

Wayland Public Schools

**TECHNOLOGY
REPORT**

Jean Tower, Director of Technology and Accountability

July 30, 2007

I. Executive Summary

This Technology Report is presented to the Superintendent and to School Committee annually. In it, the state of technology in the Wayland Public Schools is described in terms of goals set and progress against these goals, news and initiatives, and technology in the curriculum. Examples of noteworthy projects are provided and significant trends and issues are related. Further, goals are set for the upcoming school year.

The progress we have made against our infrastructure goals from last year, and the new goals that we have set are evidence of our strong commitment to providing the best infrastructure possible, given the level of funding and existing building conditions, like electrical capacity. Wayland's commitment to capital spending on technology is middle-of-the-road – neither starving the program out of existence, not providing the funding required to fully implement district plans. Internet and local area network bandwidth are big issues we need to pay attention to in the next few years. More and more content and curriculum resources are becoming available on the web, and more of our mission-critical software is shifting over to be web-based. This increased reliability on the web translates into the need for more bandwidth. I predict that all schools will be scrambling to keep up with bandwidth demand in the coming years.

The Wayland Public Schools Foundation was instrumental in providing funding for several new projects described later in the *Technology in the Curriculum* section. While implementing these projects took many hours of work, they were ultimately successful, rewarding, and exciting.

In professional development the critical need seems always to be described as *time*. Teachers interested in technology and hoping to sign up for courses and workshops are often torn between those workshops and courses like EMI, Research for Better Teaching, other district-led courses, courses to get them to their required master's degree, and more. Since we are always competing with the many worthwhile courses that teachers would like to take, it is very difficult to achieve systemic change or adoption of any software or pedagogy. Our most reasonable course of action is to continuously offer courses and to inspire teachers by showing them the work of colleagues. This is both a motivator and a confidence builder, as teachers think – "they can do it, then so can I." Having a fulltime Technology Specialist in each building is also an important component of our Professional Development model.

In staffing, we have not only made no progress in recent years, we have regressed. The key issues I identify in staffing are the need to get the Technology Specialists in each building to be full time, and the need for a data analyst. It is understood that in the current atmosphere it may be difficult to advocate for increasing staff, but I continue to do so. The Technology Specialists not only provide direct instruction to students, but are the soldiers in the trenches when it comes to supporting teachers and providing "just in time" professional development.

Lastly, funding continues to be a key obstacle to full realization of technology plans. The history of the Technology Capital Allotment over the last several years is as follows: FY03: \$200,000, FY04: \$50,000, FY05: \$200,000, FY06: \$300,000, FY07: \$200,000. However, the amount requested to implement plans is regularly between \$300,000 and \$350,000. Moreover, since the enactment of NCLB, Wayland is no longer eligible for most state and federal technology

improvement grants. To qualify for competitive grants, a district must be defined as a "high needs" district. Last, even the amount of our state technology entitlement grants has been greatly reduced over the years. There were a few years during the 90's that the entitlement grant was around \$30,000 – since 2002 it has been less than \$2000 every year. The confluence of these funding realities has led to a consistent under-funding of capital purchases for technology in the district. The result is user dissatisfaction in terms of age of computers. Users may describe it as having "older software and browsers" and have "slow" computers, but the core reason is the age of the computers. If the computer cannot be upgraded to run newer operating system, then it also cannot make use of newer software, nor the latest browsers, and therefore the latest web sites do not work appropriately. Teachers who come from other school districts, especially those who have had recent building projects, relate much better conditions to our veteran staff. If we want to continue to attract and retain the best teachers in the state, we must improve our commitment to funding technology.

Also, typically I have an addendum to this report summarizing all of the computer hardware in the district and calculating our student to computer ratios. The timing of my report this year is such that we are in the middle of major projects and upgrades. Therefore, rather than attaching an inventory update to this report, I have requested to attend an additional School Committee meeting in the Fall to present that update, and at the same time submit my request for Capital Funding for the 2008-2009 school year.

II. Progress Report Relative to Goals

Following is an update on the progress made against our goals set forth for 2006-2007 school year.

