups as predictors of hospital performance: A comparison of perspectives," *Academy of Management Annual Meeting*, Atlanta, Ga., August, 1993.

Thomas, J. B. "Strategic alignment: Perspectives on planning in hospitals," *Jean-Yves-Rivard Health Care Colloquium*, University of Montreal, March, 1993. (invited speaker).

Henderson, John C., Venkatraman, N., and Thomas, J. B. "Making sense of IT: Strategic alignment and organizational context," *Strategic Management Society Conference*, London, October, 1992.

Gioia, Dennis A., and Thomas, J. B. "Organizational transformation in non-profit institutions: Sensemaking, action, and performance," *Strategic Management Society Conference*, London, October, 1992.

Thomas, J. B., and Snow, Charles C. "Role of the broker in strategic network development," *ORSA/TIMS*, Anaheim, Calif., November, 1991 (invited presentation).

DeWitt, Rocki-Lee, Thomas, J. B., and Fekula, Michael. "Relationships among environment, top management team change, strategic change, and firm performance: A longitudinal analysis," *Strategic Management Society Conference*, Toronto, October, 1991.

Gioia, Dennis A., and Thomas, J. B. "Sensemaking, sensegiving, and action taking in a university: Toward a model of strategic interpretation," *Academy of Management Annual Meeting*, Miami, Fla.; August, 1991.

Thomas, J. B. "Strategic alignment," *Health Care Executive Conference*, Orlando, Fla., March, 1991 (invited presentation).

Gioia, Dennis A., and Thomas, J. B. "Linking strategic sensemaking and action taking," *Strategic Management Society Conference*, Stockholm, Sweden, September, 1990 (joint presentation). Also presented at Norwegian School of Management, Oslo, Norway, September, 1990.

Snow, Charles C., and Thomas, J. B. "Field research methods in strategic management," *Conference on Theory Building in Strategic Management*, University of Illinois, Champaign/Urbana, IL, May, 1990 (invited presentation).

Thomas, J. B., McDaniel, Jr., Reuben R., and Anderson, Ruth A. "Hospitals as interpretation systems: The role of top management information processing and strategy type," *Academy of Management Annual Meeting*, Washington, D.C., August, 1989.

Thomas, J. B., and Trevino, Linda K. "The implications of media choice in strategic decision environments," *Academy of Management Annual Meeting*, Washington, D.C., August, 1989.

Sitkin, Sim and Thomas, J. B. "The strategy of small losses: Learning from failure and conflict," *Academy of Management Annual Meeting*, Washington, D.C., August, 1989.

Thomas, J. B., and Gioia, Dennis A. "Strategic sensemaking in top management teams," *ORSA/TIMS*, Vancouver, Canada, May, 1989.

Thomas, J. B. "The impact of organizational context on strategic problem formulation," Systems Methodology and Design Group, Gerald Nadler, Chair, *ORSA/TIMS*, New Orleans, LA, May, 1987 (invited presentation).

Honors and Awards

Recipient: 1993 Fred Brand, Jr., Award as "Outstanding Undergraduate Teacher," Smeal College of Business Administration, Pennsylvania State University.

Phi Kappa Phi (Scholastic Honorary)

New Faculty Consortium, Business Policy and Planning, Academy of Management Annual Meeting, Washington, D.C., 1989.

Recipient: "Outstanding Teacher of the Year," Sigma Iota Epsilon Business Fraternity, The Pennsylvania State University, 1988, 1990.

University Fellowship, University of Texas at Austin, 1986-87.

Doctoral Consortium, Business Planning and Policy, Academy of Management Annual Meeting, Chicago, IL, 1986.

Recipient: Outstanding Paper of Conference Award, 29th World Conference of the International Council for Small Businesses, Chicago, IL, June, 1984.

Grants

  Grants completed:

"Validating strategic alignment," J. B. Thomas, IBM's Consulting Group, $50,000, 1996.

"National culture effects on the interpretation of strategic constructs." J. B. Thomas, IBM's Consulting Group, $97,000, 1994-95.

"Top management team, organizational and industry effects on strategic alignment," J. B. Thomas and Rocki-Lee DeWitt, IBM's Advanced Business Institute/IBM Consulting Group, $85,000, 1992-94.

Unrestricted Research Grant, J. B. Thomas, IBM's Advanced Business Institute, Palisades, NY, $15,000, Summer, 1991.

"Empirical testing of the strategic alignment model," J. B. Thomas, Boston University/IBM, $19,500, Fall, 1990.

"Sensemaking in top management teams," J. B. Thomas, The Smeal College of Business Administration Research Initiation Grant, $3,200, 1989/90.

"Organizational mechanisms for equivocality reduction in strategic problem formulation: An empirical study," J. B. Thomas and Linda K. Trevino, The Smeal College of Business Administration Research Initiation Grant, $3,500, 1988/89.

Teaching Experience

1993 - 1998	Associate Professor of Management, The Pennsylvania State University, Smeal College of Business Administration
1987 – 1993	Assistant Professor of Management, The Pennsylvania State University, Smeal College of Business Administration
1984 - 1986	Lecturer, University of Texas at Austin
1980 – 1981	Lecturer, Florida State University, Tallahassee, Fla.
1975 – 1978	Instructor, Broward Community College, Coral Springs, Fla. (evenings)
1975 - 1978	Teacher, Palm Cove Beach High School, Pompano Beach, Fla.

Courses Taught at Penn State:
Strategic Management (undergraduate, MBA)
Organization Theory and Behavior (undergraduate)
Business Policy (Ph.D.)
Human Resource Management (undergraduate)
Career Development (undergraduate)

Academic Committees:
Currently serve as *chair* for two doctoral committees and *co-chair* for one other. Have served in the past as the co-chair on two other doctoral committees.

Have served, or currently serve, as a *member* on twenty-three other doctoral committees and four master's committees.

Other Work Experience

1997 - 1999	Senior Associate Dean, Smeal College of Business Administration
1985 - 1986	Director, Special Projects, Texas Secretary of State's Office, Austin, Tex.
1982 - 1983	Legislative Analyst, Florida State Legislature, Tallahassee, Fla.
1980 - 1982	Director, Management Systems, Florida Department of State, Tallahassee, Fla.

Selective Executive Education Engagements

"Competency identification workshop," Executive Education Program, Penn State, August, 1997.

"Penn State Business Simulator," Executive Education Program, Penn State, multiple engagements, 1993 to present.

"Strategic alignment: Linking business and information technology domains," IBM Advanced Business Institute, School of Business Management, Palisades, NY, multiple engagements, 1990, 1991; NCR Corporation, 1993; Executive Education Program, Penn State, 1993-1996.

"Strategic alignment: Antecedents and outcomes," Shell Oil Co., Houston, Tex., July, 1993; IBM Consulting Group, Dallas, Tex., 1995.

"Pitfalls in decision making," Faculty Leader, Executive Education Program, Penn State, multiple engagements, 1990, 1991, 1993.

"Creativity blockbusting: Recognizing cognitive constraints," Faculty Leader, University Administrator Summer Education Seminar, Penn State University, June, 1990.

"Strategic management in action," Keynote Speaker and Case Discussant, University of West Indies, Jamaica, November, 1989.

Selective Consulting Engagements

IBM Consulting Group. Leading role in designing and analyzing data from multi-client study on the strategic use of network computing, 1996-1997.

Citibank. Designed and implemented six-day workshop series for identifying, designing, and developing core competencies, 1996.

IBM Consulting Group. Designed strategy competency area to be used in consulting group client engagements, 1994-96.

Universal Suppliers, Selinsgrove, Pa. Conducted top management team development program, 1992, 1993.

Department of Professional Regulation, State of Florida. Coordinated planning process to align business and technology domains (with J. Elam, Florida International University), 1991.

Editorial BoardsEditorial BoardsEditorial BoardsEditorial Boards
Academy of Management Journal, 1993-1997
Journal of Management, 1993-1997
Management Science (Asia-Pacific), 1995-

Ad Hoc Manuscript Reviewer
Administrative Science Quarterly
Academy of Management Journal
Academy of Management Review
Organization Science
Strategic Management Journal
Journal of Management Studies
Journal of Applied Behavioral Science
Sloan Management Review
Journal of Management
Hospital and Health Services Administration
Journal of Management Inquiry
National Academy of Management
Society for Information Management

Memberships
Academy of Management
Strategic Management Society
Institute for Operations Research and the Management Sciences (INFORMS)
Association for Health Services Research Center for Health Policy Research, Penn State
Affiliate Faculty Member, Department of Health Policy Administration Department, Penn State

Appendix D-The Written Statement Of Eva Cronin, Teacher,
Hayes Elementary School, Marietta, Georgia

Testimony of Eva Cronin
Teacher, Hayes Elementary School
Cobb County School District
Marietta, Georgia
Before the House Committee on
Education and the Workforce
September 22, 2000

Introduction

Good morning Mr. Chairman and members of the committee. It is an honor to appear

before you today to discuss why technology is an integral part of my classroom, how it is

utilized, and what benefits result for students, their families and teachers.

My name is Eva Cronin, and I team-teach at Hayes Elementary School, Cobb County

School District, in a multi-age 3rd, 4th and 5th grade setting. Our students are quite diverse:

they come not only from middle class households but also the country club and a homeless

shelter. We have bridged the Digital Divide at Hayes.

My teammates and I also participate in the Education for a Sustainable Future (ESF)

project, a Technology Innovation Challenge Grant funded by the USDOE and awarded to

Cobb County School District (Marietta, Georgia) and The Center for a Sustainable Future

(a subsidiary of the Concord Consortium). Participating in the ESF grant project has

provided many hours of professional development through both online netcourses and

hands-on meetings. The project has given me the opportunity to collaborate with

colleagues K-12 as well as with content, technology, and pedagogy experts from around

the world.

In my teaching career of 18 years, I have seen tremendous changes in education, many of

them due to changes in our world. We are part of an information-driven, global society, one

1

that demands instant access to and analysis of data, immediacy of communication across great distances, and multi-modal avenues of presenting information. If our students are to become responsible citizens, able to meet the challenges of the 21st century, they must become technologically literate. As I discuss how we use technology daily and the benefits it provides, I trust you will agree that this is an essential component of education for all of our students.

Our school district has connected each school with a wide-area network and provides Internet access and E-mail through that network. The district, through inkind funding support of the ESF Grant, has provided a number of technologies for our classrooms. Our hardware includes five networked computers with a networked printer, a scanner, a laptop, and a digital camera. In addition, we share a Smartboard and projector. Software includes decision-making simulations, graphing programs, a modeling program, and a program designed to promote brainstorming and outlining. Also, the ESF grant has created three software programs that can be used K-12. These programs are:

- *Community Planner* - a spatial modeling and visualization tool for community design and evaluation
- *What-If Builder* - a scenario building tool that allows creation of branching stories
- *Ecological Footprint Calculator* – a tool for students to calculate their own ecological footprint and compare that footprint to average footprints from around the world

Students, parents and teachers have utilized the technology in many ways. The benefits fall into four major categories: communication, access to information, activities that promote higher-level thinking, and opportunities to address learning styles and needs. Although there are limitless examples, I will highlight a few in each area.

2

Communication

E-mail has proved to be an indispensable communication tool for us. This past spring, I was out of school for four weeks to be with my mother, who was dying of cancer. Because my students, their parents and I are so immersed in using technology, it was natural for us to maintain daily contact through E-mail and instant messages. I was able to reassure my students that I was all right, and that they could depend on me even though I was far away. In addition, I could support the substitute teacher and be by her side virtually. Technology literally allowed me to be in two places at once – the places I most needed to be.

Jason, a student who made great progress in reading last year, responded to my personal challenge this summer. We agreed to form a "Book Club" of two, read the new Harry Potter installment, and E-mail our reactions every few days. We both enjoyed reading an exciting book, and sharing thoughts, predictions and surprises as we read deepened our understanding.

This year, an ESF colleague and I are utilizing E-mail for his high school Current Issues class to correspond with my students weekly; the older students write about current events of interest to our students, who respond to the articles. This opportunity to provide virtual mentoring benefits both the older and younger students. Those who write the articles have to truly understand the events in order to explain them to a younger audience. Those who read and respond are learning about current events at their own reading level.

Increasingly, parents E-mail with questions, comments and compliments, knowing that I value their input and interest in their children's education. Even parents with no access at home generally have and use E-mail at work. It has become a part of our daily lives.

Collaboration with national and international colleagues through list-serves related to education has been valuable to me as a professional. And, the ESF grant is experimenting with online teacher to teacher mentoring this year. I have already begun correspondence with a teacher in a neighboring county who is teaching one of our units. She is excited to know I am available to help at any time.

Allowing students to communicate directly with me and with others via E-mail has greatly developed their skills in written expression and has provided opportunities for real-life audiences to respond to them. As a professional, I appreciate working even more closely with parents and colleagues even across great distances. There are many teachers who check their E-mail when reminded; I can't imagine going through one day without it!

Access to Information

If my school district were to order Social Studies or Science textbooks today, some of the information that is printed in them is guaranteed to be out-of-date by tomorrow. Using the Internet provides students, parents and teachers information that is up-to-date.

We often track current events, and right now we're "watching" Olympic events as they unfold, and graphing information in the classroom. The opportunity to work with "real-time" data opens up new worlds for students, who can study history as it happens across the world.

Students use the Internet to provide multiple sources for research. While working on a Biography unit last year, Jeree was thrilled to find new information on her subject, who is now working as an astronaut with NASA.

4

As a teacher, I find that lesson planning has again become exciting as I search for interactive sites. When we studied body systems last year, students enjoyed multi-media sites about the brain, and returned again and again to learn new facts to share with the class.

The excitement generated through using the Internet as a learning tool motivates my students to achieve every day. They are proud of the content and scope of their knowledge! I also find that my teaching has become re-energized, and I automatically look for ways to integrate the Internet into my planning and teaching. Parents appreciate learning about websites that are educational and enjoyable for children; we exchange suggestions frequently.

Higher-Level Thinking

Utilizing software acquired through our ESF grant has allowed students to concentrate on data analysis, a higher-level thinking skill. As a third grader, Scott had difficulty drawing graphs. In his frustration with making all those straight lines, he missed the point of why and how graphs are used. Last year, he was introduced to *The Graph Club*, a software program. Scott was so excited about it that for a month he used his recess time to survey his peers about different issues, create graphs, and present his information to the class. Technology made a huge difference for this child!

As part of an ESF unit we created on local land use, our students studied maps of our city from 1972 and 1994. They used software to graph the percentage of land used for government, commercial enterprise, residences and agriculture. It was astounding for them to note the changes evident over time. Because the software could effortlessly switch between types of graphs and the intervals used, students could see different ways of

5

presenting their information and choose the one they felt was most persuasive for their purposes.

What-If Builder allowed Kristen to explore many story pathways to solving a real-life problem last year. She wondered if there were alternate solutions to the problem of clear-cutting to build new subdivisions, and traced the subsequent problems and solutions in her story. Because of the branching capabilities, she was able to quickly revise her story as it developed.

Since technology can complete certain tasks in a shorter amount of time, students are freed up to look at the "big picture", to reason, to analyze, and to think critically. This is a vital skill for their future.

Individualized Learning

We learn in different ways. Marguerite, a fourth grader, is a visual learner who was having difficulty remembering the meaning of the word *perseverance*. She and three friends planned a series of digital pictures to illustrate its meaning, and those pictures now hang on our classroom wall.

For Parents' Night, the children helped produce a PowerPoint presentation including pictures to describe our daily schedule. Many parents commented that they truly gained a sense of "what's happening in the classroom." They saw their children actively involved in learning, working collaboratively, and producing work of high quality.

For Mark, a learning disabled student, reading for information was a difficult task. Using the computer and having the encyclopedia program "read" articles to him allowed Mark to learn

6

the information he needed to produce a report comparing the digestive systems of frogs and humans. He was thrilled to be working independently, just like everyone else.

All students are capable of learning. Technology widens the avenues of learning, and addresses individual strengths and needs. Multiple types of input deepen learning for all students. Being able to utilize technology to increase the types of input available for students is invaluable to educators. We are able to reach students who would have struggled greatly in the past, allowing them to reach their full potential.

Aligning With the Standards

One of the challenges teachers face today is how to meaningfully address the curriculum standards we are being held accountable to teach. Several of the technology tools developed by the ESF project for teachers have made it easier to accomplish this task. We use a rubric that guides our choice of the right technology at the right time for the right objective in developing materials for our classrooms. We also have an online curriculum development template that helps us select and align the appropriate standards with our curriculum. This has made what is sometimes a burdensome task much easier.

Professional Development and Renewal

As a teacher of 18 years, I keep myself engaged and renewed in my profession by taking advantage of opportunities to develop my knowledge and skills as a teacher. My participation in the ESF project has strengthened my ability to give my students what they need to thrive in the information-rich future they face. Through my own development in this regard, I have become a facilitator who helps them master the art of putting technology to the best use for themselves, their families, and their communities.

7

I have seen the same kind of professional growth and renewal occur in my other colleagues who are involved in this ESF opportunity. They are learning to use technology as a tool for creativity, collaboration, invention, and to extend their network of peers and mentors. In so doing they are keeping themselves ahead of the curve as teachers and making themselves more valuable to their students.

Our project has documented these kinds of changes among most of the teachers who have participated in the first two years of the project. More specifically, these changes include:

- they were more thoughtful and excited about their teaching and became better teachers,
- their technological skills grew and empowered them in their teaching and general self-confidence ("*I feel like I have a new calling…I'm on the cutting edge.*"),
- their personal understanding of sustainability grew (in most cases from little or no understanding) to a point where it affected them in their own lives—thinking about the future, planning, envisioning, clear-cutting, etc. ["*I feel as though I should not have bought my house, now that I know all the trees were cleared by the developer just to save money.*"],
- they were professionally challenged and developed,
- several were advancing their careers through opportunities the project has opened up for them, e.g. teaching technology to others, presenting at conferences, working toward higher degrees.

Conclusion

Over the past three years, my teammates and I have progressed through a number of stages in our level of technology use. At first, in a one-computer classroom, we struggled to schedule students for computer time and to find valid activities that could be incorporated

8

into our day. Next, as ESF Grant participants, we began to increase our technology and curriculum integration through activities that were suggested to us by our mentors. Students used the computers more regularly and in ways that truly supported learning. As we gained experience and confidence, it was apparent that other activities could be adapted to meet our needs and the needs of our students.

Now, we find that for every successful project we complete, four more come to mind -- and they are not always our ideas, but often originate with the children. For example, when I told my students that I was coming to speak with you today, they wanted to know if one of you would be willing to correspond via E-mail or instant message during our study of government this fall. For those of you who have children, I am sure you know the tremendous impact one such message would have on a classroom!

Thank you again for the opportunity to bring a bit of the classroom to you. I would be happy to answer any questions you may have at this time.

9

Notes

Other sources provide evidence of these kinds of the positive effects of technology in the classroom:

1. Increase In Achievement

A review of 219 research studies from 1990-1997 fond that children showed increases in achievement from preschool through higher education when immersed in technology-rich environments; and positive effects in achievement were found in all major subject areas when students were immersed in technology-rich environments. *Source:* J. Sivin-Kachala, *Report on the Effectiveness of Technology in Schools, 1990_ 1997* (Washington, D.C.: Software Publisher's Association, 1998).

A study of achievement of 950 fifth-grade students in 18 schools in West Virginia found that computer education increased student motivation, participation and achievement with the greatest impact among students who are traditionally poor performers and those who have no access to computers at home. All students' test scores on the Stanford 9 increased. The more they used Basic Skills/Computer Education, the more their scores rose. *Source: West Virginia's Basic Skills/Computer Education (BS/CE) Statewide Initiative (1999)*

A national sample of 6,227 fourth graders and 7,146 eighth graders found that eighth grade students showed 15 weeks of gains above grade level after using simulation and higher order thinking software and showed 13 weeks of gains above grade level after having teachers who received professional development on computers. *Source:*

10

Educational Testing Service (ETS) National Study of Technology's Impact on Math

Achievement (1998)

2. Master Literacy

Exposure to the Internet can help preschoolers and children in the early elementary

grades master literacy and other cognitive skills. *Source: Safe & Smart: Research and*

Guidelines for Children's Use of the Internet. National School Boards Foundation with

support from Children's Television Workshop and Microsoft.

3. More Time Spent Reading

Thirty-percent of all parents whose children use the Internet report that their children

spend more time reading books since they began using the Internet. Eighty-five percent

say their children's book reading time has increased or stayed the same. Twenty-two

percent of all parents whose 4 to 17 year old children use the Internet report that they

spend more time reading newspapers and/or magazines since they began using the

Internet. Eighty-seven percent say this time has increased or stayed the same. *Source:*

Safe & Smart: Research and Guidelines for Children's Use of the Internet. National

School Boards Foundation with support from Children's Television Workshop and

Microsoft.

