Public Schools of Brookline

Technology Plan
FY15 +

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PART I

The vision statement for the Public Schools of Brookline (PSB) states, "… each child's unique path to achievement is supported in academically exciting and programmatically rich environments" (see PSB Vision in Appendix A). Implicit in this vision is the promise to provide the best tools and resources available to create these learning environments. As citizens of the 21st Century, we recognize the significant role technology plays in our daily lives. Students are growing up in a very different world than their parents, with powerful tools in their pockets. Technology must be integrated into every dimension of our work in schools in order to *advance the best practices of teaching and learning to support each child's path to achievement.*

The Technology Plan for the Public Schools of Brookline outlines the goals and actions required to support a technology-rich educational environment. It describes where we are now, where we hope to be in 2019, and why. It specifies what is needed to provide equitable access to technology for all school users. It describes the actions Brookline must take to leverage technology for learning with the flexibility necessary to keep pace with innovation. This plan also recognizes that technology in education is an evolution and not an event. Continual updates and revisions are essential as technology advances, so that our effective use of technology remains in support of the best practices of teaching and learning.

Brief History and Current Practice

PSB has supported the purchase and placement of hardware into classrooms and provided ongoing professional development for teachers for technology integration through the support of Educational Technology Specialists (ETS) in each building. Although technology access and use was slowly increasing in the years prior to 2008, much of this technology was unreliable and most teachers reported that they did not have access to a computer that met their needs. At that time, computers were assigned to a room and not to an individual user and the school's computer lab was often the only place where students could reliably use computers in a class setting. Computers that did exist in classrooms were often over six or seven years old; they were not reliable or fully functional. Changes in operating systems made certain software and tools obsolete. While several schools were experimenting with access to mobile laptops, wireless access at the time was often not dependable enough to support mobility.

In 2008, PSB began shifting existing inventory to better meet the user needs with a limited plan to distribute laptop computers to teachers. Now five years into this initiative, an appropriate computer is provided to classroom teachers to support their administrative and teaching needs. This investment has paid off. By focusing attention on making sure educators had access to the right computer, usually a laptop, teachers started to use technology more. The addition of an enterprise wireless network in all the schools began in 2010 and significantly increased the reliability of mobile access in the classroom. As a result, teachers want to use technology more with their students; however, concerns still exist primarily around adequate access to student devices, network performance, and the existing five-year lifecycle on laptops. A middle level math teacher describes the current reality with technology in one school by describing how it would be different if technology expectations were met.

"I'd love to be able to have access to a full class set of my own Chromebooks all of the time. I wouldn't have to rearrange lessons into an illogical order in order to get a half class set of computers. I wouldn't have to have students double up on computers so I was unable to assess what an individual student understood. I wouldn't struggle to get all students on the network. And, I wouldn't always need a backup lesson plan in case the network was hiccupping that day."

Technology in education is moving rapidly into a new era. Technology is becoming more mobile and more personalized. Learning opportunities are ubiquitous and becoming more individualized. Investments are necessary to meet the immediate demand for student access to technology as we prepare for the inevitable transition of when students bring their own technology to school to support their learning. That transition has started. Since technology is a tool to assist with learning and productivity, the tool needs to be available and work easily into the everyday operations of staff and students or it becomes a burden to endure not an asset to learning. Without time, support, and resources, teachers struggle to use technology in support of teaching and learning. The Public Schools of Brookline is at a crossroads.

Technology Vision

The mission of the Public Schools of Brookline is *to ensure that every student develops the skills and knowledge to pursue a productive and fulfilling life, to participate thoughtfully in a democracy, and succeed in a diverse and evolving global society* (see PSB Mission Appendix A). The current kindergarten class will graduate from Brookline High School in the year 2025. To be true to our mission, we need to prepare students for their lives in 2025 – as difficult as it is to imagine. What will our "*evolving global society"* look like then? What will our schools look like then? Our schools need to be hubs of learning, with classrooms that are flexible and dynamic, with reliable access to the rich resources available to enhance teaching and learning, and with an understanding of the appropriate role of technology in our schools and students' lives.

In Brookline, we envision technology improving our ability to:

- Communicate and collaborate in our schools, our community, and the evolving global society;
- Maximize learning for all students using techniques and materials that take into account varying backgrounds, capabilities, and learning styles;
- Ensure that all students obtain digital literacy skills that are required in the 21st century;
- Create a well-integrated, learner-centered environment focused on inquiry into engaging problems;
- Enrich and extend professional learning for all teachers and instructional leaders; and
- Enable all school personnel to effectively and comfortably use technology as a teaching and administrative tool so that more resources and time can be focused on teaching students.

It is possible to alleviate the challenges described earlier by the middle level math teacher. Image that no such barriers existed, we asked, "Imagine that appropriate tools are readily available and reliable. What could you and your students do better?" The teacher said, *"Student assignments would be posted via Google Drive and completed online. Students would collaborate online and get valuable, real-time electronic feedback on their work from me. Students would be able to competently use a spreadsheet, and would be able to use one as needed when they thought it was the right strategy for investigating data or solving a non-routine problem, not when I thought it was a good idea and reserved the computers weeks in advance. Computers would be an integrated part of the math and science learning we did every single day."* This image is clear in our minds and is within our reach. Below is a set of educators' responses to our question of what a reasonable future with technology could be.

Scenarios of What It Could Be

In the math classroom, students routinely use apps similar to Explain Everything, to explain their thinking and consolidate their knowledge on a specific concept. This process enables students to share their learning with others and learn from other students in the district.

Sixth grade students are nearing the end of a month long project cross-curricular project on Africa. Students have been working in groups to determine the best recipient for a $1000 micro loan. Students were assigned a country, and using resources such as Kiva.org, they reviewed applications and agreed on a project that seemed worthy, practical and safe. Students used a variety of data sources and considered statistics such as per capita income, loan risk, and the performance of the field partner. In the final stages, students are excitedly preparing a multimedia "pitch" that will convince donors to help finance the loan.

As a second year teacher of grade three students, I'm planning for next week's lessons. I'm thinking about how to introduce the mammals unit to my students. I log into the PD website, and under the third grade Science curriculum, I am able to watch an online video/module of my own experienced Brookline colleagues introducing this unit. I am also able to download the variety of project-based learning activities to supplement the unit.