Update by Goal

Infrastructure Goals Update

- This summer we will replace our current email client server. Webmail by *Infinite Technologies* is no longer being developed and the support is limited to "as is" functionality. The product we have chosen is WebMail by Emumail. This migration is planned for late June – early July. Every member of the Technology Department did research to find a replacement. Teachers were invited to attend a demo of the six most promising candidates and this product was selected over all the others.
- *Progress: EmuMail proved incompatible with our email server. After further research, and a version upgrade of our email server, we chose to use the web version of the Lotus Notes/Domino email client. Trials have been very successful and we will introduce to all staff starting in September. We plan on leaving WebMail running for at least a month so that staff can make the transition at their own pace.*
- Several of our district servers are over three years old and after three to four years of running 24X7, need to be replaced for reliability. All of the Apple – Macintosh servers require some configuration and upgrade projects.
- *All of the planned configuration and upgrade projects were successfully implemented and the impact on use for students and staff was immediate. The changes eliminated several "slow server" issues and increased efficiency of client-server communication. The*

changes were all software and configuration updates, not hardware. Due to budget constraints we had to push back server hardware upgrades to the next year.

- *Improve server access speed by adding second network cards on the Xservs and by implementing gigabit to servers and by port management.*
- *This improvement was implemented successfully.*

- *If budget allows, extend teacher wireless to history and language buildings at the High School.*
- *The teacher wireless access has been extended to most buildings on the High School campus, leaving out only the Field House. This VLAN allows guest access to the Internet while protecting resources on the internal network. Teachers see this as a welcome benefit and many now bring their own laptops to school to use both for professional productivity and for working with students.*

- *If budget allows, implement fiber connections in history and language buildings at the High School. This will require new networking hardware at both ends.*
- *This project was successfully completed, funded through a combination of sources (grant, High School budget, Computer Capital). The High School network is much more reliable and stable, and the speed to connect to network resources from buildings that were formerly many hops from the Main Distribution Closet (MDR) has been noticeably improved.*

- *Complete as many of the above-listed Summer 2006 projects as possible and continue our work on these requests into the fall.*
- *In last year's report, I included the **very** long list of projects and requests that the Technology Department hoped to complete. I am happy to report that we were successful in carrying out nearly 100% of these projects. The few exceptions include transitioning to a new email client, something we are now in the process of completing; install wireless access points such that we have coverage everywhere in each school – also a project we plan to complete by September this year. In addition, I coordinated with outside vendors to manage the installation of equipment awarded through several Wayland Public Schools Foundation grants. One of the grants was for a multifaceted multimedia installation in every High School science room. This grant required many hours to elicit proposals, coordinate requirements with High School Staff, oversee electricians, computer installation and installation of multimedia components. The result is well worth a visit to see it being used. Ken Altshuler, Science Department Head and grant author, reports that even teachers who had hitherto exhibited reluctance to use technology were excited and on-board and integrating technology into instruction.*

- *Continue the transition away from OS 9 and MacManager.*
- *This has been a yearlong endeavor, and it is close to being realized. Much depends on funding (replacing the older computers) and teacher readiness (being ready to give up older software titles). As for funding, we retired some older OS 9 computers over the course of the year, and tried to reallocate where computers were deployed in order to*

minimize the impact of having fewer computers. The rest are being retired this summer and we are working on deploying new purchases and existing computers in order to best cover needs. A few OS 9 computers will remain for very specific purposes in cases where we have not yet been able to replace an older software title with something comparable for OS X. Sometimes the obstacle is money (to purchase the new software) and sometimes it is that teachers are still looking for the best suitable replacement. As for readiness, our strategy was to deploy as many OS X computers as we could, to have 15 to 20 new software titles working on them, and thus entice teachers to give up older software. This worked better than we imagined and if we had had the funding, we could have retired 95% of the OS 9 computers by October without resistance.

