

# THE FUTURE OF LEARNING: HOW TECHNOLOGY IS TRANSFORMING PUBLIC SCHOOLS

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## HEARING

BEFORE THE

COMMITTEE ON

EDUCATION AND LABOR

U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

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HEARING HELD IN WASHINGTON, DC, JUNE 16, 2009

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# **THE FUTURE OF LEARNING: HOW TECHNOLOGY IS TRANSFORMING PUBLIC SCHOOLS**

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**Tuesday, June 16, 2009  
U.S. House of Representatives  
Committee on Education and Labor  
Washington, DC**

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The committee met, pursuant to call, at 10:05 a.m., in room 2175, Rayburn House Office Building, Hon. George Miller [chairman of the committee] presiding.

Present: Representatives Miller, Kildee, Scott, Woolsey, Hinojosa, Tierney, Holt, Hirono, Altmire, Hare, Fudge, Polis, Tonko, Petri, Castle, Ehlers, Biggert, and Cassidy.

Staff present: Paulette Acevedo, Legislative Fellow, Education; Tylease Alli, Hearing Clerk; Alice Cain, Senior Education Policy Advisor (K-12); Adrienne Dunbar, Education Policy Advisor; Curtis Ellis, Legislative Fellow, Education; Denise Forte, Director of Education Policy; David Hartzler, Systems Administrator; Fred Jones, Staff Assistant, Education; Jessica Kahaneck, Press Assistant; Sharon Lewis, Senior Disability Policy Advisor; Ricardo Martinez, Policy Advisor, Subcommittee on Higher Education, Lifelong Learning and Competitiveness; Daisy Minter, Financial Administrator; Alex Nock, Deputy Staff Director; Joe Novotny, Chief Clerk; Lillian Pace, Policy Advisor, Subcommittee on Early Childhood, Elementary and Secondary Education; Lisa Pugh, Legislative Fellow, Education; Melissa Salmanowitz, Press Secretary; Margaret Young, Staff Assistant, Education; Mark Zuckerman, Staff Director; Stephanie Arras, Minority Legislative Assistant; James Bergeron, Minority Deputy Director of Education and Human Services Policy; Robert Borden, Minority General Counsel; Cameron Coursen, Minority Assistant Communications Director; Alexa Marrero, Minority Communications Director; Susan Ross, Minority Director of Education and Human Services Policy; Mandy Schaumberg, Minority Education Counsel; Linda Stevens, Minority Chief Clerk/Assistant to the General Counsel; and Sally Stroup, Minority Staff Director.

Chairman MILLER [presiding]. A quorum being present, the committee will come to order. I want to welcome everybody to this morning's hearing.

This is the first in a series of hearings on the future of learning. In this economy, it is more important than ever to ensure that every student in every classroom has the opportunity to grow,

thrive, and achieve to their fullest potential. This is becoming increasingly important as our competitiveness abroad has shifted.

Several years ago, Speaker Pelosi asked us to come together around an innovation agenda. We went to Stanford University and talked to the best in the high tech, biotech, and venture capital fields.

We talked about innovation and discovery, believing that discovery and innovation are really the only sustainable sources of economic growth in the world today.

What evolved from these conversations was an interesting definition of the kind of person employers would want to bring to their companies. They want workers who can work across companies, across countries, and across the continents.

They want the most diverse workforce in history to assemble solutions to emerging problems stemming from the most diverse client base in history.

Unfortunately, this does not sound like what we are preparing today's kindergarten students to participate 16 years from now or even 12 years from now. This is not today's education system in America.

But to quote Secretary Duncan, we now face the opportunity of a lifetime to work with our schools and other partners to build an education system that benefits students, families, our economy, and our country for generations to come.

For quite some time, I have been cataloging all the reports that acknowledge that we are running an industrial-based education system for an agrarian society on an agrarian clock.

You might not believe me, but it has been very interesting. It acknowledges a fundamental mismatch that we haven't paid much attention to other than a rather clever anecdote from time to time acknowledging that fact.

Today's students use technology in almost everything they do. From the moment they wake up from the digital alarm clocks, listening to their iPods as they walk to school, communicating with their friends on Twitter and Facebook, or sharing information on YouTube they are used to customizing their worlds at the click of a computer.

But school today for far too many kids does not look like the rest of their world. It does not capitalize on technology's potential to engage students and to improve learning.

One critical element of learning in the future must be to provide technology-rich classrooms for all students. Research shows that when technology is systemically integrated into classrooms and used by digitally-savvy staff, it can improve teacher effectiveness and student achievement, and reduce the dropout rate.

And as my grandkids tell me, it makes school a lot more fun. We call that engagement. Take, for example, the Stephen F. Austin Middle School in Bryon, Texas where the students were given laptops to help integrate technology tools into their daily instruction.

This led to an improvement in student achievement in both math and reading. In the 7th grade alone, reading scores increased by 13 percent and math scores by 14 percent.

At Dionne Warwick Institute in East Orange, New Jersey, 4th and 5th grade students wrote and recorded educational raps about civil rights leaders for a Black History project.

This project also helped them demonstrate their understanding of math strategies and concepts. Students who participated in these projects saw their math scores increase by an average of 9.6 points and social studies scores increase by 9.4.

It seems to me that if technology can substantially increase student engagement, raise student achievement and graduation rates, and prepare our students for college and the workforce, then we must do everything we can do to support these types of innovation in all our classrooms.

But this is about more than just the future of our workforce. It is about the future of our democracy. The options, opportunities, and availability that technology can bring to a classroom must be available to everyone.

And I am extremely encouraged that we expanded this access. We will make more progress in closing the achievement gap. I am encouraged that we are taking steps in the right direction.

This Congress has already endorsed several important pillars of reform included in the American Recovery and Reinvestment Program, particularly in Secretary Duncan's Race to the Top, which has unprecedented potential to shape the future of learning in our nation.

It also included \$650 million for educational technology state grants, and I believe this money can be well spent. In any industry, it is considered smart business planning to look to the future and how a company and the industry will change, grow, and adapt.

If we are serious about creating world-class schools and regaining our competitive edge, then it is time we start thinking about education the same way.

Today's hearing will explore how innovation and technology are changing the way teachers teach and students learn. We will see firsthand how transformational power of technology can unleash the talents of our teachers and students so they will, in fact, be able to use discovery and innovation to assemble solutions to the problems that future generations will face.

I would like to thank our witnesses for being here, and I look forward to your testimony.

Now I would like to recognize Congressman Castle for the purpose of making an opening statement.

[The statement of Mr. Miller follows:]

**Prepared Statement of Hon. George Miller, Chairman, Committee on  
Education and Labor**

We're here today for the first in a series of hearings on the Future of Learning.

In this economy, it is more important than ever to ensure that every student in every classroom has the opportunity to grow, thrive and achieve to their fullest potential. This is becoming increasingly important as our competitiveness abroad has shifted.

Several years ago, Speaker Pelosi asked us to come together around an innovation agenda. We went to Stanford and talked to the best in the high-tech, biotech fields, and the venture capital fields.

We talked about innovation and discovery—believing that discovery and innovation are really the only sustainable sources of economic growth in the world today. What evolved from these conversations was an interesting definition of the kind of

person they would want to bring into their companies. They want workers who can work across companies, countries, and continents.

They want the most diverse workforce in history, to assemble solutions to emerging problems stemming from the most diverse client base in history.

Unfortunately, that does not sound like what we are preparing today's kindergarten students to participate in 16 years from now or even 12 years from now. That is not today's education system in America.

But, to quote Secretary Duncan, we now face the opportunity of a lifetime to work with our schools and other partners to build an education system that benefits students, families, our economy and our country for generations to come.

For quite some time, I have been cataloging all the reports that acknowledge that we are running an industrial-based education system for an agrarian society on an agrarian clock.

You might not believe me—but it's all been very interesting. It acknowledges a fundamental mismatch that we haven't paid much attention to other than as kind of a clever anecdote.

Today's students use technology in everything they do.

From the moment they wake up to the digital alarm clocks, listening to their iPods as they walk to school, communicating with their friends on Twitter and Facebook, or sharing information on YouTube—they are used to customizing their worlds at the click of a computer.

But school today, for far too many kids, does not look like the rest of their world, and does not capitalize on technology's potential to engage students and improve learning. One critical element of learning in the future must be to provide technology-rich classrooms to all students.

Research shows that when technology is systemically integrated into classrooms and used by digitally-savvy staff, it can improve teacher effectiveness and student achievement, and reduce the dropout rate. And, as my grandkids tell me, it makes school a lot more fun.

Take for example, Stephen F. Austin Middle School in Bryan, Texas where the students were given laptops to help integrate technology tools into their daily instruction. This led to improvement in student achievement in both math and reading.

In the 7th grade alone, reading scores increased by 13 percent and math scores by 14 percent.

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It seems to me that if technology can substantially increase student engagement, raise student achievement and graduation rates, and prepare our students for college and the workforce, then we must do everything we can do to support these types of innovations in all our classrooms.

But this is about more than just the future of our workforce. This is about the future of our democracy.

The options, opportunity, and availability that technology can bring to a classroom must be available to everyone. And I am extremely encouraged that as we expand this access, we will make more progress in closing the achievement gap.

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This Congress has already endorsed several important pillars of reform included in the American Recovery and Reinvestment Plan, particularly in Secretary Duncan's Race to the Top Fund, which has unprecedented potential to shape the future of learning in our nation.

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In any industry, it's considered smart business planning to look to the future—and how a company or an industry will change, grow adapt.

If we're serious about creating world-class schools and regaining our competitive edge, then it's time we start thinking about education the same way.

Today's hearing will explore how innovation and technology are changing the way teachers teach and students learn.

We'll see first-hand how the transformational power of technology can unleash the talents of our teachers and students so that they will, in fact, be able to use discovery and innovation to assemble solutions to the problems that future generations will face.

I'd like to thank our witnesses for being here today and I look forward to hearing your thoughts.

---

Mr. CASTLE. Good morning, and thank you, Chairman Miller, for holding today's hearing. I am pleased that the committee is exploring the timely issue of how technology is transforming our nation's public schools.

More often, people are using different technologies to gather and disseminate information. I believe that in today's technologically driven world, states and school districts throughout the country had the opportunity to use these new technologies to improve academic achievement and help America's children compete in a world where new technology is the norm, not a novelty.

In many instances, this is already happening in schools today. The International Society for Technology and Education and the Consortium for School Networking has studied the impact of technology in schools. They have found that technology can help students improve in reading, writing, and math.

Technology also can improve a student's critical-thinking, problem-solving, and communication skills. Technology can help children with disabilities interact with their peers and better understand the subject matter.

Adaptive technology can also provide accommodations for the assessment process giving these children the opportunity to learn and achieve and demonstrate their success just like everyone else in the class.

Children in remote and rural areas benefit from technology too. They are no longer limited to the few books available down the road at the county library. Through technology, they now have access to all the libraries in the world right from their homes.

And for children in rural communities whose schools are not making adequate yearly progress, technology opens up a new world of tutoring options that were not available before the era of the Internet and interactive online learning.

Technology makes more parental options available through supplemental education services under "No Child Left Behind" to students who might not otherwise have access to them simply because of geography. But technology helps more than the students. Studies have shown that administrators can use technology to approve efficiency, productivity, and decision-making at their schools.

Technology also helps teachers meet professional requirements so they are qualified in their subjects. They also can use networks to learn and share the latest teaching techniques. Even parents can benefit. Through Internet-based programs, they can monitor their children's attendance, homework, and performance.

Technology is a wonderful and necessary addition to our schools, but it hasn't come for free. Over the years, Congress has provided hundreds of millions of dollars to schools to acquire and use technology, and that is before the additional funding provided in the recent American Recovery and Reinvestment Act.

In fact, in fiscal year 2009, the Education Technology State Grant program received approximately \$270 million. Technology can be a transformative force in our classrooms, and I am a strong supporter of innovation and creativity.

However, as we examine new technologies and hear from this distinguished panel of witnesses on how new technologies may be incorporated into the classroom to improve student achievement, we must remain mindful of these trying economic times, and ensure all federal funds for education technology serve a purpose and approve opportunities for students.

I look forward to learning about what is happening in classrooms at the cutting edge and hopefully exposing other educators to the types of tools and resources available. And, of course, I welcome the witnesses here today.

And just a word of caution, a concern of mine is as we deal with technology, I worry that we get too far ahead of ourselves sometimes in terms of what is next instead of how to incorporate what is there to make sure it is working correctly.

And, hopefully, we can address that today too.

Thank you, Mr. Chairman Miller. I yield back.

[The statement of Mr. Castle follows:]

**Prepared Statement of Hon. Michael Castle, a Representative in Congress  
From the State of Delaware**

Good morning and thank you, Chairman Miller, for holding today's hearing. I am pleased the Committee is exploring the timely issue of how technology is transforming our nation's public schools.

More often, people are using different technologies to gather and disseminate information. I believe that in today's technologically-driven world, states and school districts throughout the country have the opportunity to use these new technologies to improve academic achievement and help America's children compete in a world where new technology is the norm, not a novelty.

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I look forward to learning about what's happening in classrooms at the cutting edge, and hopefully exposing other educators to the types of tools and resources that are available.

With that, I welcome our witnesses today. I look forward to hearing your testimony.

Thank you, Chairman Miller. I yield back.

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Chairman MILLER. Thank you, and I would like now to introduce our distinguished panel.

Aneesh Chopra is the nation's first chief technology officer. Prior to his appointment by President Obama, Mr. Chopra served as the secretary of technology under Governor Tim Kaine where he led the strategy to effectively leverage technology and government reform.

Prior to joining Governor Kaine's cabinet, he served as the managing director of the Advisory Board Company, a publicly traded healthcare think tank. Mr. Chopra received his B.A. from John Hopkins University and graduated with a master's in public policy from Harvard University's John F. Kennedy School of Government.

Lisa Short is currently a middle school science teacher in Maryland's Montgomery County Public Schools. Ms. Short is successfully using interactive white boards to improve student engagement and student achievement through interactive science lessons that require students to demonstrate their comprehension of science content through technology tools. She teaches students with diverse needs including the English language learners.

Abel Real is a student in East Carolina University, where he is studying nursing. Prior to entering college, Mr. Real was a student in Green County, North Carolina, a rural community that uses technology in teaching core curricular areas to improve student achievement.

He credits the innovative instructional approaches that he was exposed to in school in helping him to earn a college scholarship. He is the first in his family to attend a university.

Scott Kinney is the vice president of Outreach and Professional Development at Discovery Education. He manages a large portfolio of professional development efforts and also serves as the education liaison for public policy.

Mr. Kinney has co-authored multiple articles about the use of technology as a tool to help differentiate instruction.

Jennifer Bergland is the chief technology officer at the Bryan Independent School District. Prior to becoming technology officer, Ms. Bergland spent 17 years teaching social studies.

The Bryan Independent School District was recently honored with the Consortium of School Networking team awards, which is presented each year to the district that has used technology to transform learning.

Ms. Bergland graduated from Bryan High School, received a B.A. in Political Science from Southern Nazarene University, and a masters in Educational Administration from Texas A&M.

And, Mr. Castle, I believe, is going to introduce our next witness. Mr. CASTLE. Thank you, Mr. Chairman.

I would like to welcome Dr. Wayne Hartschuh to the panel. Dr. Hartschuh is the executive director of the Delaware Center for Educational Technology within the Delaware Department of Education.

He is also a member of the State Educational Technology Director's Association Board of Directors, currently serving as chair of the board.

Dr. Hartschuh originally came to Delaware in 1995 as the director Instructional Technology at the Delaware Department of Public Instruction and moved to the Delaware Center for Educational Technology in 1996 as the chief education officer before becoming the executive director in 1998.

In his time at the Delaware Department of Education, the Delaware Center for Educational Technology wired every public school classroom in the state of Delaware for Internet access between 1996 and 1998 making Delaware the first state in the nation to wire every classroom in the state.

For this effort, the Center received the computer world's Smithsonian award. Wayne has also received the Council of State Government's Innovations Award on behalf of DCET, which is the Delaware Center for Educational Technology.

Wayne has his bachelor's degree in mathematics from Arizona State University; his master's of science in school computer studies from Northwest Missouri State University; and a Ph.D. in curriculum and instruction with a specialty in educational media and computers from Arizona State University.

Prior to coming to Delaware, Wayne taught and coached at Buckeye Union High School in Buckeye, Arizona between 1977 and 1987; taught and coached at Central High School in Kansas City, Missouri from 1991 to 1993; and was an assistant professor at the University of Findlay in Findlay, Ohio from 1994 until 1995.

And I would just add that I was last Governor of Delaware in 1992, and I don't think any of this was started then. So we congratulate you, Wayne, for all the work you have done.

Chairman MILLER. Welcome to the committee.

Our final witness will be Mr. John McAuliffe, who joined Education Online Learning as its chief financial officer in February 2008 and became the general manager in June 2009.

Prior to Educate Online, Mr. McAuliffe was the senior vice president and chief financial officer at Thompson Prometric, the world's largest computer-based testing organization.

Welcome to the committee for all of you.

We are going to begin with you, Mr. Chopra. When you begin speaking, you won't see it, because it is not in front of you, but you have to pay attention to it. You understand? Okay.

A green light will go on, and then when there is 1 minute remaining in your time, a yellow light will go on, and we would like you to use that time to summarize and to finish, and then there will be a red light. But we want you to finish in a coherent fashion, so don't panic when you see the red light. But don't dawdle.

Welcome.

Mr. CHOPRA. [OFF MIKE]

Chairman MILLER. Is your mic on?

Mr. CHOPRA. [OFF MIKE]

Chairman MILLER. It is?

Mr. CHOPRA. It is better now.

Chairman MILLER. It is now.

**STATEMENT OF ANEESH CHOPRA, CHIEF TECHNOLOGY OFFICER, WHITE HOUSE OFFICE FOR SCIENCE AND TECHNOLOGY**

Mr. CHOPRA. It is now. Technology. Where is that IT guy? Okay. Mr. Chairman, and distinguished members of the committee, it is indeed an honor to appear before you on this extremely important subject.

As the father of two young girls, I can assure you that today's topic is both a professional and a personal priority for me.

President Obama understands that in order to renew American competitiveness, we need to harness the power and potential of technology and innovation to revamp our educational system. You said it very well yourself in your opening remarks, Mr. Chairman.

We will need a greater proportion of our population with college degrees, an increased pipeline of students that excelling in the science, technology, engineering, and mathematics disciplines, and breakthrough strategies to uncover the hidden talent that we know resides throughout our country.

I am pleased to share my experiences on the role of technology and innovation in demonstrating meaningful progress against these challenges as we look to the future of learning. Beginning on the framework for educational innovation, I would like to share with you a few perspectives on where the president has put his emphasis.

We are committed to ensuring that all students are trained to use technology to research, analyze, and communicate in any discipline. However, we must integrate technology into the classroom in ways that research would demonstrate is truly helpful in the process of student learning.

Promising approaches include facilitating public-private partnerships in the development of new curriculum incorporating emerging technologies; integrating technology throughout the classroom to transform the method by which we teach; deploying collaboration tools to support teachers in the sharing best practices; and developing better student assessments to allow teachers and parents to make data-driven decisions on how to improve performance.

We are making great progress on these priorities, and we will continue to evaluate their impact. We are very proud of the fact, for example, that the OECD recently ranked the United States as number one in broadband access to schools, as it is built upon the \$2.25 billion in annual contribution through the E-rate program.

I have seen the promise of an investment in technology as Virginia's secretary of Technology. When properly deployed, it can serve as the foundation for technology-led educational transformation.

With your permission, I will hit the highlights on several of what I consider to be nearly a dozen innovative proof-of-concept initia-

tives that might help you understand better the realities on the ground, as I believe, Congressman Castle, you asked for.

Three brief examples: In Virginia, a volunteer panel of scientists convened at the governor's request in 2007 to evaluate our science, physics, chemistry, and engineering curriculum more specifically.

Led by a retired NASA scientist, a federal collaborator, we uncovered a number of opportunities for improvement in the content itself, and this group of experts came together and issued a report basically calling for some very basic changes: the idea that our classrooms should encourage more lab work; that we should incorporate emerging technologies into our curriculum aligned with the Commonwealth's overall strategic goals from an economic development standpoint; and that we facilitate the sharing of ideas across the science, technology, engineering, and mathematics community for best-practice sharing.

Traditionally, such reports sit in a policy-making process for review. But in the opportunities of technology and the potential for transformation, Governor Kaine asked that the superintendent of public instruction alongside my colleague, the secretary of Education, work together to bring together a collaboration at no cost to the taxpayers that would help get the community to write the physics chapters that would align to the Commonwealth's future.

Modeling and simulation, as an economic discipline, has great potential for job creation as does the field of nuclear physics. Both of which didn't have content developed in the classroom.

All of that now in less than 6 months using a Web-based Wiki-like platform allowed for teachers from all over the country to join in writing technology chapters that could be used for free by any classroom across the Commonwealth.

One such school is deploying a netbook platform that will have prebaked all of this curricula on it. You can still print a hard copy, if you will, for a few bucks at the local print shop, but a technology platform that actually is cost effective by deferring some of the costs of the upgrade on textbooks that wouldn't have had some of this content involved.

I will share a number of other stories with you, perhaps by written statements in light of the time, but simply want to end with one final comment: We do see the great power and potential of these capacities to improve learning with students with disabilities and see tremendous opportunity to uncover that hidden talent across this country.

And I thank you for the opportunity to continue the dialogue on this important subject.

[The statement of Mr. Chopra follows:]

**Prepared Statement of Aneesh Chopra, Chief Technology Officer, White House Office for Science and Technology**

Chairman Miller, Ranking Member McKeon and distinguished members of the Committee, it is indeed a great honor to appear before you today. As the father of two young girls, I can assure you today's topic is of both a professional and personal priority for me.

President Obama understands that in order to renew American competitiveness, we need to harness the power and potential of technology and innovation to revamp our educational system. We will need a greater proportion of our population with college degrees, an increased pipeline of students excelling in STEM fields, and breakthrough strategies to uncover the hidden talent we know resides throughout

our country. I am pleased to share my experiences on the role of technology and innovation in demonstrating meaningful progress against these challenges as we look to the future of learning.

