

**Arlington Public Schools
Technology Plan 2011 - 2015**

The Arlington Technology Mission Statement

The Technology Mission of the Arlington Public Schools (APS) is to ensure equitable access to appropriate technology in support of our educational community, teaching and student learning, school and community communication, and data management.

In order to successfully educate students in the Information Age to become members of our networked global society, we envision a school community of life long learners, in which students are capable of defining problems, retrieving information with judgment, and solving problems creatively and flexibly. The learning process has progressed from the need to master topics and recall information to learning that is self directed and collaborative, and technology is key to this evolution.

Teaching and Learning

Experts also agree that people no longer can learn everything there is to know in a lifetime, and the economic reality is that most people will change jobs throughout their lifetime. Therefore, we need adaptive learning skills that blend content knowledge with the ability to learn new things. This requires developing deep understanding within specific domains and the ability to make connections that cut across domains – learning activities that should replace the broad but shallow exposure to many topics that is the norm in our education system today. We also need to know how to use the same technology in learning that professionals in various disciplines do. - National Educational Technology Plan 2010, p.13

Retrieved from <http://www.ed.gov/technology/netp-2010>, on 05/31/10

Technology is a powerful tool for teaching and learning and is at the heart of the educational mission.

The Arlington Public Schools will strategically and systematically provide and integrate technology into the the core curriculum to promote 21st Century student learning: core subjects, 21st C. content, learning and thinking skills, information and communications technology, life skills and 21st Century assessments. (See details of each in 21st. Century Framework for Learning below.) The Arlington Public Schools will ensure that students are digitally literate and prepared to use technology effectively for research, organization, evaluation, communication of information and media, collaboration, and for life and career readiness in order to be successful learners and citizens of a global world. Technology supports students to connect with authentic audiences, apply competencies to real world problems, and create real world work products.

Technology as an instructional tool supports a balanced teaching approach, one that is both learner-centered and teacher directed. For explicit, teacher-directed and core knowledge-based instruction, technology opens up broad opportunities for teachers to customize instruction to engage and reach all learners as well as to expand the boundaries of the classroom walls. Learner-centered teaching approaches take advantage of technology's ability to support self directed, collaborative, and interactive learning that includes multiple and global perspectives and audiences.

The district will ensure that technology tools and materials are equally accessible to all students in all schools at all levels.

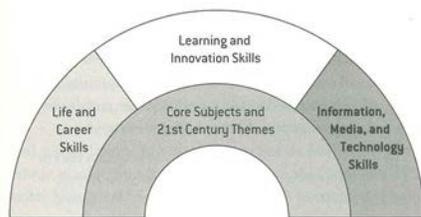


Figure 4.1. The 21st Century Knowledge-and-Skills Rainbow.

Teacher-directed	Learner-centered
Direct instruction	Interactive exchange
Knowledge	Skills
Content	Process
Basic skills	Applied skills
Facts and principles	Questions and problems
Theory	Practice
Curriculum	Projects
Time-slotted	On-demand
One-size-fits-all	Personalized
Competitive	Collaborative
Classroom	Global community
Text-based	Web-based
Summative tests	Formative evaluations
Learning for school	Learning for life

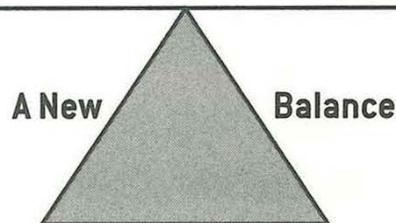


Figure 2.2. 21st Century Learning Balance.

** Excerpted from 21st Century Skills: Learning for Life in Our Times by Bernie Trilling & Charles Fadel*

*Framework for Learning in the 21st Century ***

The 21st century Framework for Learning is based on the essential skills that students need to succeed as citizens and workers in the 21st century. The six key elements of a 21st century education are identified and described below.