- We need to increase the number of IP addresses available in order to add more devices to our networks. To do this we will need to change our subnet mask and make network settings changes at every single computer. This summer, it is already a necessity at the High School and Middle School. We can delay this for one more year at the elementary school buildings.
- *This was a purely technical project and, while time consuming, was easily realized.*
- For printing on the Apple- Macintosh side of the house, we have been limited in our purchase of printers to those printers that pass AppleTalk. This year, we have purchased IP only printers and will continue to do so, so we need to plan a transition that fully brings these printers into the network structure and management. IP is now the industry standard protocol and we will, over the course of the year, transition from using only AppleTalk and enable IP printing wherever possible.
- *We have tested a new IP-based print server, have configured it, and will roll out into production during August, for the start of school.*
- Wireless access points – site survey and deploy new wireless access points where needed in order to provide ubiquitous wireless connectivity. This is a priority at every school so that teachers and students can move throughout the buildings and still be online without moving wireless access points to accommodate new locations.
- *We are very close to having universal wireless coverage. We will expand at the High School this summer.*

Professional Development Goals Update

- All instructional staff will complete the TSAT annually. We began doing this assessment in the 2004 – 2005 school year. We will use the results of the TSAT and other teacher input devices to inform our professional development planning.
- *Most staff did complete the TSAT in the spring. We plan to analyze the data this fall in time to report to the Department of Education by November, when the Technology Plan update is due. I will report to the School Committee on this later in the year.*

- We will continually assess our professional development program to reflect current research and best practices, and will use teacher evaluation forms to improve the professional development opportunities that we offer.
- *This is an ongoing effort and has resulted in some changes this year. For example, our one Wednesday in-service at each school has historically consisted of the Technology Specialists presenting to teachers. This year we made a concerted effort to have more classroom teachers present. Research shows that classroom teachers have more credibility when training other teachers, and our goal was to take advantage of this ready "buy in." In addition, we know that the best professional development is ongoing and sustained and needs driven. Based on this, at the Middle School this year we changed the presentation to be teachers presenting technology infused teaching and projects to their peers. All teachers attended and saw all the presentations, rather than have teachers select one of 5. The presentations were more "teasers" to capture interest. During the session teachers were able to sign up for more extended workshops on any of the topics. This was very well received – the feedback was very positive and many teachers signed up for workshops.*
- By June of 2007, our goal is that at least 85% of staff will have participated in 45 hours of high-quality technology professional development.
- *We have probably reached this goal. We will analyze the TSAT results in September to verify that we have.*
- We will continue to strive to have a technology strand embedded in all professional development offered by the school district.
- *This has proven to be a more difficult nut to crack. We offer many different professional development opportunities led both by our own staff and by outside consultants. We made progress in this area by working with key district professional development providers (curriculum specialists and department heads) and it would appear that we are making progress. As more teachers become familiar with online extensions to the classroom-learning environment, we expect that it will become easier to suggest online forums as a simple way to extend professional development to include some technology strand.*
- We will have eight teachers participating in an online learning course this summer. The Technology Specialists at the High School and Middle School are enrolled in this course and they will continue to support and train teachers who are using it over the course of the next school year.
I believe strongly that an online component to all of our classes at the secondary levels is one of the most important initiatives that we will be supporting and encouraging in the next several years. This course and the continuing support of these teachers will be carefully shepherded.
- *The teachers who participated in the Moodle course all successfully used Moodle with their students. In the description of professional development and the change for technology in-service Wednesdays, I mentioned that at the Middle School we had teachers present. One teacher who presented showed a student discussion of "free*

choice" reading. Several teachers became interested in the online Moodle portal and subsequently worked with the Middle School Technology Specialist to further investigate.

Personnel and Staffing Goals Update

Staffing goals remain much as they were in last year's report, since we have not yet been able to meet these goals. Fiscal limitations have hampered any progress we had hoped to make in the area of staffing.

