Rethinking the Big Hairy Technology Problems of K-12

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Serving K-12 technology leaders who through their strategic use of technology, improve teaching and learning.

Core Value
The primary challenge we face in using technology effectively is human, not technical.

Audience
School System Technology and education Leaders

For that reason, CoSN focuses on Leadership and Policy.
Big, Hairy Problem: Ubiquity & Access Gaps

The Bigger, Even More Hairy Problem: Human Capacity
Technologies to Watch

2012

ONE YEAR OR LESS:
- Mobiles & Apps
- Tablet Computing

TWO TO THREE YEARS:
- Game-Based Learning
  - Personalized Learning

FOUR TO FIVE YEARS:
- Augmented Reality
  - Natural User Interfaces

2013

ONE YEAR OR LESS:
- Cloud Computing
  - Mobile Learning

TWO TO THREE YEARS:
- Learning Analytics
  - Open Content

FOUR TO FIVE YEARS:
- 3D Printing
  - Virtual and Remote Labs
Technology & Innovation is happening in K-12 education but often in isolation and too slow...

One-off solutions vs. Ecosystems
Education ranks 55th out of 55 industries for IT Intensiveness.

-U.S. Department of Commerce Digital Economy, 2003
Why Hasn’t Tech “Transformed” Education?

Lack of Ubiquity
Only 13% of classrooms in US have a ubiquitous tech environment.

Layered
Mostly layered on top of what they’re already doing.

Time
Technology takes time to understand how to use in transformative ways.
<table>
<thead>
<tr>
<th>Year</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>1700</td>
<td>“Students today can’t prepare bark to calculate their problems. They depend upon their slates, which are more expensive. What will they do when their slate is dropped and it breaks? They will be unable to write!” (Teachers Conference, 1703)</td>
</tr>
<tr>
<td>1800</td>
<td>“Students today depend upon paper too much. They don’t know how to write on slate without chalk dust all over themselves. They can’t clean a slate properly. What will they do when they run out of paper?” (Principal’s Association, 1815)</td>
</tr>
</tbody>
</table>
Historical Concerns About “Technology” in Schools

“Students today depend too much upon ink. They don’t know how to use a pen knife to sharpen a pencil. Pen and ink will never replace the pencil.”
(National Association of Teachers, 1907)

“Ballpoint pens will be the ruin of education in our country. Students use these devices and then throw them away. The American virtues of thrift and frugality are being discarded. Business and banks will never allow such expensive luxuries.”
(Federal Teacher, 1950)
Wrong Question
»Should we invest in technology in education?
Better Question

» What should learning look like today that prepares students for today and tomorrow, making them college, career and life ready?
Big, hairy K-12 technology problem...
Ubiquity & Access
Ubiquitous Access
Lacking

Only 13% of Classrooms report one-to-one technology environments
Exception to Rule: Mooresville Graded School District, NC
5 years later

• Academic composite on state high stakes tests has improved from 68% to 89%, 2nd highest in state.

• 4-year cohort graduation rate improved from 68% to 90%, 3rd highest in the state.

• 100th out of 115 NC districts in dollars spent per student — $7,415.89 a year
Yet most say “can’t afford"

Even wealthier districts say they cannot afford the ongoing cost of a ubiquitous technology environment....
Figure 1. Family Technology Ownership and Child Use, Pre-K–12

Note: The 2,392 parents who answered this question were asked to report about child usage for all children, aged 3–18, in their families. Collectively, these parents have 4,164 children in this age range.

