State of Technology: Education

I.T. POWERS LEARNING

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State of Technology: Education

IT Powers Learning

Why should I **read this?**

This guide isn't something you read. It's something you talk through with school and district leaders as you work through your 3-year plan. The guide is arranged in a way to spark discussion, debate, and further research.

What can I expect?

We've arranged content into categories and checklists, each with helpful descriptions that can kickstart conversation.

Contents in this document include:

- Overview of job roles and departments affected by technology decisions
- Outline of the ideal infrastructure for a school
- A framework for prioritizing IT expenses with regard to student success
- Checklist of tech solutions supporting student success
- Checklist of tech solutions supporting operational efficiency
- List of emerging technologies which are likely to influence education in the future

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What are your sources?

The information contained in this document comes from a variety of sources on educational technology, including ...

- The Every Student Succeeds Act
- National Educational Technology Plan
- Future Ready Schools Framework
- Horizon Report for 2016
- WebMediaGroup Top Tech Trends
- Project Tomorrow SpeakUp 2014 Report
- Draft 2 of the ISTE Standards for Students 2016
- A variety of Pew Research Studies, including ones on gaming, privacy, and Internet use

The Challenge

The challenge of any educational institution is how to identify and improve student success - which may be defined in a number of ways -- while being responsible stewards of limited funds. Below are just a few examples of some of the many success metrics and influences on fiscal stability.

How do we improve student success...

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- GPA
- Global Ratings
- College & Career Readiness
- Standardized Test Scores
- Graduation
- Non-Cognitive Competencies

... and maintain fiscal responsibility?

- Enrollment
- Funding Sources
- Highly Qualified Teachers
- Operational Efficiencies

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The Foundation

A Great **Team**

Considering the requirements of people and infrastructure is the foundation of every effective technology adoption.*

As an initial exercise, examine the diagram above with your team in light of your most recent technology initiative. Whose input was most important? Least? Who was affected in ways you didn't anticipate?

**ISTE's Essential Conditions*

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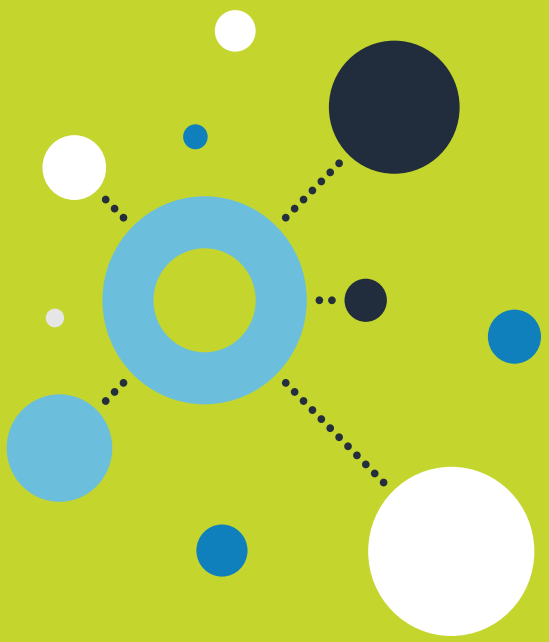
The **Foundation**

Considering the same initiative, of the elements below, what technical requirements were examined? Which were not? What unexpected technical requirements appeared as the project moved forward?

A Great Infrastructure

- **Fiber Connection** - Your physical Internet connection. FCC's recommended bandwidth is 100 Mbps / 1000 students*
- **Firewall** - The first point of contact between your network and the Internet. It contains advanced security features and can prioritize educational traffic.
- **Internet Filtering solution** -- Filters provide visibility and accountability around web traffic.
- **Switching and Cabling** -- These must be configured to allow the greatest bandwidth possible to computers and access points
- **Access Points** -- Access points are the last connection between the Internet and your mobile device. They should be cloud-managed, customized to enable access to 1:1, BYOD, and / or guests, and up to standards that allow the greatest distribution of bandwidth to teacher and student devices.
- **Local server(s)** -- One or more local servers allow schools to implement a domain environment that enables solid printing and local, secure access to private information and onsite databases.
- **Backup Solution** -- Offsite backup is crucial to restoring data has been compromised.