Students in physical education class gather around the large projection screen to track class data for the week. They discuss trends in movement, sleep cycles, and nutritional choices. Throughout the class, there is a live update on exercise levels with individual heart rates and activity levels for viewing. Students leave class with a text to their personal devices, reporting individual assessment for that class including cardiovascular levels relative to target heart zones.

Intervention providers are able to keep real-time data on all student work and are able to share the data with classroom teachers, without delay.

As part of student-initiated projects, the ECS teacher works with a classroom teacher to set up a Skype call to an astronaut. Later that day, she checks in with a small group of 5th graders participating in their online math class, which includes six other Brookline students in different schools.

The list of future scenarios showing the benefits of infusing technology in teaching and learning goes on, but even beyond these scenarios there are multiple examples of other benefits of technology to our school system. Effectively infusing technology can make the overall work of the school system more effective and efficient, and some cases, may have financial benefit over time. Possibilities include:

- Reducing paper usage
- Reducing our inventory of hard copy texts
- Reducing our inventory of pull-down maps in classrooms
- Reducing staff time for managing inventory
- Reducing the volume of hardcopy intra-system deliveries
- Improving town-wide facilities usage management
- Improving system-wide fee collection
- Reducing time and improving the quality of data collection, analysis, and reporting
- Reducing parent/guardian *Beginning-of-School* paper forms completed every September

To realize the possible benefits and to be able to write the future scenarios as current realities soon, we need to make an investment in technology. A decision to advance technology would allow us to provide more access for students and help us to get the right device at the right time in the hands of students; eliminate barriers (e.g., financial) to ensure access for all students; improve safety and security for students, staff, and families; and more regularly support students to learn effective, efficient, and responsible use of the Internet, and responsible and safe digital citizenship skills – all *to ensure that every student develops the skills and knowledge to pursue a productive and fulfilling life, to participate thoughtfully in a democracy, and succeed in a diverse and evolving global society*.

Our work is grounded on a set of essential conditions for leveraging technology for learning and guided by a set of assumptions about technology and its role in teaching and learning.

Essential Conditions

The International Society for Technology in Education (ISTE, 2009) determined the following fourteen (14) conditions necessary to effectively leverage technology for learning (full document in Appendix B):

- Shared Vision
- Empowered Leaders
- Implementation Planning
- Consistent and Adequate Funding
- Equitable Access
- Skilled Personnel
- Ongoing Professional Learning
- Technical Support
- Curriculum Framework
- Student-Centered Learning
- Assessment and Evaluation
- Engaged Communities
- Support Policies
- Supportive External Context

Guiding Assumptions

The following assumptions about the role of technology in teaching and learning are the result of discussions with and feedback from teachers, principals, coordinators and senior staff.

1. We need to have a solid infrastructure to support technology in all the schools. First, we need to provide all schools quality service and reliable access, and then accelerate the infusion of technology in teaching and learning.

2. Devices do not transform learning. A tool's learning benefits depend on when, where, how, and why it's being used. Student learning is dependent upon the interplay of effective instruction, rigorous curriculum, informative assessment, resource management, and meaningful relationships between and among learning communities. Technology can enable, enhance, extend, and deepen learning.

3. Providing universal access to the technology is necessary in order for it to enable, enhance, extend, and deepen teaching and learning for all students.

4. Ongoing professional development is essential in order to use technology most effectively.

5. Mobile technology, in particular, strengthens the opportunities for learning and expands the walls of the classroom.

6. Safety and security are paramount. Students need to be taught safe use of the Internet and digital citizenship skills. Systems need to be established to store and secure information and data.

7. Technology requires maintenance and appropriate lifecycle-spans to achieve sustainability, and a flexible plan to provide for the fast pace of change.

8. Because of the pace of technological developments and our ongoing learning about technology, these assumptions will need to be reviewed and updated.

"A vision without a plan is just a dream. A plan without a vision is just drudgery.

But a vision with a plan can change the world."

– Old Proverb

We are hoping to change the Public Schools of Brookline. Our vision is clear. Our beliefs and assumptions are shared. Our understanding of what needs to be created and sustained is agreed upon; and our plan is informative and comprehensive. Part II, which follows, describes the areas in need of improvement and the steps that we need to take, along with the budgetary impact over time.

PART II.

Technology Plan

Overall Goal

By 2019, create the infrastructure, build instructional capacity, and support innovation for the full integration of advanced technologies into teaching, learning, and administration in the Public Schools of Brookline.

The areas in need of attention and the actions we need to take fall into three categories: accessibility, sustainability, and flexibility. They are described below.

Accessibility

Access to reliable up-to-date technology at the point of need is critical when building the capacity of the technology-using culture in the schools. When trying to use technology, many teachers feel there is not sufficient access to technology that works reliably to risk the potential loss of limited instructional time. In a recent survey, 80% of high school teachers surveyed (n=40) responded that inadequate access to technology for students was the biggest challenge they faced when trying to integrate more technology in school (BHS Teacher Speakup Results, 2012).

For the Public Schools for Brookline to effectively move ahead into the 21st Century, classrooms must be provisioned with the necessary hardware and access to mobile devices for learning needs to be met. We must eliminate the gap in access to technology in Brookline schools so all students graduate able compete in our global society.

In-classroom devices for students provide ongoing, flexible and equitable access to online resources and instructional programs. Developmentally, access to such devices develops appropriate strategies to increase students' thinking, mobility and productivity in all learning spaces across educational and social aspects of schools. The integration of these tools affects teaching and learning resources and operational functions/tools like software systems. Below are some of the educational considerations and demands for these two areas:

Teaching and Learning Resources and Tools

- Assistive technology to aid in specialized instruction
- Appropriate devices to access properly vetted learning software and apps for improved differentiation, connections to students' interests and passions, and explicit instruction based on the learning needs of individual students
- Software and systems to ensure all information that informs teaching and learning can be accessed

Administrative Tools and Interoperable Data

- Software and systems needed to ensure accuracy and support integration between data systems so that all school-business demands are met effectively and efficiently
- Assessment, human resources, and programmatic data collected, managed, and shared to provide access to high quality data in real time by appropriate users
- Assessment data collected, analyzed and easily accessible for timely instructional responses

Sustainability

As the system prepares to complete its digital transition, it must consider costs of the sustainability for all foreseeable technology investments that serve the Public Schools of Brookline. Thoughtful planning and budgeting will ensure that investments today will scale for tomorrow. Maintaining an ongoing operational budget to support appropriate turnover on devices and upgrades to the network infrastructure should no longer be relegated to periodic investments. Instead, we need to ensure the scaling up capabilities and long-term viability of this technology plan.

