



# Lexington Public Schools

*Department of Technology*

---

## Technology Plan: School Year 2006-2010/11

---

**Paul B. Ash, Ph. D.  
Superintendent  
Lexington Public Schools**

**Prepared by:  
Marianne McKenna  
Director of Technology**

**Draft Revision Date: January 2008**

## **Vision**

Lexington has long had an active school technology program; built on the collaboration and continued commitment of its professional instructional and technical staff, administrators, teachers and staff, community and parent volunteers, and school committee members; backed by the town's long-standing support.

The challenge ahead is **to leverage what we have together built** in this district; renovate, retool, and re-energize technology. We aim to build **reliable, flexible and sustainable** framework to support top-notch instruction, efficient administration and improved communications throughout all our schools. All of the components of the framework, i.e., our network and computing infrastructure, our information systems, staffing and training, and instructional delivery tools need to be maintained; as each component is vital. A stable, balanced framework should allow us collaboratively to consider new technologies and solutions to merge them smoothly into our plans. The framework needs to equitably support all our schools, elementary, middle and high; students and staff, and provide opportunities at each level and building for innovation and initiative.

Though firmly fixed on our long term framework vision and open to new opportunities, for Lexington the road begins, and is grounded in the here and now; our district's resources, its priorities and funding.

---

## **Plan Components**

Lexington is in the process of shifting its district wide planning and is reviewing the continuum of its program components. The technical plan has two funding sources. It addresses the myriad of "hardware" we need, is a multi-year plan, and is funded through annual capital appropriations. These include the following: network, information service delivery, computers, printing/peripherals, and classroom equipment. It also addresses our ongoing resources, software and licensing, maintenance, training, staff development and curriculum integration that are funded through yearly operating budgets and augmented by outside grants and projects. These are highlighted below.

**1. Network**— The building block of any technology implementation begins with the network.

Although the district oversees all of its internal LAN networks, we share our fiber based WAN network with the town of Lexington. All school buildings and main cabinets are connected by fiber, and our goal is to provide 100 MB connectivity to all district computers. Management, upgrades and planning for the WAN is jointly shared by school and town MIS. In addition, we maintain a service contract with a network engineering firm to insure continuity of WAN services and access to the internet and provide ongoing security monitoring, backup and troubleshooting, This is reviewed yearly.

The school district in FY 04-05 began a multi-year process of upgrading all of its WAN and LAN infrastructure connecting district buildings. Planned completion is by FY 09.

In FY 06, we upgraded all the internal cabinets (LAN) of the high school campus network (four buildings) and established a system for a comprehensive wireless deployment and reconfiguration standards for our the network. In FY 06, the Harrington Elementary School project upgraded the edge devices and internal network in this new building.

In FY 07, we completed the high school network by upgrading all edge WAN devices. In addition, full network upgrade and reconfiguration were completed for both of our middle schools. A new elementary school (Fiske) was opened in February of 07 incorporating both a wired and managed wireless network.

In FY 08, we will complete the upgrades for the cabinets and edge devices within the four remaining elementary schools. We will continue to augment our managed wireless deployment as needed in the district.

In FY 09, we plan to finish a few remaining projects on the WAN including staged replacements for central network head end devices, purchase some key switches for emergency and backup protection, and continue to build out our managed wireless network at the secondary levels. In concert with the town, we will begin a comprehensive review of our shared WAN switches and services including upgrades and consolidation. Lexington relocated its central administration building in Sept 07 taking over a retired elementary school building. Funds are requested to further update the network in this building.

In FY 10 and FY 11, we anticipate that there will be minor projects on the schools LAN including expansion of our managed wireless deployment. Ongoing and new town/school projects to streamline and introduce new WAN services such as Voice over IP and community videostreaming will continue to shape our network plan.

**2. Information Delivery Systems** – The second component is the hardware and software systems that manage users, computer services and data throughout our district.