*A Framework for Educational Innovation*

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Promising approaches include facilitating public-private partnerships in the development of new curriculum incorporating emerging technologies; integrating technology throughout the classroom to transform the method by which we teach; deploying collaboration tools to support teachers in sharing best practices; and developing better student assessments to allow teachers and parents to make “data-driven” decisions on how to improve performance.

We are making progress on these priorities and we will continue to evaluate their impact. We’re also proud of OECD’s recent ranking of the US as #1 in broadband access to schools as it has built upon the \$2.25 billion annual contribution through the E-rate program.

I’ve seen the promise of an investment in technology as Virginia’s Secretary of Technology. When properly deployed, it can serve as the foundation for technology-led educational transformation. With your permission, I thought to share a few examples from nearly a dozen innovative “proof-of-concept” initiatives that might better demonstrate the future of learning.

Virginia’s Physics Flexbook: In 2007, Governor Kaine challenged a volunteer panel of scientists and engineers to review our physics, chemistry and engineering curriculum. Led by a now retired NASA scientist, Jim Batterson, the panel strongly recommended a focus on contemporary and emerging topics that could be updated through an online collaboration platform. By July, 2008, and in partnership with legislative leaders, the Secretaries of Education and Technology and the Superintendent of Public Instruction jointly issued a call for volunteer contributors to propose contemporary and emerging physics and lab modules. Within six months, a dozen or so authors, at no pay, completed ten chapters as a supplement to the traditional textbook covering areas key to Virginia’s economic growth like modeling and simulation, and nuclear physics, available at [virginia.ck12.org](http://virginia.ck12.org).

Powering the demonstration project was a free online collaboration platform, CK12, which facilitated a rigorous quality review process and design interface for teachers, students and administrators to seamlessly incorporate new content into curriculum.

Albemarle County Schools Superintendent Pam Moran secured board approval to purchase low-cost “netbook” computers for every physics student, pre-loaded with the flexbook. By capturing the savings from eliminating the purchase of new physics textbooks, she lowered the school’s total cost of ownership and has dispatched her instructional team to focus on the content her students need to learn in order to be globally competitive.

Learning Without Boundaries and the “Mobile Learning Apps Challenge”: Virginia’s Department of Education demonstrated a new approach to teaching and learning through the use of wireless mobile computing devices on the premise that 93% of 6-9 year olds lived in households with a cell phone. To test the benefit of this platform, Virginia issued a national application development challenge on the problem of poor test scores in 6th grade mathematics (68% pass rate in 2008, up from 60% in 2007) at [www.lwbva.org](http://www.lwbva.org). With modest prize money (\$5K) we are eagerly anticipating the results by the end of June. Early designs have shown tremendous creativity in exploiting the features of the iPod Touch to inspire kids to learn fractions, proportions, and measurement.

Virginia “Open Classroom” Project: Mecklenburg Public schools, a rural district, secured a Governor’s Productivity Investment Fund grant to lower IT operating costs while delivering greater value for classroom instruction and professional development. Through the deployment of open collaboration platforms, Mecklenburg has dramatically increased the ability for teachers to exchange ideas, curriculum “objects” and student/parent messaging resources. These initiatives delivered \$123,000 in cost savings this fiscal year and enabled the district to launch [www.vaopenclassroom.org](http://www.vaopenclassroom.org) as a portal to replicate results across dozens of other districts.

Spirit of Commonwealth—PlugGED In: The real test for transformation, however, is in our ability to harness technology to uncover hidden talent. Invoking Virginia’s “spirit of Commonwealth”, we launched PlugGED In, a bold experiment to connect high school dropouts to technology jobs within six months. A broad coalition of adult

education instructors, community colleges, 4-year institutions, and even technology companies built a program that offered an accelerated GED, a Microsoft certification, and a project assignment to guarantee entry-level tech job interviews for each graduate. We will see the results of our first graduating class this July but the experience reminds us that every American, regardless of background, deserves the chance to compete and win in our technology-based economy.

I would in closing like to mention the importance of technology as an aid to learning for students with disabilities. For example, captioning, computer reading and dictation programs and the growing availability of instructional materials in convenient accessible formats are tremendous advances. The electronic equipment accessibility provisions of Section 508 of the Rehabilitation Act and the compliance efforts by hardware and software providers have greatly increased the capacity of individuals with disabilities to use and benefit from technology in education.

In conclusion, with ubiquitous connectivity, mobile platforms, compelling content, well trained teachers, and further research into what works, we can deliver a whole new world of learning opportunities. We can transform the way teachers teach and students learn.

I welcome any questions that the Committee may have.



## Future of Learning: How Technology is Transforming Public Schools

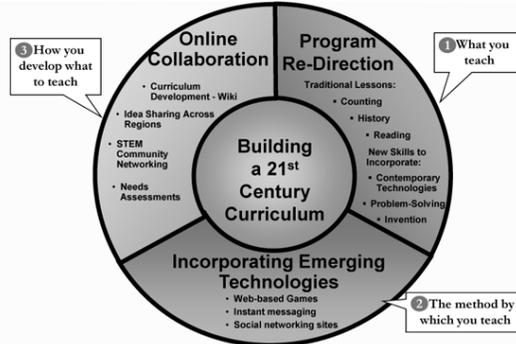
Remarks Before House Education and Labor Committee

Aneesh Chopra, Chief Technology Officer  
Executive Office of the President

June 16<sup>th</sup>, 2009



## A Framework for Delivering Educational Innovation



Source: Commonwealth of Virginia



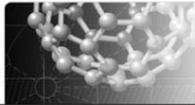
## Online Platform Enables Collaboration on 21<sup>st</sup> Century Physics

Virginia.gov

ck-12

A collaborative effort to elevate the quality of physics instruction across the Commonwealth. 33

ck-12 | Home
About CK-12



Welcome to Virginia's FlexBook Project

**Physics**  
Gravity, Kinematics, Modeling & Simulation, ...

**Particle Physics**  
Beyond The Standard Model, Standard Model, Nuclear Energy, ...

**"Open Source" Physics Flexbook**

Governor Kaine, Secretaries **Chopra, Morris** and the **Dept of Education** launched the **VA Physics FlexBook** on **March 16, 2009** – a compilation of supplemental materials in an open-source format that can be used to strengthen existing physics content. Led by retired NASA Scientist **Jim Batterson**, the team of authors included: Mike Fetso, **Henrico Co.**; David Slykhuis, Mark Mattson, Tom O'Neil, **JMU / Shenandoah Governor's School**; Bruce Davidson (retired), Angela Cutshaw, **Newport News**; Mark Clemente, **VA Beach/National Institute of Aerospace**; Andy Jackson, **Harrisonburg**; David Stern (retired), **NASA Goddard**; John Ochab, **J Sargeant Reynolds**; Professor Tapas Kar, **Utah State University**; Pranav Gokhale (student), **Montgomery County, MD**; Tony Wayne, **Albemarle County**; Greg Mulholland, **North Carolina**; and David Armstrong (technical review), **William & Mary**. The Commonwealth partnered with the **CK-12 Foundation** ([www.ck12.org](http://www.ck12.org)) on this initiative as they provided the free, open-source technology platform.

Source: [virginia.ck12.org](http://virginia.ck12.org)



## Digital Content Aligned to State Standards, Available on all Platforms

ck-12 | Home
About CK-12

### 1. Toward Understanding Gravitation

Practice

1. analysis of systems

2. analysis of motion

3. application of Newton's laws

4. application of Newton's laws

5. application of Newton's laws



Source: Andy Jackson Chapter, [virginia.ck12.org](http://virginia.ck12.org)

**Education Technology Enables Digital (Free) Learning Object Catalog**

HigherEd 2.0  
The Value of Higher Education? Yes.

“content”  
Asynchronous Learning: Interactions free from time constraints

ASSESSMENT

course blog

iPod, iPhone  
iTunes

“Education - Have it Your Way”: Current students are digital natives that expect new forms of content delivery

Source: UVA Professor Ed Berger, iTunesU

**Innovation Platforms Support Teachers, Classroom Instruction at Lower Cost**

**Open Classroom Project in Brief**

**Savings:** Mecklenburg Public Schools projects **\$200,000** in savings over 5 years by migrating to open collaboration platform

**Productivity Investment Fund:** Mecklenburg awarded **\$50,000** to document savings, facilitate replication across other school divisions

**Collaboration:** Soon to launch portal to facilitate exchange of ideas, implementation resources

Virginia Open Classroom Project

SEARCH KNOWLEDGE BASE NEWS ITEMS FILES BLOGS (IMPLEMENTING) FAQ

Welcome

This site is designed to document and support free and Open Software in the classroom. The site is currently under construction, but we are adding content daily. If you are interested in being involved, please contact Chad Lindenberg at [clindenberg@mpcs.wednet.edu](mailto:clindenberg@mpcs.wednet.edu)

USEFUL LINKS	USEFUL FILES	Attached Files
<a href="#">Official Sample Blog</a> <a href="#">Google for Education</a>	<a href="#">Google Apps Example Tutorial</a>	<a href="#">i187_1010108.pdf</a>

more

KNOWLEDGE BASE

- HOW DO I SEE ALL UNREAD MESSAGES IN Gmail?  
Posted Thu, 10/10/2008 - 10:42 by admin
- In the search area of gmail, put the following labels unread
- HOW TO SEARCH GOOGLE EMAIL FOR SPECIFIC TOPICS?  
Posted Thu, 10/10/2008 - 10:42 by admin
- In Gmail, click on the search bar, click on "Show search options" and you will see a dropdown box to select what type of search you wish to do. The list includes read, unread, your labels and other options. You can specify words you are included or not include in the email, the date of the email, and if it includes an attachment to narrow your search.
- Read more
- WHAT IS OPEN SOURCE?  
Posted Thu, 10/10/2008 - 10:42 by admin
- Open Source is a term coined back in 1982 to describe a methodology of developing software, while maintaining an open code base. While open source is a relatively new term, the concepts behind open source software have been around for almost 40 years. Recently, the term has taken on a new meaning for other projects not related to software. There are now open source books, open source music, and what can be coined as a "free software".
- Read more

more

Source: Virginia Productivity Investment Fund, [www.Vaopenclassroom.org](http://www.Vaopenclassroom.org)

Chairman MILLER. Thank you.

Ms. Short? Welcome. I just say to members of the committee, our panelists—some will be demonstrating some of the technologies they are using. They will be going back and forth. Their written statements explain what they are about and what they have done and what they have accomplished. So you feel free to proceed in the manner in which you are most comfortable here.

Ms. SHORT. [OFF MIKE]

Chairman MILLER. No. We are adapting here. This is adaptive technology. In the old days, you would have thought of this as a glitch. This is adaptive technology.

Ms. SHORT. Can you hear me if I speak—

Chairman MILLER. Yes.

**STATEMENT OF LISA SHORT, SCIENCE TEACHER, GAITHERSBURG MIDDLE SCHOOL, MONTGOMERY COUNTY PUBLIC SCHOOLS**

Ms. SHORT. Well, that is an icebreaker. Good morning Chairman Miller, Congressman, and guests. I am honored to stand here to demonstrate how technology has transformed the educational experiences of my students and how it has drastically improved my ability to teach students with various learning styles and needs.

I am currently teaching 8th grade science at Gaithersburg Middle School in Montgomery County, Maryland, and my middle school has a very diverse population of students, and we are considered to be a highest needs school.

Every day, my students walk into school, and they are carrying iPods, cell phones, video games, sometimes laptops, and the first thing we ask them to do is power down and put it all away.

And up until this year, the only thing I have had to capture their attention has been a chalkboard and an overhead projector. I have only had this type of technology in my classroom for 1 year, but I can't imagine walking into a classroom without one now.

If you could imagine trying to perform your job without the use of cell phones, would you technically be able to do it? Yes. Would it be efficient? Probably not. But my point that I am trying to make is if cell phone technology is available, why not utilize it.

I would like to share a student success story with you. Alan Vera Lopez. I had the joy of teaching him for this past year. His grade increased from a 63 percent to a 75 percent by the end of the year. You may not think that that is significant, but for an English language learner who is still currently reading at a 3rd grade level, it was huge.

So how did this increase happen? When you use this type of technology in a classroom, student engagement increases. Every single student wants to come up to the board to interact with this.

Whenever I incorporate a drag-and-drop page, which I am going to demonstrate in a second, every single student's hand goes up into the air. It got to the point where I had to develop a random number generator in order to make sure that everybody had an equal opportunity to come up to the board to participate.

I am going to demonstrate why my students were so interested in one of the drag-and-drop pages. I originally had another sound byte in here, but they took that out.

Students love positive reinforcement, and I like to incorporate a lot of sound bytes from movies that students have seen because, in general, they know that I am trying to meet their interest. And in my experiences, whenever you have an opportunity to make connections with students like that, student academic success increases.

This type of technology allows teachers to incorporate all the various learning styles that students have. I can incorporate visual, auditory, tactile, kinesthetic learning processes in a single lesson.

Now for my English language learners and my visual learner, I can imbed a 2½ minute video clip from Discovery Education. I can take snapshots of the main ideas, drag it to the bottom of the page.

And let me demonstrate. So after the 2½ minute video clip is finished playing, I can invite students up to the board to write down

a summary of the main ideas. There is no longer a 45-minute video that may be hit and miss on the content that you have covered in that lesson for the day.

For my tactile and kinesthetic learners, it is essential for them to be able to manipulate things in order for them to understand the curriculum. On this page, I have developed a lesson that the students could come up to the board, physically click on a landmass, manipulate it, and put it together like pieces of a puzzle to form a larger landmass. And then, of course, you can show them the correct answer.

So, in closing, I just have one final question for you, and I am actually going to ask you to use that odd-looking device at your stations—it is called an activote—about what percentage of classrooms in the United States have interactive whiteboards? (A) 64 percent; (B) 42 percent; or (C) 12 percent. Just take a moment. You can see how they are registering at the top.

And in the interest of time, I am going to have to cut you off. [Laughter.]

Now, this has been done in anonymous mode, so no individual name has been paired up with a response up on the board, which is fantastic for my students, especially when we are trying to address prior knowledge, uncover misconceptions, but we have data immediately after it is done. And since it is in anonymous mode, I get truthful, honest answers.

The correct answer was (C). [Laughter.]

And I can also paste the answers up onto the board, save them for later usage for team meetings or staff development training. The last point I would like to make is that only 16 percent of classrooms have this technology. If it is available, why not use it?

Right now, the United Kingdom is at 70 percent. Thank you.

Chairman MILLER. If I might just interrupt you while you are at the board, if we are all above average here, we got the answer right. But if you had (A) and (B) responses, you would then be able to do what with that data?

Ms. SHORT. If I could show the results again. Whenever the students leave and you have an opportunity to take a look at your data, you can determine whose activote—I have a database.

All the kids' names are linked to a specific activote number, and I can see who answered what incorrectly, and then I can really look at my data to determine are they the same students who are missing it over and over again, and what type of strategies do we need to incorporate to reach their needs.

And if the majority of the class answered the question incorrectly, then I know tomorrow, I am going to come in and re-teach it before I move on in my curriculum. So it is immediate feedback.

[The statement of Ms. Short follows:]

**Prepared Statement of Lisa Short, Middle School Teacher, Montgomery County (Maryland) Public Schools**

Good morning Chairman Miller, Congressman, and guests. I am honored to have this opportunity to demonstrate how technology has transformed the educational experiences of my students and how it has drastically improved my ability to teach students with various learning styles and needs. I am currently teaching 8th grade science at Gaithersburg Middle School in Montgomery County, Maryland. My school has a very diverse population of students and is considered to be a highest need school.

Technology plays such a critical role in my students' every day social lives and it must be a part of their academic lives. When my students walk into school they are carrying cell phones, iPods, video games, and sometimes laptops. The first thing they are told to do is "power down." They are asked to keep all of this technology in their lockers so instructional time is not interrupted. Two years ago they walked into a classroom that only had a chalkboard and an overhead projector. That is no longer the scenario at my school.

I am happy to share that since the integration of technology in my classroom and at my school, student engagement has increased along with academic successes. I would like to share a student success story with you. Alan Vera Lopez is an English Language Learner who is currently reading at a 3rd grade level. His grade at the end of the first marking period was a 63 percent. At this point in time, I was still learning how to use the interactive board effectively in my classroom. As the year progressed, and as I improved my skills with the technology, my lessons became more interactive. By the end of the school year his grade had improved from a 63 percent to a 75 percent.

How did this happen? When you use a Promethean board, student engagement increases. Every student, including Alan, wanted to come up to the board during my lessons to demonstrate their knowledge and show off their skills. Whenever I incorporate a "drag and drop" page, every hand goes up in the air. They all want to participate. I have to use a random number generator to ensure that everyone has an equal chance of getting selected to use the wand. Using this technology has greatly improved my relationship with students. I like to use sound bites from movies that students have seen to provide positive reinforcement when they answer correctly on the interactive board. These small touches show students that I am making an effort to relate to their interests. In my experiences, academic success increases when these types of connections are made.

The interactive board allowed me more opportunities to address the different learning styles of students. I was able to integrate visual, kinesthetic (movement), auditory, and tactile (touch) processes into a single lesson. For my English Language Learners, the use of diagrams, pictures, and videos were essential for their comprehension of the curriculum. During a lesson discussing the theory of continental drift, students were able to come up to the board to manipulate landmasses like pieces of a puzzle, in order to create the supercontinent Pangaea. A great deal of paper was saved that day.

How has this improved my teaching? At the tips of my fingers, I have access to resources that I can use to prepare my lessons. I can download video clips from Discovery Education, include a diagram from the teacher's edition of our textbook, use images from the Internet, or can use published lessons developed by other teachers. I am able to make my lessons rigorous and differentiated to meet individual student's needs. I'm excited to develop lessons again. My husband is also a teacher, and we have an unspoken competition as to who can create the best flipchart.

I use activote questions to assess students' prior knowledge. I have immediate feedback as to the foundation that I am getting ready to build upon. When I begin teaching a unit, I use the activotes in anonymous mode so students don't feel intimidated when they don't know the correct answer. After my lesson, the data from the activotes allowed me to process my students' feedback efficiently. It enabled me to make "at-the-moment" decisions as to whether or not my students understood the information or if I had to re-teach before moving on to the next topic in my curriculum.

Finally, with this technology, our students have greater access to resources at home. I can post my assignments, notes, and lessons on Edline. Every student and parent in Montgomery County has access to Edline, which allows them to monitor grades, determine when an assignment is due or when an assessment will be. If students miss a day of instruction, they can log on and print the lesson from that day. Parents have a better understanding of what is taking place in the classroom and can look at lessons and help their child with their homework. Not only can we increase engagement in our schools, we can hopefully increase engagement at home.

Thank you for allowing me this unique opportunity to share my successes throughout the past year. It has been a learning experience for not only for the students, but for teachers and parents as well. Through professional development and trainings, this technology can truly change the profession of teaching.

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Chairman MILLER. Thank you. Thank you very much.  
Mr. Kinney?

**STATEMENT OF SCOTT KINNEY, VICE PRESIDENT, DISCOVERY  
EDUCATION**

Mr. KINNEY. Thank you Chairman Miller and committee members. It is an honor to appear before you today. My name is Scott Kinney, I am vice president of Outreach and Professional Development for Discovery Education. Previous to joining Discovery, I served 14 years in education in the Pennsylvania school system.

Our parent company, Discovery Communications, is the number one non-fiction media company in the world with networks such as the Discovery Channel, Animal Planet, and the Science Channel. At Discovery Education our goal is to provide the most up-to-date instructional content in an interactive and engaging format, in a sense, bringing the world to their world.

And this is our student's world. According to the Kaiser Family Foundation study, students spend an average of 6½ hours a day with media. Since they don't take weekends off, that is 45½ hours a week, the equivalent of a full-time job.

The National School Board Association commissioned a study in which they found that 96 percent of all students engage in some form of social networking.

If MySpace were a country, it would be bigger than France, Germany, and the United Kingdom. Given that is the way our students prefer to consume information and interact with content today, it is no longer acceptable for us to ignore that when we choose instructional materials.

When we do look at the way they choose to interact with information, our own research at Discovery Education has shown multiple times that this has a positive impact on student achievement. When used effectively, media and technology in the classroom makes a difference.

We have looked at several types of schools, whether it is LA Unified or schools in rural Virginia. We have looked at different grade levels, whether it was math, social studies, or science.

We looked at grades three, six, and eight, and regardless of the type of school, the grade level, or subject, when used effectively, student achievement increases. So in addition to this, we should also be providing this:

[Play video clip.]

Mr. KINNEY. After countless years of research and multiple studies, we know that students learn differently from one another and yet, in many places, we continue to teach them as if they all learn the same.

This is an example of an interactive glossary within Discovery Education Science, a way for us to provide information in multiple formats to reach students' different learning styles.

So we can take one concept like food chains and display the text definitions, a short animation on the same concept. If that doesn't reach children, we can show them a short video.

[End video clip.]

Mr. KINNEY. And we can also support their learning with images as well. This is an example of one of our virtual labs, an environment where students can test hypotheses quickly, isolate and manipulate variables in a very safe environment.

And when we provide media and technology to students and let them construct their own meaning, they will undoubtedly surprise us. “Hometown Heroes” is a documentary created by high school students in North Canton city schools in Ohio that looks at the impact that their town had on World War II.

And for the first time, we are seeing a small number of progressive states encouraging this transition. In the state of Indiana, for example, the state Board of Education sent a letter to all school districts, which, and I quote, encouraged them, “that they should feel no obligation to utilize the standard form of social studies textbooks.”

As a result, we are currently working with Indianapolis Public Schools to align a number of their pacing guides to rich media assets such as video, images, audio, and writing prompts.

Recently, in Florida, they changed their language that defines instructional materials to include electronic media and computer courseware or software that serve as a basis for instruction for each student.

On the 8th of this month, Governor Schwarzenegger announced that a new initiative in California, which he stated high school students will have access to science and math digital textbooks by the beginning of the school year. Similar language has been proposed in Texas as well.