Calculating maintenance and replacement costs using known equipment lifecycles can help successfully estimate ongoing budgetary needs. Almost the entire technology inventory has an approximate usefulness before it either begins to perform poorly or becomes obsolete or unreliable. This technology plan acknowledges the need to plan for known ongoing costs at predetermined intervals in order to continually provide the most efficient and best access to technology. Ongoing investments, preferably in the operational budget, are the mainstay. *Achieving sustainability of access is the singular most important objective of this plan.*

By moving towards a sustainability model, the Public Schools of Brookline will be able to move into the future and proactively leverage new tools for learning and administrative efficiencies. The outline below highlights some of key components around infrastructure and sustainability that need to be considered in this evolving, yet flexible plan.

Sustainability of Infrastructure

- Ensure that technology in classrooms and associated workspaces are equitable and fully integrated into a robust and reliable network infrastructure
- Monitor and respond to growing bandwidth needs and regulations
- Determine appropriate lifecycles for technology devices to maintain quality and reliability
- Require technology maintenance and appropriate lifecycle support to achieve sustainability
- Provide timely and sufficient response to technical challenges or concerns
- Provide systems that store and regularly secure information and data

Flexibility

The rapid pace of technology innovation and the increasing availability of new applications demand that this plan be flexible in order to incorporate new ideas. It is difficult to imagine what new advances in devices or tools may be just around the corner. Innovations abound and will continue to be used creatively to advance learning. The learning journey will become more personalized and yet more collaborative as learners of all ages connect and communicate outside the boundaries of the classroom, the school, and the community.

The plan provides supports for new innovations not yet imagined. Ongoing effort to build a technology using culture in our schools is succeeding. Investments in staff computing and a robust wireless infrastructure have created even more interest and readiness in teachers to use technology to support daily work in and out of the classroom. Strategies like the flipped classroom, use of tools like Google Apps for Education, and the ease of other online tools are being creatively leveraged to support new opportunities and new protocols (workflows) in the classroom. As access increases and teachers make the case for near daily use in their classrooms, another shift will begin to happen: students will begin to see opportunities to use their own technology in support of their school work and will want to bring their technology to school. Changes in policies and additional investments in “device neutral” tools will support this shift. As such, the need to continue to grow our inventory at the same rate will most likely level out. We will need to ensure that no child is left without the appropriate resources to participate fully in the technology-infused classroom.

The shift towards a Bring Your Own Device (BYOD) model will require ongoing adjustments to how we provision technology in and around the classroom. Shared carts may give way to more mobile devices directly in the classroom. The need to maintain labs in the schools may fade as more and more use is conducted successfully and appropriately in the classroom. Technology use will become seamless and just be seen as the way we do things. Its use becomes secondary to the learning it supports. Deliberate steps to advance technology and innovation need to be considered. The following briefly describes some of the essential goals for the system:

Advances and Innovation

- Provide resources to promote growth in educators’ understanding and skills of effective infusion of technology to enhance teaching and learning

- Develop resources to foster research, inquiry, and curiosity in creating transformational learning experiences for students

Key Elements of Action and Budget

There are ten (10) important areas defining our comprehensive Technology Plan:

A. Establish an operational budget to support network infrastructure
B. Bandwidth delivery
C. Appropriate lifecycle on existing school computers
D. Adding more mobile access and budgeting support for Bring Your Own Device (BYOD)
E. Administrative tools
F. Teaching and learning tools
G. Student digital content
H. Innovation program
I. Staffing
J. Adding mounted projection to existing classrooms

Each element is outlined below including a goal statement describing our desired state, description of the current status and next steps, the information used to create the budget, and an annual budget forecast of needed increases. Greater detail of actions year-by-year is found in chart form in Appendix C.

Collectively, these documents define what we believe is necessary to ensure a successful transition from limited use of technology and one time expenditures to a sustainable, flexible plan ensuring accessibility to reliable technology. By establishing the necessary conditions, we make it possible for students to reach their full potential, where learning is limitless; where the curriculum is connected to students' lives, their interests and their passions; where mobile technology helps teachers assess student learning on an ongoing basis and then use that information to advance students' learning; where communication with parents is improved with the use of classroom blogs, Twitter, and websites; where parents see a richer picture of their child's learning as she presents her online portfolio in a parent/teacher/student conference; where collaboration is enhanced among students with Google docs, among teachers with online learning communities, and with parents through an interactive website; where students have an experience over time that not only reflects their lives outside of school now, it prepares them for a multitude of choices in the future; and where *"… each child's unique path to achievement is supported in academically exciting and programmatically rich environments."*

A. Establish an Operational Budget to Support Network Infrastructure

GOAL: Establish an operating budget for the ongoing maintenance of the network infrastructure.

CURRENT STATUS AND NEXT STEPS:
Currently there is no operational budget to support the school's network infrastructure. This includes funding necessary to support a refresh cycle on servers, switches, routers, Wireless Access Points (WAPS), and all other network equipment to support both the wired (LAN and WAN) as well as wireless infrastructure.

Though many switches were recently upgraded as part of the VOIP phone project and the Enterprise Wireless Project, other switches throughout the system are approaching eight (8) years old, are End-of-Life (no longer supported by the Manufacturer), and do not support our wireless access points or VOIP phone system. Some of these same model switches have begun to fail elsewhere. Replacing these switches would help us continue to move fully towards a gigabyte (GB) standard and begin the transition to a 10 GB standard by FY19.

BUDGET PLANNING:
Since network equipment has a foreseeable lifecycle, this plan recommends creating an operational budget to support, grow and maintain our network asset with an appropriate refresh lifecycle. This will ensure that we are able to keep pace with advances in network architecture and be more agile and flexible for adopting newer technologies that leverage that infrastructure.

The following was used to determine the operational budget needed to maintain, support, and refresh the network infrastructure on an ongoing basis.