*1. **Core Subjects.** The No Child Left Behind Act of 2001, which reauthorized the Elementary and Secondary Education Act of 1965, identifies the core subjects as English, reading or language arts; mathematics; science; foreign languages; civics; government; economics; arts; history; and geography.*

*2. **21st Century Content.** Several significant, emerging content areas are critical to success in communities and workplaces. These content areas typically are not emphasized in schools today:*

- *Global awareness*
- *Financial, economic, business and entrepreneurial literacy*
- *Civic literacy*
- *Health and wellness awareness*
- *Environmental literacy*

*3. **Learning and Thinking Skills.** As much as students need to learn academic content, they also need to know how to keep learning — and make effective and innovative use of what they know — throughout their lives. Learning and Thinking Skills are comprised of:*

- *Critical Thinking and Problem Solving Skills*
- *Communication Skills*
- *Creativity and Innovation Skills*
- *Collaboration Skills*
- *Information and Media Literacy Skills*
- *Contextual Learning Skills*

*4. **ICT Literacy.** Information and communications technology (ICT) literacy is the ability to use technology to develop 21st century content knowledge and skills in support of 21st century teaching and learning.*

*5. **Life Skills.** Good teachers have always incorporated life skills into their pedagogy. The challenge today is to incorporate these essential skills into schools deliberately, strategically and broadly. Life skills include:*

- *Leadership*
- *Ethics*
- *Accountability*
- *Adaptability*
- *Personal Productivity*
- *Personal Responsibility*

- *People Skills*
- *Self Direction*
- *Social Responsibility*

6. 21st Century Assessments. *Authentic 21st century assessments are the essential foundation of a 21st century education. Assessments must measure all five results that matter: core subjects; 21st century content; learning skills; ICT literacy; and life skills. To be effective, sustainable and affordable, assessments must use modern technologies to increase efficiency and timeliness. Standardized tests alone can measure only a few of the important skills and knowledge students should learn. A balance of assessments, including high-quality standardized testing, along with effective classroom assessments, offer students a powerful way to master the content and skills central to success.*

**** Excerpted from the Partnership for 21st C. learning**

Year 1

What we are currently doing or will do to assess district needs and research best practices/new solutions to meet the goals above:

Form a district-wide Technology Advisory Committee to oversee the implementation of this plan, receive input and survey data, and make recommendations to the Superintendent and district Administrative Team about specific technology tools, programs, resources, hardware, staffing and professional development.

Conduct a program review including a needs assessment of current hardware and infrastructure, staffing, student digital and media literacy skills, and an inventory of current technological tools, curriculum materials (subscriptions, programs, etc.), curriculum integration practices, etc. that will make recommendations that inform future planning. (Ask teachers what are their most pressing teaching challenges to determine which needs technology may fill.)

Examine state Common Core Standards and Arlington benchmarks to determine needs and ensure that Arlington is delivering the necessary 21st Century digital competencies. (Identify grade levels and subject areas to target specific skills, i.e. information search, keyboarding, ethical use of technology and Internet safety, and core curriculum knowledge for application, problem solving and higher order thinking skills.)

- *Create and administer periodic student/parent surveys to get a clearer picture of student access to the Internet and technology at home as well as student and parent opinions about the use of technology at different levels of education.*
- *Research and identify best teaching and learning practices, common technology tools & materials, and curriculum areas for technology integration. Ensure equal access to these across the district.*
- *Support and foster pioneering teaching practices to ensure the continued efforts at innovation in the integration of technology into curriculum and instruction.*

Year 2

Beginning of implementation of best practices, tools, and materials for standardization across the district

- *Create a road map of identified areas in the curriculum for the integration of technology skills and develop an approved list of teaching and learning best practices, resources, and materials, etc. for the school library/media/instructional technology specialists with teachers and administrators under the supervision of a K-12 Director of Academic Technology and Library.*
- *Communicate technology curriculum and 21st century skills, i.e. "library" or bank of approved practices/curriculum programs, websites, resources, etc. per grade/subject, in search engine of sites, to teachers and community.*
- *Begin to implement the integration of technology standards into the curriculum areas identified at each grade level.*
- *Develop and ensure that "adaptive" technologies are accessible to all students. (selected soft wares/programs, keyboarding, use of audio recording devices, etc.).*
- *Support awareness and competence to implement these new teaching strategies and tools through district professional development.*

Research and give recommendations on how labs vs. a few computers in each room effect instruction.