The only caution I would introduce today, though, is that this is fundamentally a change in the way we are asking teachers to engage our nation’s students. It is imperative that, along with this change, we provide high quality, ongoing professional development to teachers as we embark in this new way of learning.

Our own data suggests that there is a great degree of variance between districts that utilize ongoing professional developments versus those who do not. It is one of the reasons that at Discovery we support the Discovery Educator Network, a global community of teachers that we bring together both online and in person who learn, share, and collaborate the best uses of media and technology and share that with others.

So thank you for your time today. I appreciate your attention to this incredibly important matter.

[The statement of Mr. Kinney follows:]

**Prepared Statement of Scott Kinney, Vice President of Media and Technology, Outreach, and Professional Development, Discovery Education**

Thank you Chairman Miller and Mr. McKeon. It is an honor to appear before the Committee.

I address you today as a lifelong educator. I began my career as a Technology Specialist in Pennsylvania’s public education system, where, in a number of roles, I worked to encourage the use of digital media and educational technologies in the classroom.

In my current position at Discovery Education, I serve as the Vice President of Media and Technology, Outreach, and Professional Development, and am advocating today on behalf of Discovery Education for the creative and effective application of educational technologies and digital content in America’s schools.

During my tenure as an educator, I’ve seen a profound shift in students.

Today’s technology savvy students enter the classroom possessing a wide range of skills that are different than those of their parents and teachers. These students are extremely familiar with digital media and technology, multitask with ease, process information in many different ways, and interact with information and content at what people who did not grow up in this environment may see as a dizzying pace.

The data are clear regarding how much media students are exposed to on a daily basis, and how they allocate their personal media budgets across a variety of activities that deliver content to them instantaneously. They do this in the context of balancing their time with other activities that constitute their lives outside classroom walls.

Consuming, processing, and learning from media, in many forms simultaneously, is how today's tech-savvy students function. For more than six hours per day—eight when you count exposure to multiple forms of media at the same time—our students consume media. This constant interaction with media equates to a full-time job of learning through “untraditional” means.

With this data in mind, I ask you to consider the implications and the educational community's response.

Currently, our education system requires students to abandon the way they typically interact with content when they walk into school and learn in an environment much different from the digital world they inhabit outside the classroom. Instead, I believe the educational community should utilize the digital tools at our disposal to present instructional content in a way that piques students' interest and engages them in the meaningful construction of knowledge. In my opinion, this is where the future of learning lies.

Our instructional practices need to be infused with the tools and activities from which our students learn naturally. This can include methods as simple as using a short two-minute video segment to activate prior knowledge at the start of a lesson; providing multiple representations of content via images, video and audio; or giving our students an opportunity to demonstrate their understanding in different media-enhanced ways.

In doing so we can translate our instructional objectives to our students and get them interested in learning the skills, content, and ideas they need to develop.

It is clear how students use digital resources to learn. As we move forward to the classrooms of the future, the education community's challenge is to find points of intersection between what our students do in their free time and our instructional goals. The content and services provided by educational providers, such as Discovery Education, need to continue to evolve to facilitate student engagement and interaction with media.

Likewise, the federal government and state governments need to continue to show leadership in supporting the integration of digital content into America's classrooms. Finally, adequate professional development resources need to be allocated by school districts to help those educators who are not as comfortable with technology to implement digital content into their classroom activities, across all subject matters.

While the use of digital content in the classroom is a success story, the continuing evolution of media's use holds even more promise.

The story of content integration into curriculum began in the 1990s when educational media migrated from films and filmstrips to VHS tape. Videotape and VCRs initially held tremendous promise for the use of content in the classroom.

However, video's advantages over films and filmstrips proved minimal. Yes, teachers could fast-forward or rewind videos to utilize only the content they thought relevant, but that process was relatively laborious and continued to eat into classroom time. Likewise, the transition to video did not change the need for schools to continue to invest in expensive hardcopy libraries and for teachers to continue to compete against one another for the media they wanted for their classrooms.

In January of 2001, a company called United Learning launched a new service called Unitedstreaming. Utilizing America's emerging broadband network, Unitedstreaming (now known as Discovery Education streaming) offered American classrooms thousands of videos, delivered via the internet, correlated to state standards, and in 3-5 minute clips that teachers could easily integrate into their classroom lessons. No longer was media stopping and starting classroom instruction. Rather, digital content was being seamlessly integrated into existing curriculum.

In the fall of 2003, Discovery Education, a division of Discovery Communications whose networks include Discovery Channel, Animal Planet, and Science Channel, purchased United Learning. Education has always been at the heart of Discovery's mission. From its inception, Discovery Education has sought to continue to respond to the changing way America's students learn. We have sought to create engaging, media-rich programs that mirror the way students interact with the world and develop high-quality multimedia resources in easy-to-use formats across all core-curricular subject areas to reach students.

Our flagship service, Discovery Education streaming, is available in more than half of all U.S. schools, offers teachers and students a library of up to 9,000 videos and 70,000 video clips, and is aligned to state academic and testing standards. Searchable by keyword, content area and grade level, the rich video content and

other digital assets from Discovery Education enhance curriculum and engage today's students in learning.

Perhaps most importantly in this era of increased accountability in education and the compelling argument for the proliferation of educational technologies in the classroom, Discovery Education streaming is scientifically proven to improve student achievement. Two random-assignment, control group studies have revealed significant improvement in social studies, science, and math performance for students exposed to digital content from Discovery Education streaming.

In the independent evaluation conducted in rural Virginia in 2002, researchers examined third and eighth grade students in two areas of study—science and social studies. Improvement among experimental group students who received instruction aided by Discovery Education's digital content showed a 12.6 percent average increase in achievement over control group students.

In a more recent study conducted in 2004 in the Los Angeles Unified School District, researchers examined mathematics performance among 6th and 8th grade students. Students who received instruction aided by Discovery Education's digital content showed a 3 to 5 percent average increase in achievement in math scores over the control group.

While Discovery Education has sought to directly address the changing way students learn, we also have sought to use the power of digital content in response to American students' lagging performances in the sciences. In an ever-changing global economy, it is evident that the current state of U.S. science, technology, engineering and math education must be improved to avoid the potential of negatively affecting our future financial and national security. Swift action must be taken to ensure students do not lose the opportunity to move into the new global economy. And it is clear that technology allows companies like Discovery Education to react rapidly and effectively to new and changing educational needs, by modifying content and creating new services to address such needs—such as our recent creation of Discovery Education Science, to specifically focus on the needs of middle school and elementary school students in science education.

*State Support of Using Traditional Textbook Dollars for Digital Content/Indianapolis Curriculum Alignment*

State governments, with the support of forward-thinking organizations like SETDA, also are responding to the challenge of addressing the way students learn today by supporting a migration from traditional textbooks towards digital content.

One example of this shifting paradigm occurred recently when California Governor Arnold Schwarzenegger announced a first-in-the-nation digital textbook initiative that puts California on the road to a technologically advanced, higher quality, and lower cost education system.

According to the Governor's plan, California high school students will have access to science and math digital textbooks by the beginning of the next school year. A list of standards-aligned digital textbooks for subjects such as geometry, algebra II, trigonometry, calculus, physics, chemistry, biology/life science, and earth science courses will be released this August.

Phase two of the initiative is currently being developed. This includes making digital textbooks available for all grades, incorporating interactive content, and eventually creating a statewide web site highlighting available books.

In Indiana, that state's Board of Education also has made changes to their textbook adoption process, further embracing digital media. Recently, that state's Board of Education voted to issue a blanket waiver allowing school corporations and state-accredited nonpublic schools to use a broad range of multimedia, computer and Internet resources to supplement or replace traditional textbooks. Although the state textbook adoption process is still in place, school corporations and state-accredited nonpublic schools have the freedom to choose materials and resources they feel are best suited to the instructional needs of their students.

In addition, legislation is now in place in Florida allowing school districts to purchase digital content, and similar legislation is currently under consideration in Texas.

One of the most innovative approaches school systems are taking in their efforts to embrace the future of learning is currently being undertaken by Indianapolis Public Schools. Districts struggle with how to provide consistent instruction to students across a district. Usually, curriculum documents and textbooks are printed and shipped to schools. The documents, while helpful to the teachers in laying out a roadmap for what is taught during the school year, are static, and to update these documents is a major district endeavor in terms of both manpower and cost. In addition, each teacher must often juggle several of these documents and a textbook in order to plan instruction, so ease of use on the part of educators is critical. If the

documents are difficult to use, chances are the digital content purchased by the district along with traditional texts will remain unused as well.

Discovery Education is responding to this challenge by assisting Indianapolis Public Schools in creating easy to use curriculum documents for history teachers correlated to the digital services used in the district. This content includes videos, articles, writing prompts, lesson plans, quizzes, images, and audio files. Upon completion of the project, the pacing guides will represent comprehensive, dynamic documents that will provide every teacher in the district access to the most effective content that both specifically addresses the district's learning standards and engages their students in learning. For students, access to engaging content is no longer dependent on the ability of the teacher to locate the content. This complete access with appropriate curricular alignment addresses the important issue of educational equity. This is just one example of how technology can be used to increase the effectiveness of our children's education.

#### *Empowering Teachers with Professional Development*

While the promise of digital content to positively impact the future of learning is great, any plan to integrate digital content and educational technologies into classroom curriculum is doomed to failure without ongoing, job-embedded professional development, supported fully by school districts.

Educators' content knowledge is deepened across the curriculum by providing research-based instructional strategies that assist students in meeting rigorous academic standards and prepare them to use technology to demonstrate their new learning. Successful professional development programs are backed with buy-in from district decision-makers and model best practices: namely, strategies for providing students with consistent feedback, utilizing cooperative learning structures, embedding digital content into instruction, and promoting the creation of content for the Web in an effort to better engage 21st century students.

Similarly, building internal capacity in districts and participating schools is of utmost importance in providing school systems professional development. District leaders, facilitators and teachers must receive continuous support through subsequent professional development that includes lesson and unit development, modeling, and non-punitive coaching.

Discovery Education's recent partnership with a large district located in the southeast region of the United States to provide professional development demonstrates the impact this kind of investment in teachers can make and how it can be done effectively. Over the course of five months, Discovery Education trained approximately 135 school-based facilitators and more than 800 teachers. The partnership included 82 Title I schools. In our initial meetings with the district we conducted a needs-analysis and determined three areas of focus for a successful implementation. We believe it is this concerted focus on targeted, measureable outcomes that garnered a 1,500 percent increase in use by both teachers and students of our digital library resource.

So why a 1,500 percent increase in use? We worked with their teachers to facilitate the consistent use of multimedia to engage and promote learning. Such professional development has empowered teachers to embed video into their instructional presentations, to build background knowledge, engage students in dynamic learning activities, and provide their students alternatives to book reports and traditional essays—allowing them to demonstrate what they have learned through the creation of blogs, wikis, or movies using editable content from their online resources. This is one example of the impact professional development can make in ensuring our children can take full advantage of the opportunities technology in the classroom can provide.

#### *The Future of Learning*

The way students learn will continue to evolve in the future, and providers of educational materials, state governments, and school districts will continue to be challenged to meet their needs.

In my view, these continuing trends represent the future of digital learning.

With data supporting the benefits of integrating digital media into classroom instruction, now is the time for every level of government and school districts nationwide to accelerate their support for the use of effective digital content in schools. It is only with this continued support that today's students will reach their full academic potential.

Thank you for your time and attention to this issue.

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Chairman MILLER. Thank you.

Ms. Bergland?

Ms. BERGLAND. Sorry.

Chairman MILLER. Don't worry. We are mesmerized by what you are doing. [Laughter.]

**STATEMENT OF JENNIFER BERGLAND, CHIEF TECHNOLOGY OFFICER, BRYAN INDEPENDENT SCHOOL DISTRICT**

Ms. BERGLAND. Okay. Thank you, Chairman Miller, and the committee for inviting me to testify. My name is Jennifer Bergland, and I am the chief technology officer of Bryan Independent School District in Bryan, Texas.

We have over 15,000 students in our district of which 71 percent are considered economically disadvantaged, and 61 percent are considered at-risk.

I want to tell you about how we use technology to empower these kids to do things they never thought were possible. In 2004, Stephen F. Austin Middle School, which we call SFA, issued laptops to all students and teachers attending the school, which was made possible with funds from a grant through the No Child Left Behind Title II, Enhancing Education through Technology program.

We called this program "One Vision," for we had one vision for how we wanted one-to-one computing to transform how teachers taught and how students learned. I have a short video that I want to show you that, hopefully, gives you a brief introduction.

[Play video clip.]

Ms. BERGLAND. After 5 years of implementation, the one-to-one learning environment the school—with the one-to-one learning environment, the school has increased achievement, a reduction in discipline referrals, had an increase in teacher retention, an increased technology proficiency for both teachers and students.

The access to these resources enables the students of SFA to be engaged in their learning. Students use online resources to perform digital experiments, view virtual manipulations for abstract concepts in math and science, discuss topics in social studies using an online chat application, and publish their writings on the Internet.

One student at SFA used her laptop to begin writing a sequel to the Harry Potter series from the point of view of her favorite character. This wasn't an assignment given to her by her teacher. This was her passion. The laptop just made the writing a little bit easier.

Having digital content rather than traditional textbooks enables the students to use all the Web tools available to personalize their learning. Students use these to customize their experience on the Internet. They create; they collaborate, and they publish in ways that were not possible 10 years ago.

The teacher no longer has to possess all the knowledge needed to instruct their students. They can truly be the facilitator of learning. In fact, students are able to find their own teacher using the Internet. These teachers might be a video demonstrating a physics problem or step-by-step instructions on how to divide fractions.

This customization of a student's learning has led the students to become more independent learners. When each student is issued a laptop, the learning is extended beyond the school day. One

teacher set aside two nights a week to have a live homework chat session.

At first, the teacher was the one answering the other students' questions, but soon, the teacher was able to back away and let the students answer each other's questions. The research conducted on this project indicates that the students' use of laptops for home learning was the strongest predictor of both reading and mathematics achievement.

The findings for home learning underscore the important role that individual student laptops play in equalizing the out-of-school learning opportunities for students in disadvantaged families and school situations.

Before I end, I want to tell you about a small West Texas community whose schools also participated in this project. Floydada ISD is out in way West Texas. They saw such success in their middle school with double-digit gains that they extended their project to their high school.

As a result, the students were able to complete 206 college-level courses in 2008 for a total of 619 hours. These courses not only helped prepare students for higher education but also saved parents thousands of dollars since the district covered the cost of the courses and allowed children to see themselves, for the first time, as college students.

One thing that Jerry Vaughn, the superintendent of this school district says, "If you don't ever start college, you won't ever finish." I want to end by telling you about a conversation that I had with our track coach several years ago.

He told me he was about to take an overnight trip to attend a track meet. He only took the top three athletes for each event. So he would have the athletes tryout the week prior to the track meet. There was this one kid that was trying out for every single event.

The coach couldn't figure out why, because this kid very rarely showed this much initiative. So the coach said, "Son, why are you doing this?" And this kid looked up at Coach Greenow, and he said, "Coach, I have never been out of town before." The digital divide is real.

I have kids in my community who have never been out of Bryan. This last year, some of the students at Stephen F. Austin Middle School participated in a unit on NASA. They might not be able to go to Houston, even though it is 90 miles away, but they can go on their laptop using the virtual trip.

Thank you for allowing me to share you my testimony. I love sharing our story. It has given me a chance to voice our teachers and how they feel about how this has transformed their teaching and their learning in their schools. Thank you.

[The statement of Ms. Bergland follows:]

**Prepared Statement of Jennifer Bergland, Bryan Independent School District**

Good Morning. Thank you to Chairman Miller and the Committee for inviting me to testify today. I am the Chief Technology Officer of Bryan Independent School District, in Bryan, Texas. We have 15,000 students of which 71% receive free or reduced lunches and 61% of our students are considered at-risk. Technology has been a key factor in our efforts to ensure that all students are academically successful. We are reaching and engaging more students and seeing real gains in achievement. In 2008, the district received the TEAM award from CoSN (the Consortium for

School Networking) that is given to a school district whose impact on technology's role in transforming learning has been significant. This award recognized the district's efforts in using technology to change the way our teachers teach and our students learn.

#### *Technology Immersion Pilot (TIP) Model*

In 2004, Stephen F. Austin Middle (SFA) School, one of four middle schools in my district, issued laptops to all students and teachers attending the school. At the same time, the school received access to more robust digital content and tools, more professional development, and increased technical support. After five years of implementation the school has seen increased achievement scores, a reduction in discipline referrals, increased teacher retention, and an increase of technology proficiency for both students and teachers.

SFA received funds from a grant funded through the NCLB Title II, D—Enhancing Education through Technology (EETT)—program to implement the Technology Immersion Pilot (TIP). TIP required each school to provide a laptop computer for every student and teacher, wireless access throughout the school, online curricular resources, on-going assessments, professional development and on-going support for teachers, and the technical support to maintain an immersed campus.

The combination of these six components created a technology-rich learning environment that looks different than most typical classrooms. Collaboration, critical thinking skills, and student engagement are a part of teaching and learning in all subject areas. Tools like interactive white boards, digital content, on-line courseware, digital cameras, science probes, and laptops provide students with opportunities to collaborate and use relevant content that typically would not be available to the students in a traditionally-taught classroom. Leadership and professional development are critical to the vision and the sustainability of the type of change that occurs in a campus that immerses their teaching environment with technology tools and digital content. This is more than just putting technology in classrooms. The key is that teaching and learning happen in a different way. Education is transformed.

#### *Transforming a School*

At SFA, academic achievement scores have increased steadily for all grades 6-8 in both math and reading over the past several years. The increase in scores matches the research conducted in relation to the TIP project. <http://www.tcer.org/>

SFA has approximately 900 students in grades 6-8. They have a diverse student body with 75% of their students receiving free or reduced lunches. As part of this project they not only have laptops for all students, they also have extensive on-going professional development for their teachers, a designated Integration Specialist who models and mentors the teachers as they learn new skills and pedagogies. In addition, the students and teachers have online curricular resources, on-campus technical support, and a robust technical infrastructure that ensures each laptop can access the network and Internet from any place on campus.

The access to these resources enables the students at SFA to be cognitively active and engaged in their learning. Students use online resources to perform digital science experiments, view virtual manipulations for abstract concepts in math and science, discuss topics in social studies using an online chat application, and publish their writing for a wide audience on blogs and wikis (web pages designed to enable anyone who access it to contribute or modify content). One student at SFA used her laptop to begin writing a sequel to the Harry Potter series from the point of view of her favorite character. This was not an assignment made by her teacher, but was her passion. The laptop made the writing much easier to accomplish. The technology also allows the students to collaborate not only in school, but also when they go home. Teachers at SFA began to assign more project-based learning opportunities that enable students to collaborate with each other while problem-solving real-world dilemmas. When students are cognitively engaged in their subject content, learning occurs. One tool that was used by Math and Science teachers are Gizmos by Explore Learning. Let me quickly demonstrate for you how these work.

Having digital content, rather than traditional textbooks, enables the students to use all the Web tools available to personalize their learning. Students use these outside of school to customize their experience on the Internet. They create, collaborate, and publish in ways that were not possible ten years ago. SFA has been using similar tools within the classroom. Students are able to take a learning objective and use the vast resources on the Internet to go more in-depth on topics of interest or find more information on a topic or skill in which they are struggling. The teacher no longer has to possess all the knowledge needed to instruct their students. They can truly be the facilitator of learning. In fact, students are able to find their own

“teacher” using the Internet. These “teachers” might be a video demonstrating a physics problem, or step-by-step instructions on how to divide fractions. This customization of a student’s learning has enabled the SFA students to create their own “teachable moments” through their investigative inquiry during and outside of school. This leads the students to become more independent learners. One teacher has described her classroom this way, “It’s opened the environment \* \* \* anybody can become the teacher at any point, and they don’t hesitate.”

When each student is issued a laptop, the learning is extended beyond the school day. Students at SFA mainly complete projects and homework assignments with their laptops at home, but the laptops are also used in other ways. One teacher set aside two nights a week to have a “live homework chat session”. At first, the teacher was the one answering the student’s questions. Soon, however, the teacher was able to back away and let the students answer each other’s questions. The research conducted on the TIP project indicates that the students’ use of laptops for home learning was the strongest predictor of both reading and mathematics achievement on the state achievement tests. The findings for home learning underscore the important role that individual student laptops play in promoting ubiquitous learning and equalizing the out-of-school learning opportunities for students in disadvantaged family and school situations. Individual student laptops, in contrast to laptops on carts or computers in libraries, labs, or classrooms, expand where and how student learning occurs. Access to electronic textbooks on laptops motivates many students to continue working on chapter assignments outside of school.

The laptops also provide teachers with a variety of ways to assess their students’ mastery of their subject content. Many of the online resources provide immediate feedback both for the teacher and the student. Some SFA teachers use Moodle, an online course management system, which allows teachers to embed assessments throughout the online assignment. The teachers can also set the system to allow students to re-take the test until the student masters the material. Benchmark assessments that are taken online allow a teacher to quickly determine what objectives each student needs to be re-taught or reinforced. The use of the student laptops has enabled teachers to diagnose and suggest remediation for students during the learning process, rather than after the process is complete.

#### *Professional Development in Bryan: Improving Teacher Effectiveness*

Ongoing, job embedded professional development is essential when changing teaching practices. Teachers at SFA were given hands-on training on how to use the technical tools and online resources. This is a first step in helping them to be comfortable with the tools that the students will have. It is important that schools not stop at this step. In order to use the power of the technology, the teachers have to learn how to leverage these tools to educate differently. If teachers teach the same way using technology, as they did without technology, then the investment is wasted. Helping teachers see this takes time. Professional development needs to be based on teachers’ evolving needs, and progress from the first-year focus on proficiency with technology tools and online resources to an increased emphasis on technology-related lessons, subject-specific lesson development, and the use of more advanced technology applications for projects.

