



ROCHESTER SCHOOLS TECHNOLOGY PLAN

February 15, 2018

Technology Plan Revision 8

This revised plan reflects the ever-changing way technology is taught in the 21st Century.

Rochester School Department
140 Wakefield Street
Rochester, NH 03867
Phone 603-332-3678

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Rochester School Department - Technology Plan Revision 8
Adopted by the Rochester School District
February 15, 2018

This is the eighth revision of the Rochester Schools Technology Plan. Our original plan was originally created in 1997. Since that time, technology has continually evolved and changed to become an integral tool in 21st century education. With that in mind, we have revised this plan to reflect the current needs of our district, its staff and students.

Pahm Allard	District Media Technology Coordinator
Dan Bahlert	System Technician
Don Demars	Network and Systems Administrator
Shirley Greer	Webmaster
Michael Hopkins	Superintendent of Schools
Jerry Lachance	Technology Integrator
Kyle Repucci	Assistant Superintendent of Schools
Tricia Torr	IT Administrative Assistant
David Yasenchock	Chief Technology Officer

We are grateful to the time and efforts those who have reviewed the revision.

Executive Summary

In the twenty years since adoption of Rochester's first Technology Plan, the district has moved from having a few, ineffectively used, Apple IIe computers to a position of national respect and leadership.

The transition and recognition have hinged not only from the acquisition of better computers, the addition of mobile devices and the creation of a high-speed network, but more importantly, on effective staff training. In addition, with careful selection of goals and uses of the equipment, and robust design standards we have made the network both dependable and efficient.

The next phase of this technology plan shifts the focus from decisions about how to design and operate the system to:

- How the school district can use the technology more effectively for improved student learning in the 21st century classroom.
- Planning and funding the systematic maintenance, replacement, and upgrade of equipment.
- Projection of technological needs and changes.

Although projections go three to five years, the plan assumes regular and frequent adjustments as technology and district needs change.

Introduction: Technology in the Schools

Today's classroom environment is a dramatic change from the traditional classroom of the past. Every day, technology is changing the way we teach in the 21st century classroom. Children today have grown up with technology. We need to take advantage of this by using technology as a tool to keep students engaged and learning. The teacher's role in the classroom is changing from being a presenter to becoming a facilitator to student personalized learning. With the implementation of 1:1 (1 device per 1 student) mobile computing and BYOD (bring your own device) students have the tools to discover answers to problems independently and through collaboration with others. Findings support the common sense notion that if technology use is based on, and combined with, effective instructional techniques; it will have a profound and positive impact on learning.

Technology is a valuable tool for teaching all subjects including reading, math and other core subjects. The need for students to understand technology for their future careers is unassailable. Basic skills can no longer be characterized simply as "reading, writing and arithmetic". Even unskilled positions require at least some familiarity with computers and other technology. Students who will go into skilled or professional positions must be expert in the use of technology if they are to be successful.

Further, the value of technology for increasing efficiency and effectiveness in administration and operations is no longer questioned. Everything from climate controls to student record systems have been greatly improved with computers. Like business and industry, schools can help to control costs and improve services by investing in technology appropriate to their needs.

It is in this larger context that a technology plan must look at needs for its school district. That is, neither instructional uses of technology nor operational applications alone can be considered sufficient for a school district to claim that it is working well with technology.

In addition to relying on national research studies, the district must continually look at its own technology use to determine the effectiveness of its programs. Planning for the use of technology in schools must necessarily include all aspects of school operations and product use, from selection of equipment, software and online applications, to training, evaluation, scope of services to be provided, and resources available for maintaining and upgrading.

Part 1: Curriculum, Instruction and Operations - The Major Focus

Three Uses of Technology in the Curriculum

Technology generally fits into the school curriculum in three different ways. We teach *about* the technology, *with* the technology, and finally, have students *apply* the technology to problem solving, either theoretical or real life.

It is first necessary to teach about the technology. That is, we must teach the students how to use a computer or mobile device, how it works, and what to do with it. At the elementary level, this may involve an introduction to the keyboard, elementary word processing for publishing books in the writing process, an introduction to the Internet and the use of online resources including G Suite for Education. In addition, students at the middle school may be introduced to spreadsheet, database, and multimedia presentation, basic programming and graphics, as well as basic telecommunications and fundamental research skills using the Internet. At the high school level, this area involves teaching students how to use specialized software such as CAD/CAM (Computer Aided Design and Manufacturing), accounting software, the more sophisticated word processors and desktop publishing, advanced programming, electronics, musical composition software, more advanced Internet usage, webpage design, use of scientific instrumentation, and other applications of technology.

Teaching with technology is the second common approach. In this mode, technology is used to enhance more traditional tools of instruction. Audio and video technologies have been used in the classroom for years. The focus has shifted from these technologies to more interactive technologies, such as computers and mobile devices. Every classroom in the Rochester School Department is equipped with at least one networked computer and a computer lab having high-speed Internet access. All schools have one or more mobile laptop cart, iPad cart or Chromebook cart with the ability to connect our district Wi-Fi network. In addition, many classrooms have an iPad or Chromebook cart to facilitate 1:1 personalized student learning. Teachers and students

now access online applications across the network that provide individualized learning. This includes reading and math instruction using Reader Street, Everyday Math and IXL. All students have a G Suite for Education account, which provides them access to many 21st Century productivity tools. All district computers also have access to a variety of research resources, including the Alexandria online library catalog along with other online library resources. At the high school, file sharing and electronic portfolios provide opportunities to share teacher/student created projects from school to school throughout the district.

Internet access provides almost limitless opportunities for teaching with technology, ranging from acquiring content area information using effective search strategies to communicating and collaborating with teachers and students in the next classroom, neighboring communities and around the world. The district website (Internet and Intranet) provides vital information to students, teachers, and the community. Web based subscriptions to such services as the EBSCO databases, ProQuest, Virtual High School, as well as individual school websites, also enhance the teaching/learning experience.