4. Improves Science and Writing Skills

Studies have shown that children's communication with peers about how to solve a

science problem can improve science learning. Others demonstrate that stimulating

11

collaboration in young children's story-telling play lead to improved writing skills. Other findings provide encouraging evidence that informal, collaborative experiences with quality educational software can help develop skills that are not only content-specific, but that can also be transferred to new situations. *Source: GROWING UP WITH INTERACTIVE MEDIA What We Know and What We Don't About the Impact of New Media on Children; An Executive Summary of a Report to The Markle Foundation by Dr. Ellen Wartella, Dr. Barbara O'Keefe and Dr. Ronda Scantlin.*

5. Learn More in Less Time

Analysis of 500 research studies on computer based instruction found that students who used computer-based instruction learn more in less time; and students who used computer-based instruction scored in the 64 th percentile on achievement tests while students without computers scored in the 50 th percentile. *Source: Kulik, J.A. (1994). Meta-Analytic Studies of Findings on Computer-Based Instruction. In Baker, E.L. and O'Neil, H.F. (Eds.) Technology Assessment in Education and Training. Hillsdale, NJ: LEA Publishers.*

6. Higher Scores in Math

Eighth-graders who used computers to learn higher order thinking skills or who had teachers that were trained in the use of technology raised their achievement in mathematics by more than one-third of a grade level. *Source: Does it Compute? – The Relationship Between Educational Technology and Student Achievement in Mathematics. Educational Testing Service, Princeton, NJ: September 1998.*

7. Higher quality writing by students

Word processing makes it easier for students to edit their writing, makes students more willing to revise their writing and ultimately helps them become better writers. Students are also more willing to have other students critique their writing over computers, and the writing they share tends to be higher quality. *Source: Means, B., Technology and Education Reform: The Reality Behind the Promise. San Francisco, CA: Jossey-Bass, 1994*

8. More ambitious student projects

When elementary students used the Internet, they made more effective and comprehensive presentations; integrated more competing points of view in their presentations, submitted more ambitious and complete projects; and were more likely to use the Internet in subsequent schoolwork. *Source: The Role of Online Communications in Schools: A National Study. Center for Applied Special Technology, Peabody, MA: 1996.*

9. Better Attitudes

Kulik's Analysis Study of 500 research studies on computer based instruction found that students find more enjoyment and have more positive attitudes toward classes that include computer-based instruction. *Source: Kulik, J.A. (1994). Meta-Analytic Studies of Findings on Computer-Based Instruction. In Baker, E.L. and O'Neil, H.F. (Eds.) Technology Assessment in Education and Training. Hillsdale, NJ: LEA Publishers.*

13

A review of 219 research studies from 1990-1997 fond that when computers were used for instruction, students' self-concept and attitudes toward learning consistently improved. *Source:* J. Sivin-Kachala, *Report on the Effectiveness of Technology in Schools, 1990_ 1997* (Washington, D.C.: Software Publisher's Association, 1998).

10. Promoting Active Learning

Teachers hope that in the future, technology-rich classrooms will promote more active learning that will emphasize problem-solving and critical thinking. They hope that technological skill-sets will be utilized and applied across the curriculum to present meaningful real-life problems for students to solve. *Source: Tech-Savvy: Educating Girls in the New Computer Age. AAUW Educational Foundation, 2000.*

11. Students Deserve 21st Century Learning Tools

Learning is no more about the computer then it is about the pencil...information is not learning, and the process of transforming information into knowledge/learning is what education is about. *Source: Tech-Savvy: Educating Girls in the New Computer Age. AAUW Educational Foundation, 2000.*

12. Bringing the World into the Classroom

The computer can literally bring the world into the classroom, leading to a more united, peaceful, tolerant, intelligent children. *Source: Tech-Savvy: Educating Girls in the New Computer Age. AAUW Educational Foundation, 2000.*

13. Customizing Curriculum and Increasing Diversity

Teachers are enthusiastic that information technology allows them to customize the curriculum and to suppliment the curriculum through the Internet to include information about groups that may get overlooked in traditional textbooks. *Source: Tech-Savvy: Educating Girls in the New Computer Age. AAUW Educational Foundation, 2000.*

14. Learning Together

Teachers praise computers for enabling students of different backgrounds to learn together "at their own pace." Students who were labeled slow learners were actually some of the best computer operators in the class and were able to help others complete projects. *Source: Tech-Savvy: Educating Girls in the New Computer Age. AAUW Educational Foundation, 2000.*

15. Individualized Teaching and Learning

Analysis of geometry computer "tutor" in several classrooms found that it allowed teachers to dispense more individualized attention and advise to their students. Further, it encouraged self-paced learning for slower and faster students, and introduced controls against students "skipping over" concepts in the curriculum that they did not truly understand. *Source: Schofield, Janet. Computers and Classroom Culture (New York: Cambridge University Press, 1995).*

91

16. Preparing Children For 21st Century Careers

According to the U.S. Department of Labor assessments, information technology jobs

are projected to be among the fastest-growing occupations between 1996 and 2006.

The Department of Labor's Occupational Handbook identifies computer scientists,

computer engineers, and systems analysts as the top three fastest-growing

occupations, and among the top 20 in the number of new jobs created.

Source: U.S. Department of Labor, Bureau of Labor Statistics, MLR: The Editor's Desk,

October 28, 1998, stats.bls.gov/opub/ted/1998/oct/wk4/art03.htm.

17. Education for a Sustainable Future Teacher Impact Data.

Through a self-evaluation process, teachers indicate a shift from a low technology,

passive learning classroom environment to creating a learning environment where

students are more actively engaged and use technology in the learning process.

Source: Year Two Interim Progress Report, Education for a Sustainable Future

Technology Innovation Challenge Grant, Cobb County Schools, 1998.

Technology Innovation Challenge Grant

Impact Data - 1998
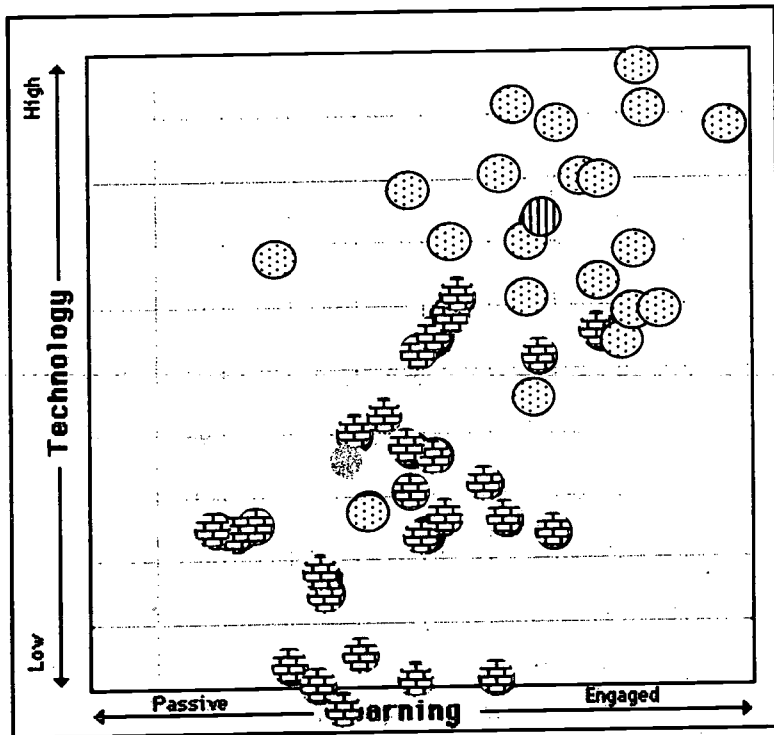
- Each dot represents a participating teacher.

🔅 Composite Pre Grant

➡ Individual Pre Grant

Ⓙ Composite Post Yr. 2

☺ Individual Post Yr. 2

LEARNING AND TECHNOLOGY INDICATORS

Program used for collection of this information is "Learning With Technology Profile Tool" developed by North Central Regional Educational Laboratory (NCRTEC). It is available from www.ncrel.org.

Indicators used for data collection are:

Engaged Learning Indicators

    1. Vision of Engaged Learning

    ❏ *Responsible for Learning*. Students take charge of their own learning and are self-regulated. They define learning goals and problems that are meaningful to them; understand how specific activities relate to those goals; and, using standards of excellence, evaluate how well they have achieved the goals. Successful, engaged learners also have explicit measures and criteria for assessing their work as well as benchmark activities, products, or events for checking their progress toward achieving their goals.

    ❏ *Energized by Learning*. Engaged learners find excitement and pleasure in learning. They possess a lifelong passion for solving problems and understanding ideas or concepts. To such students, learning is intrinsically motivating.

    ❏ *Strategic*. Engaged learners continually develop and refine learning and problem-solving strategies. This capacity for learning how to learn includes

constructing effective mental models of knowledge and resources, even though the models may be based on complex and changing information. Engaged learners can apply and transfer knowledge in order to solve problems creatively and they can make connections at different levels.

❑ *Collaborative.* Engaged learners understand that learning is social. They are able to see themselves and ideas as others see them, can articulate their ideas to others, have empathy for others, and are fair-minded in dealing with contradictory or conflicting vies. They have the ability to identify the strengths and intelligences of themselves and others.

2. Tasks for Engaged Learning

❑ *Challenging.* Unlike tasks usually offered in schools, challenging tasks are typically complex and required sustained amounts of time. Such tasks also require students to stretch their thinking and social skills in order to be successful.

❑ *Authentic.* Authentic tasks correspond to tasks in the home and workplace. They are closely related to real-world problems and projects, build on life experiences, require in-depth work, and benefit from frequent collaborations. Such collaboration can take place with peers and mentors within school or with diverse people outside of school.

❑ *Integrative/interdisciplinary.* Challenging and authentic tasks often require integrated instruction, which blends disciplines into thematic or problem-based pursuits, and instruction that incorporates problem-based learning and curriculum by project.

3. Assessment of Engaged Learning

❏ *Performance-Based.* Students construct knowledge and create artifacts to represent their learning. Ideally, students also are involved in generating performance criteria and are instrumental in the overall design, evaluation, and reporting of their assessment.

❏ *Generative.* The overriding purpose of assessment is to improve learning. To that end, assessment should closely match the goals of the curriculum; represent significant knowledge and enduring skills, content, and themes; and provide authentic contexts for performance. The performance criteria should be clear, well articulated, and part of the students' learning experience prior to assessment. Indeed, developing standards of excellence for learning and thinking is an important part of learning.

❏ *Interwoven with Curriculum and Instruction.* Assessment should include all meaningful aspects of performance. It should encompass the evaluation of individual as well as group efforts; self, peer, and teacher assessments; attitudes and thinking processes; drafts or artifacts of developing products as well as final products; open-ended as well as structured tasks; and tasks that emphasize connections, communication, and real-world applications. Multiple measures (e.g., surveys, inventories, journals, illustrations, oral presentations, demonstrations, models, portfolios, and other artifacts of learning) are needed to assess "big ideas" and complex learning outcomes over time.

❑ *Equitable Standards*. Parents and students should be familiar with the standards that apply to all students and be able to evaluate the performance of an individual or group using those standards.

4. Instruction Models and Strategies for Engaged Learning

❑ *Interactive*. Instruction actively engages the learner.

❑ *Generative*. Generative instruction encourages learners to construct and produce knowledge in meaningful ways by providing experiences and learning environments that promote deep, engaged learning. Generative instruction also encourages learners to solve problems actively, conduct meaningful inquiry, engage in reflection, and build a repertoire of effective strategies for learning in diverse social contexts.

5. Learning Context for Engaged Learning

❑ *Knowledge-Building Learning Community*. The learning community resists fragmentation and competition and enables students to learn more collaboratively.

❑ *Collaborative*. In learning communities, intelligence is assumed to be distributed among all members. Collaborative classrooms, schools, and communities encourage all students to ask hard questions; define problems; take charge of the conversation when appropriate; participate in assessments and in setting goals, standards, and benchmarks; have work-related conversations with various adults in and outside schools; and engage in entrepreneurial activities.

□ *Empathetic.* Learning communities search for strategies to build on the strengths of all members. These strategies are especially important for learning situations in which members have very different prior knowledge.

6. Grouping for Engaged Learning

□ *Heterogeneous.* Heterogeneous groups include males and females and a mix of cultures, learning styles, abilities, socioeconomic status, and ages. This mixture brings a wealth of background knowledge and differing perspectives to authentic, challenging tasks.

□ *Flexible.* Flexible groups are configures and reconfigured according to the purposes of instruction. This flexibility enables educators to make frequent use of heterogeneous groups and to form groups, usually for short periods of time, based on common interests or needs.

□ *Equitable.* The use of both flexible and heterogeneous groups is one of the most equitable means of grouping. It ensures increased opportunities to learn for all students.

7. Teacher Roles for Engaged Learning

□ *Facilitator.* The teacher provides rich environments, experiences, and activities for learning by incorporating opportunities for collaborative work, problem solving, authentic tasks, and shared knowledge and responsibility.

□ *Guide.* In a collaborative classroom, the teacher must act as a guide - a complex and varied role that incorporates mediation, modeling, and coaching. When mediating student learning, the teacher frequently adjusts the level of information and support based on students' needs and helps students to link

new information to prior knowledge, refine their problem-solving strategies, and learn how to learn.

❑ *Co-Learner and Co-Investigator.* Teachers and students participate in investigations with practicing professionals. Using this model, students explore new frontiers and become producers of knowledge in knowledge-building communities. Indeed, with the help of technology, students may become the teachers as teachers become the learners.

8. Student Roles for Engaged Learning

❑ *Explorer.* Students discover concepts and connections and apply skills by interacting with the physical world, materials, technology, and other people. Such discovery-oriented exploration provides students with opportunities to make decisions while figuring out the components/attributes of events, objects people, or concepts.

❑ *Cognitive Apprentice.* Students become cognitive apprentices when they observe, apply, and refine through practice the thinking processes used in the real-world practitioners. In this model, students reflect on their practice in diverse situations and across a range of tasks, and they articulate the common elements of their experiences.

❑ *Producers of knowledge.* Students generate products for themselves and their community that synthesize and integrate knowledge and skills. Through the use of technology, students increasingly are able to make significant contributions to the world's knowledge.

99

18. For Further Information about the Education for a Sustainable Future.

Additional information about Education for a Sustainable Future can be found at

http://csf.concord.org/esf and http://www.cobb.k12.ga.us/~Grants/.

Committee on Education and the Workforce
Witness Disclosure Requirement – "Truth in Testimony"
Required by House Rule XI. Clause 2(g)

Your Name: **Eva Cronin**			

	Yes	No
1. Will you be representing a federal. State. or local government entity? (If the answer is yes please contact the Committee).		(No)

2. Please list any federal grants or contracts (including subgrants or subcontracts) which you have received since October 1, 1997:

	Yes	No
3. Will you be representing an entity other than a Government entity?	(Yes)	No

4. Other than yourself. please list what entity or entities you will be representing:

Education for a Sustainable Future, a Technology Innovation Challenge Grant Project

5. Please list any offices or elected positions held or briefly describe your representational capacity with each of the entities you listed in response to question 4:

Grant Participant

6. Please list any federal grants or contracts (including subgrants or subcontracts) received by the entities you listed in response to question 4 since October 1, 1997. including the source and amount of each grant or contract: On October 1, 1997, Cobb County School District and The Center for a Sustainable Future were awarded a 5-year 6 million dollar Technology Innovation Challenge Grant funded by the United States Department of Education.

	Yes	No
7. Are there parent organizations. subsidiaries. or partnerships to the entities you disclosed in response to question number 4 that you will not be representing?		(No)

Signature: _Eva Cronin_ Date: _9/20/00_

Please attach this sheet to your written testimony.

Eva Bergren Cronin
1335 Pinebreeze Way
Marietta, Georgia 30062-2155
(770) 579-8059
epcronin1@aol.com

PROFESSIONAL EXPERIENCE

September, 1994- Present	Hayes Elementary School Kennesaw, Georgia *Teacher, Grades 3 and 4, Family Grouping Model*

- Piloted Intermediate Family Grouping, Grades 3-5
- Planned and implemented multiage curriculum
- Facilitated Spelling Study Group for staff
- Served as Mentor Teacher and Curriculum Writer for Technology Innovation Challenge Grant – Education for a Sustainable Future
- Implemented Integrated Thematic Instruction
- Honored as Hayes Elementary Teacher of the Year 2000-2001

September, 1990- June, 1994	Mount Pleasant Central Schools Thornwood, New York *Writing Curriculum Leader*

- Chaired Elementary Writing Committee
- Co-authored Elementary Writing Curriculum, Teacher Management Guide for Writing Instruction, County-wide Language Arts Survey and Parent Handbook on Writing
- Prepared semi-annual curriculum reports for the Board of Education
- Planned, conducted and evaluated grade-level and school-wide assessment in writing
- Conducted teacher training
- Conducted parent workshops on writing and parent training for the Paw Publishing Center

September, 1985- June 1994	Columbus Elementary School Thornwood, New York *Teacher, Grade 4*

- Taught "Storytelling Through Dance" integrated curriculum in coordination with the New York City Ballet Education Department at Lincoln Center
- Supervised student teachers

September, 1983- June, 1985	The Home School White Plains, New York *Teacher, Grades 1, 5/6*

CERTIFICATION

New York State Permanent Certificate, Nursery-Grade 6
    #078448878

Georgia Teaching Certificate, Early Childhood
    #078448878

EDUCATION

1990   Western Connecticut State University   Danbury, Connecticut
       Master of Science in Instructional Management and Curriculum

1983   Alfred University   Alfred, New York
       Bachelor of Arts in Elementary Education, Magna Cum Laude
       Minor in Psychology

PROFESSIONAL AFFILIATIONS

Association for Supervision and Curriculum Development
International Reading Association
National Council of Teachers of English
National Council of Teachers of Mathematics

References available upon request

**Appendix E-The Written Statement Of Janet Guge, Art And
French Teacher, Franklin Public Schools, Franklin, Nebraska**

Testimony of Ms. Janet Guge
Art and French Teacher
Franklin Public Schools
Franklin, NE

"Bonjour! Je m'appelle Mme Guge." If you had taken high school French, you would know that I said: "Hello, my name is Mrs. Guge." And I'm pleased to be here today. I teach French in a small school in Franklin, Nebraska. I have been asked to speak about my experience with Distance Learning and how I provide French to two high schools through a two-way interactive network. The town of Franklin has about 1200 people, and the town of Minden, 30 miles away, has about 3000 people. I want you to know that I am a classroom teacher, and this is my second year using the distance education network, but my twelfth year as a French teacher. I have also taught art for twenty-two years. I am not an expert on funding, policy or the technology of how it all works. I am working, though, to be an effective distance learning instructor.

Our schools are a part of the Tri-Valley Distance Education Consortium (TVDEC). The consortium has over 35 schools and more are joining. This consortium serves 16,535 students in grades K-12. Schools within the consortium have an average enrollment of 533 students. Among members are three Educational Service Units (7, 10, and 11), the University of Nebraska at Kearney, and the Central Community College system (See maps). The consortium provides full-motion audio/video connectivity within an eighteen-county region. I teach using four TV monitors, two cameras, microphones, a document camera (instead of a chalkboard), a VCR, a computer with CD player, and a FAX machine (See photo).

(109)

105

When I was first asked to try teaching this way it sounded exciting, but also scary when I considered all the equipment I would have to be trained to use. And it was just I, no camera operator or sound tech. The consortium, however, provided excellent training, support personnel and a stipend to cover my costs. And now after one year of experience and more training, I feel more relaxed and confident running my classroom this way. This training wouldn't be possible without funding through grants and lottery money.

I want to briefly tell you how all this came about. In the late 1980s, the Nebraska State Department of Education conducted a survey of needs. Although every school district in Nebraska has unique values and priorities, there were some common needs and goals identified for all school districts. Some of these needs and goals include:

- Communication skills involving reading, writing and speaking.
- Alternative course offerings such as foreign language, college credits for high school, advanced placement classes, and community training opportunities.
- Community involvement and access to technology.
- Problem solving, career education, and multicultural learning.
- Professional development.

Because of the shortage of Foreign Language teachers in the state of Nebraska willing to work in a small-town, rural setting, many schools lacked instructors. Schools that did have instructors didn't always have a full schedule for those teachers and the enrollment was low at times. It's difficult to hire a teacher for two or three class periods a day. So the idea of sharing a teacher and resources seemed the ideal answer. There have been a variety of methods attempted previously to do this: satellite, one-way video

and two-way audio, but the method I use is more interactive. I feel the students benefit tremendously with this opportunity.

The eight students I have in French II need this class to meet requirements for university admission. I have a girl in Minden, Melissa, who was not interested in taking Spanish, which her school offered, but needed the two-year foreign language requirement. With the distance learning arrangement between our schools, she has the opportunity to take a subject she likes and one at which she definitely excels. Franklin also offers two levels of Spanish to another small school in our county. We feel we are providing a needed resource to area students. We also are offering an ACT prep class. In addition we have adults taking classes from the University of Nebraska at Kearney using the two-way interactive network. To me it feels very natural and convenient to use the network. And it saves drive time, as many towns in Nebraska are thirty minutes to an hour away.

I love being able to teach French, a subject I love, to as many students as I can. I have even taught a group of second graders because they were learning about Canada. They like being able to say: "Bonjour Mme Guge, Ça va?" And they liked seeing themselves on the TV monitor. I enjoy the challenge of new technology. It is definitely an important aspect of our future.

Yet all this technology can be a challenge. When things are working right, the classroom runs smoothly. But some days, technology has a mind of its own. That's when the teacher needs to think quickly, change plans on how to get the information across and have a sense of humor. One day we had no video from Minden: they couldn't see or hear me. I heard them say, "All right, no class today!" But I jumped up, wrote out

an explanation and some exercises and faxed the information to the classroom. In three minutes I heard a groan as they read the fax and realized I could hear them and expected them to work on the French assignments for the day!

Training and support for distance education is extremely important. A teacher needs to feel equipped to handle many situations and different learning styles. The TVDEC provided a Level II training that stressed a brain-compatible classroom and teaching to multiple intelligence with a variety of activities for all students.

School districts must also provide extra preparation time for these lessons. If this is not possible, then monetary compensation to the teacher for the time spent preparing is important. Teaching these classes takes additional plan time and grading time. I'm lucky that my school administrators and school board are very aware of this and supportive of my efforts.

With distance learning equipment, a teacher can teach almost anything to students anywhere, if their school has the proper equipment. I met an anatomy teacher from another consortium who teaches a unit on the eye. She is able to plan a dissection lesson using a cow's eye for all the students in her classes. She just has to warn the secretary that a package full of eyes will be arriving at the distant site school.

