Rethinking the Big Hairy Technology Problems of K-12

NM CTO Clinic
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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
Key Trends 2015

LONG-TERM TRENDS
• Rethinking How Schools Work
• Shift to Deeper Learning Approaches

MID-TERM TRENDS
• Increasing Use of Collaborative Learning Approaches
• Shift from Students as Consumers to Students as Creators

SHORT-TERM TRENDS
• Increasing Use of Hybrid/Blended Learning Designs
• Rise of STEAM Learning
Significant Challenges

2015

**SOLVABLE CHALLENGES**
- Creating Authentic Learning Opportunities
- Integrating Technology in Teacher Education

**DIFFICULT CHALLENGES**
- Personalizing Learning
- Rethinking Roles of Teachers

**WICKED CHALLENGES**
- Scaling Teaching Innovations
- Teaching Complex Thinking
Important Developments In Ed Tech 2015

ONE YEAR OR LESS
- Bring Your Own Device (BYOD)
- Makerspaces

TWO TO THREE YEARS
- 3D Printing/Rapid Prototyping
- Adaptive Learning Technologies

FOUR TO FIVE YEARS
- Badges/Microcredit
- Wearable Technology
<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Near Term - One Year or Less</strong></td>
<td>Cloud Computing</td>
<td>Cloud Computing</td>
<td>Mobile Devices &amp; Apps</td>
<td>Cloud Computing</td>
<td>BYOD</td>
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<tr>
<td><strong>Collaborative Environments</strong></td>
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<td>Mobiles</td>
<td>Tablet Computing</td>
<td>Mobile Learning</td>
<td>Cloud Computing</td>
</tr>
<tr>
<td><strong>Mid Term - Two to Three Years</strong></td>
<td>Mobiles</td>
<td>Game-Based Learning</td>
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<td>Learning Analytics</td>
<td>Games and Gamification</td>
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<td><strong>Game-Based Learning</strong></td>
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<td>Open Content</td>
<td>Personal Learning Environments</td>
<td>Open Content</td>
<td>Learning Analytics</td>
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<tr>
<td><strong>Far Term - Four to Five Years</strong></td>
<td>Augmented Reality</td>
<td>Learning Analytics</td>
<td>Augmented Reality</td>
<td>3D Printing</td>
<td>The Internet of Things</td>
</tr>
<tr>
<td><strong>Flexible Displays</strong></td>
<td>Flexible Displays</td>
<td>Personal Learning Environments</td>
<td>Natural User Interfaces</td>
<td>Virtual &amp; Remote Laboratories</td>
<td>Wearable Technology</td>
</tr>
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Impact

Technology & Innovation is happening in K-12 education but often in isolation and too slow...

One-off solutions vs. Ecosystems

Hero mentality
Why?

Lack of Ubiquity
Majority of classrooms in US do not 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>Quote</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>
<tr>
<td>Year</td>
<td>Concern</td>
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<tr>
<td>1900</td>
<td>“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)</td>
</tr>
<tr>
<td>1950</td>
<td>“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)</td>
</tr>
</tbody>
</table>
Old Debate

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
District implementation levels of 1:1 computing in 2014

• 31% substantial (vs. 23% in 2013)
• 45% partial
• 25% not at all

MDR survey
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
Even wealthier districts say they cannot afford 1-to-1
Benefits of mobile devices for schoolwork

- Extends learning beyond the school day: 67% of Principals, 59% of Teachers, 49% of Parents
- Provides way for students to review materials anytime: 64% of Principals, 60% of Teachers, 67% of Parents
- Improves school to home communications: 62% of Principals, 57% of Teachers, 59% of Parents
- Increases student engagement: 87% of Principals, 77% of Teachers
- Personalizes learning: 69% of Principals, 59% of Teachers, 48% of Parents

© 2015, Project Tomorrow
Majority of teens can have cell phones at school but not in class

- 1% don’t go to school, say it doesn’t apply
- 1% don’t know
- 12% of teens can have a cell phone at school at all times
- 24% of teens attend schools that forbid having a cell phone at school at all times
- 62% of teens are allowed to have a cell phone at school, but not in class

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
Sounds Easy... but big challenges

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

*Adult fears*
Not to mention...

- 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.
2015 CoSN IT Leadership Survey

Does your district have a BYOD/BYOT policy as part of a 1:1 initiative?

- District has fully implemented BYOD/BYOT 13.6%
- Currently working on large scale BYOD/BYOT implementation 11.9%
- Piloting BYOD/BYOT in some areas, to study large scale adoption 16.3%
- Discussions or planning for BYOD/BYOT project 29.4%
- No BYOD/BYOT interest 28.9%
Affordability and adequate funding are most significant barriers

Only 9 percent of the districts have adequate bandwidth for online assessments/digital content over the next 18 months.

1/4 of districts reported that not a single school could meet the US short-term goal of 100Mbps / 1,000 students.

45% of school districts do not have the capacity to deploy a 1:1 initiative.

CoSN/AASA E-rate & Infrastructure Survey, fall 2014
Affordability

10% of rural districts pay over $250 per Mbps per month
Some pay staggering $800 per Mbps.

Consortia – 2/3rds of districts use consortium buying services for bandwidth/Internet access – up from 44 percent last year.

CoSN/AASA E-rate & Infrastructure Survey, fall 2014
Lack of Capacity & Competition

More than 1/3 districts have three or more days of Internet down time a year.

32% of US school systems have no choice for Internet services (6% got no bid/26% received one bid).

Biggest problems in rural areas. Slower connections / less robust Wi-Fi.

