Education Technology

Moving Toward Total Technology Integration in K-12

White Paper by Vicky Wooten, MBA, Public School Teacher

Includes Excerpts for the National Education Technology Plan (NETP)
Contents

The Need for Radical Change in Education
   Technically the Rest of the World has Left K-12 Behind

21st Century Competencies
   Computer Based Teaching & Learning

Personalized & Blended Learning

Student Engagement
   Content Creation & Project Based

Real Word Learning Experiences

Funding Implementation
   Identifying Necessary Resources

Uncle Sam’s Role
   Programs that Fund Technology Education

The Marriage of Education & Technology Expertise
   Human Resources & Specifications Gathering

Unrelenting Numbers & Academic Needs of Students
   The Need for Individualized Instruction

Conclusion: The Argument for Comprehensive Education Technology Integration
The Need for Radical Change in Education

Change is hard, especially when it comes to altering, “The System.” Believe it or not, we are the system. Parents, teachers, administrators or public officials, we all play an intricate role in maintaining the status quo. If a kid tells their parents that her school doesn’t have textbooks, that parent might think something is wrong with the school, because that is how it’s always been. Teachers and college professors were educated by The System; passed its way of doing things down to us and we are passing it down to today’s kids.

Are we ready to trade in our warm and cozy text books and worksheets for cloud-based laptops with sophisticated learning management systems (LMS)? Systems that store, process lessons, grade them/assess student learning and differentiate instructions to address the individual needs of students. Once the transition from the old to the new way of doing things is done, it is the difference between the horse and buggy, the automobile and then to the air plane, the paper map to GPS. You get the picture: faster, easier and much more efficient.

Even computer labs need to be deemed outdated and replaced with thoroughly technology integrated math, language arts, science and social studies; while adding video production and coding to these core subjects. We put students at risk when education doesn’t keep up with the world around us and possibly guarantee their place in low level jobs at the bottom of the economic ladder. This is especially true for economically challenged students whose only primary chance for accessing equality is through quality education. They often do not have computers and the Internet at home.

One of the most important aspects of technology in education is its ability to level the field of opportunity for students.
—John King, U.S. Secretary of Education

21ST Century Competencies

Furthermore, it is not just about having computer access, but how they are being utilized. It is imperative that students and teachers are introduced to truly technology integrated usage that impacts education in profound ways. Just the very use of technology in sophisticated ways builds students’ computing skills.

By 2020, there will be one million open jobs in computing nationwide, our youth cannot afford to be excluded from this $500 billion dollar opportunity.
—Code in the Schools.Org

K-12 Education is perhaps the only major sector in our society where paper-based work is still acceptable. The problem with this is that the rest of the world is changing at a much faster rate with technology-based methods. Even low skilled jobs are now carried out with mobile, kiosk checkouts and satellite backed technology. Ironically it is education’s responsibility to prepare students for that world.
One-to-One Computing
Personalized & Blended Learning

Living in Chicago and watching how some of our children’s lives turn out is very painful. The kids who come from well-resourced communities and homes have a fighting chance. What is it that kids from well-resourced communities have that less affluent kids don’t? One-to-One or 1:1 Computing is one of the trends sweeping the education world. For every child in a school there is a desktop, laptop or a tablet. I suspect resourced school districts are moving toward this model. Fortunately, Google saw the need and provide low cost Chrome books easily stored in classroom mobile labs.

One-to-one computing helps with the implementation of “personalized learning.” This does not necessarily mean every child receives individualized instruction though. However, One-to-One computing makes personal learning much more plausible.

Student Engagement
Content Creation & Project Based

Technology can enable personalized learning or experiences that are more engaging and relevant. Mindful of the learning objectives, educators might design learning experiences that allow students to choose from a menu of learning experiences such as:

- Producing Media
- Building Websites
- Collaborating with Experts Across the Globe

The research is clear, if utilized properly, technology is a game changer when it comes to student performance. It is not a matter of just putting kids in front of computers however. The tight integration of well thought out pedagogical strategies is key. It is important that it is interactive and explorative. Teacher involvement is important. According to some Stanford University Researchers in their report, Using Technology to Support At-Risk Students’ Learning; providing students with content creation skills has an intense and positive impact on student outcomes.