- The Middle School Technology Assistant position should be increased to full-time.
- *There has been no progress made.*

- I continue to advocate for increasing the High School Technology Specialist position from .8 to 1.0, as soon as funding permits such an increase.
- *There has been no progress made.*

- In order to meet the DOE benchmark, "*The district has one FTE person dedicated to data management and assessment,*" the district needs to hire someone in this capacity.
- *There has been no progress made.*

- Due to budgetary constraints, at the elementary level, one of the Technology Specialist positions has been cut to .9 and two of the Technology Assistants positions have been cut. I would argue that it is unwise to spend the money that we do on infrastructure, connectivity, software, and training, and then to cut the people who provide direct support to teachers and students. I advocate that we reinstate these positions fully, starting with the Technology Specialist.
- *There has been no progress made. I continue to advocate that we reinstate these positions fully, starting with the Technology Specialist.*

III. Goals for the 2007 – 2008 School Year

One of our goals for next year is to work with an outside agency to conduct a Technology Audit.

Technology Audit

Technology is unique in that it is a strand within every subject area, rather than a subject by itself. Technology is used in every curriculum area to support teaching and learning throughout the schools. We look to an audit to help reveal ways to do this better.

Our overarching goal is to gather and analyze data that will inform our technology plan and position the Wayland Public Schools to make the most efficient and effective use of learning technologies for students and teachers.

Toward that end, we would hire an outside consultant from MESPA to conduct a K to 12 audit of technology in the Wayland Public Schools.

The audit would look at technology use throughout the 5 schools, and would examine things like:

- access to technology

- teacher use of technology for various purposes
- student use of technology
- obstacles to productive access
- areas of greatest success
- areas of greatest need
- skill levels of teachers

It will be a comprehensive audit, designed to measure user satisfaction, uncover urgent priorities that need to be addressed and funded, review technology integration across the board, and make recommendations.

The need for this has become evident in a variety of ways. Technology users report dissatisfaction with some aspects of the technology available – age of hardware and software, bandwidth, and access. Members of the technology department express a desire to support more cutting edge use and integrated projects but feel we lack the resources to do so. And last, it is simply good practice to review programs such as this periodically, especially when we continually ask for support and investment from the citizens of Wayland. Results of the audit will be publically shared.

Infrastructure Goals

- This summer we will complete the transition to OS X computing by removing all OS 9 computers from the managed network. Many of the oldest computers will go to recycle and some will be kept for single purpose computers while we investigate replacing those key software titles that will reside on them.
- All of the servers for the instructional side will be upgraded with newer release of the operating system. This, coupled with taking the OS 9 computers off the network, will poise us to be able to take advantage of more of the capabilities of Workgroup Manager, including improved access management to shared folders.
- A new server is being installed at the High School to house our new student database management system, iPass. iPass is an important upgrade that we will be working to support and help users to make the transition to all year.
- We are replacing our Firewall this school year. We have used a Firewall called BorderWare since 1994. Switching to one that is more of an industry standard will widen opportunities for training, support, and enhancements, since a wider user base usually translates to more rapid improvements in the product. The switch is necessitated by the fact that we require a fourth network card or port on the enterprise firewall.
- The six administrative servers in the district will be replaced with new hardware and will be upgraded from Windows 2000 server to Windows 2003 server.
- We are testing twenty new OS X software titles to work on the network and hope to have at least 17 of them deployed by September 1, 2007. The remaining three, we plan to configure for network use in the fall.
- At Wayland High School we will continue to bring universal wireless access to the buildings. It is in place in the Administrative building, the commons and the Social Studies building. Only a few wireless access points need to be added to the language building and then we hope to do the Math-English building and Science as well.

- We have upgraded our Internet bandwidth over the last several years by gradually adding Comcast cable modems at each school. Bandwidth is still an issue, especially at the High School, where we have more staff, students, and computers than any other school. In addition, when Comcast has technical issues we lose connectivity entirely. One goal we have this year is to investigate the possibility of adding another provider to the network. This impact would be two-fold: an increase in bandwidth every day, as well as a built-in redundancy for those times when Comcast service is down. If affordable, we hope to make this improvement during this school year.
- We want to continue to make progress on our plans, as outlined in our capital budget request. These items include more instructional computers, more projectors and other peripherals, and replacing hubs with newer manageable switches.