The TVDEC offers a variety of classes to meet the interests and requirements of many students. Some courses offered this year include French, German, Spanish, College Algebra, Analytical Geometry and Calculus I and an automotive class. This technology provides students with so many opportunities that their own high school might not be able to provide (See TVDEC Schedule).

At this time there are over 220 sites across the state. The state of Nebraska hopes to connect all the pods or consortiums through a broadband network. Their goal for this intrastate connectivity is a year and a half in the future.

Let me conclude with the idea that distance learning is the way to provide small schools and their students a quality education. It also gives the students a sense of belonging to a bigger world, yet allows them to remain in their hometown.

"Merci et au revoir."
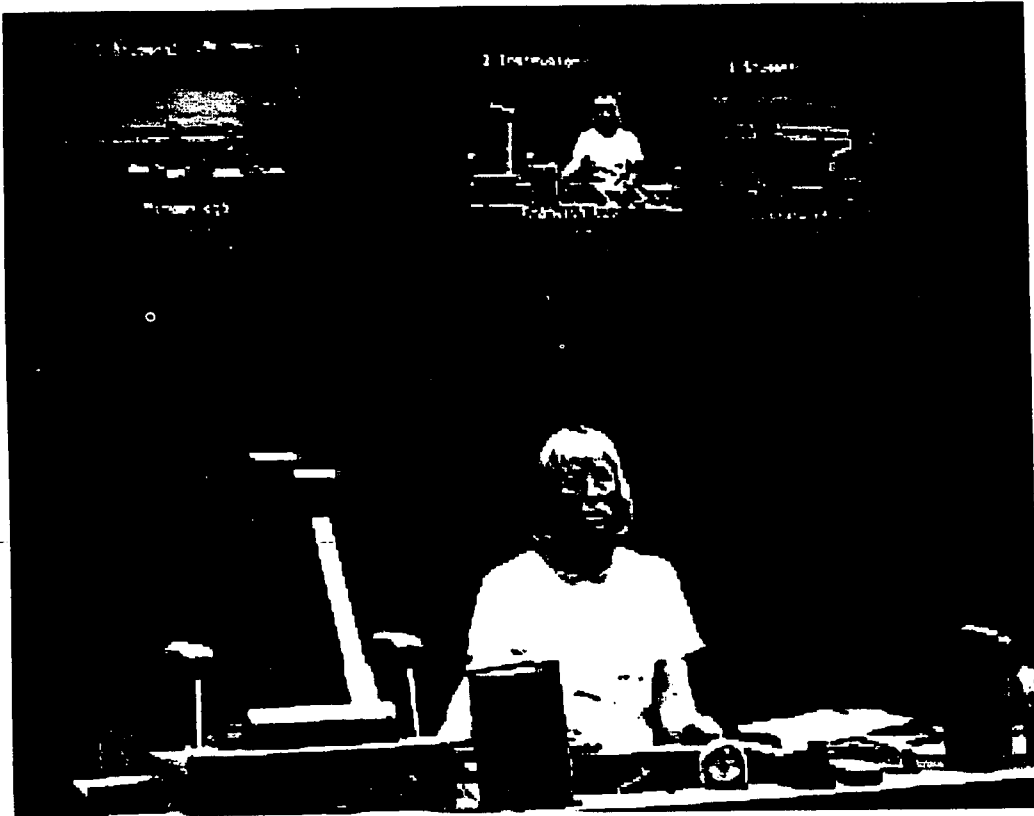
TVDEC SCHEDULE (FALL SEM. 2000)

Revised Sept.5, 2000

	Class	Send		Receive		Receive		Receive	
7.30	Written Comp.	College Park	14	Shelton	4	Alma	4	Axtell	1
8:00	Beginning Spanish	College Park	6	Holdrege	1				
8:00-8:50	College Algebra	CCC	10	NLS	11	Silver Lake		Palmer	10
8:15	French I	Franklin	2	Minden	2				
8:10	French I	Gibbon	8	Pleasanton	9				
8:53-9:46	App. Calc.	Fullerton	3	St. Edward	3	Spalding	2		
9:00-9:50	Composition	CCC	22	Palmer	6	Wolbach	9	NLS	7
9:02	Psychology	Pleasanton	14	Centura	2				
9:05	Spanish 2	Franklin	11	Hildreth	11				
9:14	Ag. 1	Wilcox	2	Minden	6	Cozad	2		
9:46-10:36	App. Algebra	Fullerton	8	St. Edward	3				
9:55	Spanish I	Franklin	29	Hildreth	7				
10:00-10:50	Automotive	CCC		Wolbach	6	Silver Lake	6	Sutton	6
10:03-10:50	Psychology	Bertrand	3	Wilcox	8				
11:00-11:50	Spanish I	CCC	2	Greeley	10	NLS	15	Elba	6
11:00	Ani. Geom. & Cal I	College Park	0	Minden	1	Loomis	1		
11:43-12:28	German I	Elwood	0	Bertrand	1				
11:51	Spanish I	Bertrand	3	Elwood	9				
12:00-12:50	Spanish II	CCC	0	Greeley	10	NLS	15	Elba	6
1:00-1:50	Beg. Spanish I	CCC	0	Spalding	5	Wolbach	13		
1:00	Sociology (T,Th)	College Park	20	Gibbon	6				
1:00	Written Comp (MWF)	College Park	10	Centura	16	Overton	13	Pleasanton	12
				Cozad	2				
1:00	French 2	Franklin	2	Minden	6	Elm Creek	1		
2:00	College Algebra	College Park	6	Centura	2	Minden	1	Alma	1
				Pleasanton	1	Elm Creek	1		
2:30-3:45	Composition	CCC	4	NLS	7	Fullerton	13		
8:30-9:20	EDAD 848 (Tu)	UNK	8	Cozad	2	Holdrege	4	Ord	2
8:30-9:30	EDAD 954 (W)	UNK	12	Cozad	2	Holdrege	4	Ord	2
7:00-8:15	Math 305 (M,Th)	UNK	10	College Park	2				
8:30-9:45	ISME 208 (M,Th)	UNK	6	College Park	1				
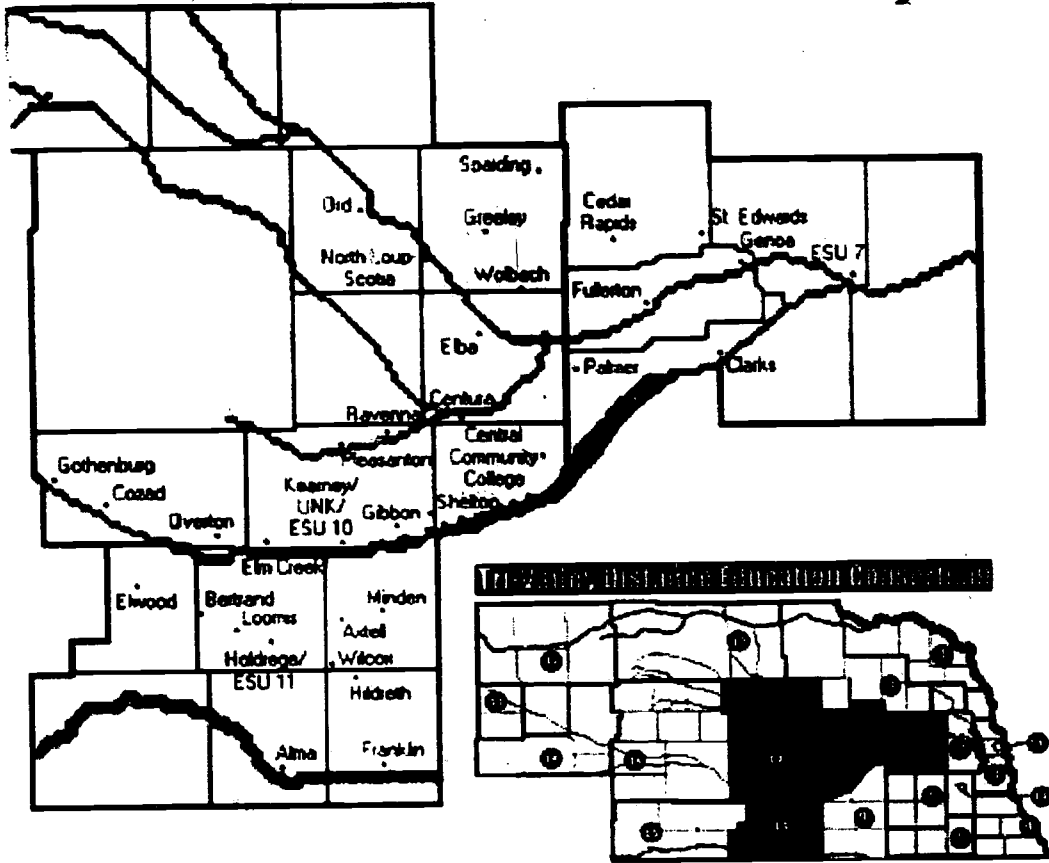
Tri-Valley Distance Education Consortium

Committee on Education and the Workforce
Witness Disclosure Requirement – "Truth in Testimony"
Required by House Rule XI, Clause 2(g)

Your Name: Janet G. Guge		

	Yes	No
1. Will you be representing a federal, State, or local government entity? (If the answer is yes please contact the Committee).	X	

2. Please list any federal grants or contracts (including subgrants or subcontracts) which <u>you have received</u> since October 1, 1997:

```
        Title I - Math and Reading
        Title VI - Math and Science, Safe and Drug-free
                Schools and Communities
```

	Yes	No
3. Will you be representing an entity other than a Government entity?		X

4. Other than yourself, please list what entity or entities you will be representing:

N/A

5. Please list any offices or elected positions held or briefly describe your representational capacity with each of the entities you listed in response to question 4:

N/A

6. Please list any federal grants or contracts (including subgrants or subcontracts) received by the entities you listed in response to question 4 since October 1, 1997, including the source and amount of each grant or contract:

N/A

	Yes	No
7. Are there parent organizations, subsidiaries, or partnerships to the entities you disclosed in response to question number 4 that you will not be representing?		X

Signature: _Janet B. Guge_   Date: _18 Sept 2000_

Please attach this sheet to your written testimony.

JANET GUGE
1610 M Street
Franklin, Nebraska 68939
(308) 425-3757

EDUCATION	**Kearney State College** Kearney, Nebraska 68849 Bachelor of Arts in Education, December 1977 *Student Teaching*: Kearney High School, Kearney, Nebraska 68849 Additional Hours – 30+ in French, Art and Education
	Bellevue High School Bellevue, Nebraska 68005 High School Diploma, May 1973
EMPLOYMENT	**Franklin Public Schools**, 1001 M Street, Franklin NE 68939 Art Teacher, August 1979 to Present French Teacher, 12 years – August 1979 to Present • Teach K-6 Art, Art 7, Art I, II, III, Creative Arts (9-12) • Teach French I and II (9-12)
SKILLS	<u>Highlights of Professional Qualifications</u>: • Classroom Presenter of K-12 students in art, 9-12 in French and adults in Distance Learning training • Fluent in French • Computer literate in Word Processing, PowerPoint, HyperStudio, eClass Grades, Adobe Illustrator and Photoshop
EXPERIENCE	**Tri-Valley Distance Education Consortium Level I and II training** ESU 10, Kearney, NE 68849 June 1999, January, June and August 2000 • Participated as a student in Level I and II training • Served as a Mentor for two sessions of Level I training **Professional Development Courses** • Hypertext and Multimedia – July and August 2000, University of Nebraska at Kearney • Art and Design – Computer – July 2000, University of Nebraska at Kearney • PowerPoint – June 2000, ESU 11, Holdrege NE **School-to-Work Internship** Horizon Designs, Kearney NE - June 1997 • Worked in the Product Development Department

- Learned Graphic Arts Computer programs
- Experienced business policies and job skills needed by students in the work force

Artward Bound
Joslyn Art Museum, Omaha NE – August 1987 and August 1988
- Developed curriculum in Disciplined Based Art Education (DBAE)
- Presented lessons to students and educators

Tour of England and France
Supervised a tour group of students – June 1986
- Experienced the culture of England and France
- Used the language to participate in day-to-day activities
- Incorporated experience into French curriculum

PROFESSIONAL ACTIVITES

Active membership:
- Member of National Education Association (NEA), Nebraska State Education Association (NSEA), National Art Education Association (NAEA) and Nebraska Art Teachers Association (NATA)
- Served as President of Franklin Teachers' Association (FTA)
- Serve as Communications Chairman of Delta Kappa Gamma(DKG), an International Society for Women Educators

VOLUNTEER ACTIVITES

Current positions:
- Serve as Secretary on the Franklin Public Library Board
- Serve as Advancement Committee Chairman and Secretary for Boy Scouts of America (BSA) Troop 186, Franklin NE

INTERESTS

Reading, Crossword puzzles (New York Times), Golf, Cooking, Making antique reproduction porcelain dolls, Sewing, Traveling

Appendix F- ITI High-Tech Education Report

INFORMATION
TECHNOLOGY
INDUSTRY
■COUNCIL■

ITI High-Tech
Education Report
September 2000

3COM

Agilent Technologies

AMERICA Online

Cisco Systems

COMPAQ

CORNING

DELL

hp invent

IBM

intel.

Kodak

Microsoft

NCR

N&RTEL NETWORKS

Panasonic

sgi

SONY

STORAGETEK

UNISYS

(123)

The Information Technology Industry Council is proud to release its 2000 *High-Tech Education Report*. In this Report, we have highlighted the top education programs developed and funded by 20 of the nation's leading high-tech companies. From large-scale teacher training initiatives to innovative programs to interest kids in math and science, the high-tech industry has a long history of investing in our nation's educational system. By bringing those programs together in this Report, we hope to provide policy makers with valuable information about the industry's best programs in K-12, higher education and life long learning.

The programs in the Report represent over $1.1 billion invested in education initiatives.

Some other highlights from the Report:

- Millions of students helped through dozens of programs to train teachers, wire schools, develop technology curricula, provide grants and scholarships, and fund alternative learning environments.

- Innovative partnerships with such organizations as the Boys and Girls Clubs of America, National Science Foundation, Plugged In, United Way, Urban League, US Department of Education, and YWCA.

- Major partnerships with dozens of school districts around the country including Boston, Charlotte-Mechlenberg, Cincinnati, Detroit, Durham, Dayton, El Paso, Los Angeles, San Francisco, San Jose, Thornton, Colorado and the state of West Virginia.

ITI's members are dedicated to improving education in America by integrating technology into the curriculum, providing access to that technology, training teachers to make the best use of that technology, and promoting science and math education. On the following pages, we detail the strong steps we are taking towards achieving those goals. While the programs in this Report are impressive, it is incredible to think that they represent only some of each company's education efforts.

If you would like more information about any of these programs, such as locations, applications, or company contacts, please contact Matt Tanielian, Director of Government Relations at (202) 737-8888 or mtanielian@itic.org.
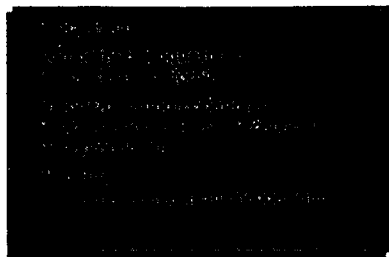
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119

3com

3Com is committed to enhancing education and promoting the best interests of its communities. 3Com recognizes the educational challenges America's teachers and children face and has forged on-going partnerships with public schools to promote educational growth and development. 3Com invests over $5 million per year to develop technology education programs and strengthen its partnerships with America's public schools.

3Com's Educational Highlights

NetPrep-Network Training - Launched in fall 1998, the NetPrep program is a comprehensive curriculum developed by 3Com that enables high schools, community colleges and universities to prepare their students for careers in computer networking. Available throughout the United States, NetPrep is expected to reach 500 schools and 50,000 students over the next 2 years. Designed as a 2+2 program, NetPrep provides a solid academic foundation in computer networking that not only prepares students for immediate entry into the IT job market, but also provides the critical thinking skills they will need in order to evolve from technician to manager. Students who complete and pass the course receive certification ranging from Student Network Technician in high school to Associate and Senior Network Specialists at the college level. This certification allows graduates to immediately enter the IT job market as qualified network operators.

NetPrep GYRLS - 3Com has teamed with the YWCA in a focused initiative to offer the NetPrep training program to high-school-aged girls. NetPrep GYRLS is designed to allow girls who are graduates of the YWCA's TechGYRLS program (for girls 9-13) to continue their education in information technology by training for a career in computer networking. As with the original NetPrep program, NetPrep GYRLS participants have the opportunity for network operation certification. 3Com believes that its continued partnership with the YWCA will encourage more girls to pursue careers in the IT industry and has pledged $3 million in equipment, funding, training, and curriculum to support the program over the next three years.

School Internet Access - 3Com has been actively supporting the connection of schools to the Internet since 1993. 3Com has donated over $6 million to the San Jose Education Network (SJEN), an initiative that provided Internet access to 335 schools in Silicon Valley, and is partnering with the City of Boston to bring all of the district's 128 public schools online, including a $3 million donation to the Massachusetts Liberty Network. 3Com offers E-rate application resources to schools to help them obtain federal funding and is now the only networking company with a representative on the board of the Universal Service Administrative Company, which includes the Schools and Libraries Division, responsible for administering E-rate. 3Com also offers teacher training to help schools effectively integrate technology into the classroom.

"If the global economy is to grow and thrive in the 21st century, we must support schools in their efforts to produce a generation of workers who have the high level information and communication skills to fuel that growth."

Eric Benhamou, Chairman and CEO 3Com
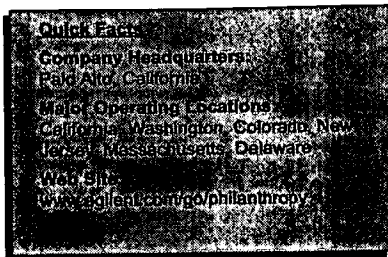
Agilent Technologies

Agilent Technologies is committed to improving scien: and math education, including increasing the number of women and minorities studying and teaching science and mathematics. Agilent supports high academic standards; standards for teacher skill and achievement; student and school accountability; rigorous performance assessments to standards; and effective programs to increase teacher availability. Agilent provides nearly $1 million each year to efforts that meet these criteria.

Agilent's Educational Highlights

Agilent Science Lab - Aglient has awarded a $250,000 grant to Plugged In, the nation's oldest and most successful community and technology center. Plugged In serves at-risk populations in East Palo Alto, California, which was a featured stop on President Clinton's 2000 Digital Divide tour. Its mission is to ensure that everyone in the community has the opportunity to fully benefit from all that the information revolution has to offer. The grant will be used to create an Agilent Science Lab in a new facility.

Diversity in Education Initiative - Agilent has partnered with the University of Texas at El Paso Independent School District to impact curriculum reform across the entire "vertical slice" of the district. The elementary, middle and high schools selected for the program represent a complete "feeder pattern" for the primarily Hispanic students growing up on the US/Mexico border. The initiative involves funding for science curriculum support at all grade levels, engineering scholarships at UTEP, and summer internships.

Professional Development Grants - Agilent Technologies has provided $350,000 in grants this year, ranging from $22,000 to $30,000 to 12 school districts or organizations in Roseville, Santa Rosa, and San Jose, California; Loveland and Colorado Springs, Colorado; Delaware; Boston and Lawrence, Massachusetts; and Seattle and Spokane, Washington. These grants help to support science standards in the middle and high school grades.

K-8 Hands-on-Science Grants - Agilent employees are actively involved in K-8 Hands-on-Science curriculum reform in Agilent Communities. The cornerstone of a Hands-on-Science curriculum is its ability to engage children directly in the inquiry process as they learn critical science concepts. In previous years, Agilent has awarded over $1 million in multi-year grants to support Hands-on-Science curriculum adoption in Agilent communities. Agilent grants in the Colorado Springs, Colorado region and in the state of Delaware have helped to galvanize financial support from other sources to radically reform science education.

"Supporting education is one of the most important things we can do to realize success for our children, for future generations, for our companies and for society as a whole."

Ned Barnholt, CEO
Agilent Technologies
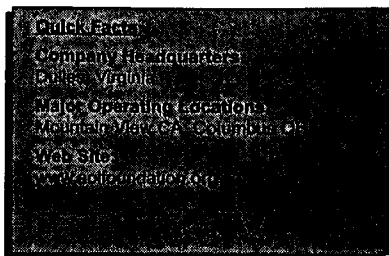
America Online has developed a host of initiatives to guarantee that the medium offers exciting and rewarding educational opportunities for kids; that teachers and administrators have the technological means to enhance their own skills; and that the online medium is a safe environment for children of any age.
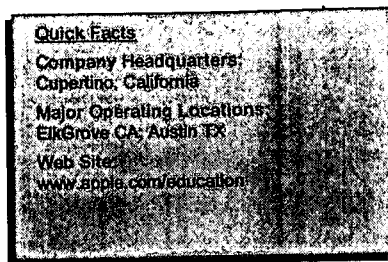
AOL's Educational Highlights

AOL@SCHOOL - Working closely with professional educators, AOL developed AOL@School to help make the Internet a free, easy to use and age-appropriate learning tool. Rather than spending valuable time searching millions of sites on the Internet, educators and students now have one-click access to sites that are valuable and targeted to their specific needs. These sites are organized into portals, tailored for administrators, teachers, and students by grade level. AOL@School, launched fall 2000, also provides helpful tools for classroom use, including lesson plans and activities, reference materials, and assistance in setting up individual home pages. Visit www.school.aol.com or AOL Keyword: AOL@School

PowerUP - AOL has partnered with PowerUP, a national effort to connect kids with computers. The program is using the interactive medium to link children to mentors, education and career counseling, and opportunities to learn, grow and serve the communities in which they live. PowerUP leverages the talents of trained, full-time staff from AmeriCorps*VISTA and other organizations to work with young people at sites around the country to gain digital literacy and other skills. PowerUP was launched in November 1999 with an initial grant of $10 million from the Case Foundation. By the end of 2000, PowerUP will have 250 new, fully equipped and staffed sites in 43 states. In support of PowerUP, America Online and the AOL Foundation are providing more than 100,000 AOL accounts to PowerUP centers across the country. AOL also has created PowerUP Online, the first-of-its-kind online guide that children in PowerUP centers use to receive a dynamic package of interactive tools for character building, education support, career guidance and health information. Visit www.powerup.org or AOL Keyword: PowerUP

Interactive Education Initiative - AOL and the AOL Foundation believe that those who are working directly with young people at the grassroots level - including teachers, parents, and youth program staff - are full of innovative ideas that will lead to more effective models for tapping the educational potential of the online medium. Recognizing that flexible resources are needed to foster experimentation with new approaches, the AOL Foundation 's Interactive Education Initiative (IEI) has provided seed money to about 150 teams of educators, administrators, parents and community leaders across the country to develop hands-on projects that use interactive technology to improve student learning. Visit www.aolfoundation.org/programs or AOL Keyword: Foundation

"In the Internet Century, access to technology and the training to make the most of it is not only empowering, it's a necessity. We must all work together to make sure that no one is left behind and ensure that all communities receive the full benefits of this new medium quickly."