Source: Grunwald Associates LLC
Changes in smartphone ownership

- Smartphone:
  - May 2011: 35%
  - February 2012: 46%
  - May 2013: 56%

- Other cell phone:
  - May 2011: 48%
  - February 2012: 41%
  - May 2013: 35%

- No cell phone:
  - May 2011: 17%
  - February 2012: 12%
  - May 2013: 9%
Majority of teens can have cell phones at school but not in class

24% of teens attend schools that forbid having a cell phone at school at all times

12% of teens can have a cell phone at school at all times

62% of teens are allowed to have a cell phone at school, but not in class

1% don’t go to school, say it doesn’t apply

1% don’t know

86% can’t use cell phone in class
Bring Your Own (BYO) Strategies
Driven by Cost-Savings

Forsyth County, Georgia
Affluent district but couldn’t afford TCO of providing devices to every kid
Speak Up 2012 National Findings
From Chalkboards to Tablets

Benefits of mobile devices for schoolwork

- Extends learning beyond school day: Principals (59%), Teachers (53%), Parents (60%)
- Provides way for students to review materials anytime: Principals (84%), Teachers (77%), Parents (57%)
- Improves school to home communications: Principals (48%), Teachers (52%), Parents (50%)
- Increases student engagement: Principals (64%), Teachers (55%), Parents (50%)
- Personalizes learning: Principals (63%), Teachers (57%), Parents (48%)
Sounds Easy...but big challenges

» Distraction/Classroom Management
» Concerns of cheating
» Lack of skills & curriculum to use mobiles

The fears of adults (teachers, administrators & parents)
Sounds Easy...but big challenges

» Digital Equity
» Safety/Liability
» Bandwidth
» Tech Support
If done right...big opportunity

Literally overnight we could go from an average of one device for every four students to a ubiquitous environment in K-12.
**Speak Up 2012 National Findings From Chalkboards to Tablets**

The BYOD/BYOT trend – what a difference a year makes!

<table>
<thead>
<tr>
<th>Policy/Position</th>
<th>Admin 2011</th>
<th>Admin 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not allow</td>
<td>52%</td>
<td>37%</td>
</tr>
<tr>
<td>Discretion of building principal</td>
<td>16%</td>
<td>21%</td>
</tr>
<tr>
<td>Discretion of teacher</td>
<td>21%</td>
<td>32%</td>
</tr>
<tr>
<td>We provide devices</td>
<td>13%</td>
<td>18%</td>
</tr>
<tr>
<td>Evaluating BYOD/T</td>
<td>19%</td>
<td>28%</td>
</tr>
<tr>
<td>BYOD/T in place</td>
<td>17%</td>
<td>30%</td>
</tr>
</tbody>
</table>
99% of districts need additional Internet bandwidth and connectivity in the next 36 months.

43% of the school districts indicated that none of their schools can meet the SETDA goal of 100Mbps of internet access per 1,000 students today.

Only one quarter of districts report that 100% of their schools meet the goal.

*CoSN E-rate & Broadband Survey, Oct 2013*
20% of districts identified geography as a barrier to increasing connectivity in their schools.

10.5% say their Internet providers were either at capacity or could not expand capacity.

CoSN E-rate & Broadband Survey, Oct 2013
Poor Internal Networks

Can’t support broadband because of problems with internal connections/wiring, backbone in the school LAN and wireless networks

57% of districts do not believe their school’s wireless networks have the capacity to currently handle a 1:1 deployment

CoSN E-rate & Broadband Survey, Oct 2013
Half of school buildings have in part older, slower wiring (Cat5 and Cat3) that will not carry data at broadband speeds.

26% of districts are using slower copper or 2.3% wireless backbones in their school LAN

CoSN E-rate & Broadband Survey, Oct 2013
Poor Wireless Access

About 40% of classrooms are NOT equipped with wireless Internet connectivity.

CoSN E-rate & Broadband Survey, Oct 2013
Broadband at home – 68% of adults

December 2012

<table>
<thead>
<tr>
<th>Income Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $30K</td>
<td>47%</td>
</tr>
<tr>
<td>$30K-$50K</td>
<td>71%</td>
</tr>
<tr>
<td>$5K-$75K</td>
<td>86%</td>
</tr>
<tr>
<td>Over $75K</td>
<td>89%</td>
</tr>
</tbody>
</table>
South America

Uruguay Plan Ceibal

- 450,000 devices for students in grades 1-9
- Hotspots throughout the country

Report and blog
www.cosn.org/southamericadelegation
Social Inclusion & Equity

Not simply an education ICT program.