NETWORK INFRASTRUCTURE	Inventory	Cost/item	Anticipated cost /lifetime	Lifecycle (years)	Average Yearly Support
Switches (based on 48 port POE)	150	$7,200.00	$1,080,000.00	7	$154,285.71
Wireless Access Points (WAPS)	670	$499.00	$334,330.00	6	$47,761.43
Servers	14	$3,200.00	$44,800.00	4	$11,200.00
WISM	3	$19,000.00	$57,000.00	7	$8,142.86

Switches: Overall, the system maintains an inventory of about 180 switches, 50 of which are 24 port. Replacing those 24 port with 48 port would result in an inventory of about ~115. Another 15 switches are anticipated as more Wireless Access Points are added, for a total switch inventory of 130 at a cost of (~$7200) on a 7-year lifecycle.

The wireless network design, when fully built, includes 670 wireless access points (WAPS). Currently 440 have been installed. 230 WAPS will be added over the next couple of years to accommodate more devices on the network.

Establishing a network operating budget now will allow for the initial growth of the wireless infrastructure over the next two years and then support infrastructure upgrades going forward. Although the Runkle and Heath Schools have brand new switches throughout their closets, we should still be planning for their future replacements now.

ANNUAL BUDGET:

Network Infrastructure	**FY15**	**FY16**	**FY17**	**FY18**	**FY19**
Network Hardware	$190,150	$196,100	$196,100	$213,246	$221,389

B. Bandwidth Delivery

GOAL: Establish operational budget supports to subscribe, monitor, and manage appropriate bandwidth delivery to all users.

CURRENT STATUS AND NEXT STEPS:
Current bandwidth subscription = 500 Mbps shared between the town and school.

The successful use of wireless devices on the network requires a solid infrastructure with adequate bandwidth.

The next generation classroom will provide wireless connectivity to encourage collaboration, communication, and creative applications. Bandwidth delivery needs are expected to rise significantly in the coming years as:

- Online collaboration tools become more prevalent;
- More users with more devices utilize network resources;
- More services are provided in the cloud; and
- Greater use of high bandwidth services becomes more prevalent (video, assessments).

BUDGET PLANNING:
Establishing an operational budget for bandwidth services would provide the ability to increase bandwidth subscriptions if needed and meet associated costs for licensing and tools (filtering, packet shaping, monitoring).

SETDA's The Broadband Imperative: Recommendations to Address K-12 Educational Infrastructure Needs
(http://www.setda.org/c/document_library/get_file?folderId=353&name=DLFE-1517.pdf)

SETDA Recommended Benchmarks:

- **FY15:** 100 Mbps/every 1000 staff and students = ~800 Mbps
- **FY18:** 1Gbps/every 1000 staff and students = ~8.6 Gbps

Wireless	Bandwidth	Device
90%+ of the school including all academic areas with adequate access points	At least: • 1 Gbps per 1,000 users (external) • 10 Gpbs per 1,000 users (internal) • 300kbps at peak for all users	Mobile devices that can be used for instruction and assessments*

Table from The Next Generation Classroom, MA DESE

ANNUAL BUDGET:

Network Infrastructure	FY15	FY16	FY17	FY18	FY19
Bandwidth Delivery:	$50,000	$50,000	$50,000	$50,000	$50,000

C. Appropriate Lifecycle on Existing School Computers

GOAL: Shorten the lifecycle on all existing computers from 5 years to 4 years.

CURRENT STATUS:

- Established 5-year lifecycle on all computers in 2008 to address issues with computers remaining in inventory for 7+ years.
- Began issuing laptops to professional staff in 2008 with understanding of the 5-year cycle. Staff in their 5th year regular report many performance issues and high level of frustration.
- Shortening lifecycle to 4 years would put it in line with the town lifecycle of 4 years.

BUDGET PLANNING:
Currently the school owns and maintains an inventory of about 2400 computers. This includes computers in labs, mobile carts, classrooms, staff-issued laptops, secretarial and admin computers. It also includes computers that have come in through PTO donations and other grants. The annual lifecycle fund to support this inventory is $356,000, therefore a $244,000 annual increase is needed to properly support this inventory on a four-year cycle.

Existing Inventory	Budget Cost	Total Cost	Budget 5-Year	Budget 4-Year	Existing Budget	Annual increase to cover 4-year cycle
2400	$1000	$2,400,000	$480,000	$600,000	$356,000	$244,000

ANNUAL BUDGET:

Device Hardware	FY15	FY16	FY17	FY18	FY19
Shortening existing inventory to 4-year lifecycle	$244,000	$244,000	$244,000	$244,000	$244,000

D: Adding More Mobile Access and Budgeting Support for BYOD

GOAL: Increase inventory by an additional 2400 computers on a 4-year lifecycle.

CURRENT STATUS:
Existing inventory provides limited student access to mobile computers to meet the needs in the classroom. Most schools currently have only 3-4 carts with 12 computers on each. To meet the needs going forward, a full cart (24) per grade/per school for 3-4 sections will be needed. Schools with 5-6 sections per grade would need an additional cart at that grade level in order provide adequate access to support instruction and assessment needs.

Assessment Guidelines

School Type	Recommended Devices
For a school with three tested grades (K-5, 6-8, 9-12)	One device per student for the largest tested grade
For a school with six tested grades (K-8)	One device per student for the two largest tested grades

Table from The Next Generation Classroom, MA DESE

The increase in inventory will initially provide much needed access for students and prepare for the transition to a BYOD.

BUDGET PLANNING:
Budgeting anticipates the initial need to increase access for students and then transition to supports for Bring Your Own Device (BYOD).

- Meeting this new level of access requires approximately 2400 computers on a four-year cycle.
- Planning for an inventory increase of 2400 computers on a 4-year lifecycle is the equivalent of budgeting for a 33% stake in supporting BYOD for 7200 students.
- Establish series of 3-Year Leases for 600 devices for FY15, FY16, FY17 to scale upstart

ANNUAL BUDGET:

Device Hardware	FY15	FY16	FY17	FY18	FY19
Increase access to 2400 student mobile devices	$200,000	$400,000	$600,000	$600,000	$600,000

E. Administrative Tools

GOAL: Invest and establish ongoing support in tools to improve administrative efficiencies and advance the use of data for teaching and learning.

CURRENT STATUS:

- X2 SIS- need to plan for enrollment increases and anticipated costs
- Evaluation Tool- is not part of annual operational budget
- Professional Development Tool - The tool we currently subscribe to was purchased to help facilitate workshop signups.
- Curriculum Management Tool- Use currently does not exist. Atlas Rubicon is used to map standards. Next Generation tool will substitute for Atlas, but is expected to cost more. Increase in budget will be necessary to move to a new tool.
- Analytics Dashboard- Use currently does not exist. Need in order to streamline the communication of data back to the user in order to build data using culture.
- Inventory Management Software- Use currently does not exist. Coordinators track inventory using spreadsheets; very time consuming.

