Digital Learning @ APS
Update: September 2014

Part One
Why We Care About Digital Learning

In an era of competing demands on educators, why is digital learning

an imperative in Arlington Public Schools?

Keeping Pace in a Digital World

Even a casual observer of young children today knows that big changes are underway when it comes to kids and technology. The mobile revolution that has hit adults is on the move with children.

The numbers are startling:

- Seventy-two percent of children age 8 and under have used a mobile device for some type of media activity (up from 38 % two years ago).

- 38% of children *under 2* have used a mobile device (compared to 10% two years ago).

- The percent of children who use mobile devices on a *daily* basis – at least once a day or more – in the last two years has more than doubled, from 8% to 17%.

- Among families with children age 8 and under, there has been **a five-fold increase** in ownership of tablet devices such as iPads, from 8% of all families in 2011 to 40% in 2013.

- The percent of children with access to some type of "smart" mobile device at home (e.g., smartphone, tablet) has jumped from half (52%) to three-quarters (75%) of all children in just two years.

- Almost twice as many children have used mobile media compared to two years ago, and the average amount of time children spend using mobile devices has tripled.

- Access to mobile media devices and applications among poor and minority children are much higher than it was two years ago, but a large gap between rich and poor still persists. [1]

All of these numbers—and more like them—underscore the urgent need to acknowledge that the growing momentum of pervasive digital media use spells a future for K-12 education that will look much different than the past.

Modes of learning are changing dramatically—sources of information, the way we exchange and interact with it and how the information informs and shapes us all demonstrate the need to develop a strong connection between digital technology and classrooms.

In addition, the efficiencies that technology can provide to classroom learning can support an environment where a teacher is better equipped to address the individual learning needs of her students and prepare them for their future in a changing world.

To be sure, educators are conflicted. How much screen time is too much? How do we keep our kids safe? How do laptops, tablets, and mobile devices change the way students learn? And how do they change the way we teach? How do we shape an experience to provide our students with the skills they will need to make technology enrich their lives? What about the digital divide?

Yet, who better than educators to provide reasoned approaches to questions of students and learning? It's what we do best. The opportunity—the moral obligation—for educators is to shape technology use in a way to advance student learning for all and to produce responsible users who ultimately lead enriched lives as workforce-ready citizens.

Our strategic planning process and State Technology plans in Arlington Public Schools has included adaptations for increased technology use since 1998. A framework is in place, through our technology plan, that takes us through 2017 with goals and strategies to integrate technology in a meaningful way into division systems and classroom practices. (Visit the APS website for further details.)

Building a Personalized Approach to Learning

One of the great potentials for digital learning is to move from a one size fits all classroom environment to one of personalization where each child's learning needs are quickly and frequently assessed and then teaching practices are either altered or reinforced. Digital tools in the hands of a teacher and every student, regardless of economic circumstance, can make that happen. This is using technology not just for the sake of technology. It's integrating technology as an important part of the teaching and learning process.

Yet, it's not a quick fix. Some of the challenges include identifying effective staff development approaches, appropriate digital assessments and robust instructional tools. Teachers and instructional leaders are sorting through these issues and sharing their findings with each other. A pilot program last year of every school in using mobile devices, will be expanded this year to a pilot of using personalized devices in one or more classrooms. Our target is to expand the practice of personalized education to every classroom by 2017. This target is part of a progressive plan to grow this important initiative.

Creating a Vision for the Future

Our continuing obligation to the Arlington Public School community is to graduate students who are:

1. College and Career Ready.
2. Provided access to opportunities.
3. Given choices in learning.
4. Provided opportunities for 24/7 continuous learning.
5. Provided a personalized learning environment.

The key to our success will be our focus on developing a personalized learning environment and integrating technology as an integral part of it rather than as an add-on after the instruction is over. We're headed in the right direction. Research indicates that in addition to *efficient*

personalization, technology helps students to improve content learning, develop higher order thinking and problem solving skills and become more workforce ready. [2] These are the outcomes we seek.

And our vision is ambitious. By the year 2020, APS aims to become the country's best media-rich personalized platform that features seamless integration with all instructional systems and creates a user-friendly interface that gives teachers an efficient tool for sharing instructional resources, assignments, activities and assessments with students and families.

