The 2010 US National Educational Technology Plan

Roy Pea
Stanford University
IEEE WMUTE 2010
Research Policy Panel
April 14, 2010
What is it?

- Response to Congressional mandate for five-year plan for educational uses of technology
- Plan for *transforming* education with technology in response to urgent need to remain competitive in a global economy
- Reflection of increased understanding of *how to support learning and of growing capabilities* enabled by technology
Why was this plan created and why now?
Proportion of Population Graduating from College

1995 % Rate

United States, New Zealand, Netherlands, Norway, Denmark, Japan, Sweden, Spain, OECD Average, Finland, Portugal, Slovak Republic, Germany, Greece, Czech Republic, Austria, Switzerland, Turkey

2006 % Rate

Iceland, Australia, New Zealand, Finland, Poland, Denmark, Netherlands, Norway, Sweden, Spain, Italy, Ireland, United Kingdom, Japan, OECD Average, United States, Slovak Republic, Czech Republic, Austria, Germany, Greece, Turkey
Enabling Technology Trends

- Mobility - 24/7 Access
- Digital Content
- Social Interactions for Learning
Capabilities and Expectations on the Rise

Innovation

1999  On Campus  2009

Consumer Companies
Student Expectations
Institutional Technology

facebook
flickr
YouTube
Google
How was the plan created?
## NETP Technical Working Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Title/Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jim Shelton</td>
<td>U.S. DoED Chair</td>
<td>Chair</td>
</tr>
<tr>
<td>Marshall (Mike) Smith</td>
<td>U.S. DoED Chair</td>
<td>Chair</td>
</tr>
<tr>
<td>Karen Cator</td>
<td>U.S. DoED Chair</td>
<td>Chair</td>
</tr>
<tr>
<td>Dan Atkins</td>
<td>University of Michigan</td>
<td>Chair</td>
</tr>
<tr>
<td>Barry Fishman</td>
<td>University of Michigan</td>
<td>Chair</td>
</tr>
<tr>
<td>Roy Pea</td>
<td>Stanford University</td>
<td>Chair</td>
</tr>
<tr>
<td>John Bennett</td>
<td>Akron Public Schools</td>
<td></td>
</tr>
<tr>
<td>Louis Gomez</td>
<td>University of Pittsburgh</td>
<td></td>
</tr>
<tr>
<td>Jim Pellegrino</td>
<td>University of Illinois, Chicago</td>
<td></td>
</tr>
<tr>
<td>John Seely Brown</td>
<td>Deloitte Center for the Edge</td>
<td></td>
</tr>
<tr>
<td>Margaret Honey</td>
<td>New York Hall of Science</td>
<td></td>
</tr>
<tr>
<td>David Rose</td>
<td>Center for Applied Special Technology (CAST)</td>
<td></td>
</tr>
<tr>
<td>Aneesh Chopra</td>
<td>White House Office of Science and Technology Policy</td>
<td></td>
</tr>
<tr>
<td>Yasmin Kafai</td>
<td>University of Pennsylvania</td>
<td></td>
</tr>
<tr>
<td>Candace Thille</td>
<td>Carnegie Mellon University</td>
<td></td>
</tr>
<tr>
<td>Chris Dede</td>
<td>Harvard University</td>
<td></td>
</tr>
<tr>
<td>Maribeth Luftglass</td>
<td>Fairfax Co. Public Schools</td>
<td></td>
</tr>
<tr>
<td>Brenda Williams</td>
<td>West Virginia Dept. of Education</td>
<td></td>
</tr>
</tbody>
</table>
How the Plan Was Developed

12 federal policymakers
15 experts on Technical Working Group

24 industry leaders
17 events and focus groups

50 chief technology officers
48 school administrators

123 college instructors

153 technology providers

235 classroom teachers

572 reports, examples, and statements contributed to the website

22,876 users of public website
Interagency Connections

- NSF - The Cyberlearning Challenge and Opportunity
- FCC - Broadband Plan (Commerce and Agriculture)
- OSTP - Health, Energy and Education
- DOD - Interoperability and R&D
What are the key elements of the plan?
Key Elements

• Five goals
• Action recommendations
• Strategic Research Agenda
The Five Goals

- Productivity
- Teaching
- Infrastructure
- Assessment
- Learning
Learning

• Students at the center

• Change what and how we teach to match *what* students need to know, *how* they learn, *where* and *when* they will learn, and *who* needs to learn

• View learning as *life-long and life-wide* activity

• Develop *adaptive* learning skills

• Bring state-of-the-art technology into learning in meaningful ways to engage, motivate, and inspire

• Provide *universal access* to learning opportunities
The Plan Treats Learning as Life-long and Life-wide

LIFE Center, 2007 (http://life-slc.org)
Learning Goal

All learners will have engaging and empowering learning experiences both in and outside of school that prepare them to be active, creative, knowledgeable, and ethical participants in our globally networked society.

- Revise, create, and adopt standards and learning objectives for all content areas that reflect 21st century expertise and the power of technology to improve learning.
- Develop and adopt learning resources that use technology to embody design principles from the learning sciences.
- Develop and adopt learning resources that exploit the flexibility and power of technology to reach all learners anytime and anywhere.
- Use advances in learning sciences & technology to enhance STEM learning, and develop, adopt, and evaluate new methodologies with the potential to enable all learners to excel in STEM.
Assessment

- Measure what matters
- Improve learning in the moment; don’t only measure it after the fact
- Use technology to measure complex competencies
- Create electronic learning records, similar to electronic medical records
- Aggregate and analyze data on a system level
Assessment Goal

Our education system at all levels will leverage the power of technology to measure what matters and use assessment data for continuous improvement.