BUDGET PLANNING:

- X2 Aspen Student Information Management System (SIS):
  Costs = $10/student. Adjustments are needed to meet anticipated enrollment increase.
- Evaluation support tool (Teachpoint or equivalent)- Annual Subscription Fee of ~$25,000.
  With the new evaluation system, we are currently using Teachpoint to assist with the management of forms. Current budget came from one-time funds.
- Professional Development Tool - Annual Subscription Fee
  Our current PD management tool provides only limited functionality to assist with publication of the course catalog and course signup. We are currently investigating a new tool that will add functionality that includes managing teacher professional development; facilitate reporting; and better integration with existing SIS, evaluation, and HR systems.
- Analytics Dashboard- to start in FY16. Anticipated costs = $5/student
- Curriculum Management Tool - Increasingly there is a need to have one place to store and share all curriculum related documents, instructional videos, and resources. Possible tools include the DESE EDWIN Teaching and Learning tool, *Curriculum and Learning* add on to our Aspen SIS, or other. Each solution is expected to have a yearly subscription fee of ~$4/student.
- Inventory Management Software: Follet Asset Manager will integrate with our Follet Destiny Server to provide inventory management to keep track of classroom assets, sports equipment, musical instruments, etc.
- Establish next generation parent portal.
- Casper Licensing: Casper is an IT tool that assists with management of devices. A planned increase in devices will require additional funds for licensing.
- Software/Apps: Increase in devices will require additional software/app support.

ANNUAL BUDGET:

Administrative Tools	FY15	FY16	FY17	FY18	FY19
X2 Aspen - cost per pupil increase	$0	$1,000	$1,500	$1,500	$1,000
Evaluation Tool (Teachpoint or other)	$25,000	$25,000	$25,000	$25,000	$25,000
Professional Development Management Tool	$20,000	$20,000	$20,000	$20,000	$20,000
Analytics Dashboard Tool	0	$35,000	$35,000	$35,000	$35,000

Curriculum Management Tool	0	$28,800	$28,800	$28,800	$28,800
Inventory Management Software	0	$20,000	$5,000	$5,000	$5,000
Online Portal	0	$25,000	$25,000	$25,000	$25,000
Casper Licensing	$8,400	$16,800	$25,200	$33,600	$33,600
Software/Apps	$16,000	$26,000	$36,000	$46,000	$56,000

F. Teaching and Learning Tools

GOAL: Invest and establish ongoing support in tools to improve efficiencies around needs in teaching and learning.

CURRENT STATUS:

- Learning Management Tool: A system that supports 24/7 online connection to the classroom. Is used to support blended learning, flipped classrooms, and online PD courses. Currently use Canvas at Brookline High School.
- Portfolio Management System: No existing system in place.

BUDGET PLANNING:

- Learning Management System: Budget to extend the use of our Learning Management system down to the middle grades. Cost = $12/student. Middle grade students = 1,550 (FY15)
- Portfolio Management system:
- Online Student Learning: Virtual High School or similar tool
- Information and Research Skills: A tool for teaching research skills and information literacy. New tools like *Research Ready* are beginning to address this niche market. Cost: $2-3 dollars a student.
- Student Technology Assessment Tools: Learning.com's technology assessment or similar tool would monitor student's acquisition of essential technology and 21st Century skills. Results are normed nationally. To be administered in two grades (5 & 8). Costs: $ 4 dollars a student

ANNUAL BUDGET:

Teaching and Learning Tools	FY15	FY16	FY17	FY18	FY19
Learning Management System Growth	$15,600	$19,100	$31,100	$32,850	$34,350
Portfolio Management Tool	$0	$0	$20,000	$50,000	$50,000
Online Student Learning	$20,000	$20,000	$20,000	$20,000	$20,000
Information and Research Skills	$2,500	$2,500	$2,500	$2,500	$2,500
Student Technology Assessment Tools	$4,800	$4,800	$4,800	$4,800	$4,800
Online Video Archiving/Distribution	$0	$40,000	$40,000	$40,000	$40,000
Staff Tech Assessment Tool	$5,000	$5,000	$5,000	$5,000	$5,000

G. Student Digital Content

GOAL: Establish support for a portfolio of online subscriptions, and collection development of e-books and audiobooks to meet the needs of diverse learners.

CURRENT STATUS:

- E-books and Audiobooks: Currently the library budgets cannot support growth here. Typical costs for a single title =~$43
- Existing Subscriptions: Although the state provides access to many resources as part of the MA Library System, many of these tools are not specific to school, especially K-8. We currently subscribe to the following, although many of these subscriptions are limited versions.

System-Wide Online Books-Subscriptions-Tools	
Cobblestone.Net	$125.00
Country Reports	$617.00
Grolier Online - Elementary	$2,806.00
World Book	$4,950.12
TeachingBooks	$1,500.00
BrainPop (limited access only)	$2,925.00
NoodleTools	$567.00
VoiceThread	$1,250.00
BHS Online Books-Subscriptions-Tools	
ABC-Clio Databases	$2,992.00
African American Studies	$450.00
CQ Researcher/Global Researcher	$1,026.00
JSTOR	$1,500.00
Scientific American Journal	$395.00
Sirs Issues Researcher-BHS	$1,275.00

BUDGET PLANNING:

- E-books and Audiobooks: Currently the library budgets cannot support growth in this area. Typical costs for a single title =~$43. Anticipated budget = $8/student
- Existing Subscriptions: To support full versions of existing subscriptions and add material, especially for the younger grades, ELL, and Special Education (some possibilities include Pebble-Go, RazKids, Facts-on-file, Discovery Streaming) Anticipated budget = $8/student
- Software/Apps: $8/student. Phase in over 5 years.

ANNUAL BUDGET:

Student Digital Content	FY15	FY16	FY17	FY18	FY19
Audiobooks and e-books	$16,000	$26,000	$36,000	$46,000	$56,000
Subscription Content Portfolio	$16,000	$26,000	$36,000	$46,000	$56,000
Software/Apps	$16,000	$26,000	$36,000	$46,000	$56,000

H. Innovation Program

GOAL: Establish funds to promote proactive exploration of innovation in our schools.