Perhaps the words of John Dewey frame our challenge the best: "If we teach today's students as we taught yesterday's, we rob them of tomorrow." Arlington Public Schools is committed to providing all of our students with the instructional benefits of a personalized education that will lead them to successful and accomplished tomorrows.

How Digital Learning Can Work

Several teachers piloted digital learning in their classrooms last year. Here's a story about Ms. Hale's experience at Abingdon Elementary.

A visitor walking into Ms. Hale's 5th grade class at Abingdon Elementary School would see what is common in most classrooms. The class includes students who struggled to read, those who are learning to speak in English, and students who were academically advanced. In 2012, delivering differentiated instruction to her class using traditional methods was a challenge for Ms. Hale. She recognized the challenge to find new ways to better reach and address the individual needs of all students.

Ms. Hale reflected on her difficulties and identified two major issues. First, she needed a method to assess the level of student learning on a daily basis without losing valuable instructional time. Typically, she needed two to three days whenever she assessed the learning level of each student on the concepts being taught. Second, she needed to identify a method to differentiate supplemental learning tailored to their individual needs to accelerate and enrich all students learning opportunities and choices.

Ms. Hale's fifth grade class was one of several classrooms in Arlington that piloted the use of new learning technologies to support student learning during the 2013-14 school year. As part of the division wide pilot program, every school identified specific areas of instructional focus, which enhanced learning through the use of technology.

Each pilot had an associated SMART goal to measure the effectiveness of the pilot. Ms. Hale piloted the use of iPads with her 5th graders. With the help of the school Instructional

Technology Coordinator (ITC), Ms. Hale planned her instruction to leverage the new iPads by customizing lessons uploaded to each device that were based upon each student's individual instructional needs. With the support of the principal and parents, the students were able to take the iPads home with them regularly to continue their studies outside the classroom.

Through the personalized lessons on the iPads, **each day** Ms. Hale was able to effectively and efficiently assess each student's academic progress, both in the classroom and at home. Based on the assessment information Ms. Hale dynamically grouped and regrouped students for classroom instruction and individualized supplemental learning opportunities to address specific needs.

This differentiated, personalized environment created a very high level of student excitement and involvement. The achievement of the objectives laid out in the SMART goal confirmed that the model Ms. Hale piloted has the potential to be useful throughout APS.

The following is what Ms. Hale had to say about her journey and experience regarding the pilot:

"Simply put, the 1:1 iPad classroom pilot redefined school for my fifth grade learners, knocking down the barriers to learning. With classroom leadership, instructional technology enhanced students' ability to overcome individual learning challenges such as language, attention, anxiety, motivation and confidence. The result was a family of fifth graders who took ownership of their learning: by collaborating, by communicating and by seeing homework as a natural continuation of the classroom."

Little Chris in her class summed it up when he told her, "It helped me a lot because it allowed me to take **you** home with me and had **you** teaching me."

Part Three
Working Together Towards 2017

Using the APS Strategic Plan as their guide, a wide coalition of APS professionals created a framework for impacting technology implementation.

The foundation for the digital learning platform was developed in the 2009 APS Technology Plan. The School Board was concerned about the digital divide, and instructed staff to add a goal to the plan that every student should have access to an internet connected personal computing device both during and outside of school hours.

In 2011, the APS Strategic Plan for 2011-17 was adopted to guide the work of the division.

- Goals 1 and 2 articulate the desired student outcomes and challenge staff to ensure that every student is challenged and engaged while simultaneously eliminating achievement gaps.
- Goal 3: Recruit, retain and develop highly-qualified staff
- Goal 4: Establish optimal learning environments
- Goal 5: Meet the needs of the whole child and form the foundation necessary to achieve the student outcomes.

Within Goal 4, the Strategic Plan directs the use of technology in support of student learning to "create vital and engaging, technology-rich learning environments." Strategy B of Goal 4, "Provide an infrastructure for Learning," establishes the desired outcome in which "APS utilizes state-of-the-art technology that creates engaging, relevant, and personalized learning experiences for all learners regardless of background, language, or disabilities." This strategic outcome is measured in part by the availability of technology to support APS instructional programs.