A danger exists, however, in the use of technology as an instructional aide. It is easy for the teacher to let the technology become the primary instructor because the student's interest is more easily held by the variety of images. We must not allow ourselves to view our mission as entertaining the students on a daily basis. Commercial videos and websites produced for entertainment will very seldom fulfill the objectives of the curriculum and should not become a replacement for good, solid instruction.

The third use of technology in schools is the *application of technology* by students in problem solving. This takes the use of such things as CAD/CAM and 3D printing steps further than in the first mode by applying the software and other tools they have learned about on the computer to solve design problems as they would in industrial settings. This particular use of technology will necessarily be more prevalent at the high school level than either elementary or middle school. In a high school that is technologically sophisticated, it will occur across the curriculum. Graphic programs will be used in art and graphic arts classes, business and financial applications in the business areas, medical technology in health occupations, word processing and desktop publishing in the English curriculum, graphing calculators and scientific programs in the math and science departments, and virtually every other form of technology in various other courses.

For the most effective use of technology in the classroom, individual teachers, departments, and entire grade level staff should look at the available technologies, determine how they can best be used to strengthen existing curriculum, and what modifications should be made in the curriculum to capitalize on the strengths of technology.

Administrative hardware, software and online applications should, likewise, be evaluated in terms of their contribution to the mission of the school district and their ability to make operations more efficient. "Heat seeking," "NTS – New Technology Syndrome," or purchasing the most recent version of everything just to keep up with the state of the art, has no place in public school administration.

Teaching with Technology

As teachers review curriculum and plan their lessons, "technology" is to be used as a resource, an method for bringing the subjects into focus for students. Teachers should have access to the following technologies:

- Audio: electronic sound sources, including broadcast TV, broadcast radio, cable, streaming audio, compact discs, mp3, podcasts, etc.
- Video: digital video, document cameras, video projectors, PC with flat screen displays, Smart TV's, DVD recorders, streaming services, various interactive presentation boards and other presentation devices.
- Computer / mobile devices: acting as a hub of the technology; used to access, capture, store, process, transform, teach, communicate and publish.
- Communications: linking classroom to classroom, down the hall, across the city and around the world; classrooms separated by thousands of miles conduct joint investigations by communicating images, sounds, text and animations from computer to computer via the Internet.
- Distance learning: two-way data, voice and video carriers enable students to 'plug into' other researchers and experts in the local community and across the planet; guest speakers conduct joint inquiry activities with students.
- Multimedia: creating interactive informational packets in the form of presentations, publications, online presentations, publications, integrating music, text, images, live-action video, spoken voices, colorful animations into simulations of real-world situations.
- Website: posting vital information to enhance learning for students, teachers, and the community.

This does not mean that all resources must be present in each classroom to be effective, but that teachers and students *have access* to it. No matter what the size of the class, or the size or location of the building, the inequities of "large school vs. small school" disappear with the use of technology. However, the issue of access cannot overshadow the issue of *use*. If students use computers simply for drill and practice, rather than hands-on activities and those that call for higher-order thinking skills with richer, more challenging activities that enhance learning, inequities will remain. Technology can enhance the process of learning by providing students with a variety of experiences requiring more than listening and regurgitating. Effective use of technology requires critical thinking, problem solving, researching, remembering, and, most importantly, doing.

All technologies need to be used with these considerations in mind:

- Is the activity worth doing in the classroom? If the content is not suitable, or if the emphasis is wrong, then it should not be considered.
- Is the activity worth doing through technology? It is useful to consider technology in the context of the larger delivery system, i.e., the use of materials such as measuring devices, maps, art materials, manipulatives, artifacts, specimens, and people resources.
- Does the activity use the uniqueness of the available technology? Technologies available now offer learning opportunities that are not possible in any other context; this is the most justifiable use of technology in the classroom allowing teachers to extend the curriculum into entirely new areas.

The emphasis must always be placed on the learning, not on the technology itself. We must ask what we expect the students to *do* with the technology. After this question is answered for each student, each class, and each school, then the appropriate hardware, software and applications may be utilized. Within every segment of the curriculum, students may be writing stories, illustrating science diagrams, creating interactive multimedia reports, graphing data using spreadsheets, communicating with scientists for up-to-the-minute research findings, participating in shared projects with other students within the classroom, school or around the world, or filming a program to be broadcast throughout the school and/or district.

Staffing Issues

One thread that runs through the research on successful implementation of all types of technology is the issue of technical and in-service support. It is essential to provide sufficient technical support to sustain the programs we wish to see put in place.

To this end, Rochester has employed a full-time Media/Technology Coordinator and webmaster to assist in the instructional and in-service aspects of the operation. Additionally, the technical staff provides training in troubleshooting and operation of the technology. The district will need to maintain these positions and allow for contracting of special programs and events in addition.

In addition to the staff training, the technical support staff will need to cover the following on a citywide level:

- Keeping the hardware up and running.
- Providing ongoing technical training for teachers and administrators who wish this level of expertise.
- Keeping abreast of technological advances and trends (not necessarily specific to education).
- Planning with the "technology coordinator" and "webmaster" on how to implement the technology most effectively and efficiently.
- Coordinating and coexisting with the maintenance department in maintaining other electronic equipment.
- Planning and coordination of district website.

Several other suggestions have been made for the best use of personnel. When teachers with expertise have been identified in each school, these teachers should be recognized for their leadership, and should comprise a committee in and of itself. These teacher representatives could be recognized by giving them some amount of release time for in-service planning, or extra professional days to attend workshops outside the district, or even a small stipend for curriculum work they accomplish.

Paraprofessionals already in place in the schools could be utilized in the implementation of technological instruction. Expanding their job descriptions slightly might put extra personnel at our disposal in computer labs or clusters, or monitoring the on-line applications.

Part 2: An Overview of Educational Technology

Virtually every area of technology can have an impact on the classroom and the operation of school districts. Areas that should be considered in bringing technology into a school district include communications, audio/visual equipment, computers and their peripherals, mobile devices and scientific equipment such as oscilloscopes, graphic calculators and equipment for chemical analysis.

Further, any technology plan needs to address all operations in the school district. First and most important is the integration of technology into the curriculum and instructional practices. However, the plan should not ignore the importance of technology in the administration of the schools and in managing the schools' facilities and resources.