CoSN/AASA E-rate & Infrastructure Survey, fall 2014
Broadband at home – 68% of adults
December 2012

- Under $30K: 47%
- $30K-$50k: 71%
- $5K-$75K: 86%
- Over $75K: 89%
Uruguay’s Plan Ceibal

450,000 devices for students in grades 1-9

Hotspots

www.cosn.org/southamericadelegation
Design Guidelines & Checklist

FREE
www.cosn.org/SmartEdNetworks
Transformation to a Technology-Rich Learning Environment

Emerging Reliance on Online Educational Tools and Resources

Basic Connectivity for Supplemental Enrichment

- Limited or no wireless
- No server virtualization
- No business continuity
- 100MB/1GB core
- Limited Internet
- Category 3 or 5 cabling
- Limited or no fiber for WAN/LAN
- Analog voice, POTS

- Limited mobility and BYOD
- Wireless coverage, not capacity
- Some server virtualization
- Adequate business continuity
- Some online instructional services
- Limited directory integration and device management
- Marginallly adequate Internet
- 100M/1GB and some 10GB 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
5 Imperatives for Technology Leadership:

- Strengthen District Leadership and Communications
- Raise the Bar with Rigorous, Transformative and Innovative Learning and Skills
- Transform Pedagogy with Compelling Learning Environments
- Support Professional Development and Communities of Practice
- Create Balanced Assessments
4 Action Steps for Strengthening the Technology Leadership Team:

- Recognize and better understand the evolving role of the CTO
- Identify the role of the CTO in the district structure, preferably in the cabinet
- Help guide the CTO interview and hiring process, seeking candidates with CETL credentials.
- Target professional training needs to build your technology staff to the CETL level.
Practical Tools: Self Assessments

**Self-Assessment for Superintendents**

**District Leadership Team Assessment**

**CTO Self-Assessment**

www.cosn.org/superintendents
Practical Tools to Build Your Team

- Chief Technology Officer Job Description
- Interview Questions for Hiring an Educational Technology Leader
- Evaluation Rubric for the Chief Technology Officer
- CETL Certification for Educational Technology Staff
- References and Resources for Professional Learning

www.cosn.org/superintendents
FR AM E W ORK
of Essential Skills of the K-12 CTO

Leadership & Vision
Educational Environment
Managing Technology

www.cosn.org/framework
www.cosn.org/certification
Framework of Essential Skills of the K-12 CTO

I. Leadership + Vision

- Leadership + Vision
- Ethics + Policies
- Strategic Planning

II. Understanding the Educational Environment

- Instructional Focus + Prof. Development
- Team Building + Staffing
- Stakeholder Focus

III. Managing Technology & Support Resources

- Information Technology Management
- Communication Systems Management
- Business Management
- Data Management
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<th>Priorities</th>
<th>2013</th>
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<th>2015</th>
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<tr>
<td>#1</td>
<td>BYOD</td>
<td>Assessment Readiness</td>
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<tr>
<td>#2</td>
<td>Assessment Readiness</td>
<td>Mobile Learning</td>
<td>Wireless Access</td>
</tr>
<tr>
<td>#3</td>
<td>Broadband Access</td>
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Assessment Readiness

If Common Core or state-wide, high-stakes online assessments were implemented tomorrow, to what extent would your district be ready to implement them?

- Fully prepared for online assessments 28.2%
- Almost ready for online assessments 34.2%
- Half-way to online assessments 18.9%
- Just began to prepare for online assessments 14.4%
- No resources for online assessments 4.3%
## Top 3 Challenges

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<td>#1</td>
<td>Budget constraints and lack of resources</td>
<td>Changing the culture of teaching to student-centered&lt;sup&gt;20&lt;/sup&gt;</td>
<td>Budget constraints and lack of resources</td>
</tr>
<tr>
<td>#2</td>
<td>Changing the culture of teaching to student-centered</td>
<td>Budget constraints and lack of resources</td>
<td>Relevant training and professional development unavailable*</td>
</tr>
<tr>
<td>#3</td>
<td>Breaking down silos within the district</td>
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<td>Existence of silos in the district, which make it difficult to work together on technology planning</td>
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Becoming Assessment Ready

www.cosn.org/becoming-assessment-ready
In depth guide to FERPA, COPPA and related privacy issues
FREE from CoSN & Harvard Law
www.cosn.org/privacy

10 Steps Every School District Should Take Today
Security Questions to Ask Service Providers
Infographic
Rethinking State and School District Policies Concerning Mobile Technologies and Social Media

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

www.cosn.org/AUPGuide

www.cosn.org/MakingProgress
Rethinking Educational Equity in a Digital Era:

Forging a Strong Partnership between District Title I and Technology Leaders

www.cosn.org/digital-equity
How Do You Find The Resources?

- Reallocating
- Showing Value of Investments
- Breaking Down Silos
- Budgeting for Sustainability
Thinking Strategically

Not simply buying stuff
But thinking differently about how technology can be a catalyst for improved learning.
**Continue.** The school district is already following best practices in this area and the area in question is of high value and impact.

**Focus.** Look for areas where technology is most valuable.

**Consolidate.** Mark areas of duplication or gaps of effort or parallel processes that can be mitigated with a change in workflow and/or governance.

**Initiate.** Technology processes that provide economies or that are mandates fall into this category.

**Stop.** Ruthlessly eliminate processes, deployment practices and service models that have no recognized value, are too expensive to be done well or have little positive impact on the educational environment in your school district.
• Determining costs and benefits
• Value of investment
• Evaluation tools

www.cosn.org/smartIT
Leading the Digital Leap

LeadDigitalLeap.org
Be not afraid
Save the Date!

CoSN 2016 Annual Conference 🌸 April 4-7, 2016 🌸 Washington, D.C.

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