CURRENT STATUS: As the town and schools address the technology infrastructure and access obstacles over the next 5 years, PSB will build internal supports for new projects and programs that seek to improve learning and business efficiencies that align with our Strategic Plan goals. Currently there is no internal support for such innovation.

BUDGET PLANNING:
In consultation with the Superintendent of schools, an initial budget was set for $100,000 and would grow to approximately $150,000 by FY19. These funds would be accessed through an internal application process and funds distributed after plans were reviewed, approved, and additional funding partners established, where appropriate. Applications will require a solid design for implementation, evaluation, and proposed impact for scalability and sustainability of the program should it demonstrate positive results.

ANNUAL BUDGET:

Innovation Program	FY15	FY16	FY17	FY18	FY19
Innovation Program	$100,000.00	$110,000.00	$121,000.00	$133,100.00	$146,410.00

I. Staffing

GOAL: To build necessary staffing to support increase in devices and applications and align roles to serve users with timely solutions and proactive systems maintenance.

CURRENT STATUS: Technology is served by several organizations that include the Department of Educational Technology and Libraries, The Help Desk, and Town IT department:

Ed Tech and Library Department

- Director
- Educational Technology Specialists (9); one per school. Provide coaching and job-embedded professional development
- Librarians (12)

Help desk and data team:

- Help Desk Manager
- Technicians (4)
- Data Support (3)

Town IT Department:

- Network manager (1) and Network Engineer (1) provide network support
- Additional supports for enterprise applications provided through variety of staff

BUDGET PLANNING:

Project Manager: To address the anticipated increase in building (Devotion/Driscoll/BHS) and special projects (mounted projection/wireless network). People to guide, coordinate, finalize projects to ensure timely and accurate delivery.

Digital Learning Specialist: This position is needed to provide system-wide support for online learning tools like Google Apps for Education, Learning Management Systems, subscription- based tools and services that are setup and managed at the system level. May include webmaster-like responsibilities.

Assistive Technology Specialist: Provides specialty technology supports, guidance, and coordination to students with disabilities. Provides evaluation, acquisition, and training on assistive tools.

System Administrator: A system-wide administrator would oversee policies and protocols for management of all devices including mobile device management, system-wide updates and image maintenance.

Help Desk Senior Technician: To address inventory increases, adding a senior support position would also add needed tiered and specialty support.

Building-based Technical Support: There is an increasing need to provide specialty and building-based technical support. Without this support, Educational Technology Specialists are being pulled away from their primary role to assist with increasing technical needs. Guiding documents from the Department of Elementary and Secondary Education (DESE), suggest one technician per 400 supported computers. Best option to better serve schools include adding Ed Tech and Libraries paraprofessionals at each of the schools.

ANNUAL BUDGET:

Staffing	FY15	FY16	FY17	FY18	FY19
Project Manager	$75,000	$75,000	$75,000	$75,000	$75,000

Online Learning Specialist	$75,000	$75,000	$75,000	$75,000	$75,000
Assistive Technology Specialist	$75,000	$75,000	$75,000	$75,000	$75,000
Systems Administrator	$0.00	$70,000	$70,000	$70,000	$70,000
Help Desk- Senior Technician	$0.00	$55,000	$55,000	$55,000	$55,000
Building-based Technical Support	$105,000	$175,000	$350,000	$350,000	$350,000

J. Adding Mounted Projection to Existing Classrooms

GOAL: Add mounted projection systems to classrooms throughout the system.

CURRENT STATUS:

- Runkle School - 44 Classrooms funded through building project
- Heath School - 7 classrooms funded through building project
- Devotion School- 21 Classrooms funded through PTO

BUDGET PLANNING:

- K-8:
    - 214 classrooms (325 minus Runkle, Devotion, and Driscoll due to recent or planned projects)
    - $5500/installation includes projection, boards/screen, sound, installation
- BHS:
    - 50 classrooms
        - $5500/installation of Interactive whiteboard
    - 85 Classrooms
        - $3500/ installation includes projection, boards/screen, sound, installation

ANNUAL BUDGET:

Mounted Projection	FY15	FY16	FY17	FY18	FY19
K-8 Mounted Projection	$0	$0	$0	$250,000	$250,000
BHS Mounted Projection	$286,250	$143,125	$143,125	$0	$0

APPENDIX A: PSB VISION AND MISSION

Ten-Year Vision

The Public Schools of Brookline
Dynamic, Collaborative, Equitable
Engaged with the Community
Contributing to the World

Brookline provides an extraordinary education for every child. Each child's unique path to achievement is supported in academically exciting and programmatically rich environments. A dynamic, diverse community of teaching professionals works collaboratively, innovating and inspiring each other and their students. Staff gets to know students intellectually, developmentally and culturally. Students are encouraged to question and challenge ideas and participate as active citizens. Schools use a variety of assessments to get the fullest picture of student learning and growth over time. These data are shared regularly with the community, and they form the basis of how we understand and improve student, teacher and administrator performance. Parents are partners with the schools in supporting their children's education, and schools communicate effectively so that parents are confident of the response to their child's circumstances and needs. The community, well informed and involved in the schools, supports these efforts that continue a tradition of challenging ourselves to do better, efforts that ensure the enduring value of a Brookline education.

Mission

Our mission is to ensure that every student develops the skills and knowledge to pursue a productive and fulfilling life, to participate thoughtfully in a democracy, and succeed in a diverse and evolving global society.

APPENDIX B: ESSENTIAL CONDITIONS (International Society for Technology in Education - ISTE)

ESSENTIAL CONDITIONS: Necessary Conditions to Effectively Leverage Technology for Learning

Shared Vision	Proactive leadership in developing a shared vision for educational technology among all education stakeholders including teachers and support staff, school and district administrators, teacher educators, students, parents, and the community
Empowered Leaders	Stakeholders at every level empowered to be leaders in effecting change.
Implementation Planning	A systematic plan aligned with a shared vision for school effectiveness and student learning through the infusion of information and communication technologies (ICT) and digital learning resources
Consistent and Adequate Funding	Ongoing funding to support technology infrastructure, personnel, digital resources, and staff development
Equitable Access	Robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff, and school leaders
Skilled Personnel	Educators, support staff, and other leaders skilled in the selection and effective use of appropriate ICT resources
Ongoing Professional Learning	Technology-related professional learning plans and opportunities with dedicated time to practice and share ideas
Technical Support	Consistent and reliable assistance for maintaining, renewing, and using ICT and digital learning resources
Curriculum Framework	Content standards and related digital curriculum resources that are aligned with and support digital-age learning and work
Student-Centered Learning	Planning, teaching, and assessment centered around the needs and abilities of students
Assessment and Evaluation	Continuous assessment of teaching, learning, and leadership, and evaluation of the use of ICT and digital resources
Engaged Communities	Partnerships and collaboration within communities to support and fund the use of ICT and digital resources
Support Policies	Policies, financial plans, accountability measures, and incentive structures to support the use of ICT and digital learning resources for learning and in district school operations
Supportive External Context	Policies and initiatives at the national, regional, and local levels to support schools and teacher preparation programs in effective implementation of technology for achieving curriculum and learning technology (ICT) standards