Professional Development Goals

- All instructional staff will complete the TSAT annually. We began doing this assessment in the 2004 – 2005 school year. We will use the results of the TSAT and other teacher input devices to inform our professional development planning.
- We will continually assess our professional development program to reflect current research and best practices, and will use teacher evaluation forms to improve the professional development opportunities that we offer.
- We will continue to strive to have a technology strand embedded in all professional development offered by the school district.
- For the Technology Department itself, I have been investigating a Professional Development firm, Ouellette and Associates, Consulting. Their approach to IT is to focus on IT as a customer service branch of the organization. Universities that have used Ouellette for professional development have been very successful in improving their service level, minimizing downtime, and increasing "customer" satisfaction. If funding can be found, I'd like to have Ouellette provide training for my entire department.

Personnel and Staffing Goals

Staffing goals remain much as they were in last year's report, since we have not yet been able to meet these goals. Fiscal limitations have hampered any progress we had hoped to make in the area of staffing.

- The Middle School Technology Assistant position should be increased to full-time.
- I continue to advocate for increasing the High School Technology Specialist position from .8 to 1.0, as soon as funding permits such an increase.
- In order to meet the DOE benchmark, "*The district has one FTE person dedicated to data management and assessment,*" the district needs to hire someone in this capacity. It is becoming more evident over time, that this position needs to be filled. We have skilled and passionate educators who would benefit from the data analysis that someone in this capacity could provide.

- Due to budgetary constraints, at the elementary level, one of the Technology Specialist positions has been cut to .9 and two of the Technology Assistants positions have been cut. I advocate that we reinstate this Technology Specialist to full time.

IV. Technology in the Curriculum

The Technology in the Curriculum section is divided into two parts. In the first, goals set last year are updated and goals for the upcoming year are outlined. In the second are the noteworthy projects from each level that the Technology Specialists have submitted for this report.

Goals and Progress Report

Students Meeting Standards and Assessing Students Update

One of our goals for the past school year was to continue our work in measuring whether we are providing sufficient opportunities for students to meet the student standards as set forth by the Department of Education and to create a plan to assess students against the standards. The Technology Specialists have been working with building level technology committees and curriculum leaders to begin to develop a comprehensive plan at all levels to systemically provide the opportunities for students to meet the standards, and to determine where, within the core curriculum areas, the standards are introduced, practiced, and mastered.

Progress: Technology Specialists continue planning with building based Technology Committees. While the discussion is rich and interesting, we have not yet finalized a plan for assessing students against the standards required by the state.

Goal 2007 – 2008: The Technology Specialists cannot carry this project without close cooperation from curriculum leaders and administrators. We will work to be sure that they become more aware and involved and have more of an active voice to help move the project forward. Our plan is that school principals will take more of the planning burden and that by the end of the upcoming school we will have a comprehensive plan that outlines opportunities for students to meet the standards, and sets where, within the core curriculum areas, the standards are introduced, practiced, and mastered, and that includes an assessment strategy.

Stronger Coordination Between Technology and all Curriculum Areas Update

Another goal was to meet more often with the K-12 curriculum leadership teams in order to better understand the curriculum challenges so that we might better target technology as a tool toward helping to make progress in these challenges. As in the past, Jean Tower attended all the K – 12 curriculum meetings. These meetings continue to provide wonderful opportunities to share ideas, problems, and initiatives.

At the elementary level, the Technology Specialists met with Tammy Mulligan and Claire Landrigan on literacy projects and initiatives. They also worked closely together training teachers to use the Lexia family of software and supporting them in that use. At the Middle School, Beth Monahan met regularly with curriculum leaders in both formal meetings and informally around the school. At the High School, Mary Barber worked with department heads as much as possible, meeting to discuss projects, needs, priorities, writing grants, and staff development.

Progress: We continued all of these initiatives. At the elementary level, the Technology Specialists met with Tammy Mulligan and Claire Landrigan on literacy projects and initiatives. They also worked closely together training teachers to use the Lexia family of software and supporting them in that use. At the Middle School, Beth Monahan met regularly with curriculum leaders in both formal meetings and informally around the school. At the High School, Mary Barber worked with department heads as much as possible, meeting to discuss projects, needs, priorities, writing grants, and staff development.