Steve Case, Chairman and CEO
AOL

Quick Facts

Company Headquarters:
Cupertino, California

Major Operating Locations:
Elk Grove CA, Austin TX

Web Site:
www.apple.com/education

Apple is dedicated to providing opportunities for our children to grow by creating education programs not only for the children, but also for staff development - ensuring a technology-friendly learning environment that prepares today's children for the 21st century. Apple is the leading provider of education technology and computers in the United States.

Apple's Educational Highlights

Apple Learning Series - The Apple Learning Series is a collection of nine kits that contain educator evaluated software and model student projects that have been correlated to select state and national standards. And because teachers are also learners, each kit comes with an online professional development course that demonstrates the features of the software and provides examples of how each can enhance student learning. Kits are available for teacher productivity, web publishing, multimedia and all curricular areas in elementary, middle and high schools. Additional information is available at www.apple.com/education/learningseries

Apple Learning Interchange - Apple has created the Apple Learning Interchange (ALI), an online network of over 37,000 educators designed to facilitate communication among America's teachers and inspire new and inventive methods of classroom learning. The ALI website, http://ali.apple.com, enables educators to share teaching techniques, lesson plans and resource tools and get feedback from their colleagues. Through QuickTime TV for Learning, ALI also provides a search engine for lessons and projects posted by educators, and serves as a continuing education resource that posts information for staff on Apple's professional development programs. ALI has also been the host of several United States Department of Education Teleconferences and satellite Town Meetings that have given educators a forum to discuss education policy and America's education system.

Apple Learning Professional Development - Professional development is the key to the successful integration of technology into teaching and learning. Apple's professional development offerings cover everything from the fundamentals to methods for integrating technology into the curriculum, to leadership workshops, and to consulting services that can be customized to the needs of a school or district. Apple's workshops show educators the strategies that have been found to be the most effective in using technology to impact student learning. Apple Learning Professional Development is designed to foster changes in educators' thinking that will yield ongoing changes in their teaching practices. Coupled with programs for administrators on how to support change, these courses can help a school or district put in place a comprehensive technology professional development plan.

"By working directly with schools for more than two decades, Apple has experienced first hand the positive impact technology can have on teaching and learning."

Mitch Mandich
Senior Vice President of Worldwide Sales
Apple

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123
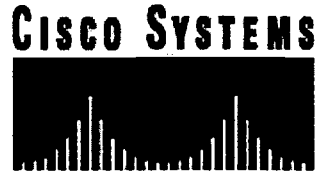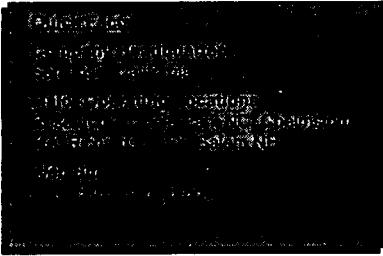
CISCO SYSTEMS

Since its founding in 1984, Cisco Systems, Inc. has grown into one of the leading global networking technology companies. However, it has not forgotten its responsibility to give back to the community--most importantly, building our workforce by training school children and retraining adults. Cisco has developed several programs to train children for future IT-related careers and has invested over $100 million into such projects.

Cisco's Educational Highlights

Cisco Networking Academies - Originally developed in 1997 to provide students in one Arizona high school the skills they needed to maintain their local computer network, the Cisco Networking Academy Program has expanded to more than 5,000 Academies in all 50 states and over 80 countries. This internationally-acclaimed program entails a 4 semester course to train students and in-transition workers to design, build, and maintain computer networks. Offered at high schools, universities, community colleges, occupational training centers and other locations around the world, the Networking Academy Program prepares its graduates for the demands of, and enormous opportunities in, the information economy. 80,000 students will be enrolled in the Academy program this fall with well over 160,000 students expected by 2001. Cisco places special emphasis on establishing Networking Academies where they are most needed, including 47 Academies in U.S. empowerment zones and many more located throughout the developing world. To find a Cisco Academy in your area, go to: http://cisco.netacad.net/cnacs/pub-doc/locator.shtml

The Cisco Foundation Community Grant Program - Cisco supports education initiatives through its community grant program. Seventy percent of the total grant funds are allocated to education programs that support K-12 education initiatives, career training for disadvantaged adults, and the arts in education. Cash grants averaging $10,000 each are awarded to applicant organizations that operate within 50 miles of San Jose, California; Research Triangle Park, North Carolina; Chelmsford, Massachusetts; and New York City, New York to support programs ranging from athletic events and competitions to school start-up programs. 46 educational programs have received grants from Cisco in 2000.

California Charter Schools Initiative - Cisco has been one of the most vocal advocates of improving the public education system through the use of charter schools, an innovative alternative to traditional public schools. Charter schools are public schools that have more operational freedom than traditional public schools. Cisco supported a 1998 California initiative that eliminated a 100-school cap on charter schools, in order to increase parental choice and spark new opportunities for children to learn in innovative and creative school environments. The legislation was signed at Cisco headquarters in San Jose, California, reaffirming Cisco's longtime commitment to improving public school education in America.

"We need a fundamental change in the way we teach kids today. Working together, government, teachers, parents, and industry must embrace the values of choice, accountability and competition in our schools."

John Chambers. President and CEO
Cisco Systems Inc.
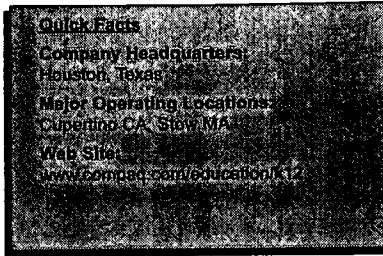
COMPAQ

At Compaq, we recognize the power and importance of technology in enhancing information literacy across all socioeconomic, racial, disability and geographic boundaries. We believe technology, when used effectively, can stimulate learning, enrich lives, and provide greater opportunities for the future. With this in mind, Compaq has created a generous educational grant program and inspired volunteer projects to further promote technology in communities and in the classroom.

Compaq's Educational Highlights

Teaching with Technology Grant Program - Compaq is a proud sponsor of the Teaching With Technology Grant Program that recognizes innovative and effective uses of technology in the classroom. Compaq understands that putting technology in the classroom is only the start. The technology must become integrated into the curriculum for it to have an impact. Under the Teaching with Technology grant program, fifty-two educators from across the country are selected, based on the technology integration and use in classroom activities. Each winner is awarded a Compaq desktop PC for their school. Nine educators will be recognized for "Best of Region" projects and three will be honored as "National Models." Regional winners receive a Compaq server for their school as well as a Compaq desktop PC, and the three National Models receive the desktop PC, server, and are asked to present their projects and classroom activities at the National Educational Computing Conference (NECC).

Tech Corps - Compaq sponsored the development, pilot and national rollout of *techs4schools program* - a web-based "virtual volunteer/mentor" program for schools matching them with technical mentors at key companies, which was announced by President Clinton in April 2000. *techs4Schools* addresses the critical need for technical expertise to schools, particularly schools in outlying, rural areas such as Native American Reservations and School Empowerment Zones where the program was initially piloted.

Boys and Girls Clubs of America - Compaq recently donated nearly $1.2 million in cash and equipment to help the development of the Boys and Girls Clubs (B&GCA) of America's Technology Initiative in eleven cities across the U.S. The initiative is a global Intranet system that will increase and make more efficient communication between B&GCA's national headquarters in Atlanta and its regional and local facilities in order to offer more learning opportunities and more community resources for underserved children. Compaq continues to support numerous B&GCA projects that impact the safety of children including its Child Safety and Protection Program and its drug and alcohol education program.

Compaq Professional Development Program - With every K-12 technology purchase, Compaq offers points that can be redeemed for Professional Development courses to increase the educator's understanding of technology and how to integrate it into their classroom.

"Technology alone does not enhance education. It is the application of that technology in innovative ways that creates new opportunities for students to learn and to explore their world."

Michael D. Cappellas, CEO and President Compaq Computer Corporation
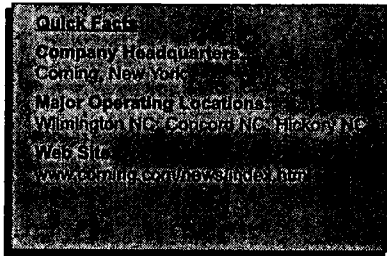
CORNING
Discovering Beyond Imagination

Corning is committed to enhancing the quality of education in its neighboring communities, whether it's through initiatives that support math and science education in area schools or serving on the National Skills Standards Board. These efforts continually reaffirm a partnership that has existed for close to 50 years: the partnership between Corning and its surrounding community.

Corning's Educational Highlights

The Corning Foundation - The Corning Foundation was established in 1952 to support community projects that promoted educational, cultural and community activities. Each year, the foundation fulfills approximately 225 grant requests totaling $2,250,000. Corning's educational involvement has ranged from supporting curriculum enrichment initiatives in public schools to improving technology access in the classroom. The foundation also supports higher education programs to help build a higher-skilled workforce for the future. Past higher education programs have included education grants for women and ethnically under-represented students in the engineering field, sponsorship of pre-doctoral science fellowships in specific fields, and support of various special projects at university institutions.

Partners In Education Grant Program - Corning's Big Flats plant began an annual program in 1998 to donate $20,000 worth of science equipment to Corning and Elmira, New York-area middle and high schools as part of their Partners in Education Grant Program. The plant will award $2,000 grants to 10 schools that are redeemable for Corning science-related equipment such as beakers, flasks, bottles, and hot plates. The idea for the program originated from an employee suggestion, that expressed a desire to have area school children use products that were made locally and, in many times, by their parents. Corning expects to expand to include middle and high schools in additional upstate New York counties.

Upstate New York Math Team Sponsorship - Corning sponsored the Upstate New York Math Team won the American Regions Mathematics League National Competition. This effort continued Corning's goal of promoting mathematics education in public schools. The team consisted of 54 students from the Albany, Buffalo, Hudson Valley, Rochester and Southern Tier area school districts in New York. Corning saw their sponsorship as an investment in America's future scientists and engineers, and in the future of technology. The sponsorship included funding the team's trip to the national competition and hosting the team during their trip to the Corning headquarters.

"Without world-class schools in our communities, we cannot continue the growth and enhanced quality of life offered by the New Economy."

Roger Ackerman, CEO
Corning

DELL

Since its establishment in 1995, the Dell Foundation has supported a wide-range of programs focusing on children and education. In 1999, Dell-related giving totaled upwards of $30 million. Recognizing the need and an opportunity, the Dell Foundation recently recalibrated its focus to support programs to provide local children access to quality education and state-of-the-art Internet technologies and training.

Dell's Educational Highlights

The Dell Foundation - The Dell Foundation launched a new strategy in 2000 to create innovative programs to prepare children for the digital world. The Foundation will award grants to organizations that address education and community access needs, such as education quality in the math and science fields and computer availability within the community. The first set of Dell grants will be awarded in fall 2000. The Dell Foundation also has several other programs in the works, including partnership initiatives between graduating college students and employers as well as hosting a national tech industry youth summit for over 1,000 students.

Urban League Workforce Centers - Dell has helped develop Urban League Workforce Centers to continue its ongoing efforts to bridge the digital divide. In partnership with the Urban League in Central Texas and Nashville, Tennessee, Dell has helped to provide employment development and job-readiness programs. The program trained nearly 550 clients in 1999, nearly half of whom are currently employed by Dell. To complement these centers, Dell has also set up several technology labs in economically disadvantaged and disconnected neighborhoods and communities in Austin and Nashville.

Know the Net for Teachers - Dell understands that training teachers is an essential element to realizing the potential of technology in education. Know the Net for Teachers is an online training curriculum for educators to learn about computer use and integration of technology into the classroom. The program, modeled after the curriculum used to train Dell employees, helps teachers become familiar with the technology available to them and provides instruction on how to use such technology as an effective teaching resource. Dell is also developing Know the Net for Kids, an online technology training curriculum geared towards students and scheduled to launch in Fall 2000.

"We must integrate the Internet and Internet training into our schools just as we are integrating it into our businesses if we are to address the growing demand for tech-savvy employees and to prepare students for the opportunities that await them in the New Economy."

Michael Dell, Chairman and CEO
Dell Computer Corporation

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127
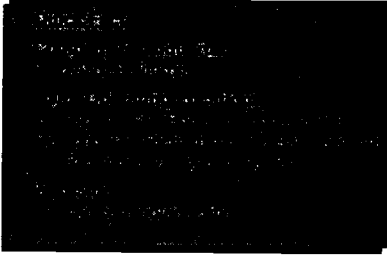
HP's education vision is to help students be prepared to succeed in the workforce of the future by making math and science exciting and meaningful, giving all students the opportunity to succeed, and helping every child enter school ready to learn. Last year, Hewlett-Packard contributed over $40 million to education efforts.

HP's Educational Highlights

Diversity in Education - HP and the Hewlett-Packard Company Foundation have committed $5 million over 5 years to the Diversity in Education Initiative which promotes the representation of women and minorities in the engineering field. This initiative supports expanding technology, math, and science-related classes and programs that serve African-American, American Indian, Latino, and female students. Ultimately, these efforts help increase enrollment numbers in higher education facilities and an overall increased knowledge in math and science fields. HP provides scholarships, internships and mentoring to minority students at several major U.S. universities affiliated with the program, and encourages careers in math, science, and engineering. Such programs are currently being supported in Boston, Los Angeles, and San Jose.

Hands-On Science - HP's Hands-On Science Program has awarded twenty-nine $90,000 grants to public school districts across the country. These grants have benefited more than 15,000 teachers and more than 350,000 K-6 graders as of 1998. Through Hands-On Science, HP and public school districts work together to reform school science curriculums by incorporating the use of hands-on education methods and HP-developed Science Kits, to encourage students to get involved in science. The program also includes continuing education programs for public school educators and staff. Three-year Hands-On grants have been awarded to school districts in California, Oregon, Washington, Idaho, Colorado, Massachusetts, Georgia, and Texas.

HP Telementors - The HP E-Mail Mentor program brings together teachers, students and Hewlett-Packard employee mentors via e-mail to work on teacher-designed projects. The program currently serves 5th-12th graders, and based on its success, HP is expanding the program to include community colleges and universities. The role of the mentor is to answer, via e-mail, any questions the students may have, help the students learn the concepts and keep the teacher informed if and when problems arise. Today, approximately 3,000 HP employees are involved in HP Telementors. Applications, example projects and information are on the HP E-Mail Mentor web site: www.telementor.org/hp.

"If we want the world to fulfill its real potential we have to make all of our children truly prepared. It's not only the right thing to do; it's good business."

Carly Fiorina, CEO
Hewlett-Packard

IBM
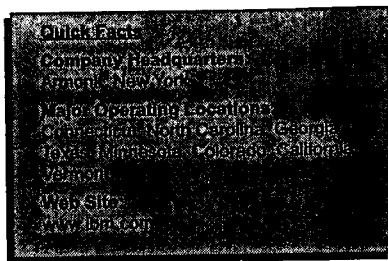
Behind IBM's commitment to education are our innovative efforts to shape the way children learn—in and out of the classroom. IBM has invested millions of dollars in the research, development and implementation of programs to enable all students to achieve at the highest levels.

IBM's Educational Highlights

Reinventing Education - At the core of IBM's commitment to education is its Reinventing Education Program Since its inception, it has become a $40 million initiative with projects in 21 US sites and six other countrie: Projects use technology to overcome challenges to student achievement such as school-year structure, curricul limits, home-school links, and professional development. IBM's world-renown researchers and expei consultants work closely with educators to develop technology that drives improvements in teaching an learning. *Watch-me!-Read*, a speech-recognition software, was developed through the Reinventing Educatior program. The software gives emerging readers support needed to become proficient. Research shows tha students at all reading levels who use the software test significantly higher. Another Reinventing Education innovation is *IBM Learning Village, Wired for Learning*. This initiative makes communication among students, parents, and educators more effective through the Internet with Lotus Notes, providing a crucial link between home and school, enabling parents to monitor their child's progress by viewing evaluated schoolwork and discussing the child's progress via confidential Internet access. The Charlotte-Meckenburg, San Francisco Unified, Durham, Detroit and Cincinnati Public School districts, as well as the West Virginia Department of Education, are currently Wired for Learning by IBM through the grants provided by the Reinventing Education program.

Online Learning - IBM collaborates with states and districts to create effective online learning which brings courses, such as language and AP mathematics, to students in rural or inner city areas which do not offer them. These "virtual" schools also provide access for students who are ill or required to hold part time jobs during the school day. Additionally, educators use online schooling to serve home-schooled students with material required to meet state academic standards and at-risk students whose behavior prevents their participation in the classroom.

IBM KidSmart Early Learning Program - The IBM KidSmart Early Learning Program gives preschool children a jumpstart on education and technology. It brings the latest computer technology to classroom teaching through Young Explorer computer stations and educational software. Collaborating with the United Way of America and local organizations, IBM donated systems to not-for-profit day care centers and preschools in nearly 200 cities in 45 states, serving more than 500,000 pre-kindergarten children.
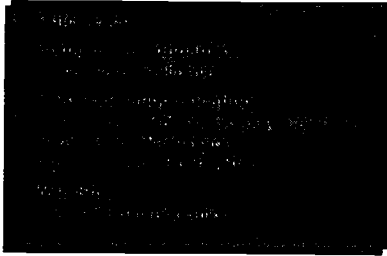
"Nothing is more essential to a vibrant, well-functioning community than the quality of its schools. IBM's commitment to improve the quality of life within individual neighborhoods manifests itself in many ways, but is most apparent in our worldwide efforts in public education."

*Louis V. Gerstner, Jr., Chairman and CEO
IBM Corporation*

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intel

Intel's mission is to be a major force in improving science, math and technology education. Intel Innovation in Education is a global, multi-million dollar initiative focusing on preparing today's teachers and students for tomorrow's demands. In 1999, Intel contributed more than $100 million worldwide to primary, secondary and higher education programs. Beyond dollars, however, Intel provides ongoing support, ideas and solutions through public- and private-sector partnerships to encourage innovation in education. Intel also supports an active employee volunteer effort in schools and other community organizations through "Intel Involved."

Intel's Educational Highlights

Teach to the Future - The Intel Teach to the Future program will provide technology training for over 400,000 teachers by 2002. The goal of the program is to assist teachers to effectively integrate the use of computers into their existing curriculum in order to increase student learning and achievement. The training consists of forty hours of hands-on instruction delivered by means of ten curricular modules. This program, offered with support from Microsoft Corporation, brings together expertise and resources from leading high-tech companies and represents a total investment of more than $500 million. Intel has also created the Intel Education Destination, a free non-commercial online toolbox developed by teachers and technologists to provide the most current information and resources to plan, implement, manage and facilitate teaching and learning with technology.

Intel Computer Clubhouses - The Intel Computer Clubhouse Network uses technology creatively to enable under-served youth to acquire the tools, problem solving skills and confidence for successful lives. Developed in cooperation with the Boston Museum of Science and the MIT Media Lab, the Intel Computer Clubhouse Network provides a safe, creative after-school environment where young people from underserved communities work closely with adult mentors to express themselves through projects based on their own interests. These youngsters create computer-generated art, develop their own web pages, and program their own computer games. By 2005, a total of 100 Intel Computer Clubhouses will open around the world touching the lives of more than 50,000 youth.

Intel Science Competitions - Intel sponsors two prestigious science competitions in order to encourage inquiry-based learning and reward excellence in math and science. The Intel Science Talent Search, often considered the Junior Nobel Prize, is America's most prestigious and highly regarded science competition for high school seniors. The Intel International Science and Engineering Fair is the world's only international science fair representing all life sciences for students in grades 9 through 12. Approximately one million students vie for awards as part of the world's largest pre-college science competition.

"We must empower our teachers with the skills and resources necessary to prepare students for success in higher education and the competitive workforce of the 21st century. This is a priority not just for Intel or our industry, but for the future of the country."

Craig Barrett, CEO
Intel

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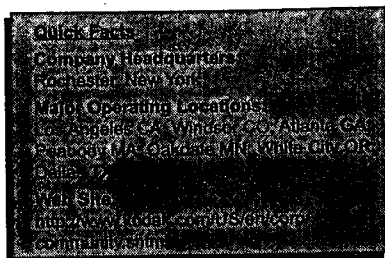
Kodak is dedicated to ensuring that today's students get the technology and knowledge necessary to be tomorrow's high-skilled, high-paid workforce. Essential to Kodak's mission of bringing to the marketplace leading-edge products and services in every imaging field is a diverse team of energetic employees with the world-class talent and skills necessary to sustain Kodak as the world leader in imaging. Education is the key to building and maintaining the necessary skills to ensure this goal continues to be met.