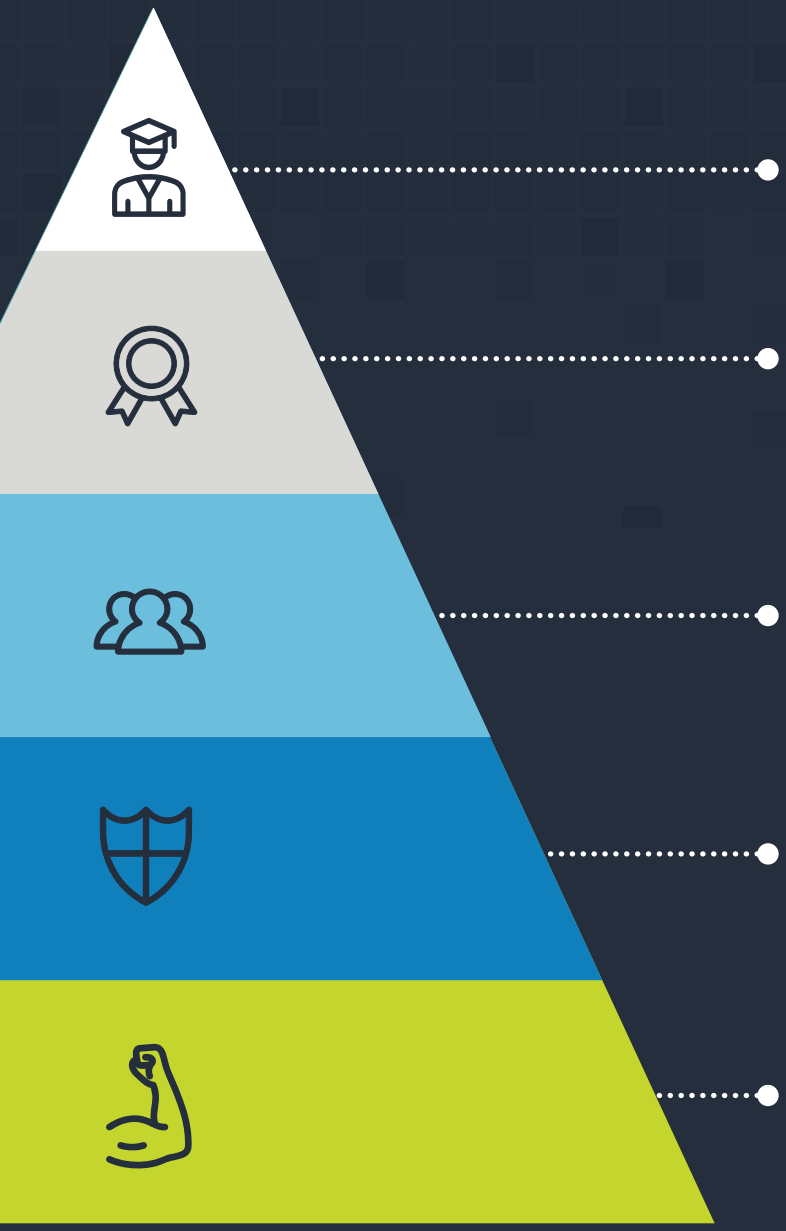
**from CoSN's 2015 Annual ERate and Infrastructure Survey*

Transitioning to Success

The purpose of these two exercises is to shed light on any cracks in the foundation your team is laying for subsequent initiatives. As we transition into a discussion on student success, it is important to note that a strong team and infrastructure supporting such initiatives must be ensured prior to moving forward..

Student **Success**

Elements contributing to student success may be organized according to their influence on Maslow's Hierarchy of Needs, summarized below. The following pages outline how IT plugs in to each level. Arranged in this way, we get a picture of how different technology initiatives contribute to advancing a child toward a self-actualized understanding of the world.



SELF ACTUALIZATION
*"The individual is doing what he is fitted for."**

ESTEEM
Respect for one's self and a positive reputation within one's community

BELONGING
A place within the community

SAFETY
Protection from the elements, danger, illness, disorder, etc.

PHYSIOLOGICAL
Physical, biological needs like food and water

*from A Theory of Human Motivation by A. H. Maslow (1943)

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01: Physiology

The physical realities of your students' experience can markedly improve through the conscious application of technology in terms of the software and services below.