The division immediately began working on a plan to accomplish this goal. **Five** areas of focus were established and the departments began to work collaboratively to put in place the required components:

1. Teachers, principals and other educators must effectively use technology to support instruction.
2. Curriculum resources provided to teachers must leverage the available technology.
3. All instructional spaces must have state-of-the-art technology available.
4. All students must have access to secure personalized technology.
5. The network infrastructure must be robust and prevalent in all instructional spaces.

Teachers, principals and other educators must effectively use technology to support instruction.

Teachers must know how to use technology effectively if it is to be used to support student learning. APS currently has over 16,000 computers and other devices designated for student use, which equates to an average of a student-designated device for every 1.6 students. Currently these devices are shared, which limits the ability of teachers to personalize the digital environment. Personalized devices will be phased into all schools over a three-year period, starting in the 2014-15 school year using existing technology funds. Planned professional learning on the use of personalized devices in the classroom is aligned with this phased transition. The Digital Learning Steering Committee has divided the professional learning into three phases. These phases are designed to help teachers make the transition from limited access on shared devices to unlimited access with personalized devices:

- When a specific grade or classroom is selected to receive the devices, the teachers will receive professional development on the basic use of the device that would be appropriate for personal or professional use
- During the first year of classroom use, ITCs will provide teachers with professional development on the use of the device to support instructional practices

- During the 2015-16 and 2016-17 school years, the Department of Instruction will provide division-wide, curriculum-specific professional development.
- Provide professional development for families.

Administrators, parents, community members and others who help students learn must also be able to leverage the new opportunities provided by personalized devices. While the teacher remains the key professional decision maker about the use of the device, others must support and enhance these uses to ensure the optimal learning environment for the student.

Curriculum resources provided to teachers must leverage the available technology.
Through personalized devices, APS can expand its use of Digital Learning. Digital Learning includes opportunities inside and outside of the classroom that utilize technology to improve educational outcomes and meet the individual academic needs of students.   The use of electronic technologies improves student engagement and expands project-based learning while reducing direct instruction.

Example of the functions of technology in digital learning include:
- Personalization – customized learning experiences
- Simulation – immersive, complex problem solving
- Collaboration – dynamic grouping using technology resources
- Accessibility – expanded options based on individual needs
- Production – produce, publish & present high-quality work products

The Digital Learning Steering Committee is providing guidance on the move toward increased use of digital learning. The committee is composed of representatives from the departments of Instruction, Student Services and Information services; ITCs, teachers, and school administrators; and representatives from the Superintendent's Advisory Committee on Technology. Working collaboratively, the committee has been charged with developing a

framework of functional requirements that provide direction on how the devices can be incorporated into the classroom-based curriculum. Their plan will

- Provide Instructional Support
- Develop and implement a short and long range professional development strategy
- Provide guidance on technology and curriculum integration
- Provide guidance to develop policy related to personalized digital learning
- Use ISTE standards to guide technology integration
- Develop functional requirements of digital learning

All instructional spaces must have state-of-the-art technology available.

State-of-the-art technology is constantly evolving. 'Moore's Law' states that the capabilities of computer technologies double every 18 months. What was once considered state-of-the-art technology just 10, 5 or even 2 years ago is considered outdated today. Technology available in instructional spaces must be regularly updated, using the latest available technology. Key success factors to achieve this outcome include:

1. High quality professional development
2. Adoption and sharing of best practices
3. Efficient use of financial resources

In order to manage the regular update of instructional technology, APS has divided the equipment into three areas:

1. Devices such as computers and tablets
2. Classroom infrastructure technologies such as interactive white boards (IWBs) and printers
3. Peripheral technologies such as document cameras

The Department of Information Services replaces computers on a 4-year cycle using an existing budget line item. School computers are provided and replaced based on an ELT approved formula:

- At least one computer is designated for student use for every four students
- Teachers, administrators and other designated staff members have an assigned computer
- Other staff members share computers, with one computer for every four staff members

Starting in 2011, APS began piloting the use of emerging technologies such as tablets, which have higher levels of mobility, flexibility and personalization than traditional computers. In 2012 all schools piloted the use of emerging technologies and monitored the success using instructionally focused SMART (Specific, Measureable, Achievable, Relevant, Time-bound) Goals.