We used several professional development models to help teachers acquire these skills. We created a cadre of mentor teachers, the iSupport team, who would help teachers learn how to teach using the laptops and the digital resources. We also found that having a person on campus that is solely dedicated to helping teachers change their teaching practices was critical to the teachers’ success. The Integration Specialist would plan with teams of teachers on how to take a traditional lesson and embed technology in that lesson that would engage the students in the learning process and increase their ability to understand and apply their learning. This individual would also model-teach, work with students, and work with teachers on classroom management.

Teachers are not alone in the need for professional development and coaching. A change of this magnitude requires that all key stakeholders understand the reasons why the classroom needs to change, the methods that will be used to obtain the transformation, and what their role is in equipping the teachers and students with the necessary support to make the change happen. In the hurry to begin the implementation, our district started with the teachers. We found during the first year we only had vocal support for the project from the executive leadership and curriculum coordinators. In the second year we began providing the necessary professional development for the district leadership and their support for the project increased. We provided professional development for all campus administrators, district curriculum coordinators, district executive leadership, and technology personnel. As a result, the administrators began to communicate to teachers how the project bene-

fits students that in turn raised the awareness of why immersion was important. Campus administrators took an active role in discussing technology issues with students, allocated time for teachers to plan technology-integrated lessons, and monitored the use of technology by visiting classrooms. The need to include all individuals that affect the classroom teacher in the professional development plan should not be underestimated.

#### *TIP Results*

Other Texas districts have experienced similar results as Bryan. As part of TIP, the Texas Education Agency (TEA) participated in a scientific investigation of the effectiveness of technology immersion in increasing middle school students' achievement in core academic subjects as measured by the Texas Assessment of Knowledge and Skills (TAKS). This research study was funded by a US Department of Education evaluation grant as part of the NCLB Title IID Program. The evaluation examined the relationships that exist among technology immersion, mediating variables (school, teacher, and student), and student achievement. Applicants were high-need due to children from families with incomes below the poverty line, schools identified for improvement, or schools with substantial need for technology. Technology immersion schools were matched by researchers with control schools on key characteristics, including eligibility for Title II funds, size, regional location, demographics, and student achievement.

The study included grades 6-8 middle schools drawn from rural, suburban, and urban locations in Texas. The study focused on two groups of student with a total of more than 10,000 students in control and experimental schools. Nearly three-quarters of students are economically disadvantaged (about 75%) and represent minority groups (approximately 70% Hispanic and 7% African American).

First and second year reports revealed positive effects of technology immersion on schools, teachers, and students. Outcomes across two evaluation years and two student cohorts show that immersing a middle school in technology produces schools with stronger administrative leadership for technology, greater teacher collaboration and collective support for technology innovation, and stronger parent and community support for technology. Additionally, teachers in immersion schools are more technically proficient and use technology more often for their own professional productivity. Students use technology more often in core-subject classrooms, and teachers adopt more learner-centered ideologies. Students in immersion schools are more technically proficient, use technology more often for learning, interact more often with their peers in small-group activities, and have fewer disciplinary problems than control-group students. Additionally, there are other outcomes for immersion students that may contribute to their long-term success. Certainly, technology immersion has narrowed the technology equity gap for economically disadvantaged students. Many students who previously had no technology in their homes are becoming computer literate through their experiences with laptops.

Across four years, students in Technology Immersion schools consistently had fewer disciplinary actions than control-group students. In the fourth year, Cohorts 2 and 3 immersion students had an average of 0.54 and 0.45 disciplinary actions per student, respectively, compared to 0.76 and 0.71 per-student averages for control students. Reducing disciplinary actions may have very important benefits due to more time in classrooms and decreased time and effort spent by middle school teachers and administrative staff on disciplinary problems of students removed from classrooms.

#### *Another District: Academic Results and College*

Rural Floydada school district began Texas TIP implementation in their school district in 2005 and then later expanded from the middle school to the high school. Sixth grade standardized math scores increased by 29 points, and 10th grade standardized math scores increased by 36 points. Also impressive is that Floydada High School students completed 206 college level courses in 2008 for a total of 619 hours. Half of the senior class completed at least 1 college course prior to graduation. These courses not only helped prepare students for higher education, but also saved parents thousands of dollars since the district covered the cost of the courses and allowed children to see themselves as college students. Because of districts success like Floydada, my district has created a high school in which the students will receive enough credits to enter college as a junior when they graduate from high school. Many students at this high school do not have the technology needed to successfully complete a college course. Therefore, we are hoping to provide each of these students with a laptop next year in order to meet this need. Technology is providing increased access to education and higher education for students most in need.

*Conclusion*

One administrative staff member described the positive effects the technology immersion project has had on the students at SFA:

“It’s one of the most rewarding projects that we have undertaken. It’s one of the few things that we do in education that we really do for the kids. We say that all the time, that we are going to be child centered. This one really is student centered because there is no other reason you would do it. They are the ones who benefit \* \* \* It’s hard for the adults \* \* \* This is for them \* \* \* It’s going to benefit all of us as they become better adults.”

Thank you for the opportunity to testify. You have provided me an opportunity to share with you what we have learned in Bryan, Texas; that classrooms are transformed when students are engaged in a meaningful learning environment, their learning is personalized to their needs and interests, and their school day is extended by providing all students with access to resources to support their scholastic objectives and interests.

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Chairman MILLER. Thank you.  
Mr. Real?

**STATEMENT OF ABEL REAL, STUDENT, EAST CAROLINA  
UNIVERSITY**

Mr. REAL. Good morning, Chairman Miller, and congressional committee members. I thank everyone for the opportunity to share my story today. I hope all of you all are doing well and, yes, I did say all “y’all.” I am from the South, born and raised, and I am very proud of my southern roots.

My rural home of Snow Hill in Greene County, North Carolina is a small community with high poverty rates and is not well known. But just as this room is full of opportunity, intelligence, and determination to succeed with change, so is Greene County. The county’s population is about 20,000 with approximately 3,200 students in our school system.

Seventy-three percent of these students receive free or reduced lunches. Thankfully, Greene County has changed their schools through a one-to-one laptop program and is now home to what, in my case, was a portal to a new life. Unfortunately, narcotics began to tear my family apart when I was 9 years old.

By the time I was 10 years old, my father had been imprisoned at least three times, fled from the law, and I have yet to hear from him. My mother was left with four young kids to look after, and with no education, she was forced to work in the fields from sunrise to sunset.

Her farm-laboring job did not adequately provide for us, and unfortunately, she eventually turned to drug trafficking as well. By the time I was 11 years old, my two older brothers dropped out of high school, and at least they began to help support the family, and my mom could finally make the commitment to stop dealing drugs.

A month after my 13th birthday, I received a blow that would change my life forever. My mother was incarcerated for drug trafficking more than a year after the last time she ever had anything to do with them. Her past had finally caught up with her, and my perfect life crumpled beneath my eyes from one day to the next.

The events to follow were as expected of a 13-year-old who had no adult supervision to stray him from wrongdoing. By sophomore

year in high school, I had 46 absences, rapidly dropping grades, no parents, a torn family, and plans to soon drop out of school.

By the age of 16 years, I was bailing my brother out of a detention center for traffic violations. During my junior year, I met my healthcare instructor and mentor that helped me change my ways. Ms. Lisa Wilson inspired me and shared with me how the use of technology tools could open doors.

Technology helped to spark an interest in school and provided many of the resources that I lacked at home. At the time, I didn't really understand the school's new educational model or the hundreds of hours of training that my teachers had attended.

I only knew that I had a laptop, and that I used technology in every classroom, which also provided access to my teachers and classmates 24 hours a day, 7 days a week.

Soon it didn't matter that my home life was a mess or that Greene County was so isolated. The integration of technology opened the world to me. By my senior year, I placed first in a regional Health Care Club speech competition and top ten in the state.

I was also varsity soccer team captain, homecoming king, president of various clubs on campus, and had perfect attendance, plus I worked two to three jobs. At home, there was no inspiration, and I truly dreaded the bell at the end of the school day.

At least I knew that when I left campus, I would be able to instant message and e-mail my teachers and classmates with questions. Since Greene County schools provided change with the one-to-one program, school life is very different than traditional high school that my brothers dropped out of.

Students work in groups; they are challenged by projects, the best part is everyone participates. In addition to the laptops, students use digital cameras, video cameras, and interactive whiteboards to prepare for college and 21st Century careers.

For example, in my physical science class, I demonstrated elevated distance by providing visual image slides for my classmates. In chemistry, I was able to manipulate elements from the periodic table on a interactive whiteboard.

Other examples of technology used in Greene Central High School includes designing Web pages, filming and editing movies, and creating thinking maps. Our teachers work with facilitators to help make all this happen.

You see, technology is not a luxury in today's society; it is a necessity.

Most importantly, the student body is now at optimal performance. Today, we aim beyond a high school diploma and at very minimum to a bachelor's degree. Through the use of technology, our teachers are preparing us with skills for our journey to successful careers.

Before our laptop program 7 years ago, the average college going rate in Greene County was 26 percent. By the time I graduated in 2008, our college going rate increased to 94 percent, our school record.

In the past, our rural county was far below average at a national average. Now we are above average by 34 percent. In addition to increased college going rates, we have increased access to honors

and AP classes and our teen pregnancy rate has dropped to number 18 from number two.

Our advancement is all thanks to the technology and great teachers who integrate tools into their lessons. Thankfully, we are not alone, and there are other students in North Carolina and across the county that are also benefitting from similar programs.

I have just finished my freshman year at East Carolina University with a major in pediatric nursing. I also received a National Nurse Scholars scholarship. I am currently employed as a certified nursing assistant. I actually received my nurse's assistant credentials as part of my high school curriculum.

Although this may seem like a most ordinary story, something not so ordinary happened along the way, technology. Technology tools helped me to create, learn, explain, document, and analyze the different aspects of my life. My grades could not have been successful without the constant e-mails.

I could not have shined through without the use of power points and movie presentations. My application to East Carolina University, my SAT registration, and most recently, my Nurse Scholars Program application were all completed online.

Without technology, there is no way I would be here testifying today. Honestly, I would probably be another dropout. There are many students across the country just like me that only need a chance or an opportunity to change their future.

Even diamonds have to be uncovered and discovered to show their brilliance and beauty. Young people across America are these diamonds. Technology is the perfect tool for these young diamonds to shine across our beautiful home we call America. Thank you.

[The statement of Mr. Real follows:]

**Prepared Statement of Abel Alejandro Real, Sophomore, East Carolina University**

Good morning Chairman Miller and Congressional Committee members, I would like to thank everyone for the opportunity to share my story today. I hope all of y'all are doing well, and yes I did say "all y'all." I am from the south, born and raised and I am very proud of my southern roots. My rural home of Snow Hill in Greene County, North Carolina is a small community, with high poverty rates and is not well known; but just as this room is full of opportunity, intelligence, and determination to succeed with change, so is Greene County. The county's population is about 20,000 and there are about 3,200 students in our school system. 73% of these students receive free or reduced lunches. Thankfully, Greene County has systematically changed their schools through a one to one laptop program and is now home to what, in my case, was a portal to a new life.

Please know that I created the movie that is playing with photos and images to help you visualize while I am sharing my story.

Today, I will share who I am, where I came from and how my public education has impacted my life. I am not here to tell you how many gigabytes are in a laptop nor how fast I can download something directly from the Internet, I'll leave this to the professionals. I am only here to tell each of you that nothing is impossible; it is only a question of giving someone a chance or an opportunity.

Unfortunately, narcotics began to tear my family apart when I was 9 years old. Since then drugs have yet to cease in the deterioration of my family. By the time I was 10, my father had been imprisoned at least 3 times, fled from the law and I haven't heard from him since. My mother was left with 4 young kids to look after and with no education, she was forced to work in the fields from sunrise to sunset. Her farm-laboring job did not adequately provide for us and unfortunately, she eventually turned to drug trafficking to make ends meet. By the time I was 11, my two older brothers dropped out of high school. My brothers didn't believe a high school diploma was necessary to become successful. Although my mother heavily opposed their decisions, she did not know enough about the school system to motivate

them to continue their education. The only positive thing that came out of my brothers dropping out of school was that they began to help support the family and my mom could finally make the commitment to change and stopped dealing drugs.

A month after my thirteen birthday, in October of 2004, I received a blow that would change my life forever. My mother was incarcerated on charges of trafficking cocaine to an undercover narcotics officer. This was more than a year after the last time she ever had anything to do with drugs. Her past had finally caught up with her. My perfect life crumpled beneath my eyes from one day to the next.

The events to follow were as expected of a 13 year old who had no adult supervision to keep him from straying into wrongdoing. My brother, although 3 years older than me, was left to care for me and was, at the time, more immature than I was. By sophomore year in high school, I had 46 absences, rapidly dropping grades, no parents, a torn family, and plans to soon drop out of school. By the age of 16, I was bailing my brother out of a detention center for traffic violations.

During my junior year, I met my healthcare instructor and mentor that helped me change my ways. Mrs. Lisa Wilson inspired me and shared with me how the use of technology tools could open doors. Technology helped to spark an interest in school and provided many of the resources that I lacked at home.

At the time, I didn't really understand the school's new educational model, or the hundreds of hours of on going training that my teachers had participated in to systematically change our school. I only knew that I had a laptop and I used technology in every classroom and through technology I had access to my teachers and classmates 24 hours a day-7 days a week. Soon it didn't matter that my home life was a mess or that Greene County was so isolated, the integration of technology opened the world to me.

By my senior year I placed first in a regional Health Care Club speech competition and in the top ten in the state competition. I was also varsity soccer team captain, Homecoming King, president of various clubs on campus, and had perfect attendance. Plus, I worked 2 to 3 jobs throughout the school year. At home, there was no inspiration and I truly dreaded the bell at the end of the school day. At least I knew when I left campus; I would be able to instant message my teachers and classmates with questions and could collaborate on group projects via emails and IM.

Since Greene County schools provided change with the one to one program, school life is very different than the traditional high school my brothers dropped out of. Students work collaboratively in groups, they are challenged by projects and thoughtful questions and the best part is everyone participates and pays attention. In addition to the laptops, students use digital cameras, video cameras, and interactive white boards. Students are being prepared for college and 21st Century careers. For example, in my physical science class I demonstrated elevated distance by providing visual image slides for my classmates. In chemistry, I was able to manipulate elements from the periodic table on the interactive whiteboard to show compound structure. Other examples of technology use in Greene Central High School, include designing web pages, filming and editing movies and creating thinking maps to name a few. Our teachers work extensively with a technology facilitator and a literacy facilitator to collaborate with one another to help make all of this happen. You see technology is not a luxury in today's society; it is a necessity.

Most importantly, the student body is now at optimal performance and growth in learning. Now, more than ever kids are graduating and are running past the limits of the older generations like my brothers and sister. Today, we aim beyond a high school diploma and at a very minimum to a bachelor's degree. Many of us are setting our goals to obtain masters and even doctoral degrees. Our teachers in our rural home are preparing us through the use of technology to acquire skills that will not only give us a direction to head in but a jump start on our journey to successful careers.

Before technology entered our school system the average college going rate was 26%. By the time I graduated in 2008 our college going rate increased to 94%, our school record. This was a significant change of 68%. The average college going rate for our nation today is at about 60%. In the past, our rural county was far below average at a national level, now we are above average by 34%. Now, we are ahead of the game and our advancement is all thanks to the technology tools and great teachers who integrate the tools into their lessons. In addition to increased college going rates, I'm happy to share that this technology integration model has been instrumental in other changes within Greene Central High School:

- Increase availability for honors and AP classes through NC Virtual Public School. Including 5 Advanced Placement classes and 11 honors classes.
- Access to 5 college classes through University of North Carolina Greensboro iSchool.

- 100% of our teachers are Highly Qualified Teachers.
- 2005-06 and 2006-07 Greene Central met Adequate Yearly Progress
- Teen Pregnancy Rates has dropped from #2 in the state to #18
- Expected or High Growth on North Carolina Accountability System (NC ABC)

Testing each year

- Dropout Rate Decreases For example in 2007-08 there were 63 drop outs and to date in 2008-09 only 53.

Not only has our school changed. This initiative has brought great changes to our entire community including:

- Increase High Speed Internet Access from 15% to 92% throughout our county. The Greene County Board of Commissioners supported the school system's need for community Internet access.

- New Business
- New Industrial Park
- New Recreation Complex
- New Golf Resort Community

And most importantly, community PRIDE!

Thankfully, there are other students across the country and even in North Carolina that are also benefiting from having technology in their schools. Other schools in North Carolina have the IMPACT program that is another technology integration program with a focus on teachers, students and planning. The IMPACT program was recently included in a scientific evaluation study funded by the US Department of Education and showed a positive impact on student achievement. In math, the odds that IMPACT students would go from non-passing to passing status over the three years was 42% higher than that for comparison students. In reading, the odds of IMPACT students increasing achievement level from the second to the fourth years were 3 times that of comparison students. This study shows that students throughout North Carolina are having success because of their use of technology in their schools. The study also showed that teachers participating in the program were 65% more likely to be retained than teachers in comparison schools. I know at Greene Central our teachers were really dedicated to our program and having them stay at our school made a big difference. Below are additional statistics about the North Carolina IMPACT program.

- Math: When looking at pass/fail rates for the End of Grade (EOG) math tests, in the baseline year IMPACT students were significantly less likely to pass the math tests than comparison students. By the fourth year, IMPACT students were more likely to pass the test.

- Reading: When looking at change in passing status, the odds that IMPACT students would increase from failing to passing over the four years were 55% higher than the odds for comparison students. When looking at Year two to year four with the larger sample, the odds were 43% higher for IMPACT students.

- Teachers: IMPACT teachers consistently saw IT as more useful, and had more positive attitudes toward the usefulness of email, the World Wide Web, multimedia in the classroom, and instructional technology for teachers than the comparison teachers.<sup>1</sup>

I have just finished my freshman year at East Carolina University in Greenville, North Carolina with a major in pediatric nursing and I am the first person in my immediate family to attend a university. I received a national Nurse Scholars scholarship that entitles me to \$20,000 for my post secondary educational costs. I am currently employed in 2 upscale assisted living facilities as a Certified Nursing Assistant. I'm so thankful to have received my nurse's assistant credentials as part of my high school curriculum so that I can have these jobs today.

I am not here to tell you a fairy tale story of how I came from the bottom and now I am at the top. In fact, I am nowhere near the top. I am only climbing. I am climbing the same mountain almost every student in Greene County is climbing, the mountain of success. My story is a series of unfortunate events and my fairy tale is far from coming true. Although this may seem like a most ordinary story, something not so ordinary happened along the way that changed my life drastically to give me the chance to stand before you today-technology. Technology tools helped me to create, learn, explain, document, and analyze. My grades could not have been successful without the constant e-mails that kept me in contact with my teachers and peers. I could not have shined through without the use of power points and movies. My application to East Carolina University, SAT registration, and most recently my Nurse Scholars Program application were all completed online. Without technology there is no way I could be testifying today. Honestly, I would probably be just another dropout.

<sup>1</sup>North Carolina IMPACT Model <http://www.ncwiseowl.org/IMPACT/>

There are many students across the country just like me that only need a chance or an opportunity to change their future. Life is all about chances and opportunities and how you take advantage of them. Even diamonds have to be uncovered and discovered to show their brilliance and beauty. Young people across America are these diamonds. Technology is the perfect tool for these young diamonds to shine across our beautiful home we call America. It is our future for learning!

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Chairman MILLER. Thank you very much.  
Dr. Hartschuh?

**STATEMENT OF WAYNE HARTSCHUH, EXECUTIVE DIRECTOR,  
DELAWARE CENTER FOR EDUCATIONAL TECHNOLOGY**

Mr. HARTSCHUH. Good morning. Thank you, Chairman Miller, Representative McKeon, and the committee for inviting me to testify today.

I would like to especially thank Delaware Representative Castle for his longtime support of education and educational technology.

I am Wayne Hartschuh, executive director of the Delaware Center for Educational Technology, part of the Delaware Department of Education. When I consider how technology is transforming our public schools, I realize that in our digital world, no organization including education can achieve results without incorporating technology into its everyday practices.

To truly realize the effects that technology can have on education, we need to consider those everyday practices and determine how technology can support them. I will discuss three of those practices and how we are addressing technology implementation in Delaware.

The first and most important is curriculum and instruction through our eMINTS program. The second is professional development through eLearning Delaware. And the third is student assessment data through our development of the Delaware Comprehensive Assessment System.

The Maximizing the Impact report states, "It is time to focus on what students need to learn and on how to create a 21st century education system that delivers results."

Delaware has done a good job of the "what" by developing content standards and aligning curriculum to meet those standards. To address the "how," we have committed No Child Left Behind Title II, Part D E2T2 funds to the implementation of the eMINTS program based on the long-term results from Missouri and the replication from other states.

eMINTS provides a model that is innovative and provides exemplary approaches that combine instructional strategies, technology, and professional development.

With proven results of increase in student achievement, the model drives the transformation of the learning environment by providing a high-tech classroom that emphasizes inquiry based teaching, cooperative learning, and the development of higher-order thinking skills.

e-Learning Delaware is Delaware's implementation of the e-Learning for Educator's Initiative, a project funded through the federal Ready to Teach Grant and a collaboration between 10 state education agencies and associated public broadcast stations.

e-Learning Delaware uses a Web-based model to provide effective professional development opportunities that lead to gains in teachers' content knowledge, improvements in their teaching practices, and an increase in the achievement levels of their students.

Since the spring of 2006, we have built our statewide capacity to deliver online professional development by training online course facilitators and developers and implemented a course management system to deliver the courses.

We have delivered over 130 online courses to over 2,000 Delaware educators and developed online courses related to Delaware recommended curriculum and required science training such as an earth history course. The earth history professional development course has been a notable accomplishment.

WHYY, Delaware's PBS station affiliate, in collaboration with DOE Science personnel produce supplementary video segments that are an integral part of the online course content.

We are following this same model of producing and incorporating video segments into the Delaware watersheds course and the weather course that are currently under development.

We are extremely pleased that the federal grant has given us the opportunity to collaborate with our local PBS station in the development of high-quality video to support online professional development.

The state of Delaware is redesigning its student assessment program. The current Delaware student testing program in place since 1998 will be replaced by the Delaware Comprehensive Assessment System in the 2010/2011 school year.