Contributors to Student Success	How IT Plugs In
Health Records	SIS, Electronic Health Records
Food Service	Confidential Point of Sale
Transportation	Intelligent Routing and Pick Up
Facilities	Work Order System
Community Partners	Data integration for care outside of school

Questions for Your Team:
• How are we automating the movement of people, whether of students or employees?
• How long are stakeholders waiting to be picked up, to be fed, to be diagnosed?
• Where might we gain efficiencies in the way we exchange information when a student transfers schools or qualifies for homeless services?
• How long does it take our team to maintain our facilities, resolve mechanical or IT-related issues?
• What tools or processes are we using to capture this data?

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02: Safety

Ensuring children's safety - physical, emotional, and digital - involves both the tools below as well as a solid set of policy statements about each, implemented with care and fidelity.

Contributors to Student Success	How IT Plugs In
Counseling	Digital referrals - from teachers and students
Scheduling	SIS, Website / Google Calendar
Messaging	Robocall and SMS to Parents
Internet Filtering	Proactive Algorithms To Alert Administrators
Physical Security	Secure Entry and Camera Systems
Digital Security	Data privacy tools

Questions for Your Team:
• What tools does your counseling department leverage to promote early detection of student difficulties?
• Does your Internet filtering application include proactive algorithms to detect language that indicates harm to self or others?
• To what degree are current messaging systems effectively communicating with students/ parents / staff regarding school events? Schedule changes? Emergency situations?
• How well have our existing security systems aided our team in discipline or police investigations?
• What tools or approaches are employed to ensure student data is secure and private?
• What policies exist that guide communication within and outside the school community?

03: Belonging

IT can help adults assess and promote their students' sense that they each have a unique and valued place in their community. It can also connect faculty and staff to form a sense of community in a discipline that often isolates.

Contributors to Student Success	How IT Plugs In
Engagement	Database of student involvement, regular climate surveys
Clubs and Activities	Promote through social media, and connect to similar clubs around the world
Athletic Programs	Promote team achievements through social media, improve performance through apps like Ubersense and Coach's Eye
Teacher Development	Cultivate Digital PLN through social media, increase feedback through use of video
Teacher Well-Being	Digitize paperwork inefficiencies through tools like Google Drive and Google Classroom

Questions for Your Team:
• How are we tracking student participation in activities? How often do we examine this metric and engage students in conversations around school involvement?
• How are we promoting our clubs / activities / teams through digital channels that connect with our students?
• How are we connecting our clubs / activities / teams with other organizations around the globe?
• How are we leveraging technology to build community within our buildings?
• How is technology removing burdens from teachers so they can have more energy to focus on relational elements of the classroom?

04: Esteem

Beyond safety and belonging, students want to see tangible evidences of success - whether gauged against a benchmark or a group of their peers. Esteem is the arena of prototypical pedagogy, and here IT can accelerate learning.

Contributors to Student Success	How IT Plugs In
Publish Student Work	Blogs, e-portfolios, social media
Collaborative Creation	Google Docs, Google Hangouts, LMS
Academic Progress Measures	Tools to analyze student progress and track intervention
College and Career Explorations	Counseling tools like Naviance, digital curricula like Project Lead the Way
Competency-based Curriculum	SIS that handles Standards-based grading

Questions for Your Team:
• To what degree does your grade reporting system represent what a student knows as opposed to how she or he behaves?
• What academic progress measurements are being analyzed, how are they communicated to faculty, and what improvements might be made to the process?
• How are students curating evidences of their own growth over time? How well can they describe what they have learned over the past year?
• How often is each student sharing his or her academic work outside the classroom?
• What tools and processes are in place to help students investigate their own strengths and career/college interests?

05: Self Actualization

The self-actualized person is the ideal of any educational pursuit. While IT has been a scaffold and assistant at other levels, here the emphasis is on IT implementation that enables self-determined choice.