In addition, I worked with several Technology Specialists and teachers to interest teachers in new areas of technology integration by inviting them to see what other schools were doing, and by attending professional development sessions with them. Once we had interested and excited teachers, we helped them by co-authoring Wayland Public Schools Foundation Grants with them so that they could begin to implement their ideas. This resulted in several new and exciting projects throughout the district and is a model we will continue into the next school year.

Goal: A goal for the next school year is to continue all of these initiatives and to expand on them.

Noteworthy Projects and Technology Integration Examples

All of the school Technology Specialists contributed to this section.

Technology Specialists:

<i>Name</i>	<i>School</i>
Beth Ann Burton	Happy Hollow School
Rita Partridge	Loker School
Nancy Colbert	Claypit Hill School
Bethann Monahan	Middle School
Mary Barber	High School

All or most of the technology rich projects reported on last year continue. In this section I make an effort to select out those projects that are either new extensions of existing projects or are new this school year.

United Streaming

UnitedStreaming is a subscription service to a digital video library. Teachers use the library of videos to integrate digital content into the curriculum. It is very easy to use, and the videos can be streamed at the moment of classroom use, or can be downloaded and saved to a hard drive or other media (DVD) to ensure speed and quality. We piloted this service at Claypit Hill School three years ago (a complimentary introduction), and have since subscribed at all five schools. Teachers from every curriculum area have reported using the videos from UnitedStreaming, and several shared examples in which they inserted film clips directly into PowerPoint presentations so that the clip represented the exact point they wanted to make at the correct time in the lesson.

Related, though not the same product, many teachers use streaming web sites to augment their classroom resources. As reported here last year, English classes listened to an online version of a previously aired National Public Radio program discussing the anniversary of Death of a Salesman. The teacher reported that the experience helped to bring the book to life. Teachers

continue to find excellent resources on the web, from NPR to Utube, and effectively integrate these resources into the curriculum

Robotics

One teacher was trained in Lego MindStorms at each of the elementary schools and at the High School. Students used the program this year, constructing robots from kits and programming them with MindStorms. At one of the schools, the final project for the unit of study was to create a robot that would assist the handicapped.

Posting on the Web

Sixteen teachers have received training in using BlackBoard and/or Moodle as an online adjunct to their face-to-face class meetings. All used these online portals this year with some interesting success stories. In addition, 76 teachers in the district used TeacherWeb to construct and post web pages. TeacherWeb is a web hosting service especially for schools and teachers. It is entirely template-based and requires no knowledge of html or of web authoring tools. This is seen as a growth area for the school district.

iPods

There were three quite distinct new initiatives this year using iPods. All were pilot projects in nature and all were successful.

At the elementary level, 12 iPods were purchased and used to support a reading initiative for some Boston resident students. The students listened to audio books while traveling to and from school by bus. They also read the books that they listened to and participated in weekly book discussions.

Below is a quote from Tammy Mulligan and Clare Landrigan just as the project was getting underway:

The iPod Project is up and running at Loker!!! Boston Resident Students are listening to and reading books on an iPod during the bus ride. They then meet with us once a week to discuss the book as a group. We began this project last week and so far it is going very well.

I know the students remained excited about the project and looked forward to their listening, reading and discussing – whether we will be able to see a measured difference in reading scores remains undiscovered.

At the High School, each teacher in the language department now has an iPod and speakers to use with the iPod (WPSF grant). The initial training was a class offered through The Education Cooperative (TEC), and was facilitated by two Apple engineers. We had four people attend: Mary Barber, High School technology Specialist, Jean Tower, Technology Director, Ed DeHoratius, language teacher, and Mary Brown, language teacher and department chair. This training was instrumental in getting the teachers excited about the possibilities and ready to pilot the use of iPods in the curriculum. We arranged training for the entire department, and the results have been exciting. Teachers have been collected audio and audio-video material to share with their students using the speakers or by connecting directly to a projector. As teachers have become more comfortable and knowledgeable, the goal this year will be to have students create original material to share on the web in the form of podcasts.