Why am I talking about assessment when we are here to talk about how technology is transforming public schools? The Delaware Comprehensive Assessment System is an entirely online assessment.

Delaware is moving to an online assessment because we want to provide immediate results, provide diagnostic reports to teachers within 2 days, provide students with multiple opportunities to pass, and be able to assess student achievement from an entire school year. This can only be done with online assessment.

Another driving factor is the desire to increase student access to technology. With the implementation comes a 4-year replacement cycle for computers and the computers we use for instruction whenever testing is not being done.

Greater access to technology and integration into curriculum are critical if we are to prepare students for the workplace of tomorrow. The good news is that we have made positive strides forward in Delaware by using technology to transform our public schools.

This is seen at the curriculum and instruction level, the professional development level, and the statewide assessment level. eMINTS and e-Learning Delaware are just two of many examples of how technology is transforming education in Delaware public schools.

Unfortunately, is the case in most states, we still have pockets of excellence rather than systemic transformation. With our transition to the Delaware comprehensive assessment system, we are moving towards systemic transformation.

The bold move of taking all statewide assessment online will also drive an increased use of technology and curriculum instruction as well as professional development. In conclusion, we hope these efforts to use technology to transform our public schools will be seen as a catalyst of change, even an accelerator of change.

Thank you for your time and your support of technology and education for our nation's children.

[The statement of Mr. Hartschuh follows:]

**Prepared Statement of Wayne Hartschuh, Ph.D., Executive Director, Delaware Center for Educational Technology, Delaware Department of Education**

Good Morning. Thank you to Chairman Miller, Representative McKeon, and the Committee for inviting me to testify today. I would like to especially thank Delaware Representative Castle for his longtime support of education and educational technology. I am Wayne Hartschuh, Executive Director of the Delaware Center for Educational Technology, Delaware Department of Education.

When I consider how technology is transforming our public schools, I realize that in our digital world, no company or organization, including education, can achieve results without incorporating technology into its everyday practices. To truly realize the effects that technology can have on education, we need to consider those “everyday practices” and determine how technology can support every aspect of those practices. I will emphasize three of the “everyday practices” and how we are addressing the technology issue in Delaware during my short time with you this morning: the first and most important is curriculum and instruction through our eMINTS program; the second is professional development through our eLearning Delaware program; and the third is student assessment data through our development of the Delaware Comprehensive Assessment System.

*Curriculum and Instruction: eMINTS*

The 2007 report, *Maximizing the Impact: the Pivotal Role of Technology in a 21st Century Education System* states, “It’s time to focus on what students need to learn—and on how to create a 21st century education system that delivers results.” Delaware has done a good job of the ‘what’ by developing content standards and aligning curriculum to meet those standards. To address the ‘how,’ we have committed NCLB Title II, Part D funds to the implementation of the eMINTS program based on the long-term results from Missouri and the replication results from other states including Utah and Maine. The 2007 Council of Chief State School Officers (CCSSO) report, *Successful Practices Series: Report 2: Changing the Face of Education: Missouri Leads the Way* was a major selling point.

eMINTS (enhancing Missouri’s Instructional Networked Teaching Strategies) provides a model that is innovative and provides exemplary approaches that combine instructional strategies, technology, and professional development. With proven results of increasing student achievement, the model drives a transformation of the learning environment by providing a high-tech classroom that emphasizes inquiry-based teaching, cooperative learning, and the development of higher-order thinking skills. The keys to success in our eMINTS classrooms have been increased student engagement, improved interactivity, and high-quality professional development. In other words, the technology in the high-tech classroom has driven a positive change in how teachers teach and how students learn.

eMINTS has provided a refreshing approach to teaching and learning in Delaware with high-quality professional development and high-tech classrooms. The eMINTS instructional model provides a research-based approach to organizing instruction and can be implemented in any subject area at any level. The eMINTS instructional model enables educators to:

- create classrooms where all students are motivated to succeed socially and academically,
- fully incorporate technology investments into teaching and learning,
- complement existing preK-16 curriculum with critical-thinking requirements found in national, state and local curriculum standards, and
- build enthusiasm and creativity into daily teaching.

Although we are too early in the process to have Delaware data, the data from implementations in other states is impressive. In Utah, Missouri, and Maine, the eMINTS program provides schools and teachers with educational technology tools, curriculum, and over 200 hours of professional development to change how teachers

teach and students learn. Utilizing 21st Century skills, relevant content, and collaboration are all key to the instructional strategies used in eMINTS classrooms. eMINTS changes how teachers teach and how students learn. Students in eMINTS classrooms no longer have to “power down,” disconnect or disengage from the excitement and motivation the technology brings to their world.

Teachers in eMINTS classrooms at all grade levels (3-12) report significant increases in student attendance and significant decreases in student behavior disruptions. Students in eMINTS classrooms are fully engaged in authentic projects that utilize technology and provide opportunities for students to hone the skills they will need to compete in the 21st Century, Missouri has evaluated this program for 8 years, and other states are conducting evaluations, as well. The following link provides a strong overview of the program: <http://www.emints.org/> and findings are found at <http://www.emints.org/evaluation/reports/>. Findings include:

- In Utah, classrooms in the same school (one with eMINTS and one without), the student achievement of students in the eMINTS classroom was repeatedly over 10% higher than the control classroom. In Title I buildings participating in the eMINTS-4-Utah initiative, a greater percentage of 4th–6th grade students enrolled in eMINTS classrooms scored at proficient levels on the UPASS CRT tests for language arts, mathematics, and science than did 4th-6th grade students in non-eMINTS classrooms.

- After 6 years of data in Grade 4 Mathematics, eMINTS students in subgroups (special education, low income, and Title I) have reduced the gap in test scores between their performance and their peers by up to ½ of the difference attributable to subgroup classification.

- In another district that had not met AYP goals, teachers began implementing the eMINTS program. After using the eMINTS approach with extensive professional development, the 3rd grade math scores increased by more than the 15% goal and made AYP in every subgroup.

Analysis of Missouri Assessment Program (MAP) scores reported by outside program evaluators from 2001–2006 showed consistently positive results for students in eMINTS classrooms when compared to their peers not enrolled in eMINTS classrooms. The analyses reported “statistical significance” for various findings. Statistical significance refers to findings that cannot be easily explained as being caused by variables other than the program or intervention (in this case, eMINTS) being studied.

In analyses of the differences between the performance of eMINTS students compared to non-eMINTS students, the statistical significance varied by year. However, the overall trends established higher achievement on the MAP tests for eMINTS students in all subject areas (communication arts, mathematics, science and social studies) when compared to non-eMINTS students. Please note: each year represented a different group of students in different schools with different teachers.

Over the course of the analyses there have been a number of programmatic changes to eMINTS and how districts were selected to participate in eMINTS. Over the past six years, eMINTS grant funds have changed from being available to any interested district in Missouri to being available only to districts meeting federal poverty eligibility guidelines. The MAP has also undergone changes in scoring procedures and how student scores are reported. Comparisons continue to demonstrate eMINTS students consistently achieved higher MAP scores than their non-eMINTS peers.

Statistically significant differences (eMINTS students achieving higher scores than their non-eMINTS peers) occurred in:

- 3rd Grade Communication Arts (2001, 2003, 2004, 2005)
- 3rd Grade Science (2001, 2003)\*
- 4th Grade Mathematics (2001, 2002, 2003, 2005, 2006)
- 4th Grade Social Studies (2001, 2002, 2003)\*

Beginning in 2003, examination of eMINTS v non-eMINTS student MAP scores included analysis of difference for students in particular sub-groups such as students in special education, students receiving Free and Reduced Lunch, and students in ethnic groups that have historically experienced gaps in achievement when compared with other students. Statistically significant differences in MAP scores for eMINTS students when compared to their non-eMINTS peers in the following sub-groups were noted:

- Title I students on 4th Grade Mathematics (2001, 2002)
- Special education students on 4th Grade Mathematics (2002, 2003)

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\*Science and Social Studies not analyzed after 2003 when many districts no longer participated in MAP tests in those subjects.

- Students receiving Free and Reduced Lunch on 3rd Grade Communication Arts (2003, 2005)
- Students receiving Free and Reduced Lunch on 4th Grade Mathematics (2003, 2005)
- African America students on 4th Grade Mathematics (2004)

We are extremely pleased with our eMINTS implementations so far and as we enter our second year, we look forward to expanding the program and seeing similar results showing improved student achievement and success for our Delaware students.

One of the key ingredients to success in the eMINTS project is professional development. Professional development, especially with regard to technology, is key in most all curriculum and instruction programs. Delaware has been delivering online professional development for subject-matter content, as well as technology integration for over five years.

#### *Professional Development: eLearning Delaware*

eLearning Delaware is Delaware's implementation of the e-Learning for Educators Initiative, a project funded through a federal Ready to Teach grant and a multi-state collaboration between ten state education agencies and associated public broadcast stations. eLearning Delaware partners are the Delaware Center for Educational Technology, the Delaware Department of Education, and WHYY. The Ready to Teach grant is administered through Alabama Public Television and the national partners include the Education Development Center (EDC) and Boston College.

eLearning Delaware uses a Web-based model to provide effective professional development opportunities that lead to gains in teachers' content knowledge, improvements in their teaching practices, and an increase in the achievement levels of their students.

Since the spring of 2006, we have built our statewide capacity to deliver online professional development and technical assistance to our districts and schools. eLearning Delaware has trained over 50 online course facilitators, trained over 35 online course developers, and implemented a course management system, Blackboard, to deliver the online courses. In turn, we have delivered over 130 online professional development courses to over 2,000 Delaware educators, and developed 10 online courses, most notably the six courses related to the Delaware Recommended Curriculum and the Earth History course that is part of the required training for sixth grade science teachers. We currently have 12 more courses in development with two being science courses: Delaware Watersheds and Weather.

The Earth History professional development course has been a notable accomplishment and the Delaware Watersheds and Weather course will follow the same model. WHYY, Delaware's PBS station affiliate, in collaboration with Delaware Department of Education science personnel, produced supplementary video segments for the Earth History course. An eLearning Delaware course developer worked with the DOE Science personnel to integrate this high-quality, professionally produced video into the course content and develop the online course. The video produced by WHYY is an integral part of the course. The professional development course for the teacher is designed to run concurrently with the delivery of the Earth History unit. The pilot run of the course began at the end of March to coincide with the last marking period of the school year. The course ran for nine weeks and concluded at the end of the school year.

WHYY and the Delaware DOE Science personnel will be filming the material for the Delaware Watersheds course and the Weather course this summer with the courses scheduled for completion in time to deliver in the second semester of next school year. We are extremely pleased that the Federal grant has given us the opportunity to collaborate with our local PBS station in the development of high-quality video to support online professional development.

Returning to the item mentioned previously about delivering over 130 online courses. More specifically, we have delivered over 130 sections of online courses. The courses that have been delivered are listed below. Most courses were developed by Education Development Center and those marked with an \* were developed by Delaware educators.

- Aligning Curriculum to ELA Standards\*
- Aligning Curriculum to Math Standards\*
- Aligning Curriculum to Science Standards\*
- Aligning Curriculum to Social Studies Standards\*
- Approaches and Tools for Developing Web-Enhanced Lessons
- Designing a Virtual Field Trip
- Differentiating Instruction to Accommodate Learning Styles

- Digital Storytelling in the Classroom\*
- Earth History\*
- Enhancing an Aligned Unit\*
- Finding the Best Educational Resources on the Web
- Getting Ready for Algebra by Using Virtual Manipulatives
- Helping Struggling Readers Improve Comprehension
- Improving Reading and Writing in the Content Areas
- Incorporating Primary Resources into the Social Studies Classroom
- Making the Most of Adolescent Literature
- Special Students in Regular Classrooms: Technology, Teaching, and Universal

#### Design

- Strategies and Tools for Teaching the Writing Process
- Transforming the Classroom with Project-Based Learning
- Unpacking the Delaware Recommended Curriculum
- Using Patterns to Develop Algebraic Thinking
- Using Real Data in the Math Classroom
- Using Technology to Support Research and Presentation
- Visual Literacy Strategies for the Classroom\*

The e-Learning for Educators project initially included eight states: Alabama, Delaware, Kentucky, Missouri, Mississippi, New Hampshire, Pennsylvania, and West Virginia. In October 2009, the project expanded to include Maryland and North Carolina.

Significant Accomplishments across the project (from the Boston College (2009): Alabama Public Television e-Learning for Educators Annual Comprehensive Evaluation of the e-Learning for Educators Project):

- The partner states trained 352 facilitators (online instructors) who have delivered more than 1,201 online professional development courses—far more than the target goal.
- 225 teachers have been trained to design online courses; these educators have created more than 80 new courses that are aligned with state/local-identified instructional needs
- Almost 22,000 teachers have enrolled in courses and 16,627 completed courses for free or at a very low cost. Evaluation data were collected from 10,291 teachers.
- On average, 32% of teachers in the online courses are from schools eligible to receive Title I School-wide funds but percentages vary by state from 60% to 7%.
- Based on the most conservative teacher-student data gathered by the project, it is estimated that at least 700,000 students have been affected by eLE training. If more liberal data are used to calculate student impact, 1,000,000+ students may have been impacted.
- 90% of teachers completing e-Learning courses felt the quality of the courses were excellent (56%) or very good (35%).
- 89% of participants feel they gained insight into new or different approaches to teaching from the e-Learning workshop.
- 82% of participants report they are very likely to take another e-Learning workshop.
- 56% became more skilled in using technology for instruction
- 42% learned new subject-area content
- Of teachers who have taken e-Learning for Educators (eLE) courses and completed a 6 month follow up survey, 66% indicated that they had already used the material learned from the online course with their students. Of those who are already using the material:
  - 90% agree that when they used eLE content in class, students appeared more interested
  - 89% agree that when they used eLE content in class, students had their diverse learning needs met
  - 77% agree that students performed more difficult work
  - 80% say that student work is of a higher quality

A follow-up survey administered six-months after course completion allowed teachers to detail lasting impacts of the e-Learning workshop on their teaching practice and classroom instruction. Here are comments from two teacher respondents:

“I have been able to address individual needs for each student using the material and resources from this workshop. I have also been able to more accurately assess individual student progress, rather than whole group progress, and plan accordingly.”

“Using what I learned in the workshop and including new technology, I was able to involve every student in classroom activities.”

The eLearning Delaware project has been a tremendous success in the State of Delaware and has been well worth the time and effort to bring the project from concept to fruition.

*Student Assessment Data: Delaware Comprehensive Assessment System*

The State of Delaware is redesigning its student assessment program. The current Delaware Student Testing Program (DSTP), in place since 1998, will be replaced by the Delaware Comprehensive Assessment System (DCAS) in the 2010-2011 school year. The DCAS will enhance and strengthen the DSTP by providing a more accurate measure of student growth and more timely and detailed information to educators for planning and improving educational programs at the school, district and state levels. In addition, the DCAS will provide multiple opportunities for students to demonstrate proficiency and will provide increased information to students and parents, including a measure of fall-to-spring and year-to-year individual student growth.

Why am I talking about assessment when we are here to talk about how technology is transforming public schools? The Delaware Comprehensive Assessment System is an entirely online assessment. Delaware is moving to an online assessment because we want to provide immediate results; provide diagnostic reports to teachers within two days; provide students with multiple opportunities to pass; and be able to assess student achievement from an entire school year. This can only be done with online assessment.

The purposes of the Delaware Comprehensive Assessment System are fourfold:

- To measure student achievement of state academic standards;
- To measure each student's growth over time along the assessment scale;
- To provide the primary basis for student, school and school district accountability, pursuant to Delaware law and the No Child Left Behind Act; and
- To provide schools and school districts with timely information useful for instructional program improvement.

The DCAS is being developed to consist of the following five components:

1. Online, Web-based summative assessments: a) for grades three through eight in reading and mathematics which are adaptive, and b) for one elementary grade and one middle school grade in science and social studies which are fixed form with the option for future transition to adaptive tests;
2. Online summative End-of-Course Assessments for high school students in specific courses, to be determined, in mathematics, English, science and social studies;
3. Online summative writing assessments to be given at grades five and eight and in high school, and online formative writing assessments in grades three through eleven;
4. A Benchmark Growth Assessment for grades two through ten which is computer-adaptive across grade levels and given at least three times each school year; and
5. An online Classroom Assessment Item Bank that provides teachers with high-quality formative assessment items and tools for the creation of tests aligned to specific Delaware Grade Level Expectations.

Another driving factor is the desire to increase student access to technology. With the implementation comes a four-year replacement cycle for computers and the computers will be used for instruction whenever testing is not being done. Greater access to technology and integration into the curriculum are critical if we are to prepare students for the workplace of tomorrow.

We are currently in the process of evaluating and recommending the winner(s) of the Delaware Comprehensive Assessment System (DCAS)—Request for Proposals. The proposals have been evaluated and the DOE anticipates that contract(s) with the winning vendor(s) will be finalized no later than the end of July 2009. With the finalization of the awards, there will be preparation and pilots conducted during the 2009-10 school year with the DCAS fully operational for the 2010-11 school year.

*Conclusion*

The good news is that we have made positive strides forward in Delaware with using technology to transform our public schools. This is seen at the curriculum and instruction level, the professional development level, and the statewide assessment level. eMINTS and eLearning Delaware are just two of many examples of how technology is transforming education in Delaware public schools.

Unfortunately, as is the case in most states, we still have pockets of transformation rather than statewide, systemic transformation. With our transition to the Delaware Comprehensive Assessment System, we are moving toward systemic transformation. The bold move of taking all statewide assessment online will also

drive an increased use of technology in curriculum and instruction, as well as, professional development.

In conclusion, we hope these efforts to use technology to transform our public schools will be seen as a catalyst of change, even an accelerator of change.

Thank you for your time and your support of education for our nation's children.

#### REFERENCES

- Maximizing the Impact: the Pivotal Role of Technology in a 21st Century Education System <http://www.setda.org/web/guest/maximizingimpactreport>  
 Successful Practices Series: Report 2: Changing the Face of Education: Missouri Leads the Way <http://www.ccsso.org/publications/details.cfm?PublicationID=356>  
 Source of statistics is eMINTS Evaluation Reports (2003-2006) at: <http://www.emints.org/evaluation/reports/>

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Chairman MILLER. Thank you.  
 Mr. McAuliffe?

#### **STATEMENT OF JOHN MC AULIFFE, GENERAL MANAGER, EDUCATE ONLINE LEARNING, LLC**

Mr. MCAULIFFE. I would like to thank Chairman Miller and the rest of the committee for allowing me the opportunity to present here today. Hearing and seeing these other technologies and stories are truly inspiring to us at Educate Online.

Educate Online is America's leading provider of live, personalized online tutoring services. We have successfully served more than 50,000 students since 2002 and currently serving students in almost 200 school districts across the country.

All of our tutoring is done by certified teachers and delivered online to students in their home. Students are able to access this tutoring through a computer and Internet access provided free by Educate Online.

Before I get into a little bit more detail on our technology, I wanted to make a couple of points. Number one, as you have seen here today, technology is truly transforming the way education is provided throughout our country. It is expanding the learning day, the week, and the year.

It is redesigning the traditional classroom, and is vastly increasing student achievement. How do we know this? Because our program has been independently tested and shown that a typical Title I student who starts our program one grade level below can catch up to their peers after just 24 1-hour sessions of our tutoring.

In the case of English language learners and other at-risk students, gains are even greater. This is also, in our opinion, just the first step in how this technology can be used.

Second, because of the good work of the members of this committee and others in Congress, we can supply these tutoring services free of charge for Title I students through the supplemental education services program that you created.

These students are the ones most in need, and the story you just heard gives you an example of what can happen when the use of technology can help drive student achievement. We would like to thank you for that opportunity to service these students.

Now for a few facts about our program: We use U.S.-based certified teachers with bachelor's degrees and at least 2 years of teaching experience. More than one-third of teachers have master's de-

grees and 5 percent have Ph.D.s. Approximately 9 percent are certified to work with ELL students, and 14 percent are certified to work with students with disabilities.

All of our instructors also go through 8 hours of instruction related to our curriculum, our technology, our proprietary methods, and how to maximize student motivation and participation.

Our curriculum is research-based and nationally recognized. We have more than 12,500 digital lessons created by third party educational publishing companies and an internal content development team.

Our goal is to raise student achievement to meet state standards. We optimize our instructional time through an initial diagnostic assessment, which then derives a prescriptive, personalized learning plan.

We also recognize the key role the parents, teachers, and principals play in educating these students. As a result, we provide both a parent and principal portal. These portals are updated for each student after each lesson to ensure data is completely current.

The portal is secure and available 24/7. Parents can view portals through the computer provided by Educate Online if they do not have access to another computer. In addition, we send monthly progress reports to schools and districts, and we have a bilingual call center staff to address questions and concerns.

As I stated previously, our program has been independently evaluated and measured demonstrating significant academic gains. We have also demonstrated evidence of increased performance on state assessments.

In the 2007/2008 school year, 250 South Dakota middle students, predominantly native Americans, received tutoring from Educate Online. Ninety-one percent of these students saw gains on the South Dakota state assessment with an average gain of 18 points.

I would like to now show you a demo of our technology at work. It is this technology that drives our success. We also believe, as I stated before, this technology has many more applications, a few of which I will talk about at the conclusion of the demo.

[Play video clip.]

Mr. MCAULIFFE. As you can see, the technology is at the heart of what we do, but it also has far-reaching applications. This platform should allow us to address many needs, in particular, where specialty labor shortages are depriving students in need.

Several examples of this are speech therapists, reading specialists, and guidance counselors. In fact, we are running a pilot this fall in Pennsylvania where we are matching students with speech therapists online.

We are also investigating how we can partner with community colleges that target recent high school graduates that may need remedial classes to be successful in college. Our plan would be to provide tutoring during the summer prior to them entering college, making sure they are ready for college-level work.

In conclusion, I would like to, again, thank the chairman and members of the committee for inviting me to be here today.

