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The Future of Learning: How Technology is Transforming Public Schools
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Testimony of
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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. 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)*

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

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 subgroups were noted:

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

- 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 (revision in progress)
- 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

The e-Learning for Educators project initially included eight states: Alabama, Delaware, Kentucky, Missouri, Mississippi, Hew 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 efE 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 (eFE) 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 eFE content in class, students appeared more interested
  - 89% agree that when they used eFE 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 being 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 Learning 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. We are working toward systemic transformation with the transitioning to the Delaware Comprehensive Assessment System, our new statewide assessment, in the 2010-11 school year. The bold move of taking all statewide assessment online should drive the use of technology in curriculum and instruction.

We hope to use technology as a catalyst of change, even an accelerator of change.

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/