Driving ed transformation
Smart Education Networks by Design a CoSN leadership initiative

Design Guidelines & Checklist

FREE
www.cosn.org/SmartEdNetworks

Sponsored by
Qualcomm Technologies, Inc.
Comcast
Education Networks of America
Presideo
Transformation to a Technology-Rich Learning Environment

Emerging Reliance on Online Educational Tools and Resources

Basic Connectivity for Supplemental Enrichment

- Limited mobility and BYOD
- Wireless coverage, not capacity
- Some server virtualization
- Adequate business continuity
- Some online instructional services
- Limited directory integration and device management
- Marginally adequate internet
- 100M/1G and some 10G Core
- Category 5 and 5e cabling
- Fiber WAN—star/ring/hybrid
- VoIP or planning to implement

- Full mobility (1:1) and BYOD
- WWAN support for mobility
- Wireless coverage and capacity
- Many online resources, courses and instructional services with 24/7 availability
- Virtual school
- Cloud initiatives: IaaS/SaaS/EaaS
- Complete server virtualization
- Full business continuity with data replication as needed
- Deep directory integration for authorization and management of services and devices
- Substantial internet capacity from multiple providers
- 1GB/10GB+ core
- Category 5e and 6 cabling
- Fiber WAN—star/ring/hybrid
- Unified communications and VoIP

Capacity and Services

Time, Technology, and Investment
The BIGGER, hairy problem...US!
The BIG Problem
Is Human Capacity

To achieve what is needed

• **Superintendents** must understand their role in making the digital leap

• **Instruction** need new models and become more student-centered

• **Students and teachers** need more immediate feedback and be continuous learners

• **Technology leaders** must understand the educational environment, manage technology, and provide vision/leadership
New Skills Needed

Educational Leaders must understand their role in making shift from print to digital

Empowering the 21st Century Superintendent
www.cosn.org/superintendents
The Transformation Requires Leadership, YET

In 2009 only 51% of districts reported employing a full time individual responsible for ed tech leadership (32% PT)

Even in large districts nearly 20% do not have a FT position

National Center for Education Statistics (NCES), 
*Educational Technology in Public School Districts: Fall 2008* (Gray and Lewis, 2009)
Statistics for technology leader by poverty concentration are significant.

Wealthy districts 60% have a full-time technology leader. Drops to 47% in poorer districts.

National Center for Education Statistics (NCES), Educational Technology in Public School Districts: Fall 2008 (Gray and Lewis, 2009),
Essential Skills of the K-12 CTO

Defined by experts

- Expanded role of CTO as an education—not just technology—leader
- Defines best practices
- Identifies skills and knowledge that CTOs need to acquire or strengthen
- Basis for CTO certification
Superintendents & CETL

Administrators Guide
Tips & Info on how your district can leverage CETL

http://www.cosn.org/value-cetl-superintendents
Top Three Priorities of CTO’s

1. IT Assessment Readiness
2. Mobile Learning
3. Wireless Access

CoSN IT Leadership Survey, March 2014
www.cosn.org/itsurvey2014
Major IT Challenges

1) changing the culture of teaching
2) budget and resource limitations
3) breaking down district-wide silos
Becoming Assessment Ready

www.cosn.org/
becoming-assessment-ready
Coming Toolkit on Breaking Silos

Rethinking Educational Equity in a Digital Era:

Forging a Strong Partnership between District Title I and Technology Leaders
New Resource Allocation

SmartIT

» Less on textbooks
» More on digital content
» More on broadband

www.cosn.org/smartIT
New Pedagogy

Leadership for Mobile Learning

Administrators Guide

www.cosn.org/MobileLead
New Policies

In depth guide to FERPA, COPPA and related privacy issues

FREE from CoSN & Harvard Law

www.cosn.org/privacy

Protecting Privacy in Connected Learning
A CoSN Leadership Initiative

Sponsored by Microsoft
Rethinking State and School District Policies Concerning Mobile Technologies and Social Media

www.cosn.org/MakingProgress
Making Progress
Recommendations

» Banning not the answer
» Educate students on responsible use
» Emphasize professional development on safe and effective use
» Rethink and revise acceptable use polices (AUP)
Be not afraid