- *Update curriculum using Curriculum Mapping in Google*
- *Continue to expand teacher and administrator access and training in use of student data to inform instruction*
- *Research electronic formative assessments (e.g. MAP) to monitor student progress that are efficient, user friendly, and time-saving.*

Year 3

- *Work with teachers across the district to complete systematic integration of technology standards and use of resources and programs into curriculum and instruction.*
- *Continue curriculum mapping process for all disciplines*
- *Begin to implement selected electronic assessments of student progress*
- *Continue to keep current with the technology tools to ensure the vision.*

Staffing

Support teaching and learning in each school - (See attached Technology Organizational Chart)

A staff of instructional technology integration and library media specialists are sorely needed at each level in the district to develop curriculum benchmarks for technology and support teachers with the integration of technology into the teaching and learning process.

The organizational structure to support teachers and students would require K-12 leadership in the form of a Director of Academic Technology and Libraries who would report to the Assistant Superintendent of Curriculum and Instruction and the Chief Technology Officer and be a member of the Administrative Team. The Director would oversee the implementation of the technology plan, guide and supervise building Technology Integration/Library Media Specialists. These specialists would have the skills and certification in library media and/or educational instructional technology. They would be responsible for aligning Arlington curriculum with state technology standards, integrating 21st c. skills and competencies into the classroom teaching and learning process, offering technological instructional solutions and curriculum resources to teachers, and leading formal as well as job embedded professional development in the latest technological tools and practices. Additionally, they would provide direct instruction to students as appropriate based on the level.

The AHS Technology/Library Media Specialists' time (.5) would be devoted to support the expansion of online learning opportunities at AHS.

The added Data manager position would also report to both the Assistant Superintendent and the CTO and support data driven instruction and program evaluation as well as manage district data bases and administrative efficiencies. An assistant data entry person would also support this work.

District Network Managers, Web Manager, and Technicians would report to the Chief Technology Officer for schools and town and manage the network infrastructure, provide technical support to staff, coordinate and prioritize web based Help Desk requests, and maintain the web site and school based technology throughout the district.

Year 1

Start up of Google Apps and providing ongoing support for new technology tools for teaching and learning.

- *Tutorials, videos, Tech Help Desk, and teachers available to support staff with Google Applications.*
- *Stipend positions for Technology Integration Specialists in each elementary school (7) and each cluster at Ottoson Middle School (3) as well as AHS staff offerings for professional development for Google Applications*
- *Convene a Technology Committee meeting three times a year at each school to respond to building technological needs and requests. Elementary and Middle School Technology*

Integration Teachers meet with leadership teams and principal. High School Technology Committee meets with department chairs.

- *1 FTE Director of K-12 Academic Technology and Libraries to lead initiative*

Year 2

Expand instructional technology support in each building and district network technical staff

- *3.5 FTEs (7 half-time) Instructional Technology and Library Specialists in each elementary school*
- *1 FTE Instructional Technology and Library Specialist at the Ottoson Middle School*
- *1 FTE Instructional Technology and Library Specialist at AHS*

Year 3

Professional staff in each school

- *Add 3.5 FTEs (all 7 schools become full time) Instructional Technology and Library Specialists in each elementary school to provide instruction to students and support to teachers*
- *Add .5 FTE Instructional Technology and Library Specialists at OMS to provide instruction and support to students and teachers*
- *1 FTE Instructional Technology Integration Specialist/Online Course Developer at AHS*
- *1 FTE Help Desk Manager (Assistant Network manager) for the district*

On the Horizon and Beyond

- *1 FTE Program Evaluator/Data Manager*
- *1 FTE Assistant Network Manager*

Infrastructure and Hardware: Implementation and Replacement Plan

The use of technology in schools is exploding, and it is expected that this trend will continue at its current pace. Technology tools are no longer an innovation that is "nice to have," but rather technology is like electricity or any appliance, it is a necessity. Thus, building a solid foundation to support current and future technologies is key to the success of a 21st century education in the Arlington Public Schools, and it is essential that hardware, access and resources are equalized across the district.