Based on the learning from this research, Instructional Technology Coordinators (ITCs) collaborated with school staff members to build functional requirements for these alternative devices. The Department of Information Services (IS) evaluated the requirements and determined that the devices can be managed to meet the functional requirements. Based on this ability to meet the instructional requirements combined with the relative lower cost per device when compared with computers, APS has determined that these alternate 'devices' will serve as a key classroom technology in future years.

To date, schools have decided what infrastructure technologies are most appropriate, including the best brand, model and whether or not to install the technology. New instructional spaces are provided with an Interactive white board through capital funds. Schools use funds from the PTA, grants, and school based technology funds to meet this key requirement.

In order to ensure equitable access to classroom infrastructure technology for all students, Information Services is currently establishing an APS Technology co-op. Schools join the co-op using a designated portion of their technology funds, or may continue making technology purchases under the current, independent model. Schools are involved in selecting standardized equipment for classroom infrastructure technology, which is installed and replaced on a scheduled cycle. By centralizing the funds in a co-op and making bulk purchases,

IS anticipates a per-unit cost savings of approximately 25% for APS. These cost savings allow for a 25% increase in the availability of classroom technology for schools. The schools also benefit from unified professional development, sharing of best practices, and simplified troubleshooting by using uniform hardware and software.

All students must have access to secure personalized technology.
Personalization is the customization of the technology environment based on individual needs and preferences. Examples of personalization include customized applications, differentiated instructional materials, and fonts based on identified needs for SPED students. The division has done significant research and testing to establish a model for effective use of personalized student devices in an environment where students share computers, such as in a computer lab.

Attempts to create personalized environments by customizing the device at login resulted in unacceptably slow login speeds. Web-based personalized environments exist and are in use, however web-based technologies currently do not meet all of the instructional software requirements of APS. Based on these experiences, APS has determined that to meet the need for personalization described in the strategic plan, APS must move from shared devices to individual devices. By assigning a specific device to a student, the device can be customized with the necessary software and targeted instructional material that meets the student's individualized needs.

Key benefits of secure personalized devices include:
- The device can be have customized applications as designated through Arlington Tiered System of Supports (ATSS)
- Teachers can monitor students' progress
- Teachers can send designated documents to the device
- Students can complete work without requiring internet access
- Students can send completed documents back to the teacher
- The device can be configured to ensure student data is protected

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- Items such as logins and passwords can be stored in an encrypted manner on the device, speeding access to online resources while allowing for stronger passwords.

By 2017, the goal is for every student in grades 2-12 to have a personalized device to support classroom learning, with the devices being functional both at and away from school. To ensure the devices are equitably available to all learners regardless of background, and the devices can be efficiently managed and contain the appropriate instructional resources, the devices must be standardized across schools and provided by APS.

During the 2014-15 School Year, IS will be using existing technology funds to make personalized devices available to schools. The devices will be available through an expanded pilot program, similar to the 2013-14 pilots. Schools have been offered the opportunity to continue their pilot from 2013-14, introducing personalization, or they may develop an alternative pilot. The results of these pilots will be used to establish best practices, monitor the effectiveness of the new device management system and to inform the needs for professional development.

The network infrastructure must be robust and prevalent in all instructional spaces.
- The Platform Project, which started in 2011 and continues today, has expanded and upgraded the network infrastructure. Completed key elements of the project include: upgrading the network core (core router, firewall), completely redesigning and expanding the wireless infrastructure to place an access point in every classroom, tripling the Internet bandwidth and adding a redundant internet connection, and significantly expanding the network storage available to APS students and staff. The project has successfully created a robust network infrastructure, which is prevalent in all instructional spaces.

Looking forward, current network utilization projections anticipate that the network infrastructure must be able to accommodate up to 90,000 devices by 2017. With the movement toward making a broad spectrum of devices ranging from televisions to refrigerators network-connected or 'smart', the upward trend of connected devices is expected to continue

indefinitely. In anticipation of this ongoing growth, the Platform Project will place a second access point in every classroom and further increase the Internet bandwidth.