DRAFT: Year-by-Year Actions

Key Element	Network Hardware	Current Status	FY15 Detail	FY16 Detail	FY17 Detail	FY18 Detail	FY19 Detail
A.	**Establish an Operational Budget to Support Network Infrastructure** Establish an operating budget for the ongoing maintenance of the network infrastructure, both wired and wireless	• Recent network infrastructure improvements addressed through special projects. • Inadequate lifecycle support for current inventory • Basic monitoring tools in place • Established enterprise wireless network in each school. • Increased reliability of new wireless is increasing need and desire for more mobile access	• Add additional WISM for failover protection • Add additional Wireless Access Points (WAPS • Upgrade oldest switches to new standard • Add switches when need to support additional wireless	• Add additional Wireless Access Points (WAPS • Continue switches upgrade/adds where needed • Continue assessing and supporting network development, bolstering wireless infrastructure	• Continue assessing and supporting network development, bolstering wireless infrastructure • Begin looking at next generation WAP standard	• Continue assessing and supporting network development, bolstering wireless infrastructure • Start WAP upgrades in key places	• Continue assessing and supporting network development, bolstering wireless infrastructure • Continue WAP upgrades in key places
B.	**Bandwidth Delivery** Establish operational budget supports to subscribe, monitor and manage appropriate bandwidth delivery to all users	• Currently share 500Mbps with Town	• Increase bandwidth to approach recommended 800Mbps (currently share 500Mbps with the town) • Explore use of network tools to prioritize and shape traffic	• Monitor and optimize performance of wireless traffic • Assess weakest links in system for upgrading • begin preparing to meet 1Gbps recommendation in FY18	• Continue to monitor and optimize performance of wireless traffic • Assess weakest links in system for upgrading • Continue preparation to meet 1Gbps recommendation in FY18	• Increase bandwidth to meet SETDA recommendations of 1 Gbps per 1000 staff and students.	• Continue to monitor and optimize performance of wireless traffic • Assess weakest links in system for upgrading
Key Element	**Device Hardware**	**Current Status**	**FY15 Detail**	**FY16 Detail**	**FY17 Detail**	**FY18 Detail**	**FY19 Detail**
C.	**Appropriate Lifecycle on Existing School Computers** Shorten the lifecycle on all existing computers from 5 years to 4 years	• 5 year lifecycle on desktops and laptops • Existing budget not enough to meet lifecycle on existing inventory	• Continue lifecycle support for existing desktops • Begin shortening lifecycle (4 year) on all laptops • Add additional carts of devices to each school to increase access	• Continue lifecycle shift to 4 years on all laptops • Add additional carts of devices to each school to increase access	• Complete lifecycle shift • Add additional carts of devices to each school to increase access • Monitor inventory and adjust for growing BYOD environment	• Ongoing lifecycle support • Monitor inventory and adjust for growing BYOD environment	• Ongoing lifecycle support • Monitor inventory and adjust for growing BYOD environment
D.	**Adding More Mobile Access and Budgeting Support for Bring Tour Own Device (BYOD)** Increase inventory by an additional 2,400 computers on a 4-year life cycle and prepare for the transition to Bring Your Own Device (BYOD)	• 6 of the 8 elementary schools have labs; Baker and Lawrence do not. • Access to computers in carts varies. Typically includes 2-3 half carts; 1 full cart for entire school • Schools with strong PTO support have more access to devices than other schools • Some teachers experimenting with student use of smart devices	• Initiate Lease A for 600 devices to provide more mobile access, Year 1 payment • Review existing policies, practices, and needs; modify as needed • Begin Professional Development support for BYOD • Pilot BYOD options in classrooms/departments • Address assistance for students in need	• Lease A, Year 2 payment • Initiate Lease B for 600 devices, Year 1 payment • Extend Professional Development support for BYOD • Ongoing assessment of assistance for students in need • Establish annual budget support for classroom instructional iPads	• Lease A , Year 3 payment • Lease B, Year 2 payment • Initiate Lease C for 600 devices, Year 1 payment • Continue Professional Development support for BYOD • Ongoing assessment of assistance for students in need	• Lease B, Year 3 payment • Lease C, Year 2 payment • Adjust for growing BYOD environment • Ongoing Professional Development support for BYOD • Ongoing assessment of assistance for students in need	• Lease C, Year 3 payment • Adjust for growing BYOD environment • Ongoing Professional Development support for BYOD • Ongoing assessment of assistance for students in need