Contributors to Student Success	How IT Plugs In
Leadership Opportunities	Student participation in IT decision-making process; Student-led Help Desk to solve tech issues
Personal Branding	LinkedIn / about.me portfolio
Personalization	BYOD Infrastructure and Policy
Problem Finding	Finding / Collecting Data and Analyzing towards a Solution
Entrepreneurship	Makerspace / 20% Time Tools and Opportunities

Questions for Your Team:
• To what degree is student voice valued and encouraged in the IT decision-making process?
• What opportunities exist within your school that allow students passionate about technology to support the work of IT?
• How well does your school graduate students who maintain and cultivate a positive personal online presence? How are faculty and staff coaching these practices in your earliest learners?
• Does your infrastructure and responsible use policy support BYOD?
• How often are your students finding problems in addition to solving them? Can they articulate the tools they use to do so?
• What spaces exist within your school that promote independent creative pursuits?

Fiscal Stability and IT

IT is an operational as well as instructional investment. Below are some ways IT plugs into the economic realities of a school as well as a few questions about how effectively IT is employed in your environment.

IT in Funding Mechanisms:

Accounting Software

Health Records Software and Compliance

CRM for Advancement purposes

Fundraising / Auction software to track giving

Grant Clearinghouses online

- Grants.gov
- "Dear Colleague" letter for the use of ESEA funds
- GetEdFunding.com

Questions for discussion:

- How are we using fundraising data to analyze patterns of giving, inform engagement practices, and predict fundraising levels 3 - 5 years out?
- What processes do we have in place that govern the collection and updating of health records? Might any of those processes be automated, such as generating SMS texts for those families that drop out of compliance or collecting digital signatures rather than paper forms?
- How many grants have we applied for in the past three years? How many have we won? Is there a common set of metrics many grants wish to see? How might that data be quickly accessed and consistently updated?

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Fiscal Stability and IT

IT in Enrollment

Communications

- Website / Content Management System
- Social Media (Facebook, Twitter, Instagram, etc.)
- E-mail Marketing Software

Admissions

- Prospective student database
- Digital application process

Teacher Attraction and Retention

- Candidate management software, often with video review capabilities
- Personality and knowledge assessment tools
- Teacher evaluation and feedback tools

Questions for discussion:

- What sort of analytics are you collecting around your communication channels? To what degree are you aware of what content generates the most engagement with your students, parents, and larger community?
- Where are you gathering and tracking information on prospective students? In what ways might you use this data to tailor student visits?
- Once students are enrolled, how might their data be used to inform matriculation activities and faculty teaching practices?
- Average teacher attrition by the end of the fifth year is somewhere between 17% and 50%. In what ways has your school assessed the knowledge, teaching habits, and personality of the candidates you screen? What patterns do you look for as a team when making a hire? What coaching structures do you have in place to beat national attrition rates?

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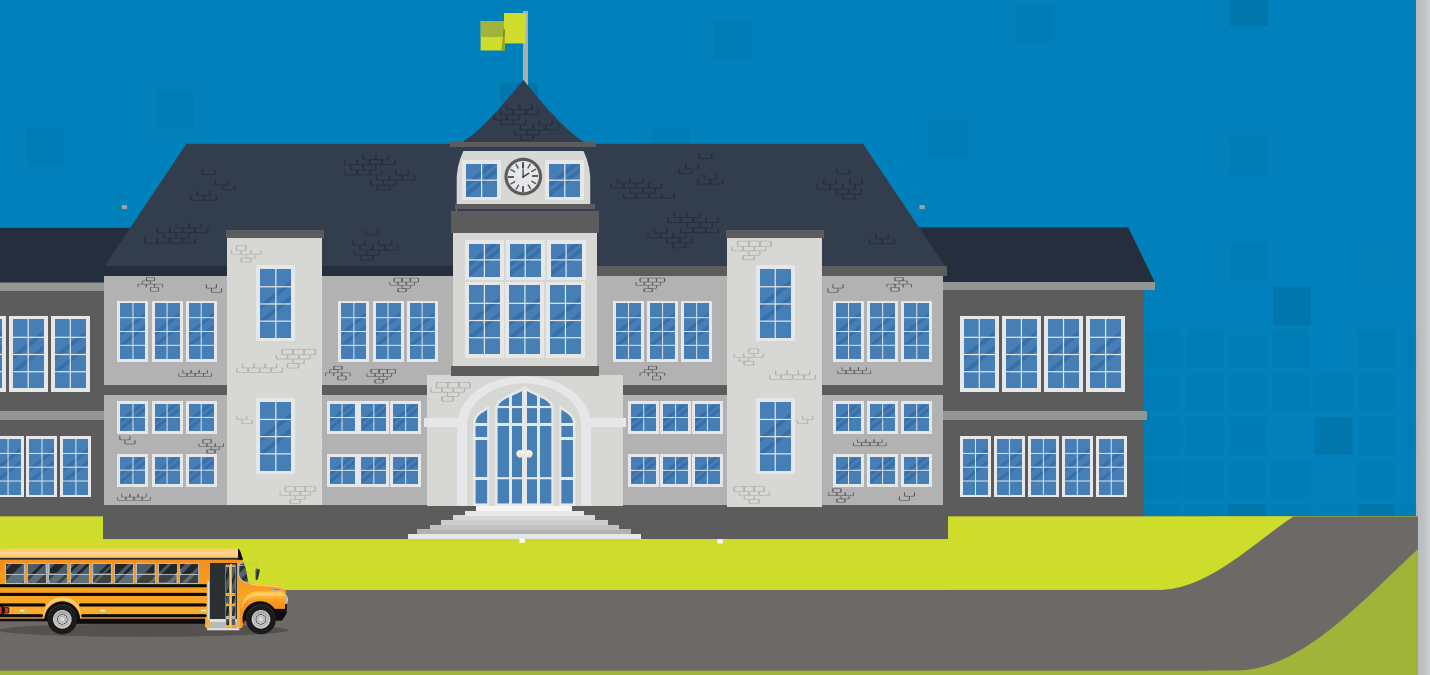
Fiscal Stability and IT