## Eastman Kodak's Educational Highlights

Colorado Institute of Technology - Kodak has pledged financial support for The Center for Creative Learning, a pilot program established by Colorado Governor Bill Owens at Ames Community College in Greeley, Colorado. Created for high school students and teachers, the Center provides a universal technology curriculum and essential hands-on experience. The Center has two labs to assist in three critical education areas: meeting standards, assessing learning, and developing 21st century competencies. The SmartLab is a learning environment consisting of six "pods", each relating to a specific technology field. Facilitators managing the lab actively engage students in the learning process. Team projects follow criteria set by the facilitator, reflecting the interdisciplinary nature of the real world. The lab supports applied learning across a broad spectrum of both technological and academic curriculum areas, providing opportunities for integrating learning in science, mathematics and the humanities. A second lab serves as a Smart Classroom. This interactive classroom consists of networked computers connected to the Internet by satellite. The lab has a primary focus of training teachers how to use and teach with advanced technologies.

BEST-Business, Engineering, Science and Technology Program - Kodak has joined with Penn State University to support the Business, Engineering, Science and Technology Program (BEST). BEST is a program for rising African-American high school seniors. Kodak supports the program through scholarships and one-on-one mentoring for 5 years. BEST students are ultimately pursued for full-time employment with Eastman Kodak.

Kodak Scholarships - Each year Eastman Kodak Company recognizes outstanding minority students in the Greater Rochester, New York Area who wish to pursue careers in engineering, sciences or business. In 2000, Kodak awarded $368,000 in Rochester area scholarships. In order to be eligible, students must have achieved a B or better average and a 1000 or better on the SAT. Kodak also supports minority scholarships through organizations such as: Catalyst of Woman Engineers, Clarkson University, the Consortium for Graduate Study in Management, Howard University, the National Hispanic Scholarship Fund, Nazareth College, the United Negro College Fund, and the University of Cape Town Fund.

"Technology will drive tremendous growth in the picture business. Digital technology, for example, is opening a treasure chest of opportunities for consumers and commercial users of leading edge products and services. Participating in this exciting opportunity requires a diverse team of energetic employees with the talent and skills to help deliver the benefits of advancements in imaging technology to our customers and consumers. Education is the key. That is why Kodak provides direct support to education at all levels, as well as organizations and programs that partner with schools to help improve student achievement. At the personal level, many Kodak employees also volunteer as tutors, mentors and in other capacities in schools all over the world."

Daniel Carp, CEO, Eastman Kodak
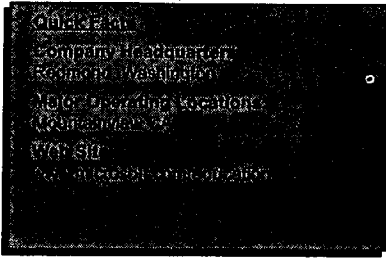
Microsoft

Microsoft has committed more than $570 million over the next three years in cash, software and other materials toward advancing its educational vision, the Connected Learning Community. The program, first introduced as a concept five years ago, combines computing devices, software and Web services to enable students to learn anytime and any place.

Microsoft's Educational Highlights

teacher.training@microsoft - Microsoft understands that training teachers to effectively use technology is key to improving education. Since 1994, Microsoft has been a leader in lifelong learning. The company has teamed with over 1,000 State Department of Education and College of Education sites in the United States and Canada to support professional development initiatives through Microsoft's teacher.training@microsoft program. The program is designed to help teachers (K - 12) provide staff development workshops and implement new technologies in their classrooms. During the 1998-1999 school year alone, more than 400,000 educators were trained through this program. Microsoft also provides program members with a two-year donation of current software and resource materials.

Microsoft Classroom Teacher Network - The Classroom Teacher Network is a free online professional development opportunity for K-12 teachers. The web site offers resources, tutorials, peer-to-peer contact and monthly online seminars aimed at helping teaching professionals to effectively use technology to improve student learning. The site also provides special resources for new teachers, including the ability to find e-mail mentors. Educators from more than 80 countries participate in the Classroom Teacher Network program. For more information about Microsoft's Classroom Teacher Network, go to: http://www.microsoft.com/education/mctn/default.asp.

Instructional Grant Program - Funding new technologies is a critical challenge for today's educators. The Instructional Grant Program was established in 1995 in order to help provide classrooms with the technology they need. In just five years, the program has awarded more than $33 million in free licenses for Microsoft development tools, applications and operating systems to 742 colleges and universities for effective integration of new technologies into curricula. In return, participants provide curriculum resources and materials to share with other educators through the Microsoft Academic Cooperative Website: http://academicoop.isu.edu/College/Grants.

"Meeting the ever changing demands of a high-tech economy and maintaining our global leadership and stimulating further growth will depend largely on our ability to produce and expand a competitive workforce. The lifeblood of our industry is not capital equipment, but human capital; and one of the key challenges all high-tech businesses face is attracting and retaining the best among our ranks."

Bill Gates. Chairman
Microsoft

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NCR
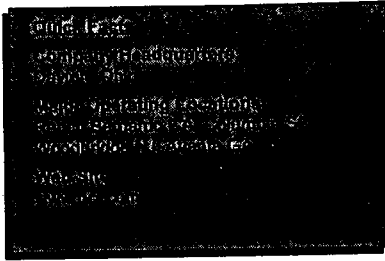
NCR has long been at the forefront of providing unique end-to-end business technology solutions to its customers. So it makes perfect sense that the company has also focused its energies in the educational arena on programs that provide students with a greater understanding of the business tools of the future. NCR has committed more than $30 million nationally to programs which teach about e-commerce, data warehousing, and other business-to-business information management solutions.

## NCR's Educational Highlights

NCR/Wal-Mart University Donation Program - NCR has partnered with Wal-Mart to educate computer technology students at six universities about leading-edge data warehousing information technologies. NCR understands the importance of helping students acquire the vital skills required by employers in the networked world. The two companies have invested nearly $25 million worth of software, hardware and training in the project. The program shows students how data warehousing, e-commerce and other technology trends are enabling key business processes and is helping develop the workforce of the 21st century. Participating universities include the University of South Carolina, Purdue University, Cameron University, the University of Arkansas, Kansas State University and the University of Texas - Pan American.

Alliance Community Schools - NCR, in partnership with other Dayton area businesses, has helped provide $1.2 million in seed funding for a charter school initiative in Dayton, Ohio. The money will fund the construction and operation of two innovative schools to help at-risk students. In addition, each student will receive home computers. The program promotes technology and encourages students to use technology extensively, both in the school and at home. The school staff will be held accountable for student performance, which will be measured through standardized testing.

University of Dayton Endowed Professorships - NCR has given $1.2 million to the University of Dayton to fund two endowed professorships. NCR is providing hardware and software to the professors so they can create specialized courses and conduct research in data warehousing. With these new resources, the university is able to offer new multi-discipline undergraduate and MBA courses in data warehousing technology and be positioned to attract funding to conduct research in emerging high tech fields.

"At NCR, we share a deep commitment to education, our community, and the nation. As we move toward a future that will challenge all of our physical and intellectual resources, education must be a priority."

Lars Nyberg, CEO
NCR

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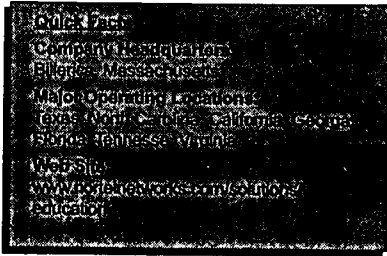
NØRTEL
NETWORKS

Nortel Networks, through the Nortel Networks Foundation, actively supports science and math education initiatives around the globe to build a better-educated global community and to help prepare students for the high-tech future. In 2000, Nortel funded more than $16.5 million in education initiatives while continuing its on-going commitment to creating a skilled and knowledgeable information technology workforce through its networking education programs.

Nortel's Educational Highlights

Nortel Networks Scholars - The Nortel Networks Scholars Program is the centerpiece of the company's science and technology education commitment. The program provides scholarships to university-level students who have chosen to study in the engineering and computer science fields and have excelled in the classroom. Nortel has made a total investment of $14 million in the program and projects over the next decade that more than 7,000 students will become Nortel Networks Scholars. Nortel Networks scholarships are awarded through participating colleges and universities across the United States to encourage studies in math and science.

NetKnowledge Program - Nortel's NetKnowledge Program provides state-of-the-art-networking curriculum to secondary and post-secondary schools in order to teach students the skills they need to pursue a career in the information technology industry. The NetKnowledge curriculum is four semesters long and includes courses in routing, switching, integrated networks and the latest technology innovations. Students solve networking problems that exist in the actual-business world. Students can take a NetKnowledge exam when they complete the course and receive a NetKnowledge Certificate. Students can also obtain further certification by taking the Nortel Networks Certified Account Specialist test. Those who pass this exam receive an industry-recognized certificate that creates a definite edge when applying for a job in the networking industry.

Exploris Science Center - Nortel donated $1 million to the Exploris Science Center in Raleigh, North Carolina to help promote Internet-based learning for students. Exploris is the first global experience center that has on-site experiments, exhibits, and programs in addition to an interactive educational website for students and parents alike (www.exploris.org). The website and science center connects students with people across the world, linking them through culture, the environment, global trade and communication. In addition to Exploris, Nortel provides funding to more than 100 science and learning centers worldwide in order to promote interest in the sciences.

"A company doesn't operate in a vacuum. It is part of a society and the communities where it is located."

John Roth, President and CEO
Nortel Networks

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Panasonic

The Matsushita group of companies (Panasonic) has been a leader for decades in educational innovation both in the United States and Japan. Panasonic spends approximately $26 million in the U.S. annually on a wide range of educational projects, including scholarships, community partnerships, and equipment donations

Panasonic's Educational Highlights

The Panasonic Foundation - The Panasonic Foundation, established in 1984, is focused on improving public education to help students develop the skills they need to be successful in the new economy. In addition to the Foundation's endowment of $20 million, Panasonic contributes approximately $200,000 a year for the Foundation's administrative costs. The Foundation's annual budget currently stands at $2 million. These funds are used to form long-term partnerships with public school districts in the United States to help restructure their education systems. The Foundation forms a partnership with the district as a whole, including not only the superintendent, central office staff, and school board, but also unions and associations, teachers and administrators, parents, and other community partners, to facilitate the creation of educational programs in the school district. Currently, the Foundation is working with 10 large urban school districts countrywide and a consortium of 25 rural districts in New Mexico.

Kid Witness News - Kid Witness News is a hands-on video education program created to encourage students to develop valuable technology, communication and organizational skills through the use of video. The program provides more than 200 elementary, middle and high schools across the country with video equipment. It offers participants the opportunity to develop their interests, abilities and creativity by producing and editing programs. 50,000 students have already participated in this program in which students under teacher supervision research, write, act in, produce, direct and edit a variety of videos. The tapings feature current events, news reports, public service announcements and interviews with prominent individuals. The creative works of the students are then submitted for review in the annual "New Vision" Awards video contest.

Creative Design Challenge - Sponsored by Panasonic in cooperation with the New Jersey Institute of Technology (NJIT) and the Liberty Science Center in Jersey City, New Jersey, the Creative Design Challenge is a science, math and engineering competition that offers college scholarships to its winners. New Jersey high school students are challenged to design a project based on criteria set by NJIT, utilizing a material kit supplied by Panasonic to help complete the challenge. Previous challenges have included the construction of devices to carry an egg up a 30-foot rope and return it unharmed, or enter a volcano's core. In the 10 years since the program started, 284 students representing 44 New Jersey high schools have participated.

"In classrooms across the country, Panasonic employees, products and resources are working to help students learn and grow. Through a wide range of programs at the local, state and national level, Panasonic's educational initiatives reflect our strong commitment to education."

Don Iwatani, Chairman and CEO, Matsushita Electric Corporation of America

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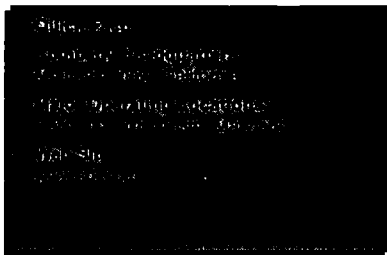
As a pioneer and leader in high performance computing and visualization, SGI is a company that has an outstanding reputation for innovation and creation in value-added computing. The company's commitment to industry innovation is matched with an equally strong commitment to its communities through support of the arts, the environment and especially education.

SGI's Educational Highlights

B.R.I.T.E. Awards - SGI sponsors the B.R.I.T.E. (Breakthrough Results Integrating Technology and Education) Award in partnership with the Tech Museum of Innovation in San Jose, California. SGI understands the importance of integrating technology into the curriculum, and this annual award recognizes and rewards teachers, schools, districts and county programs that have demonstrated innovative and functional methods for technology integration in the math, science and language arts fields. Winning programs or teachers receive $10,000 cash or $20,000 in equipment and support from SGI, a $2,500 training support package for up to 30 people from the Tech Museum of Innovation, and recognition on websites and written communications of the Tech Museum and SGI.

Mt. Pleasant High School Animation Studio - SGI, in cooperation with Mt. Pleasant High School and Disney, has helped to create and sponsor an Animation Studio program at Mt. Pleasant High School in San Jose, California. The program provides high-risk students in grades 9-12 with up to four years of instruction in drawing, art and animation history as well as the use of computers. The program additionally links computer use with science and English courses at the school. SGI digital artist and education specialists have worked with Mt. Pleasant educators and curriculum specialists to develop a program that is fun, innovative, and ensures that participants will graduate with entry-level, employable skills in the digital arts. SGI also provides facilities and meeting areas for Mt. Pleasant staff and faculty

RAFT - Resource Area for Teachers (RAFT) is a non-profit organization that collects and redistributes office materials to schools and community organizations. SGI regularly donates used equipment, office·supplies, furniture and other business items. RAFT has 4,000 members, all of whom are able to "shop" at RAFT's warehouse every Saturday for supplies and equipment. SGI is a proud supporter of RAFT's capital campaign and has provided them with office furniture for their new home.

"SGI has always placed the highest priority on innovation. And through our support of education in local communities, we are investing in the future innovators that will help to improve the quality of life for all of us in the years ahead."

Bob Bishop. Chairman and CEO
SGI

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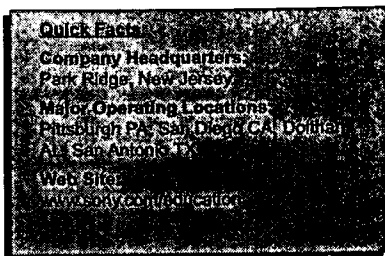
SONY

Sony's education programs focus on integrating technology into the classroom and giving opportunities to underserved schools. Whether it's improving technical capabilities in the foreign language classroom or in the science lab, Sony is committed to working with America's public schools to give children with the best possible education and provide them with the tools to achieve.

Sony's Educational Highlights

America's Promise-The Alliance for Youth - America's Promise-The Alliance for Youth originated as a result of the President's Summit for America's Future in April 1997. The organization was formed to provide the fundamental resources necessary to help the estimated 15 million at-risk children in the United States lead productive and fulfilling lives. Sony Electronics, Inc. (SEL) originally partnered with America's Promise in 1998. Over the past two years, SEL facilities across the county have organized hundreds of volunteer events in their local communities. Each of these initiatives have provided for at least one of the fundamental resources for at-risk children as identified by America's Promise. These include an ongoing relationship with a caring adult-parent, mentor, tutor or coach, a safe place with structured activities during non-school hours, a healthy start, a marketable skill through effective education, and an opportunity to give back through community service.

DVCAM Broadcast Equipment - Sony has donated more than $100,000 in DVCAM format broadcast equipment to Queen's College, Department of Journalism, Media, and Information Studies. DVCAM technology is used by broadcasters, cable operators and webcasters in addition to corporate and industrial videomakers. With the use of DVCAM equipment, students are able to get real hands-on experience with other media technologies that will provide for a more well-rounded educational experience. The video DVCAM will be delivered and ready for student use by the fall semester of 2000.

Sony's Symphony Learning System Grant Program - Each year, the Sony Symphony Learning System Grant awards a ten-station Symphony Language Learning System to one public school in the United States that has shown exemplary use of technology in the classroom and technology to promote foreign language education through multimedia software. The companion software to the system allows educators to better monitor students' performance and offers graphics for multi-media instruction. By utilizing the system, school districts aim to increase language proficiency at all levels and increase advanced placement and exit exam scores, as well as to create a fun and stimulating learning environment for children. The 2000 recipient of the Symphony Language Learning System is Robert Service High School in Anchorage, Alaska.

"As a corporate citizen, it is essential that Sony do its utmost to improve the quality of education in our community. The benefits of doing so are self-evident to everyone."

Fujio Nishida
President and Chief Operating Officer
Sony Electronics Inc.
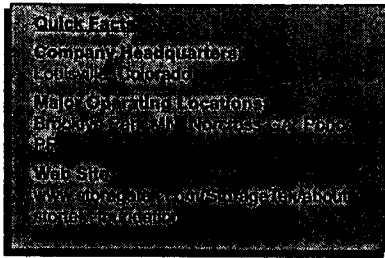
STORAGETEK

StorageTek's philosophy is that its welfare and the welfare of the communities in which it operates are mutually dependent. This philosophy has led StorageTek to contribute millions of dollars to education and to create the StorageTek Foundation. Through this foundation, StorageTek has been able to improve the welfare of its community by providing donations of nearly $1 million in 1999 to public school districts and higher education facilities.

## StorageTek's Educational Highlights

Matching Gifts to Education - StorageTek donated nearly $130,000 last year to public schools across the country through its Matching Gifts to Education Program. The program matches donations made by StorageTek employees to educational institutions. The program expanded in 1998 to provide matching funds not only to higher education facilities but also to kindergarten, elementary, and secondary schools. The matching gifts initiative promotes StorageTek's goal of changing the way America's children learn by expanding their access to knowledge and technology.

Colorado State University Initiative - StorageTek has provided Colorado State University with $500,000 over three years to remodel an auditorium in the university's Engineering Department as part of an initiative to revitalize and modernize the university's instructional facilities. The university plans to use the funds to create a state-of-the-art multimedia facility that features a computerized podium that controls presentations for the class on large video screens. Using these state of the art facilities, professors can present information via simulations, satellite downloads, video, and the Internet, fully utilizing the latest technology in the classroom.

Horizon High School Career Center - StorageTek donated over $13,000 to help Horizon High School in Thornton, Colorado outfit its career center with a 31-workstation computer network for student use. The system serves as a resource tool used by the career center and Horizon students to explore the opportunities available to them upon graduation. Numerous college applications are now available online, and the increased access for the students to the Internet facilitates the college application process. By the end of the 2000 school year, 2,500 Horizon High School students had researched colleges, scholarships, and career opportunities using the resources provided by StorageTek.

"It is our hope that our contributions to education will help to fulfill our core purpose - 'to expand the world's access to information and knowledge.'"

Pat Martin, Chairman, President and CEO StorageTek
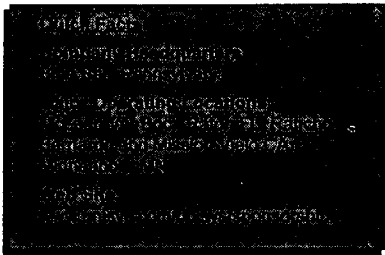
UNISYS

Unisys has a strong commitment to education. More than 70 percent of its charitable giving is focused on fostering science, math and technology education and learning among young people, with most support going to Web-based education programs developed by science museums through its premier program, the Science Learning Network.

Unisys Educational Highlights

Science Learning Network – This is a major, multi-year project exploring how a consortium of science museums can work together to provide online resources, experiences and interactions that support science learning and inquiry among young people. Today, leading science museums across the United States and the world are building new Web-based science education resources that support the teaching of science both inside and outside the classroom. The SLN Web site (www.sln.org) supports and links a growing online community of science centers, schools, students and educators involved with the Science Learning Network. Through the Web site, member museums provide schools and students around the world with technology, Web resources, teacher training and online spaces to collaborate.

International Public Science Day 2001 - Unisys, in partnership with the American Association for the Advancement of Science and The Franklin Institute in Philadelphia, sponsors International Public Science Day. Now in its third year, this event builds enthusiasm for science by promoting partnerships among science centers, schools and community learning centers. During the school year, teams will use inquiry-based investigation and experimentation to explore how science benefits their communities. Students will use the Web as a "workbench" and build their own Web spaces that will compete for the $10,000 "Unisys Prize for Online Education," which honors the outstanding use of the Web as a tool for scientific investigation. Their work will be viewed at the *International Showcase of Science* celebration in March 2001.

Support for Youth Education – Unisys supports a number of programs run by science centers to advance science education and help young people develop the skills to compete successfully in the e-business world. The *PACTS Program* (Partnership for Achieving Careers in Technology and Science) at The Franklin Institute provides science enrichment, career development and leadership opportunities for 80 middle- and high-school students each year. Students interpret exhibits for museum visitors and hold science demonstrations during the school year. They conduct environmental research in their communities and document their progress on the Web. Unisys funds the *UniTY* (Unisys Technology Youth) Program through the Miami Museum of Science. Each year, about 20 students from the museum's youth programs and the surrounding community participate in a 24-week technology program designed to build Internet skills. Students create their own Web sites based on science, math, peer issues and technology, and develop other Web sites for the museum and community organizations.

> "The e-business revolution underscores the importance of science, math and technology learning. Through the extraordinary power of the Web, science learners can now participate in communities of e-learners in ways that we couldn't have envisioned in the "pre-wired world."
>
> *Larry Weinbach, Chairman, President and CEO Unisys Corporation*

■ :::::█████:::: ■ **INFORMATION TECHNOLOGY**
■   ■   ■ **INDUSTRY COUNCIL**

The high-tech industry's commitment to improving the education of our children does not end with the programs detailed in this Report. ITI and its member companies are also committed to working with government and education professionals to address the important policy issues in the education arena. In that regard, ITI has developed the following education principles.