DRAFT: Year-by-Year Actions

Key Element	Applications	Current Status	FY15 Detail	FY16 Detail	FY17 Detail	FY18 Detail	FY19 Detail
E.	**Administrative Tools** Invest in and establish ongoing support of tools to improve administrative efficiencies and advance the use of data for teaching and learning	• X2 Aspen Student Information System (SIS) used for directory information, state reporting, attendance, report cards, transcripts, special education, student and parent portal at BHS • Teachpoint (used for new evaluation system) • HR data kept in excel spreadsheets (migrating to new system scheduled) • Destiny Library Management System • Health Office • PCS Food Services • Blackboard Connect-Ed	• Establish budget to support evaluation/management software, $25,000 • Adopt new Professional Development management tool • Increase budget for Casper/IT Management tool to accommodate device increase, $8,400 • Add $35,000 to Help Desk supplies and services budget to better meet to meet day-to-day technical needs • Initiate full review of all data, data tools, and various systems currently in place to determine interoperability, quality of data, data owners, data users, and potential improvements	• Increase X2 Aspen budget by $1,000 to adjust for enrollment • Increase Help Desk supplies and services budget to better meet to meet day-to-day technical needs, $10,000 • Ongoing review of data needs, owners, and data integrity • Identify and implement data aggregator/analytics tool for improving interoperability of data across organization • Begin implementing Curriculum Management System to provide professionals full access to all resources, $28,600 • Add Inventory Management tool (Follett Destiny), $20,000 • Increase budget for Casper/IT Management tool to accommodate device increase, $8,400 • Establish budget for Online Parent-Student Portal, $25,000	• Increase X2 Aspen budget by $1,500 to adjust for enrollment • Increase Help Desk supplies and services budget to better meet to meet day-to-day technical needs, $10,000 • Increase Follett Destiny budget by $5,000 for maintenance of Inventory Maintenance tool • Increase budget for Casper/IT Management tool to accommodate device increase, $8,400	• Increase X2 Aspen budget by $1,500 to adjust for enrollment • Increase Help Desk supplies and services budget to better meet to meet day-to-day technical needs, $10,000 • Increase budget for Casper/IT Management tool to accommodate device increase, $8,400	• Increase X2 Aspen budget by $1,000 to adjust for enrollment • Increase Help Desk supplies and services budget to better meet to meet day-to-day technical needs, $10,000
F.	**Teaching and Learning Tools** Invest in and establish ongoing support for tools to improve efficiencies around needs in teaching and learning	• Limited sharing of resources in PSB Portal Conference. • Participation in Virtual High School (VHS) for subject acceleration or special circumstances. • Canvas Learning Management System (LMS) at BHS • Use of other tools (Edmodo, Schoology, Weebly) varies widely	• Introduce LMS use in middle grades, $15,600 • Adopt a more flexible online virtual/blended education option, $20,000 • Establish budget for research and information literacy tool, $2,500 • Establish budget for staff tech assessment tool	• Increase Learning Management System (Canvas) budget to adjust for enrollment increases • Pilot portfolio management strategy/tool • Establish online video archiving distribution tool that integrates with Follett Destiny, $40,000	• Extend adoption portfolio management strategy/tool • Possible pilot of LMS-like functions at earlier grade levels, $12,000 • Pilot Portfolio Management tool, $20,000	• Increase Learning Management System (Canvas) budget to adjust for enrollment increases • Full implementation of Portfolio Management tool, $30,000	• Increase Learning Management System (Canvas) budget to adjust for enrollment increases
G.	**Student Digital Content:** Establish support for a portfolio of online subscriptions and collection development of e-books and audiobooks to meet the needs of diverse learners	• Small portfolio of resources currently provided through MA Library System and district resources. • Additional tools provided to some schools/classrooms through PTO support • Existing budget cannot address new adoptions district-wide • Support for ebooks and audio books mostly addressed through PTO, BEF grants	• Add ebook/audio book content to lending collection to better meet needs of diverse learners • Review existing portfolio of existing subscriptions and needs; add to fill needs. • Begin implementing recommendations from Assistive Technology consultant • Update existing software to address system compatibility issues • Establish funds for software/app support	• Continue building ebook/audio book lending collection • Ongoing review of portfolio of existing subscriptions • Work with content Coordinators and professional staff around needs • Establish software maintenance plans • Assess additional needs • Increase funds for software/app support	• Continue building ebook/audio book lending collection • Ongoing review of portfolio of existing subscriptions • Work with content Coordinators and professional staff around additional needs		
H.	**Innovation Program** Establish funds to promote proactive exploration of innovation in our schools	• Existing budget cannot address desires for exploration	• Develop processes for supporting innovative ideas that are directly tied to improving student learning • Develop strategies for researching innovative practices beyond Brookline and processes for testing them in PSB • Collaborate with out-of-school partners and the local community to create engaging activities that advance inquiry and spark curiosity in students	• Increase resources to support research and inquiry about instructional strategies and forms of assessment that further develop students' investment in their learning with attention to connections to students' interests and passions • Explicit instruction based on the learning needs of individual students.	• Continue supporting the development of pilots of innovative ideas that are directly tied to improving student learning • Evaluate pilots and question replication/dissemination • Extend collaboration with resources beyond PSB to create engaging activities that advance inquiry and spark curiosity in students.		

DRAFT: Year-by-Year Actions

Key Element	Staffing	Current Status	FY15 Detail	FY16 Detail	FY17 Detail	FY18 Detail	FY19 Detail
I.	**Staffing** Build necessary staffing to support the increase in devices and applications, and align roles to serve users with timely solutions and proactive systems maintenance	• Director of Educational Technology • Help Desk Manager • Four help desk technicians • Data Team (2 Application support specialists and Applications Manager) • Full Time ETS in each building (no adjustment for size) • Additional services rely on Town support • Full Time Librarians in each building (no adjustment for size); no assistant support	• Replace consulting services with Assistive Technology Specialist • Assess system-wide and school-based educational technology and libraries staffing needs; • Add new district-level project manager position to assist with increased work and planning • Add online learning specialist to support district-wide teaching and learning • Add 3 building-based technical support aides	• Add a Systems Admin. Position to address mobile device management, etc. • Add a Senior Help Desk Technician position • Add 2 building-based technical support aides	• Add 5 building-based technical support aides		
Key Element	**Capital**	**Current Status**	**FY15 Detail**	**FY16 Detail**	**FY17 Detail**	**FY18 Detail**	**FY19 Detail**
J.	**Mounted Projection** **Document Cameras** **Mobile Carts**	• Runkle has mounted Smartboards in all classrooms and some instructional spaces • Heath has 6 mounted Smartboards • Devotion, through PTO support, has 21 mounted Smartboards • Some additional mounted projection solutions in place in special locations at HS and some school labs • Document cameras exist at Runkle School • Ten existing carts in district are over 12 years old and are no longer fully functional	• Purchase mobile carts to support new devices • Purchase 25 Interactive White Board (IWB) units for Brookline High School • Purchase 43 mounted projection units for Brookline High School • Purchase 85 document cameras for classrooms	• Purchase mobile carts to support new devices • Purchase 12 IWB units for Brookline High School • Purchase 21 mounted projection units for Brookline High School • Purchase 85 document cameras for classrooms	• Purchase mobile carts to support new devices • Purchase 12 IWB units for Brookline High School • Purchase 21 mounted projection units for Brookline High School • Purchase 85 document cameras for classrooms	• Purchase of 45 mounted projection/IWB units for elementary schools • Purchase mobile carts to support new devices	• Purchase of 45 mounted projection/IWB units for elementary schools