- Design, develop, and adopt assessments that give students, educators, and other stakeholders timely and actionable feedback about student learning to improve achievement and instructional practices.
- Build the capacity of educators and educational institutions to use technology to improve assessment materials and processes for both formative and summative uses.
- Conduct research and development that explores how gaming technology, simulations, collaboration environments, and virtual worlds can be used in assessments to engage and motivate learners and to assess complex skills and performances embedded in standards.
- Revise practices, policies, and regulations to ensure privacy and information protection while enabling a model of assessment that includes ongoing student learning data gathering and sharing for continuous improvement.
Teaching

• 21st century teaching demands new competencies and tools

• Support “connected teachers” with flexible access to expertise, tools, and resources

• Provide professional learning opportunities that are collaborative, coherent, life-long & life-wide

• Ensure that every student has access to effective teaching
Connected teaching and long-tail learning

- Teachers will engage students and provide personalized learning with 24/7 teacher support. Online environments will ensure that every student has access to effective teaching.
Teaching Goal

Professional educators will be supported individually and in teams by technology that connects them to data, content, resources, expertise, and learning experiences that can empower and inspire them to provide more effective teaching for all learners.

- Design, develop, and adopt technology-based content, resources, and online learning communities that create opportunities for educators to collaborate for more effective teaching, inspire and attract new people into the profession, and encourage our best educators to continue teaching.

- Provide pre-service and in-service educators with preparation and professional learning experiences powered by technology that close the gap between students’ and educators’ fluencies with technology and promote and enable its use in teaching to improve learning, assessment, and instructional practices.

- Transform the preparation and professional learning of educators and education leaders by leveraging technology to create career-long personal learning networks within and across schools, pre-service preparation and in-service educational institutions, and professional organizations.

- Use technology to provide access to the most effective teaching and learning resources, especially where they are not otherwise available, and to provide more options for all learners at all levels.

- Develop a teaching force skilled in online instruction.
Infrastructure

- Learning resources must be “always on” and accessible anytime, anywhere, through any type of access device
- Move toward next-generation system architectures (cloud)
- Leverage devices students already own
- Support open educational resources
- Scale technical and instructional support
Infrastructure Goal

All students and educators will have access to a comprehensive infrastructure for learning when and where they need it.

- Ensure that students and educators have adequate broadband access to the Internet and adequate wireless connectivity both inside and outside school.

- 1:1 - Ensure that every student and educator has at least one Internet access device and software and resources for communication, multimedia content creation, and collaboration for use in and out of school.

- Leverage open educational resources to promote innovative and creative opportunities for all learners and accelerate the development and adoption of new open technology-based learning tools and courses.

- Build state and local education agency capacity for evolving an infrastructure for learning.

- Support “meaningful use” of educational and information technology in states and districts by establishing criteria to guide purchases made by states with federal funding.
Productivity

- Productivity gains come from *rethinking* processes, not only automating them
- Improve visibility into the data that matters, and develop comprehensive and coherent systems to capture it
- Define and track “meaningful use” of ICT in education
- Support student retention through smart progress tracking and online credit recovery classes
Productivity Goal

Our education system at all levels will redesign processes and structures to take advantage of the power of technology to improve learning outcomes while making more efficient use of time, money, and staff.

- Develop and adopt a common definition of productivity in education, and more relevant and meaningful measures of learning outcomes and costs.
- Improve policies and use technology to manage costs including those for procurement.
- Fund the development and use of interoperability standards for content, student learning data, and financial data to enable collecting, sharing, and analyzing data to improve decision-making at all levels of our education system.
- Rethink basic assumptions in our education system that inhibit leveraging technology to improve learning, starting with our current practice of organizing student and educator learning around Carnegie units or “seat time” instead of the demonstration of competencies.
- Design, implement, and evaluate technology-powered programs and interventions to ensure that students progress through our K-16 education system and emerge prepared for the workplace and citizenship.
Research and Development

• Achieving the vision in this Plan requires us to be leaders in the design of more effective learning and assessment systems
• Requires an R&D organization at the intersection of learning sciences, technology and education that is devoted to the public good
• Independent organization with the charter to identify and address R&D challenges
• Agency would target R&D that builds basic understanding and addresses practical problems
Grand Challenge Problems

1. Design and validate an integrated system that provides real-time access to learning experiences tuned to the levels of difficulty and assistance that optimize learning for all learners, and that incorporates self-improving features that enable it to become increasingly effective through interaction with learners.

2. Design and validate an integrated system for designing and implementing valid, reliable, and cost-effective assessments of complex aspects of 21st century expertise and competencies across academic disciplines.

3. Design and validate an integrated approach for capturing, aggregating, mining, and sharing content, student learning, and financial data cost-effectively for multiple purposes across many learning platforms and data systems in near real time.

4. Identify and validate design principles for efficient and effective online learning systems and combined online and offline learning systems that produce content expertise and competencies equal to or better than those produced by the best conventional instruction in half the time at half the cost.
www.ed.gov/technology

(taking public comment through May 6, 2010)