Rush-Henrietta Central School District

Five Year Instructional Technology Plan

# 2014-2019

First Draft

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I.   The Vision for 21st Century Learning:

"The seamless integration of technology devices in every Rush-Henrietta classroom that allows each student automatic access to the Internet to obtain information, communicate and collaborate with others, and create products of their learning."

In order to accomplish this vision in the Rush-Henrietta Central School District a 21st century learning environment must be acquired in all schools and in every classroom. The research from The Partnership for 21st Century Skills, National Educational Technology Plan (NETP, 2010), and International Society for Technology Education (ISTE, 2007) standards are the foundational resources used to develop the vision and goals of the instructional technology plan. The plan focuses on a 1:1 learning environment with instructional technology methodologies to transform teaching and learning for students to be college and career ready as 21st century learners.

The 21st century learner should:
- Use real world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
- Work independently and collaboratively to solve problems and accomplish goals.
- Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and learning conditions.
- Apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
- Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

R-H College and Career Readiness for 21st Century Learners
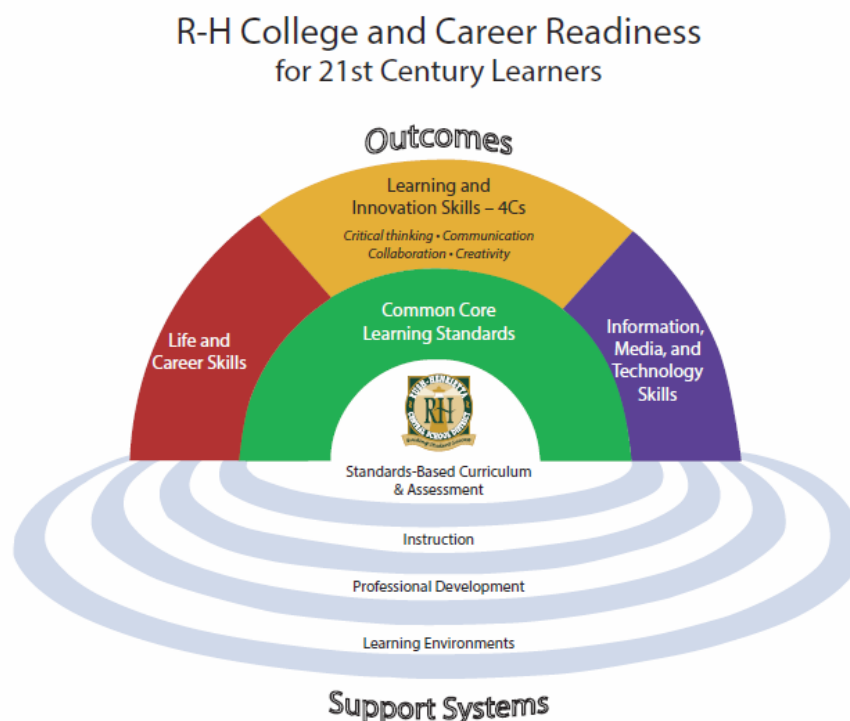
II. The *Guiding Principles* for the Five Year Instructional Technology Plan:

- Students are digital natives who are accustomed to society's technology driven culture, our classrooms need to reflect this culture to increase student engagement in their learning.

- Every student K-12 should have equal access to the development of skills and knowledge of technology, as well as access to technology devices and the Internet.

- Students need to access information independently, generate more writing through word processing, and create more authentic representations of their learning.

- Teaching and learning is an interaction between teacher and student, technology can provide more timely and specific feedback, improving the interaction between the teacher and student.

- Technology is a constantly evolving set of systems that need to be frequently reviewed and adjusted to best integrate within the learning environment.

- Technology is an integral part of learning, not supplemental, which is defined by the district curriculum.

- Ongoing professional development is required to train teachers on current instructional technology practices to promote student enabled learning.

- Technology is a tool that will assist students as learners throughout their lives.

To reach today's learners, teachers must move beyond traditional teaching methods to more authentic, real world experiences. This includes the use of technology to connect students to the world around them. Technology, the Internet, web-based applications, access of information, and synchronized communication has altered the learning environment. To be college and career ready, students must be able to interact in this new learning environment. The future of learning and work is digital, and students need access to digital learning to become fluent. Schools must give students the 21st century skills and environment that will allow them to be prepared for their lives, learning, and work when they graduate from high school.