The goal is to provide the district with a streamlined and reliable server structure that is both efficient and flexible to meet the district's ever growing need for data, management tools, security and integration. New services are sorely needed to improve the information flow through all constituencies in the district and to allow all users to function efficiently.

This is a multiyear project that started in FY 04-05 with a complete replacement and integration (including platform upgrade) of seven (7) key network servers (hardware and software). These now provide a full range of network management services (e.g., active directory, LDAP, antivirus, DNS, DHCP, language lab, etc.) for both Apple and Windows platforms.

In FY 06-07, we continued planned upgrades to our OS X open directory, file and web services purchasing six (6) new servers for the secondary level, one for an elementary school and one to serve all staff.

In FY 07-08, in concert with plans to upgrade four of our older elementary schools, we will also replace and upgrade OS X servers for improved management and file storage in each school. In addition, we have continued to upgrade and integrate our library, health and student record management systems. We will upgrade our list serve capacity as well as continue to develop and extend use of our FirstClass Collaboration mail/web server (this serves all high school students and all district staff).

Primary goal for FY 07-08 is to finalize the replacement of our current student management systems with an integrated, web based portal to provide integrated and expanded access to information for students, parents and staff. We have installed a district database server and have added networked administrative databases to track project management, inventory and EPIMS.

In FY 08-09, our priority will be to implement a new student management system and purchase any required storage hardware to meet archive and data needs. Working with the facilities department, the computer center will be redesigned to provide improved security, functionality, climate control and network management. We will revise our disaster recovery plan and analyze security risks.

In FY 10 and FY11 we currently project that we will begin renewing and replacing servers purchased at the beginning of this plan. Each year the department completes all required ongoing maintenance, archive and upgrade to insure that systems are reliable and well tuned.

**3. Desktop Computing** – The district currently supports approximately 2000 computers; Apple based for the majority of our instructional computers and Windows based for our administrative staff. We have started towards, and aim to achieve a replacement cycle for all instructional computers of 6 years (or less) within the next 3-5 years (depending on town funding). We are moving all computers in the district towards a standard platform including a common suite of application tools appropriate for classrooms and for administrators.

During the renovation of secondary schools and the construction of two new elementary buildings, we have revised both our profile of technology in a model classroom and what core instructional building technology our programs will require in the next three years; hardware, software and tools. (This detail is included in the appendix). Using this as a framework, we have revised our deployment plan to move our buildings forward.

In FY 06-07, we replaced 165 of our aging computers.

In FY 07-08, we will replace 220 of our aging computers.

In FY 08-09/FY 10-11, depending on town funding levels, we will replace between 300-500 computers to bring us to our core and our replacement goals.

(As of submission of this draft, budget discussions are still ongoing at level of funding for coming fiscal years. We project funding between \$400,000 and \$600,00 for each of the next three years.)

**4. Projection, Printing and Peripherals** – Recognizing that peripherals such as projectors, SmartBoards, scanners, handheld devices, printers, etc. are increasingly important to effective use of instructional computing, the technology capital plan includes funds for each level throughout the district and includes a core target for each. This will be continually revised and updated.

**5. Software, Equipment Repair/Maintenance and Licensing –**

The district maintains its equipment repair and maintenance, system licensing and support contracts, and software purchases through its annual operating budgets. In previous years, these expenses were distributed throughout various schools' and departmental budgets. This made cost management and operations inefficient. In FY 06 and continuing in FY 07, as part of technology reorganization, Lexington realigned its budgets to bring of all (or most) of these expenses under a single umbrella. In FY 08, one of our goals is to continue evaluate these costs to determine to insure that we preserve adequate funds to continue and where possible to reduce costs. We are looking for example to

renegotiate support agreements to allow for easier budgeting, better timing, and long-term stability. With this consolidated information, we can now begin to evaluate promising alternatives to reduce costs, e.g., open source software.