Finally, do not assume that the technologies already in place are being used with optimum effect. In selection of resources, the district should be reviewing not only the new technologies that might be desirable, but should also be looking at existing technologies to see how they can be integrated with the new and how their use can be improved for the benefit of the school district and its students.

System Components

The current solution for Rochester consists of nine major components as follows:

1. Technology to support all other components
 - Wide area communications network on Fiber Optic network connecting all school buildings with the high school serving as the hub.
 - A series of powerful file servers that support windows and web based applications. The servers are housed in a single location (SAN) rather than being placed in the same location as their respective LANs for security purposes and to facilitate easier maintenance.
 - Electronic mail and G Suite for Education Accounts, and a school website (Internet and Intranet).
 - Voice Mail Message System and Voice Over IP (VOIP).
 - Ethernet 10 Gigabit Based LANs.
 - Windows/Intel based PC Platforms (Continue to receive large amount of donations from Federal Government Computer for Schools Program).
 - Cable TV access in each classroom.
 - High-speed Internet access with content filtering (CIPA- Children's Internet Protection Act) approved device with automatic filtering updates through a consolidated firewall appliance for all district building located at the Internet gateway.
 - Wireless Access for Both School Owned and BYOD (Bring Your Own Device) Internet access. (Laptops, Chromebooks, iPads, Smartphones, tablets, etc.).
2. Instructional support
 - PCs will be purchased on a rotational basis with maximum use of industry standard upgrades instead of purchase of all new equipment. Labs will have priority for such upgrades and cycling of new PCs (Continue to receive large amount of donations from Federal Government Computer for Schools Program).
 - Mobile devices such as iPads and Chromebooks.
 - Curriculum databases with curriculum frameworks, curriculum assessment materials, and sample units and lesson plans to be shared among teachers.
 - Test item databases, scanners and statistical software for test management and validation.
 - Individualized instructional record keeping for individual teachers.
 - Multimedia instructional resources including, DVD recorders and players, websites, mp3's, various interactive presentation boards and other presentation devices.

- Research access and dissemination.
 - Website that meets Web Content Accessibility Guidelines (WCAG).
3. Instructional systems technology
- Specialized instructional support housed in the Spaulding High School and other school media centers and elsewhere.
 - Multimedia software permitting development of multi-media lesson plans by teachers, multimedia research projects by students, and administrative presentations.
 - Trained maintenance personnel for support of the entire system.
 - Electronic and physical distribution of programs, software, and other resources.
 - Maintenance of local area networks within each building.
 - Intra-building, inter-building and inter-district video conferencing.
4. Library services
- Acquisitions.
 - Collection management including cataloging, circulation, weeding, etc.
 - Reference materials.
 - Alexandria Library Automation System, provides 24/7 access to the District's library collections from any device with Internet access.
 - Database management for student, staff, and community use through both Intranet and Internet.
5. Software library (networked, with site licenses for the full system)
- Word processing with supporting software (i.e. spell check, grammar check, thesaurus, math formula generators, etc.).
 - Desktop publishing.
 - Forms management.
 - CAD-CAM and 3D Printing.
 - MUNIS Financial software (other than for school district financial management, which is currently housed in a windows server at city hall).
 - Databases.
 - Spreadsheets.
 - Graphics.
 - Statistical analysis tools (Infinite Campus, Northwest Evaluation Association, NH Statewide Assessment System, SAT's, etc.).
 - Instructional software.
 - Business analysis and other specialized software.
 - G Suite for Education Domain (sau54.org) with access to sites, docs, spreadsheets, presentations, forms and email to promote collaboration and access anywhere, anytime.

6. Administrative support

- Financial management and planning.
- Personnel management.
- Board communications.
- Fixed asset management and inventory services.
- Student records network.
- Scan sheets and test analysis
- Transportation planning.
- Special education compliance.
- Research services.
- Food service management.
- Operations.
- Honeywell Instant Alert System and VOIP.

7. Facilities management

- Preventive maintenance records.
- Human resource allocation.
- Life safety and security systems.
- Climate control and energy management.
- Key control/Access control.
- Video security.

There is flexibility in the plan, however. The district can opt for any or all of the above components or may phase in different parts of the plan over the course of several years, with periodic looks at the details of the plan to account for changes in technology that could make some of these ideas obsolete.

Technology Center - the Hub

The Technology Center is the center for information systems for the entire school district, both for staff and students. It houses a collection of servers, security devices, and other electronic media for all grade levels and serves the entire school district as a central clearinghouse and origination site of all transmissions.

The main components of this center are:

1. A powerful series of computers working as file servers with communications software on Ethernet to allow exchange of information between computers, Chromebooks, IPAD's, tablets, smartphones, etc. These computers are the hub of a district-wide network to all classrooms, administrative offices, city hall, etc. The system is connected to a multi-media interface to permit connection to a multiplicity of devices including the following:
 - A series of media servers and websites. All of students have access to encyclopedias and other standard references permanently mounted and web-based.
 - Media as specified above to include encyclopedias, national directories, mapping software, and other databases.
2. Projection devices such as, but not limited to, digital projectors and various interactive presentation boards and other presentation devices for use in large group presentations throughout the district.
3. Other computers and mobile devices with presentation software for generating multimedia projects.
4. A series of central labs available to staff for business applications, administrative software, multimedia, etc.
5. Equipment for scanning still photos and slides for transfer to digital media.
6. Digital cameras - for still and video pictures.
7. Test scoring scanner and software with statistical capabilities (IC, NWEA, etc.).
8. Audio for music history, electronic keyboard and music composition software.

Television Studio

A second major facility (Music Lab) serving the entire school district is located in the Spaulding High School. The school district has signed an agreement with Metrocast cablevision of Television Studio on television channels licensed to the Rochester Schools from the local cable company.

The district has a wide array of options for utilizing this resource, from broadcasting only commercial and learning channels at absolutely no cost to the district, to establishing a well-equipped television studio to provide students with experience in video production and originate distance-learning programs that can help to offset any cost of the facility.