[The statement of Mr. McAuliffe follows:]

**Prepared Statement of John McAuliffe, General Manager, Educate Online Learning, LLC**

Good morning, I would like to thank Chairman Miller and the rest of the Committee for inviting me here today to participate on this distinguished panel to discuss technology in our schools. I am here representing Educate Online, America's leading provider of live, personalized, online tutoring services. Educate Online has successfully served more than 50,000 students since 2002 in our math and reading programs and currently serves students in almost 200 school districts across the country. All tutoring is done by certified teachers and takes place online at the student's home or at school. Students access the tutoring through a computer and internet connectivity provided by Educate Online, both of which are provided at no charge to the student.

My message today is this: technology is transforming the way education is provided throughout our country. Technology can expand the learning day, week, and year for students and it can help us redesign the traditional classroom and school building if used correctly, education technology can vastly increase student achievement. We know this firsthand, as research on our program has proven that a typical Title I student who starts school a full year behind in reading, can catch up to his or her peers with just 24 one-hour sessions of tutoring—typically spread over about two months in time. In some instances, we have shown even greater results with English Language Learners and other at-risk groups of students.

On average, SES students show grade equivalency gains of 0.74, or seven months grade equivalency increase, on norm-referenced assessment after 24 sessions. So a third grader who scores as a beginning second grader could be reading at or close to grade level after 24 hours of instruction.

Our program is generally 24 sessions and students typically take two to four 60-minute sessions per week. Sessions are offered seven days a week, generally after school and on weekends, offering tremendous flexibility to our students. Using the headset and computer provided by Educate Online, students log on to a virtual classroom and are matched with an instructor who is usually logged on from his/her home. Students and teachers are able to view the same learning environment, so they can work together effectively. Our educational programs in math and reading utilize individualized, direct instruction and mastery learning techniques to address each student's specific skill gaps. Teachers teach, and reteach as necessary, until the student truly masters the goals on his/her individual learning plan before moving on to the next lesson.

All instructors are U.S.-based, certified teachers, have a bachelor's degree and a minimum of two years of successful teaching experience. More than a third of our teachers have master's degrees, and about 5% have doctorates. Approximately 9% are certified to work with ELL students, and approximately 14% are certified to work with students with disabilities. All instructors undergo eight hours of synchronous training which includes a comprehensive review of course curriculum, proprietary methods, online technology, and methods for maximizing student motivation/participation.

At the end of the training, the instructor must pass an assessment that evaluates knowledge of our curriculum, assessments, and logistical processes. After training, new teachers practice delivering sessions and shadow other teachers before they are allowed to tutor on their own. New instructors work with one student at a time, working up to tutoring three students at a time, over a period of weeks. Team leads work with the Educational Services director to mentor teachers by sharing teaching tips and valuable information about new research or teaching strategies. Educate Online has a dedicated team of monitors who score teachers periodically and use this as the basis for additional coaching, mentoring, and professional development. This ensures the highest quality of teaching for our students. Student-to-teacher ratios never exceed 3:1.

*Educate Online's program has been independently evaluated*

In a 2006 independent analysis, funded by the United States Department of Education, the effectiveness of the Educate Online program was evaluated by measuring pre- and post-assessment test scores. The analysis, conducted by Rockman Et Al, demonstrated that students in the Educate Online program performing below grade level, demonstrated scale score point gains on the California Achievement Test (CAT). Researchers examined data from more than 6,000 elementary, middle, and high school students, and analyzed the increase between the CAT pre-test and CAT post-test to determine academic progress. Data was examined from students across the country.

The study found that after completing the Educate Online's math program, students demonstrated grade-level gains in math of 0.2 to 2.2 over a control group and what was most impressive was that the lowest performing students demonstrated the greatest achievement scores.

Researchers again compared academic results from students in the Educate Online program with a control group of students during the 2007-2008 school year and findings indicate that students who completed the reading program in the fall of 2007 demonstrated an average grade-level gain of 1.65. What is exceptional is that students classified as English Language Learners in the fall 2007 program demonstrated average grade level gains of 1.3.

Educate Online also contacted classroom teachers to further gauge our impact on students. In 2006, with permission of the San Diego Unified School District, Educate Online surveyed teachers of students who completed our program. 79% of teachers responded that there was a noticeable change in student performance due to the Educate Online program. 83% of English Language Arts classroom teachers indicated that they had seen a noticeable change in their student's ability to read. 83% of math teachers indicated that their student demonstrated growth or a noticeable improvement in their ability to solve math problems.

Our program has also resulted in students increased performance on their state assessments. In the 2007-2008 school year, 250 middle school students, mostly Native American students, in South Dakota received tutoring after-school and during the regular school day from Educate Online. 91% of participating students saw gains in reading on the South Dakota State Test of Educational Progress (STEP). On average, students who received tutoring from Educate Online experienced gains of 18 points on the STEP.

#### *Ensuring Student Safety*

To ensure student safety, the computers are loaded with security software embedded in the operating system, only allowing students to access the Educate Online program until they complete their tutoring. While in our program students and parents can only access the Educate Online site. We secure our computers to ensure students do not have access to any inappropriate content and also for performance reasons: First, we want students to use the computers for tutoring while in the program; second, we do not want students or our teachers to accidentally download a virus that would interfere with the performance of the computer; and third, we want to protect our students from receiving emails from unknown persons. Students who successfully complete the program earn the right to keep the computer. We then send them a code to "unlock" the computer and it is theirs to keep and use accordingly. Families incur zero costs with the Educate Online program.

#### *Educate Online's Educational Program*

The Educate Online curriculum contains more than 12,500 digital lessons created by third party educational publishing companies, such as Monotype and Words and Numbers, as well as an internal content writing team. All course content was custom created to directly support a predefined curriculum derived from National Reading Panel (NRP) and National Council of Teachers of Mathematics (NCTM) standards. Each lesson is a designated "type" that supports a specific phase of the "teaching cycle" that facilitates the mastery learning and scaffolding methodology—pre-test, guided practice, independent practice, problem solving/applied practice, and mastery test.

In addition to adhering to NRP and NCTM standards, Educate Online has directly mapped our curriculum to state standards, and can provide detailed alignments.

Educate Online's Academic Reading program is a comprehensive, systematic approach to developing reading skills. Direct instruction is the key component in each of its five major strands: phonemic awareness, phonics, fluency, vocabulary and comprehension. Using guided practices in phonics, vocabulary, and comprehension, the instructor models and reinforces skills while gradually transferring the responsibility of monitoring to the student.

The Math Essentials program focuses on problem solving and the application of mathematics to real-life scenarios. The objective of our math program is to prepare students to excel in mathematics by mastering each level before moving on to the next. Our math program helps to fill the gaps and build solid mathematical foundations. These foundational concepts are then used to build on more complex operations and concepts such as fractions, algebraic reasoning and more.

Both programs optimize instructional time through use of diagnostic assessment and prescriptive, personalized learning plans.

Educate Online is accredited by CITA, the Commission on International and Trans-Regional Accreditation.

*Communicating with Parents*

We update the Educate Online parent website after every session, so that using the computer provided by Educate Online, parents can see absolutely up-to-date progress reports for their child. They can also view the lesson content to help reinforce the child's learning. The progress reports illustrate the skills each student has mastered and outline the upcoming lessons that the student will be completing. The parent website is also where parents may schedule tutoring sessions for their children at their own convenience, 24 hours a day, seven days a week.

We make every effort to make it easy for parents to contact us. Educate Online has a trained bilingual (English and Spanish) call-center staff to handle technical problems, parent questions, and any other issues that may come up during the program. Our help line is open during business hours and any time tutoring sessions are offered.

At the end of the program, parents receive a final report on their child's progress.

*Communicating with Schools and Districts*

Educate Online has been working to find new ways to communicate with districts and schools consistently and effectively. A new communication tool for the 2009-2010 school year is the Principal's Support Package. Principals will be able to log onto a secure website and see student progress, at their convenience. The website will be updated after every tutoring session delivered, ensuring up to date information and the ability to share that information with classroom teachers. Educate Online also sends monthly written progress reports to the district, and will also send progress reports to district schools. If the district provides contact information for classroom teachers, Educate-Online will provide student's regular classroom teachers with monthly progress reports for each student, so that the teacher can see the skills their students are mastering in tutoring.

*Educate Online Our Future Programs*

Educate Online is in the process of piloting the use of our technology to develop a speech and language program. Through this model we will connect students via the internet with speech pathologists. We think this technology will be particularly useful in communities where they are experiencing a shortage of speech and language pathologists.

Additionally we are partnering with community colleges to target students that just graduated from high school but need to take some remedial classes before entering college. This program will provide tutoring to these students the summer between high school and college and target student's individual skills gaps so that by the fall the student is prepared for college.

*Conclusion*

Again, I would like to thank to the Chairman and Ranking Member for inviting me to be here today so that I can share the success our technology program is having for students and schools.

I am happy to answer any questions from the Committee.

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Chairman MILLER. Thank you very much. Thank you to all of you for your testimony, your demonstrations and your expertise.

Ms. Short and Ms. Bergland? I might ask you—if you could both address part of this question, and that is you both alluded to the impact of this on professional development and also the ability to provide differentiated instruction to students who learn either in different ways or learning at different rates.

The assumption is that that this is very hard to do for a teacher that doesn't really have a mastery of the subject matter content. But I just wondered how this plays out. I assume the better educated the teacher in math or science or whatever the subject matter is would also lend to the leverage provided by the technology.

But I just wondered if you might address that and how the professional development plays into the usage of technology with the

students and given the differentiations that we see in those students in almost every classroom that we have?

Don't be shy.

Ms. BERGLAND. I will go ahead and attempt to answer that. First of all, the professional development is probably the most important thing that you need to do if you want to really see the power of technology to be used.

I think what you are getting at is maybe how can we help teachers learn their content better, particularly if they have a generalist certification, and they may not have all the specific skills.

And there is a new way where it is called "personal learning networks" where teachers can connect with other professionals across the country now, and they can do that using the Web 2.0 tools.

And so there is lots of different ways that teachers can learn their subject matter a little bit better so they can do that differentiation. But one of the things that is the power of the technology is a lot of times these programs naturally do that.

We use a product called TeamBiz where it is a reading program, and every day, the kids read current events, but the teacher has already preloaded and determined the reading level of each of the kids.

And so they are all reading the same subject matter, but it is at different reading levels. And so it is naturally being differentiated for them, and no one needs to know that they are not all at the same level.

That is just one example.

Chairman MILLER. Ms. Short?

Ms. SHORT. Are you asking about professional development in order to incorporate the technology or for your content?

Chairman MILLER. Well, really both, because the question is also whether or not we need to provide additional development and competency with the subject matter of the class and then also the use of the technology.

And does one make up for the other, or I would assume that they would be somewhat complimentary if they both took place.

Ms. SHORT. I think it would be very difficult to use the technology if your subject matter wasn't there. As teachers, in order to maintain our teaching certificates, we are required to take professional development courses throughout the course of a few years.

Also, our county offers professional development courses in technology in your content area in order to be able to use the technology to meet the different learning styles.

Obviously, if you don't know your curriculum very well, you are not going to be able to describe it in multiple ways in order to reach different students.

Chairman MILLER. Mr. Kinney, do you have the ability to fill in subject matter content for teachers that are presenting the material that you are presenting to the classroom?

Mr. KINNEY. Yes. I think one of the abilities of digital content and technology to provide within the context of a classroom is the packaging of materials to make it—I don't want to say "easier", but to make those materials more accessible to students in different ways and to make that tool easier to use for educators across the country.

So for example, if you think back to the example I used of the food chain, where you can now take a term, and instead of displaying that just as a text resource, you can display it in multiple formats. You can use animation and video and audio.

And so, the teacher doesn't have to have a deeper knowledge of a specific content area, it is just they do have to have the knowledge of utilizing that resource in a way that best meets those children's instructional needs.

So I think there is a great deal of professional development around, not just the resources themselves, but also how do these resources affectively reach each child and their instructional needs within the classroom.

Chairman MILLER. Thank you.

Mr. Chopra? How do we minimize schools getting locked into proprietary systems over a long period of time that may not work out? Or as you suggested both in Virginia and, I think, the governor's call in California is really talking about an open sourced textbook there that people would be able to change and adapt and move around.

I don't know how you quite control that content, but how do we make sure that we get the benefits. Members of Congress like to often say they went into a classroom and there was a textbook that said, when man lands on the, when man goes to the moon or something like that—and that it is outdated. That is interesting. Today, you don't have to suffer that.

But how do you maintain the integrity of these systems in a Wikipedia world if you are going to make an open-sourced text or curricula available to schools?

Mr. CHOPRA. Mr. Chairman, that is a terrific question, and I think the key to the question is: How do we govern content that is not traditionally seen as a single textbook.

One of the benefits of our move towards a data-driven environment in education is the ability now—or as we make these investments—to focus on what content works in the classroom by the various experiences.

So Ms. Short might have a compilation of lesson plans and perhaps a chapter of some book that she is used to convey the value of a particular plan. Hopefully, we will be able to understand the fact that the content itself was useful in presenting that concept.

As long as there is a thoughtful way at the state level to govern the quality of that content, that was at the heart of the pilot we had seen in Virginia. So a rigorous quality review on content organized in new ways—when we think about the old compact disc, we would buy a disk, and it would have lots of content on it.

Today, we buy songs, and they have discrete individual components. I think in the same way, educational content is now being in a similar fashion chunked up by these compilations of video clips and chapters of learning.

So the core question of yours about proprietary versus open is so long as the content can be evaluated, I believe the marketplace can decide what is the most effective means to deliver that content.

It might be on a, you know, a proprietary hardware platform like an eBook reader that might take this content and make it avail-

able. We would envision a wide range of innovations in the devices and the method by which that is dispensed.

So long as we have thoughtful understanding of which content works, and that, I think, is the key to the success of these initiatives.

Chairman MILLER. Thank you.

Mr. Castle?

Mr. CASTLE. Thank you, Mr. Chairman.

Mr. Chopra, are we at the federal level—the congressional and executive branch—delivering in the most organized and best way we can, in your mind—you can play God here, and tell us whatever you want—the whole improvement and technology driven education, or should we be doing this differently or funding it differently, or do you have any thoughts about that?

Mr. CHOPRA. Thank you.

Mr. CASTLE. Not details, but just a broad stroke.

Mr. CHOPRA. No, at the highest level, I think what you have is a policy priority of the president that you saw in real life witnessed today on these phenomenal panelists—I am sort of humbled to be aside them—and I do believe we need to dialogue in ways to best leverage the capacity of technology but focusing on its use in the classroom.

So I think to the extent that we engage in some concepts around how we can better evaluate this success in sort of a thoughtful research-based way on the use of the technology, we might be in a better position to ensure a societal return on investment.

I intend to work very closely with my colleagues across the administration, obviously Secretary Duncan and Jim Shelton, in particular, to bring some rigor to the thought process and to be supportive in, what I hope will be, a dialogue over the coming weeks and months and making this even more effective.

Mr. CASTLE. Thank you.

Perhaps, Ms. Short and Mr. Real are the ones who provoked this question, but others may want to answer it, and that is the question of how much are we really improving as far as the use of technology is concerned?

Ms. Short, you cited one student who improved a great deal, and Mr. Real, you obviously cited your own example of that.

But my concern is just on the measuring, is there some methodology by which we can determine they are truly doing better?

I mean, I can tell you that the teachers I disliked going to classes the most, are the ones who probably were the best. There were two women who were teachers of mine who were just mean and hard and tough, and I look upon them now as having actually taught me something.

I never told them that, unfortunately, they have passed on. And I just worry that, you know, this all may seem to be working because it is engaging students. But is it truly working in terms of improvement levels, and can we document that in some way or another?

And do you have any responses about that? Virtually all of you testified to that, and I don't doubt it. I just want to make sure we are documenting this in some way or another.

Mr. REAL. I just think there is a lot more resources that we have as students today, because before, you know, the traditional high school, you could always hide behind, like, “Oh, the teacher doesn’t like me. I am just going to quit.”

Whereas now, you see so many people doing it. There is always a competitive edge in high school—especially in high school. There is such competitive, you know—“What number are you in your class rank? What is your GPA?” And now you have no excuses.

Now you can do as much or as little as you want, and in our community, it is as much as we want. Because whereas before, there was the little, you know, there wasn’t that many sources.

And now there is, you know, for everything, you know, I—personally, me, there was a lot of resources that many of my students had just because of my situation. I mean, I learned how to tie a tie on YouTube. That is how I learned it. You know, whereas their father could have taught them before they went to church.

You know, I went on YouTube and now I have resources for life situations as well as, you know, school resources, and that is where I got a lot of the knowledge that I got about what are the universities that I wanted to go.

Because I couldn’t go on tours. So I got everything online and everything by word of mouth of where to go online, whereas before, it was just word of mouth. So I think the resources that we have now are just unbelievable, and that is what has opened the doors to me today.

Mr. CASTLE. Ms. Short?

Ms. SHORT. This year I have seen an amazing difference between the amount of engagement of my students and the hierarchy thinking that they have been involved in.

But when we had this technology incorporated in our school, we didn’t do it from a statistical standpoint. It wasn’t researched-based. So I don’t really have like something to compare it to.

I know that I only have two students that failed my class this year out of 125 students. Last year, I probably had about 12 percent of my students who failed. So it went down significantly, but I don’t know if it is—you can’t compare it.

Last year, those students were in seventh grade. They had a different science teacher. This year, they have me. It is different content. It is really difficult in education to compare the two when there are so many variables.

Mr. CASTLE. Mr. Chopra, did you want to comment?

Mr. CHOPRA. Your question is at the heart of ensuring we have a return on taxpayer investment, and I might suggest that we grappled with this issue in Virginia.

One of the ways in which we evaluated success was actually flipping the model around. What problem were we trying to solve? When we looked across the challenges in our test scores, we found that sixth grade algebra—pre-algebra, frankly, had been our worst performing subject and, in fact, had been in the 68 percent order of magnitude of success.

So we took that problem, and then issued a challenge to technology developers to build mobile applications. In fact, that contest is underway now—it is going to expire at the end of June—to say, help bring about innovations through technology that will help us

close what is a performance gap in this narrow subject we identified through our research on fractions, proportions, and so forth.

So if we flipped the question and said, "What is our policy or educational outcome objective," and then challenged the technology industry to help develop applications and strategies to meet it, we are going to hopefully see ourselves in a better position to assess the marginal value of that particular initiative.

And I think that methodology might be helpful as we move forward, Congressman.

Chairman MILLER. Mr. Kildee?

Mr. KILDEE. Thank you, Mr. Chairman. I am going to follow through on your question. You know, when I taught school over 40 years ago, I was considered advanced technologically, because I knew how to thread the movie projector. [Laughter.]

Other teachers would call upon me to help them on that, and then when the federal government began to get involved in assisting schools and purchasing some of the technology, a lot of it wound up in the closet.

My question then—and I will address it to you, Ms. Bergland, and others might want to answer—to what degree do teacher training institutions prepare the students to effectively use existing and rapidly changing technology and software material?

Ms. BERGLAND. Did you say the higher ed?

Mr. KILDEE. Teacher training institutions, in general.

Ms. BERGLAND. Okay. First of all, I will tell you that when I first started teaching, I always wanted to be across from the football coach, because he could help me when the projector didn't work. He knew how to use it better than anybody.

I would say that we work with our teacher training institutes. I mean, Texas A&M University is in my community, and we work with them, and their educational technology, but it is something that we do tend to have to make sure that the—a lot of the students coming out of college, they know how to use technology. That is not the problem. It is learning how to use it instructionally and having good—and that still takes some time.

So we are still working on that. I think the education departments in the universities do a good job, but they are learning a lot of their content from college professors that are still standing and delivering instruction the old, traditional way.

Mr. KILDEE. I guess then that gets to the heart of my question: How do the teacher training institutions either during the undergraduate years or graduate years teach them how to actually make that technology effective in a classroom?

Yes?

Mr. KINNEY. One of the things that we have done at Discovery is, obviously, the professional development around this is such a critical component, because it really is a change in the way we are asking people to deliver instruction.

We work with Wilkes University in Pennsylvania and actually developed a masters program in using instructional media effectively in the classroom, and so we had experts from around the country who developed these courses and actually deliver these courses both online and in person in a masters program for current in-service teachers.

So that is one of the things that we did to address that. The second thing we do is really work with administrations of school districts who are implementing a systematic approach to really look at their comprehensive professional development needs to make sure that we provide ongoing plans that are multi-year to make sure that people are effectively using this in a classroom.

Because, even if people know how to use the technology, I think, your point is right on. Using it for an instructional purpose is really a different thing.

Mr. KILDEE. One thing we don't want is what I call the Carter Glass syndrome—Senator Carter Glass—very famous senator—the Glass-Steagle Bill. When the dial telephone came in, he refused to use it. He would just dial zero—the most he would do—and then tell the operator which number he wanted.

And, you know, in every profession, you can have that Carter Glass syndrome where they just are used to one system. This is the system they learned when they started teaching, and you have kids coming in, and you want to have a teacher, whether they have been teaching 1 year or 25 years, a teacher who moves with the use of the new technology and the materials that go with that technology.

But both teacher training institutions and the school system has to push those teachers, I think, to use the new technology and don't fall into the Carter-Glass syndrome.

Any other comments on—

Mr. MCAULIFFE. Yes, I would like to comment. Technology allows you to do many things. One, the fear of a child being nervous about technology—you shouldn't worry about that. That is usually the easiest of the problems.

The teachers in our program get trained 8 hours so that they become very familiar with the technology. In addition to them being trained on the technology, they are also trained on student participation and motivation to make sure that they make the use of the technology easy for those students.

To address a couple of the other questions, if I may very quickly, technology allows you to do pre-assessments and post-assessments to very effectively measure a student's academic progress there.

In our program, the pre-assessment will drive a prescriptive, individualized learning plan that will lead the teacher through the program through mastery learning where they will teach and re-teach the lesson until the student has learned that lesson and then move onto the other lessons.

So technology can allow you to address many of the concerns that you gentlemen have raised today.

Mr. KILDEE. Thank you, Mr. Chairman.

Chairman MILLER. Mr. Hare?

Mr. HARE. Thank you, Mr. Chairman.