The district's goal is to create an infrastructure and hardware plan that can fluidly adapt to emerging technologies, that supports more web-based and interactive teaching and learning environments and community communication while reducing paper. While classroom projection, interactive whiteboards, document cameras, and student response systems represent some of the newer tools that the Arlington Public schools are working with, all of these require a robust network, back-end, and portal to enable the full potential of these systems. The need for students and teachers to work collaboratively on line requires the infrastructure to support a high degree of mobility and ease of use. Self directed and online coursework along with schedules that support more research and study time will add to the already existing need for an overarching secure wireless network. As the tools and content used for teaching and learning become more sophisticated and dependent on many different technologies, the architecture and design of our

infrastructure must become highly flexible and available by means of redundancy and hosted environments.

Currently the common vehicle for technology use for students in Arlington is through school computer labs. However, in order to make technology an integral part of the teaching and learning process, it must reach teachers and students where the work takes place, in the classroom. Changing this geography will ultimately require a mix of three components:

- *providing hardware that puts projectors, sound systems, and interactive surfaces in every classroom*
- *providing computing devices to every teacher to put lesson planning, resources, and efficient assessment tools at their finger tips*
- *providing student and teacher access to computing in the classrooms and school via student stations and/or wireless by bringing robust wireless to all buildings to allow teachers and students to connect their own devices to the Internet and/or the district network or cloud.*

The Arlington Public Schools needs to plan ahead and be prepared for the rise of the handheld device such as the Kindle, Smartphone, and iPad for reading, researching, and communicating, all of which will eventually force us to rethink the idea of giving access to computing. With handhelds, the ratios of network connected devices will require school districts to provide an infrastructure that allows individual connection to school networks rise to something more like 3:1 where teachers and students each have several devices that they wish to use in the classroom.

For example, consider a neighboring school district which now regularly uses classroom sets of iPod Touch devices in their world language classrooms allowing students to record and wirelessly podcast dialog and conversation to the classroom audio blog for purposes of recitation, review, and assessment. The old model where the teacher speaks and classroom repeats is now atomized so that students can hear, record, erase and repeat conversations at an individualized pace all with recorded, posted and archived assessments. Where once one classroom at a time went to a language lab with say 30 computers, now several classes with perhaps a couple hundred devices all connect to the network and the Internet concurrently. The pressure on infrastructure, understandably, is intense and a far cry from today.

Year 1

Network Infrastructure

- *Continue to replace and upgrade upper level network switches and routers (40)*
- *Expand wireless locations (Libraries) in each elementary and OMS schools*
- *Complete implementation of cloud computing: “Google Student” – Teacher and student log in for student access to Google Apps, including email for high school students*

- *Web-based interactive classroom platform (Moodle) – individual course management system; student and teacher log in*
- *Explore classroom infrastructure upgrades needed to support increased use of web based video and audio*
- *Redundant Internet connectivity to guarantee uninterrupted Internet access to the district*
Hardware/Equipment
- *Increase overhead projectors (100) (installed or on carts) to support teaching and learning and group collaborations at OMS, AHS, and elementary schools*
- *Continue 5 year replacement cycle of computer equipment (OMS schedule)*
- *Select HS department for interactive devices (whiteboards and interactive projectors) implementation*
- *Explore interactive teaching devices at K-5*

Year 2

Pilot use of handheld devices (smart phones) by students for learning, responding, etc. ***Hardware/Equipment***

- *Citrix for use in all Elementary classroom student machines*
- *Document cameras for each department at OMS and AHS*
- *Interactive teaching devices by department at AHS*

Begin to move schools towards centralized printing through attrition (not eliminate) after developing a strategic plan for placement and availability for 3-4 classrooms to share coupled with an increase in copiers with scanning capability.