ITI Education Principles

The success of our nation and its continued global leadership in information technology depend first and foremost upon our ability to prepare and educate our children. Bringing technology and digital content into the classroom and curriculum offers opportunity for all to fully participate in our digital economy. ITI's member companies have a long history of working with local school systems to introduce technology into the learning environment and are committed to pursuing high, output-based academic standards and innovation in education. In that regard, ITI proposes the following principles to guide these considerations.

1) Increase technology integration into the curriculum and students' access to that technology

- Support investments by all levels of government and the private sector in the integration of technology into the curriculum
- Encourage comprehensive programs that help schools to plan, build and support technology infrastructure
- Emphasize programs to increase the use of education technology in disadvantaged communities
- Demonstrate to parents, teachers and community leaders the benefits technology brings to the classroom

2) Improve teacher training and professional development

- Support technology training for teachers at all experience levels
- Support the integration of technology into teacher education programs
- Empower teachers to make full use of the technology available to their classes

3) Strengthen math, science and technology education

- Support programs to increase the number and skills of math and science teachers
- Improve the use of innovative education techniques in math, science and technology
- Encourage students, in particular women, minorities and the underprivileged, to pursue math, science and technology education opportunities and careers

Appendix G-The Written Statement Of Rhett Dawson, President,
Information Technology Industry Council, Washington, D.C.

141

Testimony of

Rhett Dawson
President
INFORMATION TECHNOLOGY INDUSTRY COUNCIL (ITI)

Before the

Committee on Education and the Workforce
United States House of Representatives

Washington, D.C.

September 22, 2000

(149)

143

Mr. Chairman and Members of the Committee,

My name is Rhett Dawson and I am President of the Information Technology Industry Council. I appreciate the opportunity to be here today to talk about education and the IT industry – this is an issue that is important to my group and our industry as a whole.

ITI is the association of the leading information technology companies, including computer hardware and software manufacturers, networking companies, and Internet services companies. ITI member companies employ more than 1.2 million people in the United States and exceeded $633 billion in worldwide revenues in 1999.

We believe that the future success of our industry and America's technological leadership is tied directly to our ability to prepare and educate our children for the digital world. Education is an IT issue. We also believe that technology is an important part of today's education process and integrating technology in to the classroom curriculum in a way that most benefits student is an important change we all face.

ITI's member companies have a long history of working with local school systems
to introduce technology into the learning environment, and they are committed to
pursuing high, output-based academic standards and innovation in education. To
further these goals, our Board of Directors has approved a set of education
principles that guide our policy efforts. They are:

- Increase technology integration into the curriculum and students' access to
  that technology.

- Improve teacher training and professional development.

- Strengthen math, science, and technology education

I would like to submit the full copy of ITI's education principles for the record.

In addition, next week ITI will release a report that highlights the deep
commitment our companies have to improving education. The 2000 *ITI High-
Tech Education Report* will summarize the top education programs developed and
funded by 20 of the nation's leading IT companies. The report includes details on
initiatives ranging from teacher training to getting computers into the classroom.
While the report is not a comprehensive listing of all ITI member company
education investments, we hope it will provide policy makers with a better picture
of how seriously and creatively the high tech industry is investing in our education

system. It can also serve as a key resource for members of Congress to help your constituents by providing them information on these valuable education initiatives.

The report details dozens of innovative programs in K-12, higher education and lifelong learning, that bring technology to students, helping students and teachers make the most of this technology, and promoting and improving math and science education.

Some highlights include:

- **Initiatives promoting math and science education from companies such as Agilent Technologies, Corning, Panasonic, StorageTek, and Unisys.** From putting science center around the country online to financing science labs to serve at-risk children, these initiatives seek to engage children in the fascinating world of science and technology.

- **Essential teacher training efforts from Intel, Microsoft, Compaq, and Dell.** From innovative online networks to provide teachers the assistance they need to meet the challenge of technology to the massive programs to train hundreds of thousands of teachers how to integrate technology into their classrooms, these programs are providing teachers with essential resources.

- **Ambitious efforts to integrate technology into the curriculum from Apple, IBM, NCR and SGI.** From innovative efforts to allow parents to follow there child's classroom progress online to rewarding teachers who come up with new and creative ways to integrate technology into the classroom, these efforts are taking the next step once technology is accessible to students—how to learn with it.

- **Initiatives to expand technology access and the opportunities of the digital world to all from AOL, Hewlett Packard, Kodak, and Sony.** From promoting women and minorities in the engineering field through scholarships, internships and mentoring, to partnerships in to getting disadvantage kids online, these initiatives are taking important steps towards provide a digital opportunity for today's youth.

- **Network training from companies such as 3Com, Cisco, and Nortel Networks.** From high schools to community colleges, to re-training centers, these network training programs are being utilized by literally hundreds of thousands of students to gain valuable high tech work skills.

And that is only a sample. We are busy finalizing our report, so disclosure of all of the details is premature. However, I can tell you that the programs in our report involve innovative partnerships with such organizations as the Boys and Girls

Clubs of America, National Science Foundation, Plugged In, United Way, Urban League, US Department of Education, and YWCA.

We also will provide specifics on major partnerships in education with dozens of school districts including, Boston, Charlotte-Mechlenberg, Cincinnati, Detroit, Durham, Dayton, El Paso, Los Angeles, San Francisco, San Jose, Thornton, CO and the state of West Virginia.

My mission today is simple: I want to make it clear that the IT industry is committed to improving the education of our children. Furthermore, that commitment does not end with the efforts detailed in our forthcoming Report. We are also committed to working with government and education professionals to address the important policy issues in the education arena.

Mr. Chairman, I commend you for today's hearing and please be assured that ITI, and its member companies, stand ready to work with you, and members of this committee, to help ensure are children get the education, skills, and training they need to succeed in the digital world. Thank you.

Testimony of

Rhett Dawson
President
INFORMATION TECHNOLOGY INDUSTRY COUNCIL (ITI)

Before the

Committee on Education and the Workforce
United States House of Representatives

Washington, D.C.

September 22, 2000

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Committee on Education and the Workforce
Witness Disclosure Requirement – "Truth in Testimony"
Required by House Rule XI. Clause 2(g)

Your Name: Rhett Dawson		
1. Will you be representing a federal. State. or local government entity? (If the answer is yes please contact the Committee).	Yes	No ✓

2. Please list any federal grants or contracts (including subgrants or subcontracts) which you have received since October 1, 1997:

N/A

3. Will you be representing an entity other than a Government entity?	Yes ✓	No

4. Other than yourself. please list what entity or entities you will be representing:

Please see attached

5. Please list any offices or elected positions held or briefly describe your representational capacity with each of the entities you listed in response to question 4:

N/A

6. Please list any federal grants or contracts (including subgrants or subcontracts) received by the entities you listed in response to question 4 since October 1. 1997. including the source and amount of each grant or contract:

N/A

7. Are there parent organizations. subsidiaries. or partnerships to the entities you disclosed in response to question number 4 that you will not be representing?	Yes	No ✓

Signature: _____ Date: 9-21-w

Please attach this sheet to your written testimony.

ITI

INFORMATION TECHNOLOGY INDUSTRY COUNCIL

The Information Technology Industry Council (ITI) represents the leading U.S. providers of information technology products and services. ITI member companies employ more than 1.3 million people in the United States and exceeded $633 billion in worldwide revenues in 1999. These companies are responsible for more than 15% of all U.S. industrially funded research and development and more than half of all information technology research and engineering. The IT industry is credited with contributing on average 35% of the US annual economic growth over the past five years.

PURPOSE and MISSION

ITI promotes understanding of the networked world and the global competitiveness of leading information technology companies. Our mission is to advance open markets, e-commerce, and standards

2000 KEY PRIORITIES
- Promote Understanding of the Digital World by educating lawmakers, opinion leaders, the media and consumers
- Encourage deployment of affordable high-speed bandwidth networks to homes and businesses
- Establish a 21st Century electronic commerce trade agenda
- Update our current export control regime to keep pace with changing technology
- Prepare a workforce for the digital age
- Reduce technical barriers and streamline regulations worldwide
- Expand market access for IT in China
- Protect intellectual property
- Promote balanced energy efficiency and environmental programs
- Minimize the tax burden on electronic commerce

MEMBERSHIP

3Com Corporation	Eastman Kodak Company	Nortel Networks
Agilent Technologies	EMC Corporation	Panasonic
Amazon.com	Hewlett-Packard Company	Pitney Bowes Inc.
America Online, Inc.	IBM Corporation	SGI
Apple Computer, Inc.	Intel Corporation	Sony Electronics Inc.
Canon U.S.A., Inc.	Lexmark International, Inc.	StorageTek
Cisco Systems, Inc.	Microsoft Corporation	Symbol Technologies, Inc.
Compaq Computer Corporation	Motorola, Inc.	Tektronix, Inc.
Corning, Inc.	NCR Corporation	Tyco International (US) Inc.
Dell Computer Corporation		Unisys Corporation

OFFICERS

Tom Green, Dell Computer Corporation, Chairman;   Rhett B. Dawson, President;
Phillip Bond, Senior Vice President;   Kathryn Hauser, Vice President;   Helga Sayadian, Vice President

ITI

INFORMATION TECHNOLOGY INDUSTRY COUNCIL

Mr. Rhett B. Dawson
President
Information Technology Industry Council (ITI)

ITI is a trade association promoting the global competitiveness of leading information technology companies. As ITI's president and chief executive officer, Mr. Dawson is responsible for the management of the Association and for the achievement of its policy objectives.

Mr. Dawson has wide-ranging experience in government—at the White House, in Congress, at the Pentagon and with two Presidential Commissions. His private sector experience includes senior corporate management and partnership in two Washington law firms.

Immediately prior to being selected as ITI President, Mr. Dawson, for five years. was Senior Vice President, Law and Public Policy for the Potomac Electric Power Company. At Pepco, he had responsibility for law and regulatory matters and governmental, community and public affairs.

For the last two years of the Reagan Administration, Mr. Dawson was Assistant to the President for Operations, where he was a member of the top-level team formed by Chief of Staff Howard Baker. At the White House, he managed the staff and decision-making process for President Reagan and had line responsibility for over 2,000 people in the three largest White House operating and support units—the White House Office, the Office of Administration, and the White House Military Office.

Prior to the White House, Mr. Dawson was a partner in the McNair Law Firm. He took a leave of absence from the firm in 1986 to direct the President's Special Review Board (the Tower Board) that investigated the Iran-Contra matter. The Board's report to the President, published in February 1987, received national acclaim.

Mr. Dawson previously had directed the year-long President's Blue Ribbon Commission on Defense Management, under its Chairman, David Packard. This Commission's recommendations for changes in the Pentagon were implemented by the President in 1986 shortly after they were made.

Prior to this, Mr. Dawson was a partner in the law firm of Dickstein, Shapiro and Morin.

Between 1975 and 1982, Mr. Dawson worked for three committees of the U.S. Congress. He was Staff Director and Chief Counsel for the Senate Committee on Armed Services, and Minority Counsel to the Senate Committee to Study Governmental Operations with Respect to Intelligence Activities (the Church Committee) and the Joint Committee on Defense Production.

Mr. Dawson's civic and community activities have included the Executive Committee for the Greater Washington Board of Trade where he chaired the Federal Affairs Committee, the Executive Committee of the regional National Conference of Christians and Jews, and the Board of Directors of the Community Partnership for the Prevention of Homelessness.

157

**Appendix H-The Written Statement Of Claudia Mansfield Sutton,
Senior Vice President, CompassLearning, San Diego, California**

Compass**Learning**™

Inspire. Explore. Achieve.

Using Technology to Learn and Learning to Use Technology

Comments of
Claudia Mansfield Sutton
Senior Vice President Marketing
CompassLearning, Inc.

For the
Software & Information Industry Association

Before
The Committee on Education and the Workforce

September 22, 2000

(167)

Mr. Chairman and members of the Committee, thank you for this opportunity to address you today to share thoughts about using technology to learn and learning to use technology. My name is Claudia Mansfield Sutton, and I am Senior Vice President of Marketing for Compass**Learning**.

Compass**Learning** has more than 20 years of experience working with educators across the country to help them successfully implement instructional technology solutions. More than 20,000 schools, serving nearly 14 million students, use Compass**Learning** programs to help teachers personalize learning, measure student performance, and connect communities of learners. WRC Media Company, Compass**Learning**'s parent company, is the largest supplemental education provider in the world today. WRC Media has four principal operating subsidiaries: Weekly Reader, The World Almanac and Facts-on-File, American Guidance Service, and Compass**Learning**.

This morning, I am also pleased to represent the Software & Information Industry Association, the principal trade group of software and digital content publishers.

Compass**Learning** and SIIA thank Chairman Goodling, Ranking Member Clay and the Committee for its strong support of education and educational technology. Federal leadership has been critical to local and state efforts to bring the benefits of instructional technology to all students, especially those in the most disadvantaged communities.

1

In the next few moments, I plan to highlight three points about using technology to learn and learning to use technology:

1. In the education arena, we have only begun to harness the power of technology.

2. Technology is an effective tool for an image-based generation.

3. Professional development is essential to the success of an instructional technology implementation.

Technology, by definition, means different things to different people and is highly influenced by experience and perspective. How many of us still use microwaves to heat coffee and VCRs to play videocassettes...when there is so much more potential to be tapped. And, so it is with education.

The reality and the potential of technology are accelerating a revolution around the globe and in our schools. Revolution is often regarded as negative, but this is truly a positive revolution. I share with you a quote about another positive and long-lasting revolution:

> "Remarkable new technology is introduced into the school system and experts predict education will be revolutionized. The technology will, as never before, allow the widespread dissemination of new concepts and ideas that stimulate young minds and free the teacher for more creative pursuits. Yet, the magic fails to materialize, and within a few years articles appear in the popular press asserting that the failure, obviously arises from the teachers not being skilled enough in the new technology."
> *Excerpts from the New York Times in an article by Peter Lewis in the 1840's describing the introduction of the blackboard.*

It is all a matter of perspective, and it is incumbent on our generation to harness the potential power of technology in classrooms across America.

2

The generation of children in our schools today are often referred to as the "Image-based" or "I Generation." They are interactive, impatient, informed, inquisitive, and intelligent. Technology, which is an integral part of this generation's psyche, is a revolutionary tool through which teachers can transform education and improve educational opportunities for all children. By providing access to quality education anytime and anywhere while providing tools that facilitate active and engaged learning, technology can empower students to take control of, and accept responsibility for, their learning. The technology itself is less important than the changes it brings about in substance, content, and the focus of the learner.

Using technology to learn does not guarantee success. Successful technology implementations are tailored to the learner, based upon sound pedagogy, and tied to national, state, and local standards. Also, a student's progress can be more easily measured and monitored through the use of technology-based solutions. As with anything else in life, there is not a silver bullet to address improving student achievement and any claim that technology might be that silver bullet is not correct. But, it is an effective tool for an image-based generation.

Technology is a tool. In the education environment, it is a resource for assisting parents and educators in their quest to teach and motivate children. However, to be efficient, useful, and successful, any tool must be used for the purpose for which it was intended and the individual using the tool needs to have the appropriate training. As a child, I once tried to use a screwdriver to drive a nail into a piece of wood. Needless to say, I

3

wasn't successful. But, with a hammer and some help from my dad, I launched into a major construction effort.

Teachers need access to high quality professional development programs designed to help them learn how to use technology as an effective curriculum support tool, similar to the blackboard discussed by Peter Lewis in the 1840s.

Our country has made a commitment to wire schools and subsidize the provision of telecommunication services. This has been a great beginning. As part of the deal, states and local districts have committed to purchase computers and other hardware necessary to support the infusion of technology into the curriculum. Over the last two years we have made significant gains in the computer to student ratio and in the connectivity of our schools, libraries, homes, and community centers.

However, I suggest that we, as a nation, need to make the necessary investments in instructional software and professional development programs in order to realize the fruit of our hardware and conductivity investment.

Like the story of the nail and the screwdriver, construction cannot be successfully launched if one doesn't have the tools, and the tools don't work if one doesn't have the skill to use them. The technology revolution is aggressively changing educational perceptions, practices, and structures and has transformed both the process and the business of learning.

4

One example of the education process change is CompassLearning's iView, an Internet and CD-ROM-based program for students in grades 6-12, that combines the vast resources of CompassLearning and its' partners *USA Today*, *Teen Newsweek*, World Almanac at FACTS.com, and Weekly Reader. Developed by educators, iView offers "just-in-time" resources that inspire student learning by using digital content, delivered through state-of-the-art technology, all easily integrated into classroom or "at-home" lessons. For this type of product to be available to all students, we must invest in the whole revolution, which includes not only hardware but also software and professional development. Without this complete investment, we risk having technology-based tools sitting in our classrooms, libraries, and homes not being used to their fullest potential and ultimately our children not receiving the education that they need and deserve.

Maximizing the benefits of technology to help students achieve will require a supportive policy environment that:

- Makes the necessary long-term investment in technology. For example, targeted federal funding for educational technology is critical to both ensure all students have access to high-quality educational technology and to maintain the forward momentum during these critical stages of integrating technology into the educational system.

- Does not inappropriately favor technology and web-based education over traditional" education. For example, non-technology federal grant programs should allow educators to determine which delivery method or medium -- traditional print-based or technology-based -- is most appropriate to meet their education goals.

5

- Relies to a great extent on market competition to meet educational technology goals. For example, as with the textbook, education is best served by providing schools with resources and market choices to meet their needs. The resulting demand creates competition, spurs innovation, and reduces cost.

A complete discussion of each of these points, as well as other issues, are contained in the attached testimony of the Software& Information Industry Association before the Web-Based Education Commission.

In closing, we all must be committed to providing educators, parents, community leaders, and most importantly, students with the resources and options they need to inspire, explore and achieve success. Working together we can harness the benefits of the technology revolution to deliver compelling content and assessment over the appropriate delivery system however, whenever, and wherever, learning occurs.

Thank you for this opportunity to address you today. I am available to answer any questions of the Committee.

6

165

Software ᐧ Information Industry Association

e-Testimony Submitted by the
Software & Information Industry Association

Web-Based Education Commission

September 7, 2000

The Software & Information Industry Association (SIIA, http://www.siia.net) is pleased to submit the following views and recommendations to the Web-Based Education Commission. SIIA and our member high-tech companies are very supportive of the Commission's efforts to examine the many evolving education and policy issues relevant to education's increasing use of Internet technology. We look forward to the resulting recommendations and to working with the Commission to realize the virtually unlimited potential of web-based education.

SIIA is the principle trade association of the software code and digital content industries, representing more than 1,000 leading high-tech companies that publish software and digital content for business, education, consumers and the Internet. More than 300 of SIIA's member companies serve the education market, and are partnering with educators to improve educational opportunities and achievement through the integration of technology into teaching and learning. Our members develop and produce educational software and web-based products, including education portals and e-learning platforms. At the same time, all of our members depend on the nation's schools to provide students with the knowledge and skills necessary to become productive citizens and help fill the nation's need for skilled high-tech workers.

Our comments begin with a vision of web-based education and then present a number of policy recommendations under the headings of Strengthening Online Software & Content, Enhancing Long-term Investment, and 21st Century Regulatory Environment.

VISION OF WEB-BASED EDUCATION

Education presents one of the most dynamic and beneficial applications of the Internet. By providing both access to quality education anytime and anywhere as well as a tool that enhances learning, the Internet can empower students to take control of, and accept responsibility for, their learning. The high-tech and education communities are partnering to transform this vision of active and engaged learning into a reality for all students, creating a revolution in education perceptions, practices, and structures and changing both the process and the business of learning. (See "Education Anytime, Anywhere" in *SIIA's Building the Net: Trends Report 2000; Trends Shaping the Digital Economy* at http://www.trendsreport.net)

Students and teachers at all levels of education are taking advantage of four complementary and integrated Internet-based learning enhancements:

- Access to Content: The Internet is making information available to learners as never before, driving the thirst for knowledge and enabling real-time, real-world exploration from the desktop.
- Distributed Learning: The Internet is providing all students with unparalleled access from a distance to courses that integrate rich curriculum, expert instruction, and global discussions.
- Individualized Learning: The Internet is providing the tools to tailor content and instruction to the unique learning interests, needs and styles of students. Students can learn at their own pace -- from home, school, or work -- and be directed through integrated diagnostic assessments to linked, supplemental enrichment or remedial curriculum.
- Improved Communications: The Internet is facilitating efficient and effective contact and enabling teacher peer networks, student interaction with instructors and a diverse virtual student body, and increased parent involvement.

The combined result is an Internet-based education tool that supplements and enhances the teaching and learning process and its staples of teachers, books, and classrooms. By enabling students, educators and parents to improve the efficiency and effectiveness of teaching and learning, technology is improving educational opportunities and outcomes. Web-based education will increasingly challenge and improve long-standing education models by both opening the learner market to non-traditional providers and shifting educational empowerment from the institution to the individual. The Internet is creating similar benefits in educational management, including e-commerce savings in school procurement, improved accountability through efficient information collection and analysis, and ease of software maintenance and upgrade. Technological developments and access will continue to dramatically enhance web-based education, including hand-held computers, e-books, thin clients, two-way interactive video and voice streaming capabilities via broadband, and product-interoperability (see SIIA's School Interoperability Framework project at http://www.siia.net/sif/overview.html).

POLICY RECOMMENDATIONS

Maximizing these benefits will require a supportive policy environment that: (1) neither prejudices nor inappropriately favors technology and web-based education over "traditional" education; and (2) relies to a great extent on consumer empowerment and market competition to meet education and education-technology needs. Local, state and federal policies must: enable and encourage the continued creation of digital content; support long-term investment in technology infrastructure, research and development, and training; and reform regulations to fit this new paradigm. With such policies in place, the Internet will increasingly help transform and improve educational opportunities and achievement.