Real World Experiences

Technology can help organize learning around real-world challenges and project-based learning – using a wide variety of digital learning devices and resources to show competency with complex concepts and content. Rather than writing a research report to be read only by her biology teacher and a small group of classmates, a student might publish her findings online where she receives feedback from researchers and other members of communities of practice around the country. In an attempt to understand the construction of persuasive arguments,
another student might draft, produce, and share a public service announcement via online video streaming sites, asking his audience for constructive feedback every step of the way.

**Funding Implementation**

*Necessary Resources*

Public perception and the public will reflect if we believe our children deserve a promising future or not. It’s not enough to say something needs to be done. Implementation is everything. A major issue is funding and specific resources. There are four major key resources necessary to fully integrate technology into education:

- Software Tailored for each Subject, School and District
- Appropriate Hardware
- Educator Personal Development/Training
- On-Going Support

**Uncle Sam’s Role**

School districts have access to government funding. The Fed is playing a crucial role in bringing education into the 21st Century with the following mandates and assistance:

- E-Rate Funding
- Every Student Succeeds Act (Title IV)
- The National Education Technology Plan

The modernization of the Federal E-rate program has made billions of dollars available to provide high-speed wireless access in schools across the country. It also provides substantial price discounts for infrastructure costs for schools and public libraries.

US Federal funding is also made available under the Every Student Succeeds Act or ESSA (Title IV) which supports personal learning initiatives specifically with Student Support and Academic Enrichment Grants. They include:

- Improving and personalizing professional learning and other supports for educators;
- Increasing access to high-quality digital content and resources for students
- Facilitating educator collaboration and communication
- Providing devices for educators and students to access digital learning resources.

Uncle Sam is also implementing the National Education Technology Plan (NETP). It sets a national visionary implementation plan of action utilizing technology to transform learning experiences while providing greater equity through building on the work of...

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leading education researchers; district, school, and higher education leaders; classroom teachers; developers; entrepreneurs; and nonprofit organizations.”

The Marriage of Education & Technology Expertise

Human Resources

One of the driving forces behind education’s lag in fully integrating technology results from a lack of the expertise to fully integrate it. Most education policy makers probably started in the classroom and worked themselves up their districts’ organization ladder. However, it is imperative that people who understand the nuances of classroom dynamics lead the charge in this area. On the flipside, those with technology skills need to work hand and hand with educators to fully integrate technology. Those skills consist of:

- Enterprise Architects
- Programmers
- Project Managers
- Database Administrators
- Hardware Technicians
- System Analysts
- System Network Administrators
- Tech Support

Currently these resources reside in the district offices but they need to be brought down to the local school and classrooms and shaped and designed from the perspective of the Teacher’s desk; this is truly where the rubber meets the road to impact student outcomes and alleviate the stressors resulting from too much paperwork and repetition.

Teacher Training & Perspective

According to a Bill and Melinda Gates report, 87% of the teachers surveyed believe that “Up-to-date technology that is well integrated into the classroom would improve academic achievement.” Technology’s job is to solve problems. A major issue is the almost insurmountable workloads of teachers.

The Gargantuan Task of Meeting the Varying Academic Needs of Each & Every Student

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Unrelenting Numbers & Academic Needs of Students

The Need for Individualized Instruction

A major factor in teacher workload challenges is the responsibility for children who are all over the map academically. Students enter classrooms from all types of homes, with myriad social, economic and learning experiences. Teachers are charged with meeting these multiplicities of needs, regardless of their levels of understanding and capabilities. Practically every general education classroom looks like this bell curve:

The average US class size ranges between 21 and 27 students, according the National Center for Education Statistics. For high school teachers this is multiplied by about 5 classes, hovering around 100 kids a day. Consequently, we begin to get an idea of the gargantuan task teachers are responsible for.

We are not simply talking about the number of kids, but subject by subject each student varies in their levels of mastery compounded with multiple assignments per day, week, month, semesters and each school year. A student who excels in writing may struggle in math or computer programming. The number of assignments and learning objectives Teachers are tasked with helping students master through assignments and grading assignments are simply put: mind boggling.
Conclusion: The Argument for Comprehensive Education Technology Integration

All of this speaks to the necessity for continuous improvement in education technology with more than standalone apps, increased Internet broadband, PC’s, mobile devices and Smart Boards. A comprehensive approach towards education technology is required to provide teachers with octopus arms to meet the unrelenting various academic needs of students.

Using Technology to Support At-Risk Students’ Learning, 2014, Linda Darling-Hammond, Molly B Zielezinski, and Shelley Goldberg, Stanford Center for Opportunity Policy in Education & Alliance for Excellent Education