The second High School iPod project took place in the Special Education department, in conjunction with the Academic Center. In this project, teachers are providing material in audio format for those students for whom this is a better match for their learning styles. We hope to accumulate a library of material, both purchased and created locally (by volunteer readers), so that we can provide audio material on the department's iPods and on students' own iPods. This was another WPSF grant funded pilot and the feedback has been positive.

Research on the Internet

Research and writing are staples of our core curriculum and technology is used for both from K through 12. These uses are maintained from past years and continue to grow. One elementary teacher shared an interesting way that she handled questions that came up in class.

When we have a question, be it content, vocabulary, a news related item, or something we need clarification on, I assign and guide one or more students to do a Google search and find information to our unanswered questions.

This allows the student to be the researcher for the class, and for the teacher and other students to participate as guides. It is a very effective way to model responsible Internet research for younger students.

Technology Specialists asked teachers in every building for input about projects that utilized technology. In a review of the responses, it quickly becomes evident that almost every teacher describes many projects throughout the year that were dependent on using technology for research. This is a trend we have documented over the last several years and it is now simply a part of the way the business of learning is realized.

Presentations

Just as students use technology for research and writing, so do they now increasingly have opportunities to present their research in class. From the early grades, when students create one slide to contribute to a classroom AppleWorks slideshow, to the upper grades, when students create more complex multimedia presentations, we see many more teachers having students create presentations as a vehicle to share their work. The quote below is from an elementary school teacher:

The new project I added this year was a Seasons Slideshow. The students used Kid Pix to create a 6-page slideshow. They needed a title page, 1 page for each season and a closing slide. We incorporated many tools and skills into this project – drawing, editing pictures, writing, writing, writing, and formatting writing, adding sound and lastly adding transitions. I think the students really enjoyed this project especially adding their voices to their finished product!

In grade three, one of the science units of study focuses on rocks and minerals. In the quote below, a teacher describes the use of technology (UnitedStreaming, research, writing, and presentations) in working on this unit.

Third graders spent most of the fall and winter on their Rock and Mineral WebQuest. We incorporated several projects into this activity. We began by creating the rock cycle using Kidspiration. We then moved into the research piece. There were lots of questions to research using the Internet. We also watched a video clip from United Streaming to help with some of this. Once the research was completed, we created slides using the new Kid Pix 3X program. The students loved using this newer version of an old favorite. They designed backgrounds, added text, formatted the text, and inserted pictures/stamps. After the drawing was completed, all of their finished slides were put together into a slideshow where they added slide transitions and sounds. What a great job they did!

In addition, teacher and staff use of presentations has grown. The elementary curriculum directors have grown very much this area and their effective use of presentations with teachers has served as a powerful model for those teachers who then take it back to the classroom.

At the Middle School and High School, where we installed interactive white boards these past two years, presentations have taken on an interactive element that has been very exciting to watch. I observed a Middle School Social Studies class using Google Earth on the white board, with students using electronic pens directly on the white board to map out and measure geographical data, to explain latitude and longitude, and to discuss the seasons and planetary movement.

One High School Classical Studies class that I attended featured a teacher-created multimedia quiz on the white board, with students using the voting devices to signal their choice for the correct answer. It was a fun and lively class, and students were engaged and interested in the material. Although the teacher designed the voting to be anonymous, after the correct answer was revealed, students often volunteered why they chose the wrong answer or what they remembered that led them to the correct answer. There were several very powerful teaching moments, as students uncovered misconceptions and shared insights.

The last example I will share was in a High School science classroom, where the teacher seamlessly transitioned from a teacher-created presentation to a clip from a DVD, to a simulation using curriculum-based software, to a web site, and back to the presentation, all through the single source of the multimedia installation that was made possible by the WPSF grant received this year. Students were engaged (perhaps mesmerized), active, participating, questioning, and *learning*.