Building Level Systems

The key to providing equal access throughout the district in a cost effective manner is shared resources through the network and central work areas within each building. The elements common to each building include the following:

- Access to cable TV programming and cable TV transmission facilities
- Each school building has at least one computer lab. The size of each lab and the number and types of labs depend on the level and enrollment of the building. These labs are networked and have additional resources not always available in the classroom, including multimedia resources and laser printers (B/W and Color).
- Each school building has at least one set of iPads and Chromebooks.
- Each classroom has a video projector and various interactive presentation boards and other presentation devices, either permanently mounted or portable devices.
- The teacher's workroom has workstations and printers, group conferencing capabilities, and portable multimedia carts (Laptops, Chromebooks, iPads, etc.).

Regular Classrooms

The typical classroom includes a teacher computer workstation connected to the network, as well as a presentation device such as, but not limited to, various interactive presentation boards and other presentation devices. The teacher accesses the curriculum support system, student records software, and other instructional support via password and an e-mail address along with a G Suite for Education account for each staff member in the district.

Classrooms have one or more computers, along with mobile devices (iPads or Chromebooks carts) to give students access to instructional software, online applications, the library catalog and electronic reference materials. Interactive teaching and learning stations, iPad or Chromebooks, students G Suite for Education accounts will be provided for 1:1 personalize learning.

Specialized Classrooms

Some classrooms will continue to need specialized equipment and materials. CAD/CAM with plotters, 3D Printers, business software, desktop publishing, robotics, and other special projects are an integral part of Career Technology Education. Scientific data gathering, statistical analysis and graphics can be used by various high school departments, and some classrooms can share resources with administration for specialized tasks such as high resolution scanning, transfer of slides and photographs for digital display and reversal of that process.

Administration

The Central Office, principal's offices, guidance department, school nurses, special education, and other administrative, classroom, and support personnel have abandoned Macintosh altogether in favor of PCs in order to provide absolute compatibility in software and data sharing (City Hall, State of NH, Federal Government, and local businesses). The sharing of a dedicated database with student records, personnel information, and other administrative information specific to the school district, is easier and more accurate if done within a single platform.

The Central Office will continue to be the communications hub for telephone and cell phones used to contact the maintenance department and transportation operations. Honeywell Instant Alert and Infinite Campus can be used to send immediate alerts to staff, students, parents, and the community.

All administrative offices have a common student records database. Health records, to be accessed only by nurses, would be included within the student records database to avoid duplication of efforts in entering basic student data. Additionally, personnel records, financial data and other administrative information are contained in the network.

The Superintendent shall develop procedures for a records retention system that is in compliance with RSA 189:29-a and NH Department of Education regulations. The procedures should ensure that all pertinent records are stored safely and are stored for such durations as are required by law. Additionally, the Superintendent shall develop procedures necessary to protect individual rights and preserve confidential information. Legal References: RSA 91A, Right to Know Law RSA 189:29-a, Records Retention and Disposition, NH Code of Administrative Rules, Section Ed. 306.04(a)(4), Records Retention, NH Code of Administrative Rules, Section Ed. 306.04(h), Records Retention, 20 U.S.C. 1232g, Family Educational Rights and Privacy Act (FERPA).

Facilities Management

The Buildings and Grounds Department is already connected by VOIP and cell phones. This capability will be expanded slightly to include school nurses and other personnel who need to be accessible at all times. Individual phones are leased for people leaving the district that would be beyond capability of VOIP.

An energy conservation project completed by Honeywell, Inc. has now provided the Buildings and Grounds Department with a comprehensive climate control, security and energy management system and instant alert system that can be centrally monitored and controlled and that permit web based control from remote locations.

Part 3: Staff Development

Without adequate staff development programs available, the money spent on upgrading the technology would be largely wasted. There are few things more frustrating to a computer savvy parent than to visit his or her child's classroom and see an expensive technology devices sitting unused.

The district has identified three staff development goals to provide the background necessary for efficient, effective, and beneficial use of the technology in the classroom. These goals will provide for a comprehensive continuum of sophistication so that technology tools are available to every staff member, from the computer neophyte to seasoned veterans who have used technology in their classrooms for several years. The goals are submitted as follows, with a recommendation that some protection be built into the budget process so that the program is not abandoned before full implementation:

GOAL 1: To provide computer training to all certified teachers in the district at their level.

Novice:

Description: Introduction to word processing, spreadsheets, multimedia presentation software, the Internet and email, using Microsoft Word, Excel, PowerPoint, Internet Explorer, and Email software/G Suite for Education.

Intermediate:

Description: Introduction to databases design using Infinite Campus, G Suite for Education, including basic webpage design using Google Sites, and evaluating and integrating web resources;

Individualized Workshops:

Description: a variety of software and programs designed to fit all levels of expertise (e.g., troubleshooting, choosing and evaluating software and web resources, student portfolios, utilities, Microsoft Office, G Suite for Education, Grading systems, Statistical Analysis systems, networking, Internet, various interactive presentation boards and other presentation devices, mobile devices, VOIP).

GOAL 2: To provide ongoing training for teachers (and support staff) on software applications, online programs and integration issues.

- Coordinators and/or elementary tech leaders in each building will support and provide help to staff with questions they may have about technology.
- Ongoing hands-on workshops on evaluating and using Internet resources will be held during the school year at each building, led by the curriculum teacher, the curriculum coordinator, Computer Information Center personnel, and/or school leaders who have been previously trained.
- Ongoing workshops and individualized training on web development will be held during the school year by district webmaster.

GOAL 3: To provide technological support for teachers in all buildings.

- Computer leaders will be solicited from each building to become a committee of trainers and technical support persons.
- This group should be persons who have completed at least the Intermediate course or its equivalent.
- Reimbursement for these leaders may be in the form of (1) additional staff development day's yearly, (2) additional reimbursement for technology-related professional days, or (3) released time for specific training.