Looking Forward

During the spring of 2014, Information Services completed one-on-one meetings with each school to discuss the transition to personalized devices and help establish an instructionally appropriate pilot. In order to prepare for the use of the new devices during the 2014-15 school year, designated teachers received a device and professional development during the spring and summer of 2014. Once all schools have submitted their pilot proposals, the proposals will be made available to the schools and departments for collaboration and refinement.

During the summer, IS purchased and configured personalized student devices based on each school's requests. Schools will refine their pilot proposals, submitting completed versions prior to the start of the school year. Designated teachers will collaborate with ITCs to review their curriculum and develop plans that describe how the devices can be used to enhance student learning. Outstanding issues, such as questions about logistics and necessary communications, will be addressed.

In the fall the schools will begin their pilots, with ITCs providing support. Schools will report their progress three times during the year. The Digital Learning Steering Committee will monitor these reports and make adjustments to the project as necessary. For the 2015-16 and 2016-17 school years, the project will shift from pilots to full implementation. Students will continue to receive their designated devices, and the professional development program will continue.

Since 2011 this work has been steadily progressing, starting with less visible work to improve infrastructure and moving toward the more visible implementation of classroom technology. For the 2014-15 school year, APS is well positioned to achieve the goal of providing engaging, relevant and personalized learning experiences for all learners using state-of-the-art technology.

By the fall of 2017, students will have access to state-of-the-art technology that will be personalized for their learning.

Endnotes:
[1]Common Sense Media: Zero to Eight, Children's Media Use in America, 2013.
[2]Center for Applied Research in Educational Technology,
Appendix

Appendix

Service	Description	SY12-13	SY13-14	SY14-15
Project Timeline				
Casper Apple Enterprise Platform	IS built the Casper Suite for endpoint management, it allows support for an extraordinary Apple experience for the end user. It enables IS to provision Macs and iPads remotely, or through end-user initiation.		X	
Clear Pass	ClearPass allows APS to manage network policies, securely onboard and manage devices and admit guest users.		X	X
Core Router Replacement	IS replaced the core of the infrastructure and supports multiple telecommunications interfaces.	X	X	
Fire Walls & Network Security	IS has upgraded its firewalls to reduce the ability for hackers, viruses, and worms to reach our computers from the internet.	X	X	X
Inventory Management	Asset management solution designed specifically for K-12 inventory control of mobile and fixed assets across building rooms and assigned to staff and students.		X	X
iPad/MDM Mobile Device Management System	This solution addresses the challenges associated with mobility by providing a simplified, efficient way to view and manage all devices from the central admin console. Enables you to enroll devices in your enterprise environment quickly, configure and update device settings over-the-air, and secure mobile devices. Allow you to manage a diverse fleet of Android, Apple iOS, BlackBerry, Mac OS, Symbian, Windows Mobile, Windows PC/RT and Windows Phone devices from a single management console.		X	X
NOC – Network Operational Center – South Taylor Street	Provide a redundancy of core services in the event of an outage in the primary data center.	X	X	X
Internet Bandwidth Expansion	Increased capacity to 1 gig. This allows devices to connect to the internet with greater flow and speed.		X	X
Wireless Network Expansion	Provides additional capacity to allow devices to securely connect to APS resources. APS has expanded the network to include 1 Access Point per classroom.	X	X	X

Digital Learning @ APS *Targets for 2017*	
1. Every Student	**2. Every Educator**
Every student in grades 2-12 will have a secure, personalized device for learning at home and school. Status: Pilots underway. Phase in beginning in 2014-15.	**Every educator will effectively use technology to support instruction; the Department of Instruction will provide division wide, curriculum-specific professional development.** Status: Digital learning steering committee has devised a plan to phase-in professional development over the next three years.
3. Instructional Spaces	**4. Curriculum Resources**
All instructional spaces will have state-of-the-art technology available. Status: Defined schedule for regular equipment updates and replacements. Reached staff consensus on "alternate devices." Established APS Technology co-op for schools to join for reduced equipment costs.	**The best in digital technology will be accessible support digital learning.** Status: Digital learning steering committee has started developing a framework of functional requirements for incorporating into classroom use.
5. Network Infrastructure	
The network infrastructure will be robust and prevalent in all instructional spaces. Status: Platform Project started in 2011 and continuing today is expanding and upgrading the network infrastructure. Targeting accommodation of 90,000 devices by 2017.	