Math

Math is supported through the use of technology in many ways – students and teachers use spreadsheets, graphing programs, simulation software, FasttMath, Geometry Factory (to create and manipulate specific patterns using polygons), Geometer's SketchPad, and web sites like Cybermath. Teachers report more use of technology in math, especially using online resources, as these resources mature and improve, and our teachers become more familiar with them. The two quotes below are both from elementary school teachers.

Students conducted a survey with students in the class. Then students tallied, graphed and analyzed the data. Students then utilized GraphMaster to create circle graphs of the data and used the circle graphs and tables in their project presentations.

Math websites were also a highlight for the children in their classrooms as well as in the lab. Math was also supported with the TERC programs again being taught as a cooperative project between the classrooms and the computer lab.

Social Studies

One elementary school teacher created a "USA Regions webquest" (see <http://teacherweb.com/MA/HappyHollowElementary/USARegionsWebquest/>) that several classroom teachers then used with students. Students completed a research packet and then used the results of their research and creative work to create a "USA Regions" poster. Students researched their region of choice and found information about landforms, natural resources, history, people, and traditions. They used MapMaker's Toolkit (software) to create a map of their region and collected pictures from the Internet. All of this went into the final poster they created of their region with their partner.

Throughout the elementary grades teachers use technology in blending Social Studies with Language Arts. Students do research, write, create pictorial representations, and create presentations. Options for the subject matter for these units depends on the teacher and the area of study they choose to infuse with technology – for many teachers it is all units.

Music

The Fine Arts department uses technology in many curriculum relevant ways. New this year was an iPod and speakers through a WPSF grant, allowing the music teacher to both record and play back for students, as well as share professional recordings from their own collections. Many of the music/instrumental teachers travel from school to school and an iPod is an effective and easy way to carry the music with them.

The quote below comes from an elementary school music teacher.

My greatest classroom use of technology was with a fifth grade unit on jazz. Students explored interactive educational websites on jazz in the music classroom using laptops. A projector and computer were available for class demonstration. Then, the students spent several weeks exploring jazz artists and gathering information for jazz biography projects. Finally, they presented their word-processed projects, some with the aid of web-based video or audio clips projected for class viewing.

At the Middle School and High School the music classes benefit from digital music labs, with software on the computers, MIDI connections, and electronic keyboards. Some of the software

that is used includes titles like: Garage Band, Band in a Box, and Print Music. Using these tools students can score and record original compositions.

Lexia

The Lexia initiative continues to develop, in spite of a few technical issues with the programs themselves. Most teachers bring their students to the computer lab for whole-class usage of the program at least once and sometimes twice a week. In addition, students are also using the Lexia suite of programs in their classrooms. Teachers are accessing the administrative tools to manage the environment for students and to run and print reports on classes and students. Teachers often share these reports with students so that they become more involved in the learning and evaluation process. The reports are used to explain their strengths and weaknesses. After students are provided extra practice time, they then look at the new reports with teachers and are excited to see their growth. The technical issues this year included that the database that stores the data often became corrupt, and then some students would either not be able to login or the progress they made would not be recorded. Working with Lexia, we created a regular maintenance routine for the databases. A Technology Support person goes to each elementary school every week carries out the maintenance. It requires the Lexia engine to be shut down for a short time, so this is scheduled after school hours. It is an inconvenient and somewhat unsatisfactory work around, but the technical support at Lexia have not yet ultimately resolved the issue. Another issue we need to resolve in using Lexia software is that we use *Comprehensive Reading Assessment* throughout the elementary grades. This product has not been updated by the company to run on OS X and to use the same database engine that the other programs have been rewritten to use. We must either find a replacement or Lexia must update the software.

Science

Science using technology, let me count the ways . . . research, presentations, simulations, probe ware (probes connected to computers with data gathering software), robotics, student voting in class (assessing student prior knowledge, checking in on progress, etc), use of video clips to demonstrate scientific principles, and much more. Science classes throughout the system use so much technology that they continue to lead the way in many aspects of technology integration and forward thinking.