**6. Staffing** – Despite our recent budget restrictions and leadership changes, the Lexington technology staff has continued to provide desktop and network support. We are currently in a rebuilding process within a new unified department. Core staff and positions have been realigned and positions filled. We are currently building a new Training department; the primary goal is to improve teacher technical competencies. The goal is for all teachers to be able to easily and seamlessly use technology daily in the classroom. Training is planned in a variety of formats; including individual and group tutorials, incorporating outside professional development activities, stipended workshops, targeted training for hardware and software tools, and, web based tutorials. Training activities will dovetail with the district initiatives for professional learning communities and action research teams.

We have restructured technical support on the district level and are looking to create a district help desk and leverage online resources. In FY08-09, we will be looking to further expand building collaboration to enlist and train tech liaisons in each building who will work closely with the district technology support specialist and become the “bridge” to technology with each building.

Although past budget reductions forced Lexington to eliminate existing integration specialists for curriculum support, in FY 08 we will add a new district integration position specifically focused on evaluating new technologies, updating our current teacher and student benchmarks, and working with district curriculum and SPED leaders to identify software and online tools appropriate to Lexington’s needs. Recognizing that the power of technology in instruction is to engage and bring new insights, this position spearheads the district search for and evaluate new technologies -- from SmartBoards, video streaming, to tablet PC’s, to hand held devices, to bring the best of these into our classrooms.

Currently, the district benefits from the continued and ongoing the Lexington Education Foundation support for new technology initiatives that allow teachers to explore and pilot innovation. LEF currently provides technical professional development opportunities with ongoing grants. In addition, the district has completed science partnership grants in science and technology at the high school level and continues to expand its new partnership with local media and cable company to provide video production, broadcasting and access.

---

## **Going Forward**

The technology department meets routinely with administrators, building technology teams (that include staff, parents and administrators), and review committees (e.g. school improvement committees, systems review committee, etc) to refine and update our technology plan. No plan is ever “finished”. Despite past budget cutbacks, Lexington strives and continues to build a solid technical framework to support teaching, learning and district administration. We are well on our way to completing the full upgrade of our network and information server structures and are moving toward our target computer deployment and replacement goals in a way that is both sustainable and affordable. We have established and are working towards common standards throughout the district in all technology areas from common software tools, through student and staff benchmarks, through consistent funding support through to policies, and are rebuilding within existing resources our staff and training initiatives.

---

## Overview of Core Design For Lexington Schools

---

Step one in our planning process was to do a complete review of current deployment of technology in the district; infrastructure, computer needs, network services, printer, peripherals and projection devices with an eye towards best practices and key needs. **We developed and previously submitted plans to upgrade our network (wired and wireless), streamline our network services and administrative systems and realign our staffing. Going forward, a key district priority is the upgrade and overhaul of our student management system. This has started and will be ongoing in FY 08-FY09.** We next turn to deployment of computers and classroom equipment.

Balancing administrative needs and instructional programs at all levels, we collaboratively identified a core set of technology goals and then a roll-out plan for how to reach those goals for each level given finite district resources. The plan attempts to focus on the critical core set of technology that based on current practice the district needs to continue to support effective instruction and school management. It allows for some future growth and builds in flexibility as building needs and initiatives may change over time. It does not include all the technology that we would like to see in the district. Nor will this plan happen overnight. It is a road map that can and will be continually refined as new technology becomes available and we rebuild our DISTRICT program.

**Based on current budget/fiscal projections, we believe that we will have the resources to implement this core technology including computers and other classroom equipment within a 3-5 year timeframe.**

### Contents Include:

- . •Snapshot of Technology for Lexington High School
- . •Snapshot of Technology for Middle Schools
- . •Snapshot of Technology for Older Elementary
- . •New Elementary Schools: Harrington & Fiske

.  
. .  
.  
**Snapshot of Core Technology for Lexington High School ----December 07**

---

**Goals: (in collaboration with LHS technology committee findings)**

- . • Standard set of classroom tools (computer/projection/capture device) to support teaching
- . • Reliable student computing support both individual and project work
- . • Sustainable technology
- . • Core curriculum software installed/supported throughout
- . • Standard platform throughout building/Classroom and administrative staff
- . • Appropriate furniture/facilities
- . • Improve managed wireless network
- . • Shared/collaborative vision for technology
- . • **Improve access and ease of use for student demographic, tracking and assessment data.**

**Planned Core Instructional Components:**

All instructional classrooms/teaching spaces (125+) will have an upgraded desktop multimedia computer with internet access, standard software tools, and access to all required administrative systems (e.g. attendance, gradebook, grade entry etc.) . Teaching staff should have access to LCD projectors (either installed or mobile) and access to image capture devices as appropriate for instruction or need.