Part 4: Staffing Required for Effective Implementation of the Plan

Staff development opportunities and technical support need to be ongoing and easily accessible for each certified staff member at his or her own level of technological sophistication. In order to accomplish this, the committee recommends the following:

1. A minimum of five technicians will be required to maintain the system. One will need expertise in network operation and maintenance as well as communication skills that would permit him or her to work with everyone from computer novices to engineers. The others need the technical skills to troubleshoot and correct problems in the network and/or workstations and Audio/Visual equipment.
2. A certified K-12 Library Media Specialist is currently holding the position of District Media Technology Coordinator. This position is twofold, (1) to provide support to eight elementary para-educator librarians and provide professional development for best practices in librarianship to all district librarians periodically throughout the year (2) to assist with evaluating software, curating web resources—including maintaining an Elementary Library Resources website, supporting the district library automation system, coordinating with district test administrators and our Network and System Administration in deploying updated software to fulfill district/state testing technology requirements, and other technology needs throughout the district. Further, this individual will provide "technological" and professional development support for all staff members and will work cooperatively with all Computer Information Center (CIC) personnel.
3. A high school technology coordinator will create and implement all staff development programs for this level and will purchase or direct the purchase of hardware and software after the initial purchase. This individual will also oversee teachers in the teaching of technology at this level and will provide technical support to the entire district. He or she will work cooperatively with the technology coordinator for grades one through eight.
4. A computer teacher will provide direct, intense instruction to all first through fifth grade students in the district. This teacher will provide weekly technology instruction to students. This teacher will also provide "technological" support and enthusiasm to building leaders and staff.
5. Technology leaders will be solicited from each elementary building to become a committee of trainers and technical support persons.
6. Web development position to coordinate staff development and maintaining district wide website.

Part 5: Curriculum Goals and Implementation

The haphazard use of technology in instruction does not provide the comprehensive and valuable experience that is desired for our students. We believe that curriculum in technological based areas must be well integrated and provide a logical progression from learning about the technology through using it for problem solving. The district has adopted the following curriculum goals:

Elementary:

All elementary students will have direct instruction in keyboarding, word processing, spreadsheets, databases, multimedia presentations and the Internet.

1. All students will be exposed to keyboarding and Microsoft Office Applications /Google Drive. Students will share their projects with teachers with other students and classrooms across our school district network and around the world via the Internet.
2. All Elementary School students will have a sau54.org G Suite for Education account which will include, but not limited to, Google Drive, Classroom, Calendar and other apps activated for personalize learning and collaboration with teachers and other students.
3. All students will be provided with instruction in the use of the G Suite for Education. This will include, but not limited to, Google Drive, Google Calendar and Google Classroom.
4. A computer club will be organized as an extended day program at each elementary school. Students will explore curriculum enhancing software as well as Internet resources.
5. Each school develops a Google Sites website to provide vital information to the community.

Middle School:

All Middle School students will complete the state required curriculum in computer science and will expand their ability to use computers and other technology as research and information management tools.

1. All students will participate in a course that will include word processing with MS Word/Google G Suite for Education, conducting research using the Internet, an introduction to graphics, and graphing using Excel spreadsheet software.
2. All Middle School students will have a sau54.org G Suite for Education account which will include, but not limited to, Google Drive, Classroom, Calendar and other apps activated for personalize learning and collaboration with teachers and other students.
3. All students will be provided with instruction in the use of the Google G Suite for Education. This will include, but not limited to, Google Drive Apps, Google Calendar and Google Classroom.
4. All student will be assigned a Chromebook for 1:1 computing for use in their personalize learning plan.
5. School develops a website to provide vital information to the community.

High School:

High School students will receive training in specialized technologies as appropriate for their courses of study and will be assisted by technology in career selection, college counseling, and other real-life decisions related to education and career goals. Computers and other online resources will be readily available to help students meet their competency based learning goals.

1. All High School students will have a sau54.org G Suite for Education account which will include, but not limited to, Google Drive, Classroom, Calendar and other apps activated for personalize learning and collaboration with teachers and other students.
2. Each High School student will use technology as a research tool in preparing class reports and term papers and will be able to apply research techniques to real-life situations in preparation for entry into college and/or the workplace.
3. High School students in specialized courses related to career preparation (e.g. career technology education courses) will be exposed to and utilize the technologies they will encounter in the careers related to their course work.
4. High School students will utilize technology in college and career searches, and in securing financial aid and college application materials.
5. School develops a website to provide vital information to the community and students enroll in web development classes.

Part 6: Network Design and Future Planning

Vision: "Provide the children of Rochester with a world-class telecommunications network to ensure they have the proper tools necessary to be successful in the Information Age."

Major Components of the Network (2018)

1. Over 5000 Pentium based PCs/Access Devices (Chromebooks, iPads, etc.) on the network
2. Over 70 Servers
3. Over 350 printers (LaserJet B/W and Color)
4. Scanners, disk backup's, digital cameras, etc.
5. 2700 Gigabit certified LAN connections
6. Fiber optic backbone for SHS, MS, and RTC
7. Fiber optic connection between buildings
8. Switched 100/1000/10000 Ethernet
9. All PCs have high-speed Internet access
10. Multiple wireless access points (Staff and BYOD Network)
11. Policies and procedures (can be viewed at <http://rochesterschools.com/cic/index.html>)

Standardization (Key to our Success)

1. Pentium based PC/Servers
2. LaserJet printers (Konica-Minolta)
3. TCP/IP as networking protocol with NAT/DHCP – Network Addressable Translation
4. Switched Ethernet LAN's
5. Microsoft WIN7/WIN10 for clients and Server 2008 R2 or greater for servers
6. Microsoft Office Suite
7. Microsoft Educational Software
8. Microsoft programming, graphics
9. Modern Web browsers: Internet Explorer, Mozilla Firefox and Google Chrome
10. Google Apps for Education
11. File Servers, Memory Sticks, Cloud services and centralized backup
12. Managed VOIP

Future Projects (1-3 Years)

1. Sustain Fiber Optic System between buildings with 10 GB LAN Capacity for additional services (Multimedia).
2. Identify and plan cycling of new PCs (new Capital Improvement Projects)
3. Training (Tech Leaders and workshops)
4. Network updates, security, and additions (Grant PCs)
5. Upgrade to Operating systems for additional security (WIN10 and beyond)
6. Increase usage of various interactive presentation boards and other presentation devices
7. Enterprise Class Wireless systems upgrades to each classroom
8. Virtualization of Servers
9. Virtual Desktop Technology

In line with the discussions above regarding appropriate technologies for schools, the areas considered for each option are divided into seventeen parts as follows:

1. The *network backbone* is a fiber optic system provided through the local cable television provider. It interconnects 12 school buildings.
2. *Telephone Communications.* As the school system has grown, our need for telephone communication has also grown. It has been suggested in professional literature that each teacher should have a telephone in his or her room. Although this plan does not subscribe to that philosophy, we have noted that there are some times of day when it is difficult for parents to reach their children's schools and when teachers are unable to get an outside line for contact with their students' parents. Accordingly, we have recommended an increase in the number of available telephones, voice mail boxes, and telephone lines through use of Voice Over IP over

VOIP systems.