Year 3

Baseline technology tools that all APS classrooms in the district expected to have:
Hardware/Equipment

- *Projector in every classroom*
- *Sound system in every classroom*
- *Computing device for every teacher*
- *Student computing ratio 5 to 1 at MS and HS levels*

Infrastructure

- *Wireless Internet connectivity in every classroom*

Professional Development

The Arlington Public Schools need to ensure that staff remains current in technology tools and practices that promote 21st century teaching and learning by providing professional development opportunities and ongoing training with emerging technologies and best practices in order to achieve the APS mission: equal, high quality instruction to all students and preparation for post secondary education and the world of work.

Each year as technology use expands in the Arlington schools, the professional development for teachers and staff must parallel and keep pace with these changes. This technology initiative

requires teacher enthusiasm, and therefore, it must be predicated on teacher leadership and teacher input.

The Arlington Schools must continually assess current and best teaching practices in and outside of the district, the technology tools needed to implement these, and provide the resources to build teacher capacity in technology integration into curriculum and instruction at every level. It is not necessary to hire outside consultants to lead professional development as the district has and will continue to develop in house expertise using teacher leaders from the ranks of advanced technology users, curriculum department chairs and academic instructional technology staff will model the use of these technologies and lead professional development that is content specific as well as job embedded, and offer courses in the summer, after school and during district professional development time. Additionally, the professional development must be based on regular assessment of the skill levels of teachers so that the offerings meet the range of needs and skill acquisition as well as interests of teachers and staff.

Professional development for all staff to develop skills and capacity with administrative tools and efficiencies is essential as well.

Year 1

Collect data pertaining to staff technology literacy and develop an ongoing plan in the following areas to address the range of levels of proficiency and offer PD/training accordingly. (Professional Development Council leads the data collection.)

Provide consistent training across the district throughout the year to support hardware/software use and best curricula and instructional practices.

- *Continue to train Building Technology Integration Specialists K-8 (stipend) and a pilot group of teachers- by department or grade level-in the use of Google Apps to support staff at building level*
- *Offer professional development courses after school for PDPS that are project based and at multiple levels for all users, teachers, staff, and administrators, in the new Google email system, docs, and calendar in order to begin the integration of Google Apps*
- *Model collaborative uses of Google docs (with CLTs), calendar, and sites with teachers and staff*
- *Continue to train teachers and staff to access and utilize electronic data, common assessments, etc. at all levels*
- *Begin to integrate technology standards into professional development content offerings at MS level*

Year 2

Increase instructional technology staffing to lead in-district development of technology skills.

Develop team/department/grade level training opportunities so that sharing or resources and ideas occurs.

Begin the integrate technology standards and skills into curriculum K-12

- Continue to send academic instructional tech staff, curriculum leaders, administrators, and teacher leaders to Alan November Building Learning Communities, MassCue and other technology conferences to keep abreast of latest practices and technology tools.
- Continue professional development offerings during release time, faculty meetings, after school, and summer for all teachers, staff, and administrators to gain proficiency in Google Apps and other new technology tools, such as interactive white boards, document cameras, etc.
- Continue basic skills and advanced training per the need based on year one data
- Teacher-led workshops to develop common technology benchmarks and the integration of technology skills for students at elementary level
- Teacher-led workshops to bring to integrate technology, tools, materials and best practices into the common core curriculum standards and instruction in all disciplines
- Provide google site for PD and develop technology resource bank—Online tutorials, grade level websites, YouTube videos, etc.- for general teacher access
- Teacher-led workshops and training to help teachers bring classroom materials online (Moodle), learn VoiceThread, podcasting, etc.
- Support time for teachers on developing online courses at AHS
- Continue to develop technology integration expertise in grade level and school teacher leaders and department heads through targeted workshops
- Fund opportunities for tech pioneers to expand their area of interest and pilot new tech activities

Year 3

Continue to develop and offer training opportunities for all faculty and staff at all levels of proficiency (become turn-over proof) to parallel the the expansion of technology tools and best practices for 21st. c. teaching and learning in the district