Each staff room will have a minimum of 3 upgraded computers for staff use.

All classroom and staff machines will have standard software tools including MS Office Appleworks, standard web browsers, mail, and, web authoring software. With an ungraded to our Student Management System, we aim to provide universal access as appropriate for all staff to student data and tracking.

LCD Projectors will be available for instructional use throughout the high school; equitably distributed by building. Some spaces due to the nature of the instruction (e.g. science labs) or to the tight physical space may require permanently installed projectors. All labs and library media classroom have mounted projectors

The library as a research and media center will be equipped with at least 20 student computing stations for research; have a managed wireless network for use inside the facility; have two (2) carts of updated laptops (40) for library

teaching and for shared use within main building.

Four (4) traditional wired computer labs with 30 stations (Two located in math building, One in Foreign Language, One in Humanities) with installed projection, network printers and scanner will be maintained. As the Science building does not have physical space for a traditional computer lab, at a minimum it will have 60 laptops and wireless network configured in 6 mobile carts to be used throughout the building. Math and Foreign Language Buildings will also have at least one upgraded wireless laptop cart for use in their buildings. Standard software kit will be installed on each as appropriate to its use.

Sony Digital Audio foreign language lab system including 30 computing stations, teacher console, presentation and audio management console and projection system will be maintained to support world language instruction..

LHS also maintains computer clusters with dedicated curriculum applications: Twelve (12) computers plus software and peripherals (electronic keyboards, synthesizer etc.) for Music Composing lab, twenty (20) in the Physics labs, Twelve (12) in MST contained classroom; and Ten (10) stations in Video/Multimedia Lab (plus teacher station).

Resource/Support rooms will have at least one upgraded OSX computer to a maximum of five to accommodate staff access to SEMSNET, as well as to student and staff access to Kurzweil and other assistive technology. Cluster support programs may require additional student computers (plan assumes no increase in number; though these may be reallocated from current location).

Fine Arts program maintains at least one high end production station with professional grade publication and design software.

Training facility will maintain minimum of 3 computing stations to support it's health and physical education curriculum.

LHS will maintain up to twenty (20) smartboard or other appropriate image capture devices for use in classrooms. Some will be permanently mounted (e.g., GEO rooms in Math building) while others due to cost, may need to be mobile to accommodate student needs. (Target maximum number of lhs projectors from all funding sources is approximately 50 total; the concern is to insure we have operating funds to maintain units).

All professional staff shall have access to appropriate computing necessary for their daily functions.

## Technical Design Considerations:

Although we have in the past two years, upgraded a number of older machines at LHS (including student labs and libraries), we will need to insure that we upgrade or replace a sufficient number of older classroom/staff machines at the high school within the next two years so that all will be able to efficiently access upgraded/replaced student information system. Also wish to maintain stable platform for all student computers. We need to look at alternative technologies for future instructional applications.

---

## Snapshot of Core Technology for Middle Schools -----December 2007

### Goals: (prepared in collaboration with administrators and building technology committee recommendations)

- . • Standard set of classroom tools (computer/projection/capture device) to support teaching
- . • Reliable student computing to support both individual and project work
- . • Sustainable technology
- . • Core curriculum software installed/supported throughout
- . • Standard platform throughout building/Classroom and administrative staff
- . • Appropriate furniture/facilities
- . • Improve managed wireless network
- . • Shared/collaborative vision for technology
- . • Support new technologies in instruction/ match computing to application

### Planned Core Instructional Components:

Clarke and Diamond have different computing requirements based on physical layout of each building and different instructional schedules. **This is general overview components common to both derived with input from both buildings. The projected numbers included in the plan have adjusted to accommodate each school's goals and core needs and to preserve equity between buildings.)**

All instructional classrooms/teaching spaces have upgraded desktop multimedia computer with internet access. These should include access to LCD projectors (either installed or mobile) and access to image capture devices as appropriate.