3. *Audio/Visual Operations*. This addresses both the individual AV needs in the classroom as well as equipment to be housed in each school's library. This area, more than any other, is affected by the selection of a network backbone because of a proposal to replace the individual AV equipment we have in numerous buildings with a centralized system for distribution of electronic signals, including television, audio, various interactive presentation boards and devices, along with other formats.

4. *Television*. This area refers to the installation and operation of the TV studio in Spaulding High School. It has no mandatory costs associated with it, although the district has the option of utilizing the system in a number of ways and may want to invest in equipment for more sophisticated use (Local Channel 25).

5. *Administrative Computers*. The district has moved to a PC platform with all student data run on a common program to reduce the current duplication of efforts we have in grading, attendance and other record-keeping functions. These PCs will be upgraded or replaced on a cyclical basis.

6. *Teacher Computers - Elementary*. We have provided a PC in each classroom so that teachers can keep their grade and attendance records, can create test item pools, and can share information with other teachers.

7. *Student Computers* – PCs and mobile devices, Chromebooks and or iPads, have been placed in classrooms and elementary libraries. These devices will be upgraded or replaced on a cyclical basis.

8. *Student Computers - Middle School*. PCs have been placed in the library, 7 labs, and in classrooms, so the students would still have access to that platform. Each student is provided with a Chromebook for 1:1 computing to be used as a tool in their personalized learning plan.

9. *Student Computers - High School*. The Library, Labs and classroom PCs have been replaced will be upgraded or replaced on a cycling basis. These students are getting ready for the world of work and require a familiarity with these devices that they will need to use after graduation. Chromebooks carts have been introduced for 1:1 computing and personalized learning.

10. *Career Technology Education Equipment* -. The Business Department labs and PCs have been replaced with modern, Windows-based computing platforms and will be upgraded or replaced on a cycling basis. The CAD, Graphic and Photography labs have specialized technology devices such as 3D printers. Chromebooks carts have been introduced as a low cost tool for 1:1 computing and personalized learning.

11. *Infinite Campus (IC)* – The Infinite Campus Student Information system is a web based system that allows faculty, students and parents access to a student's information from any PC that is connected to the Internet.

The main sections of IC are:

- Groups - Disaggregate student, teacher and parent data into custom-designed
- “Groups” for analysis and reporting.
- Goals - Determine Goals and set Targets to monitor student progress towards meeting standards.
- Reports - Create understandable and actionable charts and graphs as a basis for decision-making
- Gradebook - Track student performance at the classroom level.
- Students - Input and organize student work samples and view a longitudinal history of each student.

12. *NWEA* – Northwest Evaluation Association assessments are used by educators to ensure that every student is learning and growing—from at-risk students to high achievers. Schools using assessment data make student focused, data driven decisions. Services include accurate assessments, timely reporting, and data-tools that make practical use of test results—to measure and promote academic student growth and school improvement. It creates a culture that is strengthening education by keeping the focus squarely on meeting the individualized needs of students.

13. *Alexandria* – The Alexandria Library Circulation System is a web-based system that allows faculty, students and parents access to the district’s school libraries’ holdings from any PC that is connected to the Internet to facilitate the research process.

14. *Collaboration Software* - Also known as, groupware is application software that integrates work on a single project by several concurrent users at separated workstations. IC, Microsoft Exchange and G Suite for Education have this capability.

Software Issues

Recommending specific software, other than a few basic business applications and system software for word processing and data handling and networking/communications, is beyond the scope of this plan. Because of the fast development of software and the vast array of curriculum needs, teachers, business leaders, and other community members on software committees, etc. should make these recommendations.

When considering the purchase of software for the classroom, there are several considerations to remember, including the following:

1. The program should conform to the subject being taught and not vice versa.
2. The program should contain a tutorial to make it easy to learn and should have clear, concise manuals and other documentation.
3. The program should be easy for the teacher to manage and manipulate, with particular attention to its compatibility with an existing network if it is to be shared.
4. The program should be of high quality.
5. The program should be appropriate for the age of the students involved.
6. The school district will strictly comply with copyright laws and purchase enough copies and/or licenses for all computers or devices on which the software or media will be installed.

Part 7: Maintaining Current Technology and Financing Future Projects

Financial Issues

Local ordinance and school board policy will require that most, if not all, of this project be publicly bid, either through Requests for Proposals or detailed specifications. Specialists are necessary to assist in developing the RFPs and specifications.

A sub-committee should be appointed to look more closely at financing options available to the school district, including grant sources. Proposed Budget requests can be found in Appendix C.

Financing Technology Projects

There are two basic ways to provide the funds for projects. The first is the "pay as you go" method, which would involve the district's budgeting some amount each year for technology upgrades. The advantage to this is that it would be least costly in the long-run because there would be no interest involved. However, there is a great risk that projects will never be fully implemented, even at the minimal level, because each year's budget for technology would be subject to elimination from the budget and because some of the expenses associated with creating the network would be extraordinarily high for the regular operating budget.

The second method of financing projects is to use short-term bonds of five to seven years to finance future projects. These bonds would permit the district to spread the cost over several years, would assure stability in the program, and would provide a short enough payment schedule that the project would be completely paid for before the district had to move heavily into updating, maintenance, and replacements. While technology is constantly changing, the introduction of new capabilities does not make old technologies useless. The majority of the equipment purchased as a result of this plan should benefit the school district for a minimum of five years. Regardless of this, it is financially prudent to avoid finance charges, so purchase of individual components and replacement equipment, other than extremely large refitting projects, should not be purchased with long-term debt options.