IT in Operations

- **Work order software for custodial, transportation, facilities, and IT**
- **Asset Management software**
- **Registrar Software**

Questions for discussion:

- To what degree are you measuring time to close out work orders? What efficiency measures drive the timeliness of work at your school?
- To what degree are you aware of how loss or damage is affecting your assets? What patterns have you observed? What processes might improve loss or damage rates if changed?
- How efficient is your registrar process? Could that task take less time, freeing a person up for other duties?



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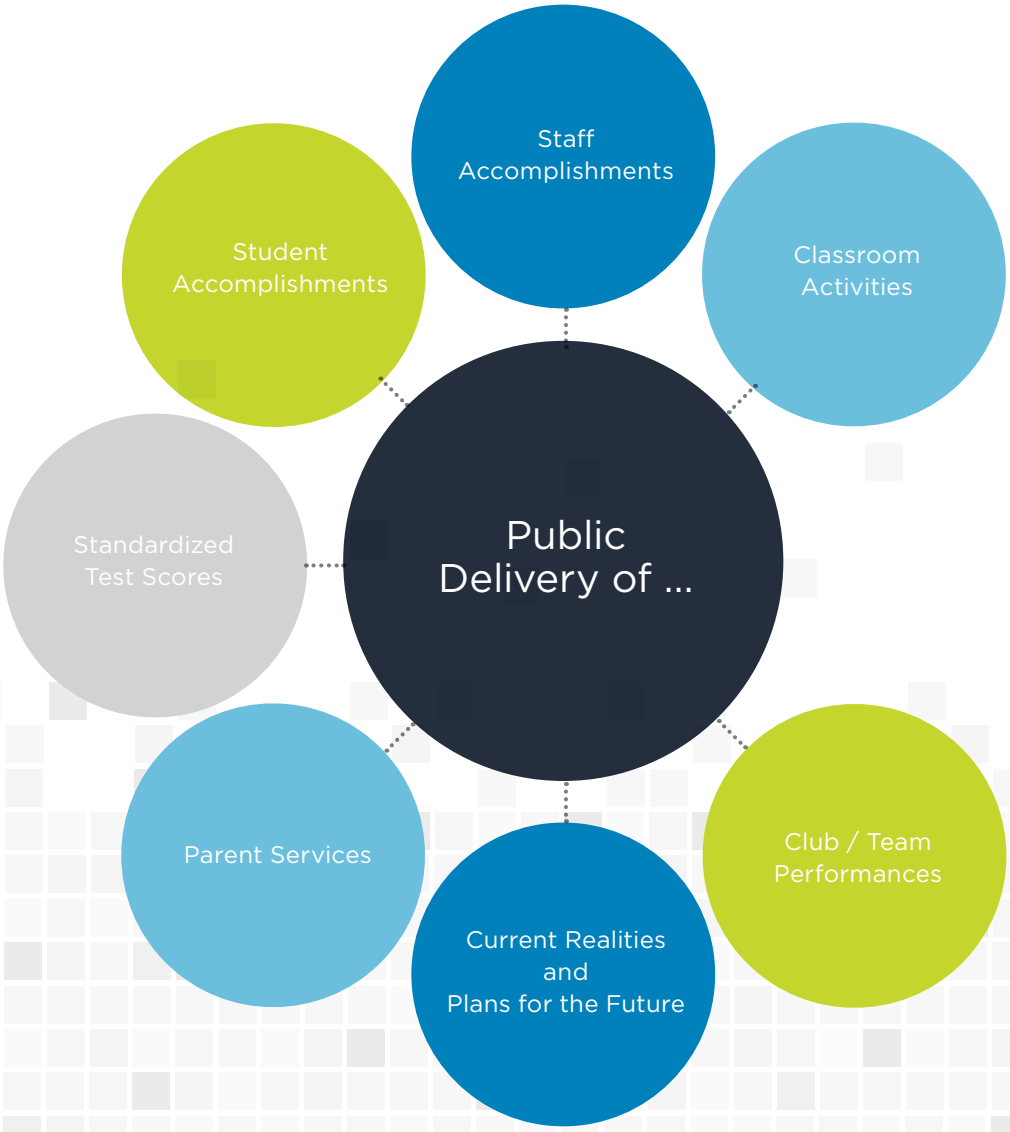
The Power of **Public Delivery**