Ms. Short, you know, parental involvement is one of the most strongest predictors of future academic success.

In your testimony, you mentioned that parents have access to lesson plans and homework help, and have you seen parents become a lot more involved in children's education as a result of this?

Ms. SHORT. Sometimes I dread getting onto my computer and checking my e-mail, because it takes 45 minutes to respond to all the parent communication.

Yes, parents are definitely involved. Even in my school with the diverse population, they are involved. I have had various scenarios this year where my students have been absent—parents will e-mail me.

They say, “What are you doing today? Can you give me your lesson, your review sheets, your flip charts”? And I have uploaded that onto a resource that we use in our county called Edline.

And then within an hour, a parent e-mails me back and says, “Thank you very much. We have everything. She will have it for you the next day.” So it is—

Mr. HARE. That is incredible.

Ms. SHORT. It is incredible. And our students and parents have access to Edline. On a daily basis they can monitor their grades. They can check to see when homework assignments are due, and when their next assessment will be.

Mr. HARE. Wow.

Mr. Chopra, I am the co-chair of the House for Rural Education Caucus, and I am particularly interested in how technology can help rural schools overcome the unique challenges such as lack of financial resources and geographics and things of that nature.

You highlighted in your testimony an innovative program being implemented in a rural Virginia school district called an Open Classroom Project, and I wonder if you could tell me a little bit more about how this program works.

And can school districts use this program to connect to and collaborate with other school districts, particularly in the rural communities, because, you know, I have a huge rural area, and I am very interested in making sure that those young kids get the opportunity to get the same type of education as the kids in the bigger cities do.

Mr. CHOPRA. I thank you for that question. In fact, rural communities, I think, are a great source of potential of next generation innovation if we can connect those communities in more meaningful ways. So we had a very high focus on that aspect.

This particular initiative is sort of the necessity as the mother of all invention. The school district was facing budget shortfalls and tried to find ways to save money. The technology department said, “Hey, we think we could actually get more with less.” And they said, “Look, we could put together a compilation of tools that would improve parent communication, teacher-to-teacher sharing, student engagement, and we could cobble together a series of tools that are available more freely and low cost in the market and assemble them in this little district.”

Governor Kaine had given them a little grant to document all the work they had done so it could be replicated in communities all across Virginia, and frankly, the country. I included a Web URL for the Virginia Open Classroom Initiative, [vaopenclassroom.org](http://vaopenclassroom.org).

Anybody can download the tools that they have been using effectively in their school district. It is extraordinarily cheap. In fact, in most cases, free. And they are focusing on the resources that will actually empower all of the components that you have heard talked about here today.

So if we can keep the infrastructure as modest in their expense as possible. Take advantage of broadband, which we haven’t spo-

ken as much of today, to ensure that we have the kind of capacity for resource sharing in our rural areas, and most importantly, focus on new content that we think could help address some of the long-standing challenges around educational attainment.

We have in our most rural communities very low rates of educational attainment, and incremental ideas are not making the kind of breakthrough change we need. And so we took, for example, the old GED curriculum for adult ed and mashed it up with Microsoft's Learning Academies for Technology and projects that would give students a chance to experiment.

And we think boldly that in 6 months, a dropout could be a technology worker, and we are going to try those kind of experiments. And I look forward to working with you on trying to find game-changing ideas to support our rural communities, because it is critical for our success.

Mr. HARE. I would love to work with you on that. And I know I am running out of time. Ms. Short, just so I get the figures right at the end of it, and by the way, I think I got it right when I hit 16 percent, so I didn't want to be the only one on the committee to get it wrong. I am glad I got it right. That would have looked great with my chairman.

What did you say the United Kingdom had or Great Britain had in terms of the percent versus what the United States—we had 16, and they have what now?

Ms. SHORT. Seventy.

Mr. HARE. So they have 70 percent, and we are at 16.

Ms. SHORT. Seventy percent of their classrooms have interactive boards.

Mr. HARE. What do we have to do from our end of it to be able to get that up? I mean, that to me just is wonderful technology. What do we have to do here?

Ms. SHORT. Funding. [Laughter.]

Chairman MILLER. Next.

Mr. HARE. Ms. Short, I just can't thank you enough for your answer.

Chairman MILLER. Some things never change even with the technology.

Mr. HARE. Thank you, Mr. Chairman. Well, we will work on that.

Chairman MILLER. Ms. Hirono?

Ms. HIRONO. Thank you. I would like to follow up on Mr. Hare's line of questioning, because this all is really impressive, and Ms. Short, you must be a very well-liked teacher, because just sitting here watching your demonstration made me think that I would have liked to have been in your class.

Mr. Chopra, I am curious to know, have you done any kind of a study on how much it would cost for our country to get up to speed on, you know, the wideband and all of that for all of our schools, realizing, of course, that it is not the federal government's role to pay for all of this, but just wondering how much would it cost our country?

Mr. CHOPRA. I don't have those figures, but I might flip the question, and that is, how might we drive more innovation into the marketplace. So I could produce facts and figures on the cost of a

laptop for every child, maybe 4 or 5 years ago, and that would have presumed a certain cost per device.

Today, we don't know what the device is going to look like that kids are going to have in their hands to be able to interact and learn. That device might cost of 50 bucks or a hundred bucks, and we might naturally find ways to find operational savings to cover that cost.

I think the bigger challenge for us is ensuring, I think, to Congressman Castle's question, where is the value in being more rigorous about how we present the outcomes that we are trying to achieve? Does it improve on math and reading and all the various things you have heard anecdotally described today.

The more rigor we have around what the "killer application" is that would drive performance, I am confident our private sector will innovate to bring new products, devices and tools into the marketplace, and therefore, drive prices down and make it easier for us to be successful.

That doesn't mean that we shouldn't look for creative ways to pilot research and development initiatives and other things with the resources we have made available so we can find ways to drive that kind of game-changing innovation, but if the number were to be based on current prices, it would be significant.

Ms. HIRONO. Ms. Short, how much say did you have in your school as to what kind of technology would be made available to your students? Because you use a whiteboard, but there are any number of other ways that your school could have gone. Did you, as a teacher, have a say in the matter?

Ms. SHORT. Actually, we didn't. Our county was going through middle school reform and a technology modernization, and within the summer, they had installed the Promethean boards into the classroom, and the first day of school, they were there, and we were ready to use them.

Ms. HIRONO. Do you think that would be an important element as we move forward that the teachers would become engaged so that this is not yet another program, another method that is imposed upon teachers?

Ms. SHORT. At the beginning of the year, a lot of teachers thought it was imposing, but throughout the year as we got better with the technology, it became fun. It became fun. My husband and I—he is also a teacher—there is an unspoken competition as to who could create the best foot chart.

Other teachers, even our veteran teachers who have been teaching the same curriculum—well not necessarily the same curriculum for 30 years, but they have been teaching in the same manner—they became excited to use the technology as well.

They were coming to professional development; they were coming to other teachers who were using it. Unfortunately, we weren't able to take our staff development subs and walk into other people's classrooms to see them use the technology efficiently, and we kind of need that back.

We need the time to go into classrooms and see teachers using this effectively, and we just didn't have an opportunity to do that this year.

Ms. HIRONO. Ms. Bergland, you mention—and others of you mentioned—how important the professional development part of this is, because I can envision teachers who really may not even know their subject area very well, but then they can maybe hide behind some of the curriculum that would be packaged using technology, and that wouldn't be such a great thing for a student to sit there knowing that the teacher is just sort of slapping these things onto a whiteboard or whatever, a computer.

So this part of how we are going to move forward as a country, I think, is very challenging. Do you have any thoughts on how we can have the two working in concert?

Ms. BERGLAND. You touched on the most important thing, and that is professional development. When we first started this, I told my school board, the technical issues, which at first, everyone is concerned about—are kids going to put, you know, viruses on the machines, and how you can have enough bandwidth to have wireless everywhere—I told them that is easy.

What is difficult is getting teachers to change the way they have been teaching. And you can't just do the "how-to" training at the beginning. It has to be ongoing, and it has to be job imbedded, and you have to take them through a continuum.

You are going to start with "how-to", and then you are going to move into, "How do I use it with kids"? "How do I manage a classroom where every student has a laptop"? That is a very disruptive thing that happens to a teacher if they are not prepared for it, but you can't stop with the teacher.

In fact, you need to start with the administrators, because they are the ones that can empower the teachers to do the things that need to be done. And it needs to be the administrators at the campus at all levels, but it also needs to be the administrators at the district level, because the curriculum coordinators have a very important part here.

Because in our first year of implementation, we had their vocal support, but their real support wasn't there, because they weren't a part of the whole buy-in process. So after that first year, we had to bring all of our curriculum coordinators in, and start with them, and once they saw the potential, then they began to support it, and then the project was successful.

Ms. HIRONO. Thank you. I think my time is up. Yield back.

Chairman MILLER. Mr. Scott?

Mr. SCOTT. Thank you, Mr. Chairman.

And, Mr. Chopra, I want to thank you for your hard work in Virginia, and I know you have got a lot on your plate. You have got all of the technology, generally, but do you also have cyber security? Is that part of your challenge? So you have been doing a lot. Thank you very much.

There is a lot of fancy equipment out there that is very expensive. How would a school system know what works that will actually better the education, and what would be a waste of money?

Mr. CHOPRA. That is a terrific question, Congressman, and thank you for your leadership in the Commonwealth as well.

I would say that one of the advantages of programs like our Education Technology program is that we are building up capacity

within state department's of education to facilitate some degree of thoughtful evaluation and support.

In Virginia—I don't know how many other states have a similar model, but we have thoughtful administrators who can assist and provide kind of best-practice sharing so that local schools can have the kind of advice and counsel they need in an objective manner so that they can make the right technology investment choices.

We do some of this around guidance on procurement. We do some of this by sharing through training professional development the technology resource administrators that many states have, and we have nearly 1,200 of them across the Commonwealth of Virginia that are funded largely by the state but supplemented by federal resources.

That network helps to ensure that the decisions that are made are fair, effective, and that they are being properly deployed. My hope is that as more and more of our research thinking goes into the evaluation of the quality of various interventions that it will help to drive the market towards better and better results.

But we are still further down the road for that activity.

Mr. SCOTT. Thank you. Following up with the gentleman from Illinois, you talked about rural areas. One of the advantages in technology is you can have a virtual teacher who can teach courses for which there is not a critical mass of students.

Are virtual teachers as effective as regular classroom teachers, and what can we do to make sure they are more effective?

Mr. CHOPRA. If it is virtual, Ms. Short, I would imagine it would be very effective.

Mr. SCOTT. Does somebody—

Mr. MCAULIFFE. Yes, I can address that—

Mr. SCOTT. Mr. McAuliffe?

Mr. MCAULIFFE [continuing]. Because we do use virtual teachers. Again, I will go back to the academic gains. We measure that on every student that starts our program and completes our program, and we have seen fairly dramatic increases in grade level performance.

We also made sure that all of our teachers are certified, have taught in a classroom for at least 2 years, so they are familiar with the teaching environment. Then we take the time to train them on the technology.

I think the beauty of our model is the fact that you can tap into a teacher base, whether it be at night, whether it be on the weekends, whether it be somebody that might be in a high-population area that can service a child in a rural environment.

Mr. SCOTT. Now, when you say "virtual" are you talking about live virtual or recorded virtual?

Mr. MCAULIFFE. Yes. No, ours is a live personalized virtual environment. The other area that I think this is very important, there is a lot of needs going unmet right now.

The example I used before was speech therapists. There are thousands of kids in our school systems that need that service that aren't receiving them because of the lack of speech therapists out there.

We have the ability to match a speech therapist, wherever they may be, with a student in school at their location using the computer.

Mr. SCOTT. Thank you.

Ms. Bergland, you indicated that laptops were extremely valuable in a student's education. Would denial of a laptop constitute a denial of equal educational opportunity?

Ms. BERGLAND. (OFF MIKE)

Mr. SCOTT. Sure. Sure it is.

Ms. BERGLAND. I do think that my community—we have at least 30 percent—we just surveyed our students, and 30 percent of our students said they do not have a computer at home.

And my own daughter is a junior in high school, and I talk to her about this a lot, and she does a lot of her homework at home using my laptop. And I have a lot of kids in my community that don't have those resources. So I think in the bigger picture, I think, I would have to answer yes to that.

I think it is important. I think those kids that don't have that access at home are not playing on the same playing field. They do not have the same advantages of the children whose parents have not only the laptop but also bandwidth and the Internet access at home.

Because when we ask the question about how many of my students in our school district have Internet access, we had about 35 percent that don't. And then it was about 45 percent that don't have cable access, because we were trying to figure out if we could label our cable franchise and get them to provide a cheap Internet access for our kids at home.

So you do have kids who if we don't provide it at school, they are not going to have that opportunity, and they are not going to have those opportunities that they need to be able to compete with those kids that do have it.

Mr. SCOTT. Thank you.

Chairman MILLER. Mr. Real, did you want to respond to Mr. Scott's last question about access to laptops? I just thought you did. If you don't, that is fine.

Mr. REAL. Well, the access to the laptop, it definitely puts us on a different, you know, playing field, because it doesn't—like, before, where we just had paper and pencil, and you had to be creative in your ways, now you want to be creative while entertaining yourself at the same time, which is at every kid's heart.

So when we want to get on the laptop, we can see this; we can do this, and when we can help each other out, that is what really gets us to do these really cool projects, because we can help each other out, expand on what we know, and then we can turn it in, and just everyone will stay in awe.

And even when we present this, like, in PowerPoints and movie presentations, we look at what we look at what each other does, and we know for next time. So it is further learning every time we present—further learning.

Because I remember when I was just a freshman, it was different, and it was so different, because it was just a basic ones—you just have a slide here, and now, you go in there, you have all

these colors, you have things flying out, and—so it is just so much different.

I think it just elevates, and it makes us do better.

Chairman MILLER. Thank you.

Mr. Tierney:

Mr. TIERNEY. As my friend Rush Holt says, “The fundamental right to be entertained,” which it doesn’t hurt at all.

I think maybe Ms. Bergland, Ms. Short, and Mr. Hartschuh might be able to answer this question: We have a whole cadre of teachers out there who have no background in technology at all—excellent teachers, been teaching for a long time—and obviously, it would be beneficial to have them become familiar with this technology and capable of using it.

So what are we going to do? How do we most effectively get them to do that, and how long does it take to have a teacher with a long-teaching experience actually acclimate themselves to this technology and become able to use it efficiently?

Ms. BERGLAND. There has been some research on that, and it indicates that it takes anywhere from 3 to 5 years starting at if you are at the level where it is in your face—is what I like to call it.

You are at that point, you are saying, “This isn’t making my life easier,” because you are having to struggle learning how to use it—to the point where you are being innovative with it and you are teaching differently—it takes 3 to 5 years.

I think one of the things that you have already done in your Title II, Part D program, you have basically said that 25 percent of the funds have to be spent on professional development.

And I think there is even a proposal where you up that to 40 percent. I think that is important.

Mr. TIERNEY. Yes, I am just curious, you know, how do we motivate those teachers to not resist it on that? Anybody that might—

Ms. BERGLAND. That is where you start with the administrators. The leadership has to buy into this, and teachers are going to do what their administrators want them to do.

And they are going to take that leadership—if they are encouraged; if they are supported—you want to have all of the good professional development strategies that we know work.

You don’t want to do just the “come in and train and sit down and leave.” You want to have ongoing professional development. You want to make it relative to their subjects. You know, teachers like what we call “make and take it sessions,” where they can come in and they can actually then go back into their classroom and use it.

And then you also—we actually hired an integration specialist that worked at our one-to-one campuses, and they would go in and plan with the teachers. They would also model teach for the teachers. And then you also want to imbed that technology into the curriculum, because if it is already imbedded into the curriculum, then it helps them with that.

Mr. TIERNEY. Well, Mr. Chopra, in that line, is anybody taking an assessment of what our colleges that are preparing people to teach have on hand for the technology itself—the hardware and the

software on there and the teaching core to teach teachers how to use that?

Mr. CHOPRA. I don't know any national studies on that, but having visited with the network of colleges that are mostly engaged on teacher training, they see this as a key element of their work going forward.

And, again, this notion of having a resource available—it is a state and local question, in large part, how they organize themselves for this kind of capacity—

Mr. TIERNEY. A huge investment, I would think, right?

Mr. CHOPRA. It is a huge investment, and states like Virginia are taking that step. I don't know as much as the other states in terms of how they built—but a network of 1,200 professionals in the classrooms across the—in this example, one state—certainly helped to mitigate against the risk of fear on the technology and the poor decision making about what you buy and how you use it.

And having that kind of capacity, certainly in our experience in Virginia was successful, and I am too early to have visibility into the national picture.

Mr. TIERNEY. I know of only one school in my district that actually made a smart campus out of it or whatever, and their enrollment applications went up 10 percent in 1 year, because students want to do this.

Mr. REAL? Can you tell me, did the technology keep you interested in school—obviously, but did it also help inform what you wanted to do with your life, or was that a totally separate decision?

Mr. REAL. It helped me stay in school 100 percent.

Mr. TIERNEY. Right.

Mr. REAL. I remember later on, I don't have much contact with my family, but my brother did say—the words that came out of his mouth, “If I would have had what you had, I think I would have stayed in school.” And for it to come out of my brother, it was tough.

Mr. TIERNEY. Did it inform what you chose to do in terms of the nursing at all, or—

Mr. REAL. It had a lot to do, because I didn't know about any careers really. I just knew that I had to go to school. But once I went into healthcare, I was like, okay, healthcare, okay, you are going to be a doctor, but then I realized that there is so many careers out there.

I mean, and then we actually had clinicals where we were near x-rays, and we could use technology, and I was like, I am going to stay.

I am going to stay, and I am going to use everything that I can, and it helped me because later on, you know, when I needed that escape from my home life, I would go and check out so many medical careers online and using the Web, and that is what really made me stay in healthcare—that I had a variety, no matter where I was.

Mr. TIERNEY. There is an incredible number of technology related jobs that are going to be available in every field, and so it is interesting that you say that.

Thank you, Mr. Chairman.

Thank you, witnesses.

Chairman MILLER. Thank you, and I want to remind members of the committee, the audience and others that beginning at 12:00 in the foyer out here, there will be demonstrations of this technology and much more from Apple, from Carnegie Learning, from CASS, from Discovery Education, from eChalk, ExploreLearning, Froguts—you can go out and dissect a frog right there in the foyer if you are so inclined, Oracle Foundation, PBS TeacherLine, Pearson, PolyVision with the interactive whiteboard and demonstrations how to use that beyond what we saw today—from Scholastic and READ 180 and on and on and on and SMART Technologies and other companies that will be presenting out here in the foyer to staff and members of Congress from 12:00 until 3:00.

Mr. Holt?

Mr. HOLT. Thank you, Mr. Chairman. A quick question for Mr. Chopra following on Mr. Tierney's line of questioning: In the \$650 million that, I believe, is available under the ARRA, the so-called "stimulus funding for educational technology," are their plans in the administration to either make that money or other money available for teacher professional development—specific plans in light of what you were all saying just a moment ago?

Mr. CHOPRA. Well, first of all, Congressman, I am from Plainsboro, New Jersey, so—

Mr. HOLT. Yes, I know you are. It is good to see here.

Mr. CHOPRA [continuing]. It is a pleasure to be here. The department is actively working on the programs for stimulus, and I believe they are focused on opportunities to tackle the issues that we have outlined.

I don't have specifics about the particulars of where that dollar funding will go, but clearly we will get back with you as those details come in.

Mr. HOLT. Let me drop that as a suggestion, and I would—

Mr. CHOPRA. I would greatly appreciate that feedback.

Mr. HOLT [continuing]. Coming back on that. One of the advantages that several of you have talked about in connection with the educational technology is the ability to have immediate feedback, formative teaching experiences—in other words, getting back to the teachers and changing outcome by changing the teaching within hours or days or weeks.

I have seen this happen in some schools, but clearly there are impediments to it. If we want to get the most of this—let me ask Dr. Hartschuh first. What do you see are the impediments to getting this kind of—using the educational technology in assessment, feedback, working with teachers to fill in the gaps to address conceptual problems that are identified and so forth.

What are the impediments to actually getting that applied throughout the country?

Mr. HARTSCHUH. Well, obviously, it is infrastructure and, you know, funding to, you know, have the equipment available to the students.

We have been very successful in Delaware doing what we call "benchmark testing," where every student will sit down over a period of 2 weeks. They will be able to have a window of about 2 weeks to run all the students in the school through, you know, their math and reading assessments.

How they do that varies by schools depending upon the infrastructure that they have. Obviously, you need the number of computers available to the students to do this, and as we look at that, the biggest impediment probably at that point is probably the data interpretation of saying, this student is at level (A), another student's at level (B), another student's at level (C), and how you address those, you know, issues at that point in time, you know, the differentiated instruction concept, and that.

But the bottom is that we are trying to give the teachers as much information about the student and where that student is at so that they can address those individual needs of the student.

Mr. HOLT. Well, let me turn to Ms. Short then, and if there is time to others.

You talk about being able to record individual students or anonymous students. How do you decide how much of this is used for individual assessment, how much of it is used to guide you as a teacher?

And for this to be applied throughout the school, what impediments do you see to using the information that is gained about individual students and individual classes being used to improve the education throughout the system.

Ms. SHORT. Great question. Obviously, I can use the data in my instruction to determine what difficulty they are having with the information as it relates to my science class.

But now in Maryland we have the science MSA, and let's say my colleague and I develop questions that relate to specific areas of the science MSA test, and we do it as a 5-minute warm up before we begin our lesson each day, and over the course of 2 weeks, we can determine if their level of inference ability is low, then we can target students on just that ability.

Or if they are unable to target the main idea, we can do that as well. In our math curriculum, or in our reading curriculum, we have the voluntary state curriculum that is broken down into different indicators that you can focus on. So you can use that—and we actually have used that information throughout this past year.

We break it down; we bring it to our instructional leadership team, and all of that data is looked at and assessed, and we try to determine strategies on how to develop programs and resources to help those students.