With either financing option, the district will need to pursue grants, as it already has through TLCF, Perkins, Title1, and other forms of financial assistance such as donations, and partnerships with local businesses.

Part 8: Conclusion

Rochester School Department has created a powerful and reliable city-wide network, has implemented a strong and flexible staff development program related to technology, and has made the technology equitably available to all public school students in the community.

However, simply "having done" all of this will be insufficient to meet the future needs of the students and the community. To maximize the value of the investment that has already been made, the district must maintain a constant vigil to upgrade the quality of instruction, availability of resources, and protect the reliability of the system. To this end, it is recommended that the Rochester School Board adopt this plan as formal commitments not to let the advances that have been made in our community languish for lack of renewal and support.

Further, it is recommended that the plan be revisited and adjusted at least annually by administration, instructional staff, and technology support personnel to assure that the program remains focused and viable.

Appendix A

Technology Inventory as of February 15, 2018

Location	Devices on Network	Mobile Devices	Printers
SAU/Elementary			
SAU/ BCA/Travel	140	41	19
William Allen	104	293	10
Chamberlain	110	123	13
East Rochester	91	352	11
Gonic	62	172	6
Maple	79	151	4
McClelland	76	220	17
Nancy Loud	68	60	7
School Street	48	94	4
Domain Controllers	13		
SAU/Elementary Totals	791	1506	91
Middle School	343	1070	36
Technology Center	360	17	25
Spaulding High School	586	499	52
Grand Total	2080	3092	204

Appendix B

Computer and Communications Policy Statement as of February 15, 2015

Rochester School District Computer & Communications Policy Statement

Introduction

The Rochester School Board recognizes the value of computer and other electronic resources to improve student learning and enhance the administration and operation of its schools. To this end, the Board encourages the responsible use of computers, computer networks, including the Internet, and other electronic resources, in support of the mission and goals of the Rochester School Department and its schools

Because the Internet is an unregulated, worldwide vehicle for communication, information available to staff and students is impossible to control fully. Therefore, the Board adopts this policy governing the voluntary use of electronic resources and the Internet in order to provide guidance to individuals and groups obtaining access to these resources on School Department-owned equipment or through School Department-affiliated organizations.

School Department Rights and Responsibilities

It is the policy of the Rochester School Board to maintain an environment that promotes ethical and responsible conduct in all computer and communications equipment activities by staff and students. It shall be a violation of this policy for any employee, student, or other individual to engage in any activity that does not conform to the established purpose and general rules and policies of computer/communications equipment use. Within this general policy, the School Department recognizes its legal and moral obligation to protect the well-being of students in its charge. To this end, the School Department retains the following rights and recognizes the following obligations:

1. To monitor the use of computer network and the communications network activities. This may include real-time monitoring of Internet access and/or maintaining a log of Internet activity, or attempted activity, for later review.
2. To provide internal and external controls as appropriate and feasible. Such controls shall include the right to determine who will have access to School Department owned equipment and, specifically, to exclude those who do not abide by the School Department's acceptable use policy, or other policies governing the use of school facilities, equipment, and materials.
3. To restrict on-line destinations, including in-coming signals, through software or other means.

4. To remove a user's access, a device, or connection to the network that is not approved and secure.
5. To provide guidelines and make reasonable efforts to train staff and students in acceptable use and policies governing on-line, wide-area, and local use of computers and communication equipment.
6. Prior to allowing user access, a signed statement of compliance will be executed, certifying that the user understands and agrees to comply with Rochester School District policy.
7. School district reserves the right to "block" at any time any sites or services that could cause bandwidth issues that affect the overall stability of the network.

Staff Responsibilities

1. Staff members who supervise students, control electronic equipment, or otherwise have occasion to observe student use of said equipment shall make reasonable efforts to monitor the use of this equipment to assure that it conforms to the mission and goals of the Rochester School District.
2. Staff should make reasonable efforts to become familiar with the Internet and its use so that effective monitoring, instruction, and assistance may be achieved.

User Responsibilities

1. Use of the computer and communication equipment provided by the School Department is a privilege that offers a wealth of information to improve research and productivity. Where it is available, these resources are provided to staff, students, and other patrons at no cost. In order to maintain the privilege, users agree to learn and comply with all of the provisions of this policy. The School Department reserves the right to monitor, review, and copy any communications at any time.
2. Failure to report breaches of this policy is itself a violation.
3. Users will be individually responsible for their own behavior and violation of this policy may result in discipline actions in the form of written reprimand, suspension, expulsion, termination of employment, or others forms decided by the school board and superintendent.
4. Staff will be responsible for maintaining their own systems for reliability, integrity, availability, and for physical protection.
5. Disciplinary or legal action including, but not limited to, criminal prosecution under appropriate local, state, and federal laws. Violation of local, state, and federal laws will be reported to the proper enforcement authorities.

Acceptable Use

1. All use of the computer and communications equipment must be in support of educational and research objectives consistent with the mission and objectives of the School Department.
2. Proper codes of conduct in electronic communication must be used. All users are representing the Rochester School District and must use polite and respectful language in any dealings through this equipment.
3. Use network etiquette which includes being polite and using it in a safe and legal manner.
4. Use of the network is a privilege, not a right.

5. Confidential information will be sent under a secure medium.
6. Protecting your own data.
7. Users will use extreme caution to verify messages go to the correct address/user.
8. Any software/hardware must be pre-approved by the CIC Staff.
9. Immediate notification of a system compromise to CIC Staff (Virus, Trojan, hackers, unauthorized access, etc.).