Library has minimum of ten (10) upgraded computers for student research via the library media program

Up to Four (4) "Computer on Wheel" Carts (laptops with projectors) for use by staff throughout the building and for presentations.

Minimum of Four (4) traditional wired updated computer labs (28 stations) to support curriculum with scanners and printers. Each lab has installed projector.

Resource rooms and SPED support rooms should have minimum of one upgraded teacher computer and 1-3 additional student computers as determined by program need and enrollment.

A minimum of three wireless mobile laptop carts to be shared within the building for project work (up to 60 computers).  
A combination of installed and mobile LCD projectors and image of capture devices (e.g. Smartboard, ELMO, Mimeo) will be available for classroom use.  
Minimum of 25 units.

Network printers and peripherals available in labs, library, shared work spaces, staff room and as appropriate classrooms.

Core curriculum software tools installed on all student/lab and teaching computers. This will include:

- . •MS Office
- . •Appleworks
- . •Inspiration (and/or Inspire Data)
- . •Science: Wind, Moon, Cloud units
- . •United Streaming
- . •Timeliner
- . •Standard web browser
- 

Other instructional software as needed may include: Computer graphics/art design e.g. Photoshop, CAD, programming, multi-media tools.

Administrators, Sped/Resource and other instructional staff will have access to updated desktop or laptop computers. Multi-building staff to be handled by district allocation for equity.

Multi-media peripherals (e.g., video cameras, document cameras, digital cameras, microphone, etc .) will be available through the library program for shared use throughout the building.

**Technical Design Considerations:** We need to upgrade computers used by instructional staff to allow us to upgrade Student Information Package. In addition, the middle school library instructional program is significantly hampered by the older computers and need to be upgraded. These objectives were given priority in planning.

---

## **Snapshot of Core Technology for Elementary Schools – December 2007**

### **Goals:**

- . • Standard set of classroom tools (computer/projection/capture device) to support teaching
- . • Reliable student computing support both individual and project work
- . • Sustainable technology
- . • Core curriculum software installed/supported throughout
- . • Standard platform throughout building/Classroom and administrative staff
- . • Appropriate furniture/facilities
- . • Upgraded internal networks
- . • Shared/collaborative vision for technology

### **Bowman, Bridge, Hastings, Estabrook (Unrenovated Schools)**

#### **Planned Core Instructional Components**

**Laptop for Instructional Classroom Teachers** for Multimedia Presentation (to be used in the classroom as primary computer).

Traditional wired **computing lab (28 stations)** network printing (B&W/Color)

**Mobile labs** for project work (60 stations) in carts with wireless capability

Up to eight (8) student research computers in library.

Projectors for shared use throughout instructional spaces. As funds allow, image capture devices (e.g. SmartBoard, Mimeo) in classrooms.

Core Curriculum Software (this list may need to be updated)

MS Office

Appleworks (?)

KidPix Deluxe (graphic/drawing/design)

TimeLiner

Type to Learn  
Kidspiration/Inspiration (per grade level)  
Neighborhood Map Machine  
Math software (TBD)  
Standard Apple Multimedia Software (iPhoto, iMovie, GarageBand etc.)

Administrators, SPED/Resource and Other instructional staff have appropriate computing. These will be allocated from district.

Additional student computers in Gr.3-5 classrooms to support daily work  
Multimedia Peripherals (e.g. video cameras, document cameras, etc) available for shared use within the building.

Shared network printers for use throughout the building.