STRENGTHENING ONLINE SOFTWARE & CONTENT

The integration of high quality digital content is critical to the success of web-based education. While access to computers and the Internet are necessary pre-conditions, their core function and value is to deliver software and content. Similarly, access to any online content is not sufficient. Most of what is available at no cost on the Web is information in the form of primary source materials and stand-alone lesson plans, rather than instruction; but students and educators require effective and appropriate learning resources. While the raw information is potentially valuable, the tremendous time and effort of a talented teacher is necessary to incorporate it into the curriculum. However, most do not have the luxury of such resources.

Education publishers are therefore acting as key partners to fill this need. They develop and package online learning resources in a manner that adds value to content and enables fluid and effortless integration into the curriculum. Publisher research and development ensures web-based educational content is learner-appropriate and safe, reflective of the curricula, matched to state standards and

assessments, and incorporates effective pedagogy. Without such private-sector efforts, learners and instructors could be easily overwhelmed by both the plethora of unrefined online content, as well as the challenges involved in delivering education over the web. Well-crafted public policies are therefore critical to supporting these existing efforts and ensuring all students have access to high quality digital content.

School Resources

SIIA Recommendation: Empower consumers/educators to meet their needs through the market by increasing and targeting public investment in education technology.

Direct public investment is critical to ensuring the availability of high quality digital content for the elementary and secondary grades, as well as for other government-supported educational institutions. Targeted state and federal education technology funding has provided schools with the resources necessary to purchase technology infrastructure and online instructional materials and services. The resulting demand has stabilized this new market, created competition among vendors, and spurred innovation and quality products. Policymakers should expand this efficient market dynamic by continuing to empower consumers (i.e., school educators) in the following ways:

(1) Increase the targeted investment in education technology to maintain the forward momentum in these critical early stages of integrating and bringing to scale technology.
(2) Target resources to high-need communities to ensure all students have access to high-quality web-based education, including both the targeting of technology program funds to schools lacking computer and Internet access and the targeting of other program funds to economically disadvantaged districts and students.
(3) Enhance a school's flexibility to meet education and education technology goals in two ways. First, allow educators to use technology funds to best meet any and all of their education technology needs, including infrastructure, software and content. Second, enable educators to determine which delivery method or medium -- traditional textbook or online curriculum -- is most appropriate to meet their specific education goals when using non-technology program funds.

Public-Private Partnerships

SIIA Recommendation: Rely primarily on the private sector and public-private partnerships to meet the demand for creating web-based software and digital content, and ensure government efforts do not distort or weaken this efficient market dynamic.

While government should encourage the creation of web-based software and digital content, it should not view the ease of distributing such materials over the Internet as carte-blanche cause to produce and make available these materials on its own and/or for free. Instead, such government action must be evaluated on a case-by-case basis to ensure it is not beyond its mission, does not distort educational decisions, and does not weaken the overall supply. When it comes to such products and services, education has long been served, and is nearly always best served, by the free-market convergence of supply and demand. In this regard, web-based curricula is no different than textbooks, desks, and computer hardware -- the public sector is neither well-positioned nor well-equipped to produce these products for schools.

In general, government grant-funded software that is provided for free has ultimately proven to be insufficient and non-sustainable. Initial development of technology-based instructional materials often accounts for a minority share of its life cycle cost. As a result, such government-funded products usually

lack the infrastructure and investment necessary to enter the market (e.g., marketing), sustain the product (e.g., technical assistance), and update and improve these products over multiple generations. The result has most often been failed implementation, including the failure to reach the intended audience and make it past release 1.0. In addition, most such grant-funded and free products are not large-scale and high-quality enough to provide the value educators are seeking.

By largely relying on free market mechanisms and creating incentives by which private sector profit-making coincides with public goals (e.g., school technology funding and opening R&D competitions to the private sector), public policies will create an environment in which providers meet education needs.. Competition will spur innovation, improve quality and reduce consumer costs. To the extent that government inappropriately competes in the software and curricula market via the Internet, it will produce the following negative consequences: (1) create disincentives to private investment; (2) perpetuate the notion that web-based products are free and thereby force the private sector to turn increasingly to alternative business models, such as when products are provided at reduced or no cost in return for advertising; and (3) ultimately limit choice and facilitate a more standardized, quasi-national, curricula.

In fact, the federal Office of Management and Budget (OMB) Circular A-76 states: "In the process of governing, the government should not compete with its citizens. . . . it has been and continues to be the general policy of the government to rely on commercial sources to supply the products and services the government needs." In this spirit, to the degree that government carries out its critical goal of funding education, including online curricula, SIIA urges this be accomplished primarily by empowering educators through grant funding to purchase the products and services that best meet their needs.

Research & Development

SIIA Recommendation: Enhance industry's ability to address education needs by both targeting government R&D to fill the gaps in private research and allowing private entities to compete for R&D grants.

With the web-based education revolution at a relatively early stage, a considerable R&D effort will be necessary to determine the most effective tools and models. In light of the size and scope of this challenge, SIIA supports the need for an enhanced federal R&D investment. Because industry continues to make significant capital investments to research and develop education software and digital content, these public resources must be appropriately targeted and designed -- including adherence to the government competition issues outlined above -- to fill the gaps and enhance industry's ability to deliver effective products and services.

Industry's investment is epitomized by the multi-year, multi-million dollar investments made to deliver products to market, while many online materials are further updated to ensure timely content. In fact, some of the most appropriate federal R&D investment has recognized these efforts by targeting areas, such as bilingual education, not adequately addressed through private R&D. This public and private investment has born great results. An August, 2000 review by SIIA of existing research found that education technology increases educational opportunities and student achievement, and that the degree of effectiveness depends on the match between such variables as students needs, software design, education goals, and educator training (See the *2000 Research Report* on the *Effectiveness of Technology in Schools* at http://www.siia.net/divisions/education/pubs.asp). Of course, there is much that remains to be discovered about technology, it's relationship to learning, and the most effective uses and pedagogical approaches.

SIIA encourages the federal government to continue this investment while taking steps to ensure the topics are the most current and relevant and the results are adequately disseminated to influence practice. More specifically, federal research and development should adhere to the following guidelines:

(1) Federal R&D should be focused long-term basic research, large-scale empirical evaluations, smaller and under-served niche markets, and other R&D that better identifies effective models, the factors that determine effectiveness (i.e., what interventions work best with students of what learning styles and under what conditions), and ultimately how these models can be replicated.

(2) Federal R&D should allow for-profit entities to compete for federal research grants to ensure the best proposals are funded and the results of those R&D efforts are brought to market. Due to the lack of incentive in the system, the results of government-funded R&D too often remains locked in a report, rather than incorporated into practice and product development. In contrast, in order to stay competitive, education publishers operate at the cutting edge of research and work closely with educators to understand and respond to their needs. As a result, companies are often in the best position to identify research gaps, respond in partnership with practitioners, translate findings to software and digital content, and ensure these resulting products are made available.

(3) Federal R&D should strongly encourage or require partnerships between education, industry, and institution-based researchers to ensure the efforts are shaped by practice and the results, in turn, help to mold that practice. In fact, publishers frequently follow this model now by partnering with educators to conduct their research and development.

Clearinghouse of Web-based Education Content

SIIA Recommendation: Ensure a public clearinghouse of technology-based instructional materials is created in partnership with industry, is designed to reflect the new technology paradigm, and is based on objective measures.

In answer to a growing demand, publishers are creating numerous high-quality, timely and sophisticated technology-based instructional products and services. In response, some state and federal policy makers are looking to develop clearinghouses that provide educators with a one-stop shop to find technology-based products that meet their teaching objectives. We also note that a number of clearinghouses are established or being developed by non-government entities, perhaps minimizing the need for a government version.

In either case, the publishing community strongly supports an instructional materials clearinghouse that allows educators to find appropriate products. SIIA member publishers make significant investments to develop and test high quality, effective products, and welcome the scrutiny of third-party evaluations. Of course, the success of such a clearinghouse requires that its criteria and review process be crafted through an education-industry partnership, fairly represent publishers and their products, and neither chill the market nor the choices available to educators. SIIA has developed the following principles to ensure such clearinghouses are successful and effective:

SIIA Principles for Technology-Based Instructional Materials Clearinghouse

1. <u>Develop in Partnership</u>. The clearinghouse must be developed in partnership with the publishing community to ensure the instrument is effective, cost-effective, and timely for both educators and publishers. Without the strong participation of publishers, educators are left with fewer choices and a diminished understanding of what is available, and the clearinghouse is ultimately left with a disappointing level of success. It is therefore critical that the clearinghouse both involve the publishing community from the outset of its development and reach out regularly to garner publisher input and address concerns.

2. Reflect the New Paradigm. The clearinghouse criteria and process should reflect qualities that make technology-based instructional materials unique and in high demand. An evaluation survey must therefore respond in-kind to the diversity of goals and designs among products and services, including such valuable features as timeliness, customization to diverse learning needs and styles, collaborative nature, multimedia ability, access anytime and anywhere, variety of delivery mechanisms (i.e., web-based, stand-alone software, etc.), and continually evolving technology. For example, many web-based products includes regular, even hourly, changes in content; and a clearinghouse must ensure this feature is accounted for in both its representation to educators and its evaluation. As such, it is critical that any clearinghouse be based on this technology paradigm, and that these new tools are not simply fit into a static paradigm designed for print or basal materials.

3. Address Educator Needs. The clearinghouse should be designed to address the most pressing needs of educators and provide that information in a clear and concise format. It could provide everything from a catalogue of products and correlation to state and national standards to an evaluation of products with an interface for educator reviews. The first step in creating this type of mechanism is to identify the priority needs of educators and the publishing community. Clearinghouse organizers should prioritize the most critical goals and work in stages to expand its features to address other needs as deemed necessary and practical.

4. Use Objective Measures. The clearinghouse should be based on objective measures that are widely accepted by publishers and educators. A publicly-funded clearinghouse must not rely on opinion or subjective judgement, because research has demonstrated the effectiveness of technology-based tools and instructional materials depends largely upon the appropriate use of the product and the training of the educator. To that end, SIIA strongly supports the inclusion of a correlation to state standards and assessments, which are often included in the development of products and represent a clearly defined measure for their evaluation. To the extent a clearinghouse includes other measures of effectiveness, it should look to objective criteria that enable a product to be compared against its design goals, including instructional/learning model, knowledge type(s), technology, and other functional characteristics. Finally, a clearinghouse must use reviewers who are well-trained in the goals and appropriate use of technology and of the particular product. Most importantly, it is critical that all products be given a level playing field and that reviews remain impartial.

5. Web-based and Interactive. The clearinghouse should employ the technology that it is reviewing, and should therefore be Web-based and interactive. It should be housed online and provide educators the opportunity to link to all products, which may include online demonstrations. The clearinghouse should be a center of information, and therefore include feedback and appeals provisions for educators and publishers.

Copyright Protection

SIIA Recommendation: Encourage the development of web-based education products by both maintaining current copyright laws that balance the rights of publishers with the needs of educators as well as closing unfair loopholes regarding states and databases.

U.S. copyright law has long protected the ownership rights of content producers, thereby maintaining the market incentive necessary for creators to invest, innovate, and meet the demand for content. With the advent of the Internet as a revolutionary distribution network, copyright law is even more critical to the protection of digital content. As evidence of this, copyright law was amended

171

significantly in 1998 by enactment of the Digital Millennium Copyright Act to address many of the new challenges posed by the Internet and digital distribution systems. While web-based distance education presents a unique challenge, SIIA believes it is premature to respond by amending existing intellectual property law.

At this stage in the development of web-based education, current law appropriately balances the online protection of content publishers against the fair use of copyrighted materials for education and related purposes. New and ever-changing education and business models, licensing practices, and digital rights technologies must be allowed to evolve unfettered by a legal framework that could create barriers to such developments and reduce incentives among the very content providers who are so critical to web-based education. Under current law, education providers are working closely with publishers on a case-by-case basis to meet the legitimate needs of both parties.

With that said, there do exist two significant loopholes in copyright law that unfairly penalize both content providers and many education institutions. In the first case, federal courts have ruled that state universities, as well as other state entities, cannot be held liable for monetary damages resulting from their copyright infringements. As a result, state universities may use copyrighted works without gaining authorization from or providing compensation to the copyright owner, and they run little risk of being sued by the copyright owner for these activities. State universities that exploit these rulings gain a competitive advantage over private institutions -- who must continue to purchase or license copyrighted products -- and create significant disincentive for educational publishers.

In the second case, existing copyright laws do not adequately protect traditional and electronic databases from piracy. Database publishers invest tremendous amounts of money, time and resources in researching, compiling, updating, marketing, and disseminating databases to the public. Under current U.S. law, however, anyone can easily copy an entire database, call it their own, and distribute it to others; and there is little the original database compiler can do. As a result, many web-based education products and services such as Internet filtering and portal sites are at risk, creating disincentives for their creation. SIIA therefore urges Congress to remedy both situations by passing legislation that would adequately protect database producers against database piracy and subject states to the same copyright remedies as all others.

ENHANCING LONG-TERM INVESTMENT

Technology Funding

> *SIIA Recommendation: Increase, target and sustain public funding to ensure education technology is brought to scale, updated and improved, while avoiding reliance on donated computers.*

Several years into the recent boom in education technology, the danger exists that policymakers, educators, and the public may view these costs as one-time capital expenses, therefore slowing its integration before it becomes sustainable. Yet, as any business can attest, technology costs are a dynamic budget item, requiring continued investment in infrastructure, software, support and training. For example, educational software and content is an ongoing cost, resulting both from payment plans such as subscription fees and from upgrades to meet evolving needs and take advantage of new standards. Similarly, hardware has about a five-year life cycle. SIIA therefore urges increased, targeted and sustained public funding to ensure education technology is brought to scale, updated, and improved to maximize its effectiveness.

The business world can also attest to the fact that technology will increasingly improve operations as its use is refined and users grow more proficient. Meanwhile, at these early stages of integrating education technology and bringing it to scale, targeted investment is critical to maintaining forward momentum, ensuring educators are not inappropriately forced to choose between funding technology or funding other critical school expenditures, and encouraging educators and technology providers to strive for the most efficient and effective use. In addition, these technology resources must be targeted to disadvantaged communities and students. While great strides have been made to reduce the digital divide, continued and expanded efforts are needed to ensure all students have access to high-quality web-based education. School access is especially critical among poorer students who may not have the benefit of home or community Internet access.

Finally, SIIA does not believe government subsidies, including tax incentives, for companies to donate computers is a sufficient solution. Schools must be provided the funding to purchase new computers that meet their needs, and not be instead required to take second-hand and out-dated equipment that often requires significant refurbishment costs and prevents a school from implementing its desired technology plan, system and software. Perhaps the greatest danger, already born out in many cases, is that policy makers will view computer donations as a substitute and significantly cut needed technology funding.

Teacher Training

SIIA Recommendation: Increase the investment of time and resources in teacher training at all levels of government and among all educational institutions as a critical component to the success of web-based education.

Perhaps the most critical investment necessary to the success of web-based education is the training of educators at all levels. For example, only about one-third of public school teachers now rate themselves as prepared or very well prepared to take advantage of technology in their classroom. SIIA therefore urges significantly increased investment of time and resources at all levels of government and among all educational institutions.

Technology provides educators with exciting new tools that can transform in a positive way their methods and role, and invigorate their experience. Most profoundly, the Internet can maximize a teacher's time and effect by enabling them to replace, in part, many rote and group activities with individualized instruction in which the teacher serves as mentor and guide to a student's self-paced and self-directed learning. This paradigm shift in teaching stands at a very early stage, and educators therefore need training and practice to understand this dynamic and learn how to best integrate technology into the curriculum. They also require ongoing, onsite maintenance and support to enable them to focus on teaching. Absent such support, the many benefits of web-based education could be undermined. Such training should be designed as follows:

(1) Technology training should be targeted to all educators, including through pre-service and in-service training of teachers and professional development of postsecondary instructors.
(2) Pre-service training will require that schools of education devote increased attention and resources, including upgrading their technology, revising their curriculum, training their professors, and partnering with industry and K-12 schools.
(3) In-service training should include intensive day or multi-day forums as well as activities that are sustained, ongoing and integrated into an educators regular teaching schedule.
(4) Technology training should both combine specific programs and activities focused exclusively on technology, and should also be integrated into all professional development activities so that

technology is not viewed as a distinct and separate aspect of teaching but rather as an integrated tool to accomplish any and all teaching and learning goals.

(5) Educators should be encouraged to take advantage of web-based training to support their own professional development, including through distributed learning and on-line communities of teachers.

(6) Schools and educators should be provided flexibility in their use of public resources to obtain training from whichever provider best meets their needs, whether that be a non-profit entity or the many for-profit entities that are already partnering with schools to integrate technology and are therefore well-positioned and well-qualified to provide the necessary training.

21" CENTURY REGULATORY ENVIRONMENT

To the degree that education is governed by various local, state, regional and federal laws and regulations, web-based education is and should be subject to the same oversight in the name of ensuring quality and protecting students. At the same time, such oversights should be minimal in nature, recognize that technology presents unique challenges and opportunities, and thereby create an environment in which web-based education can test its full potential and meet its full demand. This will require public policies that neither prejudice nor inappropriately favor web-based education, and rely to the greatest extent possible on consumer empowerment and market competition.

Student Aid & Accreditation

SIIA Recommendation: Update policies and regulations to ensure web-based education is not inappropriately penalized and is able to compete with traditional educational models, and encourage governing bodies and institutions to develop and implement new competency-based criteria, models and understandings.

A shift from institution-based to learner-based education requires that many practices and regulations be updated to reflect this new model. Those based on a seat-time (classroom- and semester-based) and single institution model must be changed to ensure web-based education is not prejudiced by long-standing rules and procedures regarding school accreditation, academic credit and certification, student financial aid, and other similar issues. Absent such regulatory evolution, web-based education will be unfairly prevented from both competing with traditional education and from achieving its full potential.

The current system creates a number of student barriers. Much of the difficulty stems from fixed-time and fixed-place assumptions. For example, federal student aid requires that an "academic year" generally include at least 30 weeks of instruction, and that a week of instruction includes at least twelve hours of "regularly scheduled instruction." However, one of the virtues of web-based education is its absence of regularly scheduled instruction in order to meet the important goal of self-paced learning. Similarly, these rules prevent schools from enrolling more than 50 percent of their students in distance education programs or offering more than 50 percent of their classes via distance education. While such student aid rules were promulgated with sound intent, these processes must be changed so that the quality of education, and therefore student and institutional eligibility, is determined not by outdated input measures but by more flexible participation and student outcome measures.

Similar problems exist with school accreditation, which is governed by a variety of federal, national, regional and state bodies. While there currently exist few virtual schools that offer courses directly to students over the Internet for academic credit and degrees, the number is expected to grow substantially in the next few years in response to student demand. However, the many accreditation requirements related to fixed-time and fixed-place are outdated in a model where teaching and learning

are online. Furthermore, web-based education crosses jurisdictional lines of accreditation, potentially creating conflicting guidelines and/or preventing student access.

It is therefore critical that this accreditation process and criteria be updated to recognize the unique characteristics of web-based education, while providers are also held to the same high standards as their competitors. Regulatory barriers must be minimized to enable the new web-based models to compete fairly based on the quality of their product and the satisfaction of their customers. It is also critical that the cooperation between traditional and virtual institutions be at least as seamless as that between traditional institutions. More specifically, students should be able to take advantage of all sound educational opportunities, and be confident their course credit can be transferred among schools of various types. Of course, the ultimate decision must be left to the institution, but policy efforts are appropriate in two ways. First, of course, is the effort to develop new standards and provide accreditation to those virtual institutions deemed worthy. Second is the effort to encourage institutions to accept the integrity of that accreditation and of those schools, and therefore the transfer credit and credentials of students. Similar efforts are necessary with regard to professional certifications.

These accreditation, student aid, and certification reforms present great challenges, but also provide great opportunities as to how we evaluate education and educational institutions. Most profoundly, the shift from a seat-time and single institution model to one based around student needs provides great promise of a parallel shift toward competency-based measures. While such outcomes-based measures are not new, their use remains limited when compared to education's goal of improving a student's knowledge and abilities. A second opportunity exists to enhance the cooperation among various institutions and governing bodies in developing common standards, models and agreements that will facilitate a new learner-based, multiple-institution education model. SIIA therefore encourages accelerated efforts among institutions and governing bodies to develop such criteria, models, and understandings.

Child Privacy & Protection

SIIA Recommendation: Protect both child online safety and educational opportunity by avoiding inappropriate state or federal technology mandates and instead relying on balanced solutions, public-private partnerships, industry self-regulation and consumer education, and local parents and school boards.

Reacting to concern about child online safety, a number of public policies have been proposed or enacted that would restrict both the information collected online from elementary and secondary school children and the content those students can access online. Education technology providers consider children's privacy, security and protection from inappropriate content to be a top priority. SIIA and its members are working with educators and policymakers to address these concerns, including through new technologies and evolving business models, with the aim of empowering customers to choose those models that best fit their needs. While this effort progresses, there is some concern that many proposed or enacted state and federal policies may be overly restrictive and produce unintended, inappropriate and detrimental educational consequences. SIIA therefore urges continuation of a strong public-private partnership to ensure policy solutions do not create prohibitively restrictive conditions that may chill development of, and student access to, web-based education. To minimize such risks, state and federal policymakers should defer first to the ability of local school boards, parents, and educators to balance their children's interests with local values and needs.

With regard to student information, public policies often fail to adequately distinguish between they type and use of information, as well as the context in which the information is obtained. One-size-fits-all rules governing the online collection of student information, such as those requiring a parental opt-

in, may prohibitively restrict school-business partnerships to improve web-based education and provide low-cost technology access for disadvantaged students. Instead, such policies should treat personally identifiable information differently from anonymous and/or aggregated information. With the latter type posing no threat to student privacy or security, policies regarding its collection and use should be left to the discretion of local communities.