Unacceptable Use

Prohibited activities include, but are not limited to, the following:

1. Users will not obtain, or provide to others, illicit copies of copyrighted software or documents. Only software provided by or approved by the Rochester School District may be installed on a School District computer. Users will not download or install software, or upgrades to approved software already installed, unless directed to do so by the Superintendent or his designee(s). Users will not download or install any unauthorized software, including freeware and shareware, on School District computers.
2. Users will not use the computer network to attempt to gain unauthorized access to any computer or communications system.
3. Users will not use the computer or communications equipment to give out any personal information about another person.
4. Any use of the computer or communications system for commercial, advertising, profit, or political purposes is prohibited.
5. Users shall not intentionally seek information on, obtain copies of, or modify files, other data, or passwords belonging to other users, or misrepresent other users on the network.
6. No use of the network shall serve to disrupt the use of the network by others. Hardware and/or software shall not be destroyed, modified, or abused in any way.
7. Malicious or mischievous use of the network to develop programs that harass other users or infiltrate a computer or computing system and/or damage the software components of a computer or computing system is prohibited.
8. Hate mail, chain letters, harassment, profanity, obscenity, racist and other antisocial behaviors are prohibited on the network.
9. Use of the network to access or process pornographic material, inappropriate text files (as determined by the system administrator or building administrator), or a file dangerous to the integrity of the network is prohibited.
10. Use of the network for any unlawful purpose is prohibited.
11. Playing games is prohibited unless specifically authorized by a teacher for instructional purposes.
12. Establishing network or Internet connections to live communications, including voice and/or video (relay chat) is prohibited unless specifically authorized by a teacher and a system administrator.
13. Sending offensive email (racist, pornographic, or otherwise inappropriate)
14. Harass, intimidate, threaten, or engage in any illegal activity.
15. Sending proprietary or confidential information to any unauthorized person.
16. Allowing other users access to your password or account.
17. Make changes to the operating system or networking settings.

18. Open up devices for repairs, etc.
19. Use of gambling, pornographic, or online action sites/programs.
20. Use of Home/Personal equipment or software for use on the school network.
21. Use of dial-up networking or other technologies to bypass the firewall.
22. Tampering with any communications devices, i.e.; computers, phones, etc.
23. Changing of wiring, connections, or placement of computers resources is prohibited.
24. Use of school resources for any cheating or academic dishonesty.
25. Use of any hacking, cracking, password cracking, scanners, or any other hacking or network discovery tools.
26. Attempting to circumvent any security.
27. Starting any denial of services attacks.
28. Any unauthorized access to include wireless devices or any other communication devices.
29. Use of email systems or accounts other than one's approved by the CIC staff and Superintendent.

Disclaimer

1. The School Department cannot be held accountable for the information that is retrieved via the network.
2. Pursuant to the Electronic Communications Privacy Act of 1986 (18 USC 2510 et seq.), notice is hereby given that there are no facilities provided by this system for sending or receiving private or confidential electronic communications. System administrators have access to all mail and will monitor messages. Messages relating to or in support of illegal activities will be reported to the appropriate authorities.
3. The School Department will not be responsible for any damages you may suffer, including loss of data resulting from delays, non-deliveries, or service interruptions caused by our own negligence or your errors or omissions. Use of any information obtained is at your own risk.
4. The School Department makes no warranties (expressed or implied) with respect to:
 - The content of any advice or information received by a user, or any costs or charges incurred as a result of seeing or accepting any information;
 - Any cost, liability or damages caused by the way the user chooses to use his or her access to the network.

The School Department reserves the right to change its policies and rules at any time.

Appendix C

Proposed Budget Request as of February 15, 2018

Budget for Years 2018-2019

1. Technology Services = \$17,000
 - a. Anti-Virus/Spam = \$8,000
 - b. Digital Certificate for Web services = \$2,000
 - c. Training and Consulting = \$7,000
2. Repair and Maintenance = \$65,000
 - a. Firewall Filter Subscription = \$1,000
 - b. Management Subscription = \$17,000
 - c. PC, Server, Switch Maint = \$35,000
3. Data Communications = \$186,000
 - a. Backup Software = \$1,000
 - b. Upgrades = \$11,000
 - c. New PC's/Chromebooks = \$125,000
- d. New Printers = \$10,000
- e. New Servers = \$10,000
- f. New Wireless Systems = \$30,000
4. Travel = \$5,000
5. General Supplies = \$1,500
6. New Equipment/Tools = \$1,200
7. Furniture = \$2,000
8. Replacement Equipment/Interns Salary = \$40,000

Proposed Budget for Years 2019-2020

1. Technology Services = \$17,300
 - a. Anti-Virus/Spam = \$8,100
 - b. Digital Certificate for Web services = \$2,100
 - c. Training and Consulting = \$7,100
2. Repair and Maintenance = \$66,500
 - a. Firewall Filter Subscription = \$1,100
 - b. Management Subscription = \$17,500
 - c. PC, Server, Switch Maint = \$36,000
3. Data Communications = \$190,100
 - a. Backup Software = \$1,100
 - b. Upgrades = \$12,000

- c. New PC's/Chromebooks = \$126,000
- d. New Printers = \$11,000
- e. New Servers = \$11,000
- f. New Wireless Systems = \$30,000
- 4. Travel = \$5,100
- 5. General Supplies = \$1,600
- 6. New Equipment/Tools = \$1,300
- 7. Furniture = \$2,100
- 8. Replacement Equipment/Interns Salary = \$41,00

Proposed Budget for Years 2020-2021

- 1. Technology Services = \$17,600
 - a. Anti-Virus/Spam = \$8200
 - b. Digital Certificate for Web services = \$2,200
 - c. Training and Consulting = \$7,200
- 2. Repair and Maintenance = \$67,200
 - a. Firewall Filter Subscription = \$1,200
 - b. Management Subscription = \$18,000
 - c. PC, Server, Switch Maint = \$37,000
- 3. Data Communications = \$194,200
 - a. Backup Software = \$1,200
 - b. Upgrades = \$13,000
 - c. New PC's/Chromebooks = \$127,000
 - d. New Printers = \$12,000
 - e. New Servers = \$12,000
 - f. New Wireless Systems = \$30,000
- 4. Travel = \$51000
- 5. General Supplies = \$1,700
- 6. New Equipment/Tools = \$1,400
- 7. Furniture = \$2,200
- 8. Replacement Equipment/Interns Salary = \$42,000