At a minimum, twelve (12) Alphasmarts (or other assistive technology) will be available for use in the building. (Most schools will require 30)

### **Technical Design Consideration:**

We need to address the infrastructure of these four schools to insure network and electrical capacity. Unlike when we opened Fiske and Harrington with all new computers, we will need to approach upgrading these schools' computers in phases and to the extent possible not disrupt ongoing programs. Although the longer term target is the same for each elementary building, implementation at each will take into account the buildings' own priorities and physical limitations.

---

### **New Elementary Schools: Harrington & Fiske: A Look Ahead –Jan. 2008**

#### **Harrington:**

Although Harrington has some of the best and stable technology in the district, there are still needs. Technology was funded in 2005 via the building funds and not by district operating nor technology capital.

**Computers:** Since Harrington was designed and opened; the district has shifted its plans for computer deployment. Key change here is that we are no longer going forward with the multiple computers per classroom model. We are shifting our core emphasis to provide classroom teachers with laptops and outfitting the classrooms with 1-2 student computers. Recognizing that project learning and need for students to use computers in and around the classroom, we are

planning to also provide wireless pods of laptops for sharing within each grade area or pod (this varies by building layout These additional units will be easily available when needed for a teacher to pull a group for an instructional unit. (This was not intended to function as a class lab set; but to provide portable workstations); leveraging out technology further.

There were several factors driving these changes – when we look at the funding projections for technology it was clear that the district would not easily be able to maintain that number of classroom computers district wide needed in the older model. We already see in the district that as the classroom computers start to age; classrooms would have computers of different “vintages” sometimes running different software. We have insufficient annual funds to be able to refresh all of the computers at one time. Over time the older classroom computers fall out of use, and require a lot of technical support. We want to shift our core package so that what we provide for teachers is consistent, stable and supportable. The core package is our priority right now. We also believe that new handheld and instructional devices may well alter what we need for computers down the road..

Harrington has close to the target number of computers that the district is planning (and can support) for elementary schools; but these are in different configuration from our new core design. (Although we still need to look at the enrollment impact resulting from the recent redistricting; and the needs of any new programs). **Our challenge will be to find a creative way to include laptops for Harrington classroom teachers and possible additional laptops for students within elementary building cap.**

Harrington computers are now close to three years old. Under district refresh plan, these would not be replaced for up to 2-3 years from now. (They are factored in the projection in FY10, although only should we get the \$600,000 capital funding) In the meantime we need to work together to determine what to do in case of loss or breakage. This will mean reallocating from within Harrington. We will need to do wholesale OS system upgrades in the building (this may require us to purchase curriculum software upgrades as well). This is planned for Summer 08.

---

### **Fiske –**

Just opened in 2007, Fiske technology funded by the building project included: laptops for classroom teachers, desktop computers for lab, library, staff and student use, managed wireless network throughout, installed projection system, mimeo capture devices, and pods of laptops computers strategically distributed throughout the building to facilitate project and class work. Fiske is one of the better equipped schools in our district. However, no plan should be static; no school considered “finished”.

Yet for this replacement projection, Fiske are not included in the next three year plan. Under current practice, replacement for Fiske would start no later than the FY11 (and possibly FY 10 ). There are many factors which could dramatically impact this – e.g., drop in computer pricing, new hand held technology that may displace the need for multiple desktop computers, etc. are just some examples. But we needed to make this estimate based on what is now known. We have reserved some funds for needed computers in order to accommodate future loss/ or irreparable damage, redesigned programs, or enrollment/staff changes at Fiske. We want to maintain to the extent possible the town's investment in effective technology for Fiske.

The Fiske design (due to budget constraints) did not include all the instructional items that we would have like to see as part of our elementary school core. For instance, Mimeo's were included in all classrooms on an evaluative basis. If after training and field testing during the school year, these don't provide all the needed functionality for effective instruction, we reserved some funds to purchase Smartboards or other image capture devices for Fiske. Fiske also did not receive Alphasmarts and other assistive devices; nor all of the curriculum software initially planned. As funds permit in the district, Fiske will be included in these purchases.