- Provide training for staff in proficiency with new technology tools such as interactive white boards/projectors, document cameras, etc..
- Continue teacher-led workshops to integrate technology, tools, materials and best practices into the common core standards at elementary and middle school levels.
- Continue teacher-led workshops and training to help teachers bring classroom materials online (Moodle), VoiceThread, etc.
- Develop on line course electives at AHS

Administrative Efficiencies

Information gathered, used, and shared in a timely way provides the foundation upon which teachers and administrators are able to efficiently deliver a quality 21st C. education to their students, and it is through information technology that our administrative efficiencies become possible.

By using information technologies educators are better able to adjust curriculum and instruction, design customized programs, provide and share resources, and work collaboratively as a team in response to student needs. Administrators are better able to manage and access student, parent, and personnel information, create budgets and school schedules, and update

school and district calendars and websites. Consider our PowerSchool student information system where teachers keep an electronic grade-book and students, parents, guidance counselors and the principal can log-in to see current real-time grades. No paper, no telephone calls, no e-mail, no waiting. In short, technology permits easy access to up-to-date information targeted to student learning and administrative tasks, and is, therefore, crucial to our educational mission.

In spite of the many and substantial improvements in administrative efficiencies gained in the Arlington Public Schools in the last five years, great challenges remain. Our data staff are highly stressed and there is a great need for increased personnel around collecting, tracking, analyzing, and maintaining personnel and student databases. Meeting federal, state and local mandates for data, entitlement grants, and audits continues to be a challenge as these demands continue to grow and become more complex. More specifically, collecting and sharing MCAS scores, core curriculum common assessments, college transcripts, report cards, individual educational plans, and the writing of annual DOE, bullying, and fitness-gram reports, to name a few, require the effective and regular flow of data to and from our data systems to teachers and staff. We have almost 5000 students and keeping PowerSchool, our student information system and Semsnet, our special education IEP database, current and up-to-date requires many person hours. Although central administrative staff use MUNIS to track payroll and EPIMS to track changes in teacher certification, many of these programs do not currently “speak to each other.” Building and some central administrators and staff are not able to view their budgets or staff in real time. Tracking over 900 employees in the Arlington Public Schools requires a comprehensive human resources information system and remains an area of great need in the district.

Considering the critical function of infrastructure and the data systems required to fulfill our educational mission, administrative efficiencies also require updated hardware and software programs as well as an infrastructure of high quality broadband Internet access. There is a need for an additional data manager as well as non-technical staff to enter data (See Organizational Chart for Staffing.) and to keep systems operating and current coupled with an increasing need for annual training of support staff, teachers and administrators in the use of these systems targeted to their educational purposes.

Year 1

Improve internal and external district communication

- *Streamline state data report*
- *Improve district communications and professional collaboration*
 - *NEASC at AHS conducted electronically with Goggle Docs and Sites*
 - *Administrative docs folder*
- *Improve communications between schools with school and district calendars*
- *Improve communications with parents:*
 - *Alert System in several schools*
 - *Parent Portal gives parents and students access to grades online*
 - *Feed system on AS website*
- *Streamline MUNIS, EPIMS, etc.*

- *Networked copy machines with scanners in central office and schools*
- *PowerSchool to share 504 plans, student accommodations, bullying reports*
- *Easy IEP, web based IEP management tool explored*

Year 2

- *Purchase Alert System for the district*
- *Create, maintain, and expand use of human resources, personnel database*
- *Develop a on line purchasing and budget access for building and department administrators*
- *Explore ways to bring secondary school scheduling in house*
- *Easy IEP program implemented*
- *Investigate electronic assessment tools, such as Excel for AMC math, and other efficiencies to reduce time for teachers inputting data*

Year 3

On the Horizon and Beyond

Implement human resource programs like MyLearningPlan (teacher pd and pdps tracking, etc.)

Disaster Recovery

Safety, Security, and Data Retention

Will be added under separate cover