Funding mechanisms and Enrollment are heavily dependent on the delivery of student success measures. But success in a vacuum won't invite others to participate in your work. When results are delivered publicly, the larger community is encouraged to increase their degree of participation in the school's mission based on what they have heard or seen. How are you publicizing the efforts outlined above?

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and the **future?**

Emerging tools and approaches force educators to wrestle with not only teaching practices, but sincerely held values regarding academic performance, assessment practices, relationship-building, and what it means to be successful.

The following pages include such emerging technologies. Mention is not meant as endorsement on our part. These technologies simply stand a very real chance of changing how members of our society interact, and learn.

School leaders who wish to be a part of shaping what learning looks like should engage in discussion regarding these technologies so that they are prepared to make wise decisions, regardless of whether these particular technologies are employed in their schools.

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The Future of **Physiology & Safety**

Our assessment of well-being and safety are increasingly becoming quantified. The principal tension centers around the opportunities for improving our health and the implications of creating (and sharing) such a large amount of personal data with third parties.

Wearable technology

- Wearable technologies give us greater transparency of our fitness, our emotional state, and our readiness to learn. How might these technologies be employed to help a teacher "read" a class of students? What policies in your school currently govern the amount of data collected on students and the duration it is stored?

Privacy

- As schools increase their collection of data, including biometric data, privacy concerns continue to increase. How is your school checking in on the security of student data?
- The adoption of the IPV6 standard is allowing more and more devices (and clothing) to be located, tracked, and controlled from the Internet. What implications will there be in a world without anonymity?

Personal Safety

- As more personal information makes it online, Internet mobs can increasingly threaten physical harm. How are we preparing students to recognize "group think" on the Internet and understand practical steps to weather the storms? How is your school leveraging existing algorithms to detect searches that indicate harm to self or others?
- Security cameras will add ever-improving facial recognition, even in the dark. To what degree does your administration plan to use this data to determine absenteeism or curb tardiness?

The Future of **Belonging**

People feel connected in responsive environments. Google's "Happy Birthday" doodle timed to arrive the appropriate day for each Google + account seems personal, even though it's an algorithm. As personal data increases, so do possibilities for tailored experiences of the world.

Personalized Information

- Web-based advertising is increasingly targeted through analysis of browsing behavior. How does your website respond to repeat viewers?
- Physical items like your phone can be detected by other machines when in close proximity, pushing contextual messages based on physical location. If your public display boards could sense who had paused in front of them, what messages might you display?