Mr. MCAULIFFE. Could I also address that? If you are okay, I would—if I could—

Chairman MILLER. Yes, quickly. Yes.

Mr. MCAULIFFE [continuing]. Situation. While our tutoring is done predominantly outside the traditional classroom, our lesson plans are driven by the assessment but then can be individualized as the student progresses.

Depending on the speed at which they are progressing through lessons, we also have prescription monitors that will monitor the progress of students along with the individual teachers tutoring them so that those lesson plans can be altered as the student progresses through the program.

And then last but not least, the parent involvement will also help drive any changes that are necessary for their curriculum.

Mrs. BIGGERT. Thank you, Mr. Chairman, and I apologize for having two other committees at the same time. But I did want to ask just a couple questions.

In addition to being a strong proponent for utilizing technology to improve learning, I am also interested in the possibility of using the new technology on the measurement side.

And I am particularly concerned about this, particularly, in Chicago where it took them through the next school year to actually get the results of the tests, which didn't really help, I think, the learning of the students since they didn't know what the results were in order to plan for the next year, and I hope that—I don't think that that would happen again.

But when NCLB is, I think, reauthorized, we are going to have to take a long, hard look at the metrics used to evaluate the students and calculate AYP.

Have any of you examined the possibility of using computerized adaptive testing to more accurately measure the student achievement? Whoever would like to answer that.

Mr. Hartschuh?

Mr. HARTSCHUH. Yes. In Delaware, the Delaware Comprehensive Assessment System is in the process of being developed—that we are going to roll out in the 2010/2011 school year. That will be all online assessments.

So all students in the state of Delaware will take online assessments in, you know, grades three through eight. They will be adaptive tests. At this point in time, they are adaptive—grade level only, because that is what USDOE will allow us to do.

We are hoping that down the road we will be able to move to an adaptive testing that goes across grade levels. So if a student actually is in third grade, if they, you know, need the adaptive testing, you know, to take them back down to second grade, or they are advanced enough to go to fourth or fifth grade, you know, we are hoping that, you know, we are going to be able to do that down the road once we clear some hurdles with that.

Mrs. BIGGERT. Wouldn't that be a lot easier to have the growth method—

Mr. HARTSCHUH. That would address the growth model that we are implementing right now, yes.

Mrs. BIGGERT. Okay. Anybody else like to address that? Yes, Mr. Chopra?

Mr. CHOPRA. Congresswoman, I would just make a general observation. If you looked at the retailing industry, the level of data and analytics available for them to know if I buy milk on Wednesday that they should up sell me to Oreo cookies because of my historical patterns—the level of analytical rigor in those kinds of decision making by the retailing sector, if you compared that with this very basic question that we are asking today, does student performance improve by the video clip that Discovery showed, or the lesson methodology that Ms. Short described for a particular day, or a chapter of content that is going to be taught over a course of weeks?

It is very difficult when I look at what I see happening in other aspects of our economy where we have measured to the nth degree the best value of resources against challenges.

It is challenging for me to think about where we are in the ability to cross content quality, teacher quality—all the various elements in order to make the kind of management decisions necessary to improve student performance.

I hope as we move forward in the initiatives that are underway, we will see a more attention focused on how we can think more broadly about these analytical capabilities, and I think there is great potential if we were to do that correctly.

Mrs. BIGGERT. That kind of addresses the other part of this question, and that is: How do we measure, I think, and evaluate the populations like special ed and then the extremely gifted, or how do we move to be able to address, not only just the student, but how to address those populations.

I think one of our biggest problems has been with the special ed when we have been asking them to take a test for their age group of like, say, fourth grade, but they are really reading at first grade level.

Anyone care to address that?

Mr. Hartschuh?

Mr. HARTSCHUH. Well, yes. One of the bigger issues you have with the paper-pencil test is it is very difficult to be adaptive with that.

The students with disabilities are obviously—the online assessment will be to their advantage. In Delaware we are starting to design our system.

The one thing that we are doing is multiple opportunities to take the state test—not only one, but again—students with disabilities, you know, there can be multiple adaptations for them, you know, to address their needs.

Mrs. BIGGERT. Just one other—I think one of the things that has bothered me is that with those kinds of tests, when we have the difference between the NAPE tests and then the state tests and sometimes the difference where the—for example, the number one state on there as they plan their test, and then ranking at the bottom of the NAPE test—would there be an integration?

Are we going to—I am not—I think that, you know, local control is so important. With this technology, would we be moving more toward the national test? Is that a concern of anyone or is that a benefit?

Chairman MILLER. Anyone?

Mrs. BIGGERT. I guess we will wait until next year when we start addressing that to get the answers. Thank you—

Mr. HARTSCHUH. Well, I might not be able to address that directly, but in our program, again, as I said before, you take a national assessment test at the beginning of that, and the lesson plan is derived from that assessment.

Those lesson plans are now aligned in our program to all the state standards. So depending on what state that student is living in or residing in, we align that program with our state standards with, as I mentioned before, our goal of trying to improve their performance on the state standard test.

Mrs. BIGGERT. Thank you.

Chairman MILLER. Ms. Woolsey?

Ms. WOOLSEY. Thank you, Mr. Chairman, and I apologize for not being here for your entire presentation, because it is so interesting.

I want to talk about the cost of professional development. In looking at what this will be, just a snap shot in time, can't we assume—or can we assume—let's put it that way—that all colleges are teaching curriculum or teaching courses that could use computers in college and kids, when they graduate as instructors, they are comfortable with computers? Okay. I am assuming that, okay.

Then I am assuming that at least a quarter of all instructors now are like Ms. Short who are there. I mean, they are there. They know what this is all about. We don't have to take them back and pay for their professional development.

So what do we have? We have a certain time to bring everybody else up to speed. So that is not going to be as huge as we think it is. I mean, but we need to know what it is.

So, Mr. Chopra, have you looked at it from that perspective? Because when we think about every single instructor coming and already there and all that, it is not everybody; it is just a certain group.

Mr. CHOPRA. Well, I might pivot the question in a slightly different direction.

Ms. WOOLSEY. Okay.

Mr. CHOPRA. Professional development to what end? I think “to what end” part is still an open question. In other words, what particular package of technology based educational content or innovation or however you want to describe it is actually the key to the performance results we are trying to achieve?

Ms. WOOLSEY. Let me ask a question in the middle of this.

Mr. CHOPRA. Yes.

Ms. WOOLSEY. So wouldn't it depend on the grade level and what the class is teaching—

Mr. CHOPRA. So there is a basic level of understanding with technology in the classroom that presumably we are in the pipeline learning more and more about, and there is a gap. I appreciate that sentiment.

But the bigger question is: As we study the impact of what exactly is it about what Ms. Short was doing with the interactive whiteboard—if we understood the nature with which she had used that tool to deliver performance, then it is the training and professional development about the use of the device not so much the—how do you flip the switch and make sure that the buttons work, but the methodology by which she incorporated it into the classroom.

It is a slightly different question that I think even if someone is familiar with the technical hardware, I would still imagine her peers would welcome professional development to learn how she chose to integrate the tool into the actual coursework itself.

So it is not so much, I know how to use my cell phone, it is, I know I am thinking about the meaningful applications for the use of—they happen to happen to be using the cell phone but will deliver educational performance.

Ms. WOOLSEY. But doesn't that replace then the ongoing professional development that we provide educators anyway? I mean, it doesn't have to be more—

Mr. CHOPRA. My hope is that it is integrated—

Ms. WOOLSEY. Integrated with, right.

Mr. CHOPRA [continuing]. Presumption is that part in parcel with how you teach—

Ms. WOOLSEY. Right.

Mr. CHOPRA [continuing]. The ongoing work of professional development integrated into that curriculum, I hope, would be opportunities to take the best learning we have seen and have that be blended as one. It is not technology unto itself. It is aligned with an educational outcome goal.

Ms. WOOLSEY. Well, I want to add one more thought, and then anybody that wants to respond to it while I still have time—devices spoil like apples and oranges and vegetables.

I mean, how do we keep up with that? And how does Europe keep up with everything—technology changing and the programs changing. So how do we keep up with that financially?

How does Europe do it?

Mr. CHOPRA. I couldn't speak intelligently about European practices, but there are best practices in IT management. So we are making a general hypothesis that over time, a greater share of a school's operating budget might involve technology maintenance and operations.

And as that is happening in every sector of our economy, candidly. And so to the extent that there are best practices, whether it is in healthcare, energy sector, you name it, there are strategies that thoughtful IT leaders have deployed to think about ways to keep technology fresh, staff trained, mitigate security threats—that is a capability that schools will be building up over time.

There will likely be a schools gap into their capacity, and I am sure there would be some broader discussions at state and local levels all over the country on how to—best practices in IT management and governance.

But I am confident there are models that are there. We certainly have explored them at the federal level. There are opportunities at the state and local, but I wouldn't imagine a unique perspective in education on those areas.

That is really a broad discipline.

Ms. WOOLSEY. Thank you, Mr. Chairman.

Mr. TONKO. Thank you, Mr. Chairman. When we look at general education, there is always a concern about the basic foundation being developed in the elementary settings. Are there any insights you can provide in terms of just what may be best to do to help those students who may not link to technology early on in that elementary setting, or are there particular things that are being done to cultivate the best outcomes in that beginning setting?

Anyone?

Ms. BERGLAND [continuing]. Not really sure exactly what you were asking.

Mr. TONKO. Well, okay. The issue of technology becomes very important as you move through middle schools and high school.

Are there particular problems or connections that you see that need to be addressed in the elementary grades—pre-K through, say, five, six—that, you know, some students don't take to math or science. Are there students not taking to technology and, if so, how

do you reach them? Are there concepts that you have developed? Are there—

Ms. BERGLAND. Well, every year they do a huge national survey of students K-12 and parents and teachers, and interestingly, some of the highest users of technology and even the higher in technology are our elementary children.

They are doing the virtual worlds. There is a place called “Second life,”—they are not using that, but they are using the Webkinz or—those of you that have small children will know those—but, you know, so they are—our younger kids are the ones that we are really watching, because we know when they hit middle school and high school, they are even more engaged in the technology outside of school than they are than even our kids at the middle school and high school.

So I think that the assumption that maybe how do we engage them, I think that is already happening.

Mr. TONKO. Ms. Short?

Ms. SHORT. One of the purposes for our technology and modernization and also our middle school reform is that research has shown that students scores started to drop off in middle school, and we needed to become more engaging in our lessons.

I can’t speak to elementary schools, but I know that the reason why this big technology push came about was because of research showing that our students scores dropped off in middle school.

Mr. TONKO. Mr. McAuliffe?

Mr. MCAULIFFE. Yes. Again, because of the fact that we do predominantly SES tutoring outside of school, this is a little bit off, but what we have found is that the younger you capture a child and get them up to grade level, the more of a chance you have at success.

And we are developing an early reading and early math application for our tutoring services. And again, like my predecessors on the panel stated, it is surprisingly how adaptive the children are to the technology.

Mr. TONKO. That being said—I am sorry, Mr. Kinney?

Mr. KINNEY. Just one thing to add, I think one of the cautions is not to separate the conversation of technology from teaching and learning.

So we know a lot in this country about how students learn. We know that students learn differently, and that if we can reach them in different ways, all the better. We know that if they collaborate with their peers, they will learn from each other. We know that if they interact with content, good things happen instructionally.

And so I think even at a very young age—I have a first grade daughter who just recently is now going to second grade—but is in a media generation. I mean, she is on Webkinz; she has a video iPod; she gets assignments from her school that take her online.

And so, I think that even at those very young ages, we can capture them using those tools but really not just to use the tools, but to capture them in a way that we know we can best reach those students.

Mr. TONKO. If, in fact, we need the parental involvement to maximize the success rate, what are some of the programs that you do to incorporate parents into technology literacy?

Are there a certain concepts you would use at your given situations that incorporate the parents and help them to keep pace, especially the pre-K through five crowd is ahead of the curve—maybe ahead of everyone. How do you keep pace with that, and how do you bring parents in so they can be partners in education if technology's entering in?

Ms. BERGLAND. We do parent training. We will have trainings at night for parents to come in. We even provide translators, because we have a large bilingual population.

That is one of the nice things about when students have a laptop that goes home, we encourage the whole family to get to use that machine so it is not just the students, but it also becomes the families during that year.

So I think that you are exactly right, we are hoping that our kids, particularly with our parents that don't have a lot of technology skills, we are hoping our kids could help teach their parents, just like sometimes they help teach teachers.

Mr. KINNEY. I can speak from a provider standpoint as well that one of the things that we do when we develop resources for education, certainly look at how parents will access those resources from home or whatever it might be.

So we want to make sure that those are available, not just within the context of a classroom environment, but also anywhere at anytime.

Mr. POLIS. Thank you, Mr. Chairman.

You know, in Colorado I have had the opportunity to be involved with the policy framework around online education, and I certainly realized that online education is only part of what we are talking about here today, and a couple of you talked about it in your testimony, but it is what I wanted to focus my remarks and questions around.

And we had a number, and just like at the federal level, we will presumably be dealing with as we improve federal education policy—a lot of policy areas are on how we treat online education.

There is a lot of jurisdictional issues that arise, accountability issues—not things that are inherently good or bad with regard to the efficacy of online education, but just a number of things that challenge the status quo in ways that hadn't really been addressed before.

My first question is for Mr. McAuliffe with regard to jurisdictional issues, and whether you have had any experience dealing with serving students that reside in other school districts, other states with programs based in different states, and whether there is—to any degree, a policy—policy framework recommendations you have around some of those jurisdictional issues that inevitably will increase as online education gains popularity.

Mr. MCAULIFFE. Thank you. Yes. We do run into several obstacles in various states. There are a couple of states, like Connecticut, that do not allow online providers to provide supplementary education services.

There are others that, in our instance, will not allow the use of retaining the computer. Under our program, the student—if they complete the program—get to keep the computer that we provide—

Mr. POLIS. Just a quick follow-up question on that. Is it the state itself, or is it district by district in those states you mentioned?

Mr. MCAULIFFE. In Connecticut's situation, it is the state, and in other situations, it could be the district. The other big issue with signature requirements being an online provider, if you are required to get parents' signatures on attendance forms when you are not there in the state, that creates a problem.

Yet, we have attendance reports that document the time in and the time out for the students.

Mr. POLIS. So on that second point, did you say there is a problem with those attendance reports being counted for state or district purposes?

Mr. MCAULIFFE. Yes, they would not—they don't allow you to submit for, you know, payment if you do not have a parent's signature.

Mr. POLIS. So do you feel that there might be a federal role in encouraging best practices and establishing an environment where online education can operate in the 50 states and many districts?

Mr. MCAULIFFE. Absolutely. If there were uniform requirements throughout the states and the districts, I think that it would make it more amenable to online providers.

Mr. POLIS. My next question is for Mr. Chopra. Have you, in your efforts—as well as your thoughts about this—have you identified any federal policies that are currently preventing or are a barrier to the implementation of new technology, or even more specifically, online education across the country?

Mr. CHOPRA. I can tell you that the department is very committed to this concept and to ensure that we are moving in this direction.

I think a lot of what you have heard in testimony today is a lot of what the department is focused on. So I don't have any specific barriers or road blocks identified, but a commitment that we will work together in uncovering them and addressing them.

Mr. POLIS. And then the next question is for anybody who would like to answer—it is also with regard to online education. Perhaps Mr. McAuliffe will answer.

From my understanding, Mr. McAuliffe, your organization does not have—you don't serve full-time—exclusively online students, right? It is purely supplemental. Is that correct, or do you have students for the whole day as well?

Mr. MCAULIFFE. The predominant amount of work that we do is with supplemental education students. We do do some, what we call "in-school," where a student or a group of students will be taken out of the classroom to get additional tutoring during the school day. We also provide that.

Mr. POLIS. You know, then by way of commentary leading to a quick question, we, in Colorado have over 3,000 students that are exclusively enrolled online.

So they are taking all their courses online for a variety of reasons. Some of them are homebound, some of them feel unsafe at school, some of them move at a pace that is either too fast or slower than the traditional classroom. So there is a variety of ways that that is occurred.

Currently, there is no federal problems with that, but again, I think it is really state by state in terms of whether that is allowed and how that is allowed. I would like to see if any of you would like to comment on this concept of full-time students that are basically taking all their courses online, and whether you think that that is something that we need any separate accountability for.

And we are out of time. So I will just add that that is something that we should consider that there also are students who are exclusively taking the full of their courses online.

Thank you, Mr. Chairman.

Chairman MILLER. Thank you very much. I want to thank the members of the panel, and the members of the committee for their participation this morning.

It seems to me that we are in a bit of a race here. We are going to be inheriting children—from all social economic levels—that may not have a computer at home, but they can borrow their iTouch from somebody else. They are going to become more and more proficient with the complexities of technology and, in fact, with the efficiencies of technology.

And I fear, that if we do not adapt schools to integrate and imbed technology in the instructional day, how these students are going to turn out.

Now the problem I see is that they are mastering more and more complex technologies. And whether the school budgets and our ability to integrate—as somebody said, don't separate the technology from the education.

We never thought of separating the textbook from education. We just assumed they went together, and they had to be beneficial and work together. But this is interesting.

You know, when you see very young kids game, and you watch them make risk assessments, develop particular proficiencies, get advice from their friends how to develop those proficiencies what is the way that you can master this level; what is the way you can game this level so you can get around it to go somewhere else without having to go through it; they are demonstrating an array of qualities that, as I said in my opening statement, a lot of employers would die to have.

There is a competition. I am trying to think who runs it—I think it was Sun, but they are young Web page developers from all over the world, and they bring them to California for awards, and they are generally 8, 9, 10, 11, 13 years old, and I think there are some older students.

And at the end of the weekend, as they tell them, here is our address, if any of you want a job, just e-mail us, because we will hire you now. So, you see this incredible talent that is being demonstrated, and you have seen it in your classes; you have seen it in the districts that you work with.

And somehow the race is to integrate the educational opportunities for these students with this technology that really, in many ways, as Mr. Real pointed out, brings out all of that potential, all of that excitement of learning.

And there are some big mismatches, obviously, across the country in states and in local districts, and in individual schools and in individual classrooms. Huge mismatches between the potential and

the opportunity of technology and the resources available, either to manage it or to use it or to learn from it.

I think this is a very exciting moment for American education. I think the ability and the kinds of resources that we can offer to teachers to better understand what they are doing; the success of what they are doing; the needs of their students on a real-time basis.

I mean this business we are in—most of this country, we give you an annual test, and then we try to figure out if the kids still in our district, in our state, and what is this information telling you now that it is October or November of the next year—has got to stop.

And I, you know, I think what you are doing in Delaware is exciting to have that kind of real-time assessment. I know very often, we go through this idea that teachers are afraid of this; they don't like it; it is not the way they did business.

But what we see is when you really have a first-class opportunity to integrate this into their daily lives and instruction, how much they start to embrace it, and really see this as a very helpful tool for them.

This is a series of hearings. We are going to look at some of these other opportunities for students, and what it tells us about their skills, their talents, and their abilities and how we continue to try to match this up.

I think that, hopefully, this will be integrated into part of the national task force working on common standards to be internationally benchmarked, and how do we adapt technology so that, in fact, that will flow back through the schools.

I think that is going to be exciting. It is going to be challenging. It is going to require a commitment of very substantial resources, but I suggest a lot of that money is already being committed on resources that are almost obsolete today.

They are put into the classroom, and they become very cumbersome for students and for families to participate in these educational opportunities and teaching moments, as we say.

So thank you very much for all of your participation and your expertise. If you don't mind, as we continue on, we might double back and ask you for some advice and help on our actions in this committee.

Again, I would like to remind the audience and members that in the foyer just down the hall here, we will have a demonstration of many of these technologies and others that are available to students.

And, Mr. Real, I think you are running a video? Are you not, there? Yes.

Ms. Short, do you have an avatar on Second Life yet? No. Yes, you do?

Ms. SHORT. Yes.

Chairman MILLER. So do you go there and do your students have avatars and show up for class?

Ms. SHORT. [OFF MIKE]

Chairman MILLER. No. [Laughter.]

Okay. Thank you very much. With that, the committee will stand adjourned.

[The statement of Mrs. McMorris Rodgers follows:]

**Prepared Statement of Hon. Cathy McMorris Rodgers, a Representative in Congress From the State of Washington**

Thank you Chairman Miller, I want to thank our witnesses who are here today to report on findings and make recommendations on how technology is transforming and improving our nation's classrooms.

Over the last 15 years, our nation has made significant progress integrating technology into the classroom. In 1994, only 35 percent of public schools had internet access. Today, nearly 100 percent of schools do. States, local educational agencies, and schools are using technology to educate students in ways that engage them and increase their achievement levels; support professional development for teachers and administrators; and engage and empower parental involvement in their children's involvement.

Research reveals that technology can improve student achievement, particularly in the areas of reading, writing, and mathematics. In fact, a study conducted by the Software Information Industry Association examining the effectiveness of technology on student achievement found "significant gains in achievement in all subject areas; increased achievement in preschool through high school for regular and special needs children; and improved [student] attitudes toward learning and increased self esteem."

I believe that technology in our schools, particularly in the areas of math and science, will continue to play a key role in ensuring that the students of today and tomorrow will have the skills needed to keep our nation competitive into the 21st century. To meet the demands of an increasingly advanced and global market we must better train and equip our nation's workforce. This starts with education and making sure students have the skills needed to be effective leaders. Current statistics reveal that one in three students will not graduate from high school. Too often, students enter high school and college unprepared to succeed leaving them ineffective in the workplace. Moreover, one in three of our students do not graduate from college. This is unacceptable. We must invest in infrastructure that engages and inspires them.

However, along with the good, comes the bad. Advances in technology have enabled predators to trespass into our homes, schools, and communities. Technology provides our children with access to inappropriate material. We must remain vigilant in our efforts to protect them through every mechanism possible, including ensuring that we as lawmakers stay one step ahead.

As a member of this committee, I am committed to ensuring that every child in America has access to the best possible education.

I look forward to hearing from our witnesses and thank them again for the time and work.

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[Whereupon, at 12:25 p.m., the committee was adjourned.]