Similarly, state and federal rules governing the online collection of personally identifiable student information may prohibitively restrict the use of revolutionary education tools. With educational activities -- from traditional testing and test reporting to new customized learning tools that link assessments with curriculum -- increasingly online, even well-intentioned restrictions can create prohibitive barriers. For example, SIIA supports the Children's Online Privacy Protection Act (COPPA), which requires all Web sites to obtain prior parental consent before allowing children to provide identifiable information. However, there is concern that the law does not reflect the uniqueness of web-based education that increasingly blurs the lines between home and school, increases student opportunities, and takes place in many settings often without the presence of a parent. For example, in a school setting where technology is integrated into instruction, online curriculum must be treated like traditional curriculum, whereby teachers are entrusted to protect students. In light of the collective nature of K-12 education, policies that seemingly encourage a student's exemption from online instruction are likely to limit the online opportunities of the entire class. Ultimately, poorly crafted policies may exaggerate the "digital divide" by limiting a young student's ability to access e-learning opportunities at home, in school or in other learning environments.

Finally, high-tech companies are concerned that some policy efforts to shield children from inappropriate Internet content may unintentionally reduce access to web-based education. Specifically, SIIA believes it is inappropriate for federal or state government to mandate specific technology solutions, and therefore urges that no laws be passed that require schools and libraries to implement Internet filtering and blocking technologies. SIIA supports the desire for children to have an age-appropriate, safe and educational online experience. High-tech companies believe the decision for accomplishing this goal, as well as other education technology-related goals, should be made at the direction of local parents and school and library boards, and not through a one-size-fits-all mandate. Such a requirement fails to recognize constantly evolving technology, alternative strategies, and the prerogative of local citizens to make these decisions in light of unique local needs, values, and educational goals. The result is the usurping of local control and a signal from government to its citizens that they can not be trusted with their children's online safety.

Most communities are addressing this issue of student Internet access and have implemented such solutions as acceptable use policies, adult oversight, family education programs, and technological controls that best reflect local norms. A filtering mandate will reduce the implementation of such alternative and complementary strategies. While filtering technology can be effective, it may not be the perfect solution for all communities. Yet, federal endorsement through a mandate will inevitably create a false sense of security among many and curtail community involvement, parental decisionmaking, and the search for improved methods. SIIA members are especially concerned with the burden that such regulation would place on many schools and libraries. The meeting of such rules, the potential legal liabilities, and the reasonable but not insignificant financial and administrative costs of filtering will inevitably force schools and libraries to divert some resources away from other educational purposes, and could force some to simply eliminate Internet access.

As education technology evolves, the education and high-tech communities must collaborate to ensure these student privacy and protection concerns are addressed while minimizing adverse educational impact. Industry self-regulation must be the first response to help minimize perceptions of student risk, while education of consumers and policymakers can help ensure government regulation is narrowly and

appropriately targeted. In addition, reliance on elected school boards to look out for the best interest of their children when developing education-industry partnerships may often best address unique local concerns and needs.

The Software & Information Industry Association and its member high-tech companies are very supportive of the Web-based Education Commission's efforts to enhance public policies and ensure the benefits of the Internet are brought to all students. From Kindergarten to the corporate classroom, web-based education is challenging traditional views of teaching and learning, fundamentally changing many long-standing education models, and improving educational opportunities and achievement. While great strides have been made, this transformation is relatively young. Maximizing the benefits will require additional efforts and a supportive policy environment.

SIIA therefore urges the Commission to put forth recommendations that ensure public policies: (1) neither prejudice nor inappropriately favor technology and web-based education over "traditional" education; and (2) rely to a great extent on consumer empowerment and market competition to meet education and education-technology needs. With such policies in place, the Internet will increasingly help transform and improve educational opportunities and achievement for all students. SIIA will continue to work toward this goal, and looks forward to further efforts to develop and implement effective policies in cooperation with the Web-based Education Commission, educators, policy makers, and other stakeholders.

Committee on Education and the Workforce
Witness Disclosure Requirement – "Truth in Testimony"
Required by House Rule XI. Clause 2(g)

Your Name:	CLAUDIA MANSFIELD SUTTON		

1. Will you be representing a federal, State, or local government entity? (If the answer is yes please contact the Committee).	Yes	No X

2. Please list any federal grants or contracts (including subgrants or subcontracts) which you have received since October 1, 1997:

3. Will you be representing an entity other than a Government entity?	Yes X	No

4. Other than yourself, please list what entity or entities you will be representing:

SIIA, Compass Learning, WRC MEDIA, Inc.

5. Please list any offices or elected positions held or briefly describe your representational capacity with each of the entities you listed in response to question 4:

SIIA – Compass LEARNING is a member of SIIA.
Compass Learning – Senior Vice President of Marketing
WRC Media, Inc. – Parent Company of Compass Learning

6. Please list any federal grants or contracts (including subgrants or subcontracts) received by the entities you listed in response to question 4 since October 1, 1997, including the source and amount of each grant or contract:

7. Are there parent organizations, subsidiaries, or partnerships to the entities you disclosed in response to question number 4 that you will not be representing?	Yes	No X

Signature: Claudia Mansfield Sutton   Date: 9/21/00

Please attach this sheet to your written testimony.

CLAUDIA MANSFIELD SUTTON
Senior Vice President, Marketing
CompassLearning

Claudia Mansfield Sutton is Senior Vice President of Marketing for CompassLearning. She is responsible for setting the company's overall strategic positioning in the education marketplace.

Ms. Mansfield Sutton has extensive experience in the fields of education and business, having worked as a teacher, a school administrator, a lobbyist for a major education association, and in marketing and sales for two instructional technology companies.

Before joining CompassLearning, Ms. Mansfield Sutton was vice president of public affairs for Computer Curriculum Corporation (CCC), where she was responsible for national marketing and sales support programs, national business development programs and corporate partnerships. As a resource for the field sales force on federal and state legislative and regulatory policy issues, she focused on funding streams and strategic business opportunities. Before her promotion to vice president at CCC, Ms. Mansfield Sutton worked in the marketing organization as the director of public relations.

Ms. Mansfield Sutton joined CCC from Control Data Corporation where she was manager of marketing communications for the Plato Education Services Division. Additionally, she was part of their first national strategic accounts team and developed the company's first corporate partnership program.

Prior to this, she worked for the American Association of School Administrators (AASA) in their Office of Government Affairs. While at AASA, Ms. Mansfield Sutton was responsible for legislative, regulatory and judicial issues management and was

Compass/bios-july2000

instrumental in conceiving and developing their first legislative corps and political action committee.

She began her career as a junior high and high school social sciences teacher and reading specialist for the McKeesport Area School District in Pennsylvania. As an administrator, she launched the district's first secondary-level gifted education program.

Ms. Mansfield Sutton received her bachelor's degree in education from Indiana University of Pennsylvania and a master's degree in language communications from the University of Pittsburgh. She also holds a post-graduate degree and certification in educational administration.

Ms. Mansfield Sutton is a member of numerous education associations and serves on several boards, including *USA Today's* Education Advisory Board, the Council of the Great City Schools Blue Ribbon Advisory Panel, and the National Education Association's Technology Exhibit Advisory Group.

Compass/bios-july2000

Appendix I-The Written Statement Of Michael Kaufman, Ceo And Chairman, Tequity, Corte Madero, California

Testimony by Michael Kaufman, Tequity, September 22, 2000
To the Committee on Education and the Workforce, U.S. House of
Representives

Chairman Goodling and members of the Committee, thank you for this
opportunity.

My name is Michael Kaufman, and more than six years ago I began to
develop the volunteer project called NetDay to jumpstart the connection of
K-12 classrooms to the Internet. However, I am an educator, not a
technology person, so my comments will be focused on what it takes to
make technology work for education, especially in communities of need.

With a goal of including all communities, NetDay set the threshold for
participation in this high-tech barn raising so low that most communities
could afford the few hundred dollars required. As an example, more than
300 parents and community members from our nation's largest housing
project, came to the 112th Street Elementary School in South-Central Los
Angeles on a sunny Saturday in 1996 to pull wires to connect their children
to the Internet and their future. They knew then that their children would
need these technologies if they were to have access to the opportunities of
the 21st century and the global economy. Unfortunately, for 112th Street
Elementary School and its students, and other schools serving similar
communities, the promise of these connections has yet to be realized and in
many cases the wires are still dangling in the walls.

(191)

182

While there isn't enough time in these brief comments to outline much of what needs to be done to ensure that these technologies contribute to the opportunities for all students to achieve high academic standards, and there is still much more to be learned, please consider the following:

- In poorer communities, where the technologies are neither in the home nor the workplace, the schools provide the best opportunity for access. The impact of these school resources is enhanced by access after-school and in the home, creating a family/community feedback loop that accelerates change in education and schools. Congress should focus its technology investments in poverty communities in the K-12 schools, but ensure that these programs are complimented with opportunities after-school and at home.

- Tens of billions of dollars have been spent during the last decade on implementing digital resources in K-12 schools. The challenge is to leverage the investments already made. And while the hardware and the software, the connections and the professional development are essential in this information age, IT (Information Technology) is the "peopleware," the human infrastructure that will make the difference, the champions to lead the charge and engage the constituents, the administrators to take the responsibility and the educators to make the change. IT is full-time peer mentors who speak the educator's language and are comfortable enough with the technologies to meet the educators where they are and to explore with them the educational potentials. IT is just-in-time, in-the-classroom support available to help teachers maximize the use of these resources with their students while minimizing

their frustration with the technologies' inevitable hiccups. IT is an engaged digital community that extends the lessons beyond the classroom walls and the school day, and that provides work opportunities that warrant the education. This "peopleware" is a new area for national investment in educational technology, without which we will never see the full value of the outlays we have made.

- All students need to see the "light at the end of the tunnel" if they are expected to invest themselves in the education required to get there. Certainly, I don't need to get into the details of how at-risk students in at-risk communities are familiar with the concept of "risk and reward." They take chances every day. Unfortunately, in many of these communities, positive alternatives are not as apparent. New economy models and mentors are essential, and programs that draw them into these challenging communities offer the promise of rewards that can motivate all students to take appropriate risks, including the risk of doing well in school.

- But all the suggestions above and more loose their value if the lessons learned aren't leveraged for the future advantage of the community. For ultimately, all externally funded programs are terminal, be they government, NGO or business, and too often, when the external support ends, unless the community has the capacity and leadership, the program dies, even though there is much more work to be done. And although program participants understood the rules of engagement from the beginning, rarely do they initiate the activity with an exit strategy in mind. Resources and time must also be dedicated to developing local

leadership and building community capacity to ensure that the investments made are continually tailored to meet the changing requirements, sustainable for the future and scalable beyond the original sites.

In response to the above considerations, I established the Tequity organization to bring together the peopleware required to make hardware and software work for learning and teaching, including national experts, local activists and a coalition of education, government, business, labor and nonprofit organizations. Tequity is dedicated to making the Web truly worldwide and the economy global by working with Empowerment Zones and Enterprise Communities (EZ/ECs) to help them use digital resources to improve the education of their children, the skills of their parents, and the viability of their communities.

For new generations growing up in America's disadvantaged communities, tequity is an essential human right. It is increasingly required for communications and commerce, and will soon be essential to access services, earn a living and fully participate in a democratic society. The Tequity organization is dedicated to achieving tequity for all.

Committee on Education and the Workforce
Witness Disclosure Requirement – "Truth in Testimony"
Required by House Rule XI. Clause 2(g)

Your Name: Michael Kaufman		
	Yes	No
1. Will you be representing a federal. State. or local government entity? (If the answer is yes please contact the Committee).		X

2. Please list any federal grants or contracts (including subgrants or subcontracts) which <u>you</u> <u>have received</u> since October 1. 1997: **None**

3. Will you be representing an entity other than a Government entity?	Yes X	No

4. Other than yourself. please list what entity or entities you will be representing:

   Tequity, a 501(c)(3) nonprofit organization

5. Please list any offices or elected positions held or briefly describe your representational capacity with each of the entities you listed in response to question 4:

   Chairman and C.E.O.

6. Please list any federal grants or contracts (including subgrants or subcontracts) received by the entities you listed in response to question 4 since October 1. 1997. including the source and amount of each grant or contract: **None**

7. Are there parent organizations. subsidiaries. or partnerships to the entities you disclosed in response to question number 4 that you will not be representing?	Yes	No N

Signature: _Michael Kaufman_   Date: __9/20/00__

Please attach this sheet to your written testimony.

MICHAEL E. KAUFMAN

SUMMARY:	My decades of experience in business, education and non-profit organizations have resulted in substantial contacts and a wide range of skills in several areas including: community outreach, government affairs, resource development, media relations, learning/teaching, electronic communications, computers and other new technologies, and management/administration.

EMPLOYMENT HISTORY:

Tequity, San Francisco, California
Creator/CEO   2000-Present
Established the Tequity organization to call for and support the goal of technical equity (tequity) for all; develop local leadership and community capacity through technical assistance, resource development an the "peopleware" required to ensure that the quest for tequity is sustained and scaled at the local level.

NetDay, San Francisco, California   1992-2000
    Creator/Executive Director, NextDay   1998-2000
    Co-creator/President, NetDay   1995-1998
    Creator/Director, Parents' Electronic Playground   1992-1995
Created volunteer-based project for wiring California's K-12 classrooms; transformed project into a Web based, one day, electronic barn raising; managed project through its NetDay96 launch in California; and throughout its evolution into an ongoing national and international initiative; created and directed the NextDay Initiative to refocus NetDay resources and partners to address the issues of the growing digital divide.

PBS, Inc., Alexandria, Virginia
    Director of Digital Learning   1996-August 1998
Assisted PBS in redefining its K-12 education services, and in repositioning the organization as a leader in the digital distribution of learning resources; developed national demonstration of the use of the Web in learning and teaching; raised funds to support digital services for education; and enhanced PBS's relationship with the Administration, Congress, the education community, and the Media

KQED, Incorporated, San Francisco, California   1981-1996
    Director, Central Services   1983-1996
    Quality Circles Coordinator   1981-1983
Managed computers, communications, facilities and new building project for this large public broadcasting and publishing organization.

International K-12 Schools: School Administrator and Educator
  • Antwerp International School, Belgium   1979-1981
  • American School of Isfahan, Iran   1977-1979
  • American School in Japan, Tokyo   1974-1977

California K-12 Schools: Educator   1971-1974

Coffee Cantata Restaurants, San Francisco, California   1967-1971
    General Manager
Developed and managed restaurants in the San Francisco Area.

Angeles Electronics, Inc. Watts, Los Angeles, California   1965-1967
    Marketing Manager
Provided interface between this all African-American company, the commercial marketplace and government agencies.

EDUCATION:
M.A., Educational Administration, San Francisco State University, California
B.A., San Francisco State University, California

TEQUITY

The History of Tequity

The last half of the 1990's brought a sharp increase in the use of information technologies in U.S. K-12 schools. A champion and catalyst of this movement was NetDay – an initiative to recruit and mobilize volunteers to "w..re" K-12 schools in their communities, bringing the Internet to education. But as NetDay grew from a grassroots initiative in California to a national/international movement, its founder Michael Kaufman, realized that this strategy had taken hold more effectively in areas which had a developed "information culture," and possessed the means to augment wiring with equipment, training, and curriculum integration, while in less advantaged communities the wires were often left dangling in the walls.

In January of 2000, Kaufman founded Tequity, a national not-for-profit, 501(c)(3) to work with the poorest communities in America to address this growing technology gap. Tequity is dedicated to equalizing access to 21st Century opportunities through a school-based engagement with communities of need in support of their quest for technical equity.

During his tenure as C.E.O. of NetDay, Kaufman, with support from the U.S. Congress and the U.S. Department of Education, launched the NextDay project to create model "Target Tech" K-12 schools in America's most underserved communities – the sixteen Round One Empowerment Zones (EZs). In collaboration with the EZ communities, Kaufman and his staff recruited and trained Local Project Directors, capable, committed individuals with deep roots in the communities they serve. The team formed partnerships with thirty-seven schools serving 40,000 students in seven communities, including: Detroit, MI; Los Angeles, CA; Mercedes, TX; New York, NY; Oakland, CA; Rosedale, MS; and Washington, DC. Respected universities such as UC Berkeley, UCLA, and Columbia University, in conjunction with national corporations, including Cisco Systems, 3M, and AT&T joined the NextDay effort to bridge the digital divide.

Tequity now builds upon these powerful school, community, university and corporate partnerships that its leadership has already established. Since September 1999, these partnerships have provided $5 million in resources, allowing these communities to install a network infrastructure to complement their technology investments. Unfortunately, the returns on these investments in hardware, software, connectivity and training often fall short of expectations because of a lack of human infrastructure, the "peopleware" required to shift thinking, build capacity, and change habits so that these information technologies will be beneficial to the schools and their communities. Tequity responds to this need by providing programmatic management oversight and technical assistance, developing local leadership and community capacity, assisting in resource development, implementation and use, and monitoring and evaluating its programs.

Currently the Tequity program is operational in Boston, Oakland and Washington, DC, with plans to expand in Spring 2001 to Houston, Philadelphia and one other EZ to be determined. Each site consists of an articulation of K-12 schools, including an elementary school, a middle/junior high school, and a high school. All schools are vigorous participants in local coalitions, which unite schools, non-profits, community-based organizations, universities and colleges, and businesses to enhance the technology opportunities of disadvantaged students, their families, and their community.

Tequity Concept
IT is the People...

Definition: teq-ui-ty (tek'we-te) Contraction of *technical equity*. The impartial and fair access to, use of, and benefit from information technologies.

Assumptions:
- Learning is key to the development of human capabilities and the success of their societies;
- Institutions responsible for learning must and will change systemically to meet the demands of the time;
- Systemic change is triggered by environmental shifts;
- The Information Age is such an environmental shift and will have a fundamental impact on education and learning.

Vision: Tequity for all.

Mission: Equalize access to 21st century opportunities

Goal: To develop effective access to and use of information technologies through school-based initiatives in communities of need.

Objectives:
- Make hardware and software work for learning and teaching;
- Extend learning and the quest for tequity beyond the classroom and the school day;
- Develop local leadership and community capacity to champion, sustain and scale tequity;
- Enhance schools as community assets;
- Engage resource providers, strategic partners and investors in the quest for tequity;
- Research and demonstrate tequity.

Strategies:
- Establish tequity as an essential human right;
- Collaborate with school districts to realize their curricular goals;
- Provide just-in-time and project-based professional development;
- Provide national coordination, technical assistance and expertise;
- Identify, recruit, develop and support local champions;
- Advocate, recruit, develop and support the peopleware;
- Initiate the project in the most needy communities;
- Engage and support Tequity School parents;
- Monitor and evaluate;
- Assist in the development of local and national partnerships and resources;
- Create and nurture information technology projects;
- Establish an alliance of tequity activists and organizations;
- Provide forums for discussion, information dissemination and collaboration;
- Represent and inform Tequity constituencies;
- Develop investment, business and employment opportunities in Tequity communities

TEQUITY

IT is the People

Tequity brings together the peopleware required to make hardware and software work for learning and teaching in communities of need. It collaborates with K-12 schools and districts to integrate information technologies and digital content to realize their curricular goals, engaging national experts, local activists and a coalition of education, government, business, labor and nonprofit organizations. It is dedicated to making the Web truly worldwide and the economy global by working with Empowerment Zones and Enterprise Communities (EZ/ECs) to help them use digital resources to improve the education of their children, the skills of their parents, and the viability of their communities.

Even though more than 90% of all K-12 schools are now connected to the Internet, and the amount of hardware and software available has increased dramatically, the educational return on these investments has fallen significantly short of expectations. Too often these technologies are not effectively integrated in support of curricular goals. Too often they are not available when needed. And in communities of need, where few of these technologies exist outside of the school, parents and community members are unable to fill the gap. Tequity responds to these shortfalls in *integrating the curriculum, supporting the technologies, involving the community,* and *documenting and leveraging the lessons learned* with the following local peopleware:

- An **Education Integration Specialist** to help teachers identify and implement educational technology activities in support of national and district academic standards and core curriculum.
- A **Technology Support Specialist** to provide, directly and through the training of others, including students and Tequity Corps members, first-line technical support, assistance in configuring and administering dependable networks, and help in developing overall support delivery strategies that ensure that the technologies continue to be reliable for the long-term.
- A local **Project Director** in each EZ/EC to create and coordinate the collaborations required for success in the classroom and which draw community members into school-based engagements, including after-school centers and computer take-home programs to extend the school day, connect families with their schools and upgrade community skills.
- A **Tequity Corps of Community Service Volunteers**, including AmeriCorps members, who have been trained to provide just-in-time support for classroom and community activities.
- A team of **AmeriCorps*VISTA** members to assist the Project Director in the organization and management of the Tequity project in the local community.

In support of these local human resources, Tequity provides management oversight and technical assistance, develops local leadership and community capacity, assists in resource development, and technology implementation and use. It monitors and evaluates the implementation of the technologies, their impact on education, and the value of increased technical equity (tequity) in EZ/EC communities. Tequity helps districts prototype their educational technology initiatives and strategies, make them more tangible and accessible to their constituents, and consider the alternatives as they implement these resources throughout their school systems. And the lessons learned in these *e*Schools and their *e*Communities (i.e., educated, electronic and empowered) will help others navigate through the flood of options as they connect their students and families to the resources and potentials of the 21st century.

For new generations growing up in America's disadvantaged communities, tequity is an essential human right. It is increasingly required for communications and commerce, and will soon be essential to access services, earn a living and fully participate in a democratic society. The Tequity organization is dedicated to achieving tequity for all.

Table of Indexes

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NOTICE

REPRODUCTION BASIS

EFF-089 (9/97)