Augmented Community

- Virtual Reality (VR) continues to gain traction in the consumer space, for both gaming as well as virtual tours. Google Cardboard and Oculus Rift lead this space, but are being followed by a number of new startups. How are your leadership teams preparing to leverage virtual spaces or technologies to help students understand the world? How might students be coached to balance every increasing digital spaces with face-to-face relationships?
- Augmented Reality (AR) tools like Google Translate, MagicLeap, and Aurasma are location-aware, providing context-specific information as we need it. What stories could you tell if a student could launch a video simply by holding up her phone in front of the main office? What would it mean to student equity if delivery of important information depended upon accessing it through the lens of a mobile device?
- Video games play an increasing role in creating community for both boys and girls. How is your school community leveraging console or computer games in community-building, as well as coaching students on how to balance their gaming time with face-to-face relationships?

The Future of **Esteem**

Tracking and assessing success indicators, both external and internal, are central to a person's development. But what happens when tools appropriate tasks that once separated the "successful" from the "unsuccessful"?

Esteem

- Students will have ever-increasing access to anonymous, large-scale "Synthetic Data Sets". How are we preparing students to analyze such sets of data, and to investigate the methods used to gather data with a critical eye?
- So-called "Deep Learning" tools are enabling computers to out-think humans using algorithms called "digital neural networks", processing data in ways similar to the human brain. What human tasks might these algorithms replace? With those tasks replaced, what additional work might humans be able to do?
- Data warehousing enables predictive analytics and might guide academic and social interventions ahead of self-reporting. Some of these analyses are already allowing schools to identify struggling students prior to reporting from teachers. What analytic layer is your school applying to its data and what interventions are you designing based upon those early warnings?
- Artificial Intelligence algorithms are now creating full news articles where rich datasets exist (sports, financial sector) and being "hired" by outlets like the Associated Press to fill roles previously held by reporters. How well are we helping students to understand and then break from the "forms" of writing, in order that they produce quality work that would provide information beyond the work of a machine?

The Future of **Self-Actualization**

Tracking and assessing success indicators, both external and internal, are central to a person's development. But what happens when tools appropriate tasks that once separated the "successful" from the "unsuccessful"?

Self Actualization

- As schools (and businesses) wrestle with the value of physical attendance, competency-based metrics will have an effect on how an individual defines herself. If your school is considering a standards-based approach to measuring academic success, what tools will you need to track such progress?
- As consumers continue to purchase computing devices ever smaller and more cost-effective, how will your school approach the BYOD environment, even if already 1:1? How will your network be secured? What policies, and social patterns, exist to promote healthy use of those tools?

The Future of **Fiscal Stability**

Fiscal stability will continue to operate through similar channels, but with new tools that improve efficiency.

Funding

- Funding for digital device programs has often come by adjusting funds from textbook budgets. Open Educational Resources (OER), copyright-free digital texts accessible at no cost, are being promoted by the US Department of Education as a viable solution. To what degree is your existing curriculum prepared to move to paperless form, if not there already?
- As districts build cases for the work they do and the challenges they face, the collection, analysis, and presentation of increasingly large datasets becomes vital. How will your school or district develop existing staff in these disciplines or to hire staff with this skill set?

Enrollment

- Personality algorithms are increasingly used as a part of hiring processes and team formation. How are your hiring teams leveraging these tools? How is your school preparing each student to understand his own personality and the effect that personality has on his future?
- Disruptive educational patterns, such as MOOCs and the rise of micro-credentials, will force brick-and-mortar institutions to identify and promote the face-to-face value proposition of their schools. How has your school folded the online learning experience into student experience? To what degree do your admissions materials connect the social value of your school to student outcomes?

Efficiencies

- iBeacon technology will supplant time-clock software, automatically recognizing when an employee walks through the front door. The same technology might also be used to verify the person's location throughout the day and suggest time-saving patterns to improve performance. To what degree might your organization adopt such practices?
- The Internet of Things will continue the trend towards green operations, where machines will use shared information to determine appropriate ways to meet needs like light, heat, and power. What systems in your environment could improve if they worked as a coordinated whole?

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IT touches almost every part of a school.

IT should accelerate learning.

For more information about how partnering with GadellNet can streamline IT for your school, contact us.

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