III. The Educational Goals for 21st Century Learning:

Goal One: A **Student Enabled Learning Environment** will be established in all classrooms.

All students will be exposed to and have opportunities to explore curriculum-connected technology tools that will further develop their abilities to problem solve and think critically in the classroom. The **Student Enabled Learning Environment** will include:

- Appropriate access to technology
- A global learning community
- Authentic learning experiences
- Student-centered learning

Student enabled learning will allow students an opportunity to explore technology tools that will help develop their problem solving and critical thinking abilities. It also provides for differentiated and personalized learning. The teacher's role in a classroom will evolve from the deliverer of information, to the facilitator of learning. Students will work in collaboration with the teacher and peers, and others in a global community. Students will make informed and responsible choices regarding the best ways to learn, hence being enabled learners who take responsibility for their learning. Their choices may or may not involve technology. Most importantly, they will know how to learn and complete a task in an efficient and effective manner. The goal is that students are independently thinking about how to demonstrate understanding of content and their learning, focused on the best ways to present their knowledge and understanding to teachers and peers.

There are no specific technology standards established by New York State Educational Department (NYSED). However, the Common Core Learning Standards (CCLS) have included technological information literacy standards from grades 1-12. It is recommended by NYSED for districts to adopt the Educational Technology Standards developed by the International Society for Technology in Education (ISTE). The information literacy standards from the Common Core Learning Standards and the ISTE standards will be the resource when developing the Rush-Henrietta curriculum maps regarding the integration of technology within the district's educational program.

See: Appendix A1, CCLS on Technological Information Literacy
Appendix A2, ISTE Standards.

<u>Goal Two:</u> **21st century skills and literacy** will be integrated in district curriculum.

Through the use of technology tools and a defined curriculum, all students will develop 21st century skills and literacy acquisition through experiences within the student enabled learning environment. The **21st century skills and literacy** in the curriculum will include:

- Creativity and Innovation
- Communication and Collaboration
- Critical Thinking and Problem Solving
- Research and Information Retrieval
- Digital Literacy and Citizenship

The district's curriculum maps are being revised to include the 21st century skills and literacy in conjunction with the adoption of the Common Core Learning Standards. Best practices for technology integration are being identified and shared with teachers through embedded professional development. The inclusion of 21st century skills and literacy will be an expectation within instructional practices.

In-depth technology integration will include creativity, innovation, communication, collaboration, critical thinking, and problem solving. These skills can be developed through the use of technology in the form of learning. The K-12 curriculum will be analyzed to identify areas where technology can be integrated in a meaningful way for all students to experience. Students will be given the opportunity to explore varies tools and expand their skills to become engaged, independent learners. Teachers will develop lessons utilizing technology to engage students in innovating ways. The technology will be a required resource within the instruction, not a supplement as an added element to instruction. Technology will be seamless within the student learning and included as part of the learning objective.

In addition, the district's program must include a curriculum that enables students to be digital citizens. Before encouraging students to use a device that is connected to the Internet, students need to be properly instructed on how to find information responsibly, ethically, and effectively. The district has identified Internet safety curriculum that is delivered by the Library Media Specialist each year. This curriculum needs to be expanded to include identifying standards for digital literacy and citizenship provided by the classroom teachers. A revised curriculum will provide student learning outcomes in digital citizenship, digital ethics, and digital literacy that are critical for students to be college and career ready as 21st century learners. Once the standards are embedded within the curriculum, instruction on digital citizenship, ethics, and literacy will occur annually with all students. The Common Core Learning Standards in ELA and Math, as well as the Next Generation Science Standards, and NYS Social Studies Frameworks identify the standards for communication, collaboration, creativity, and critical thinking for each content area.

Goal Three: Teachers will have **timely access to data to inform instruction and monitor student progress.**

Students will develop 21st century skills that will be consistently assessed across grade levels and content areas, students will also use online tools to take assessments in order for teachers to utilize technology for measurement of content standards. Teachers need to have **timely access to data to inform instruction and monitor student progress** towards achieving the standards. Student achievement data is derived from the following assessments:

- NWEA Measures of Academic Progress (MAP)
- District common assessments, in Link It! web based program
- Formative tools such as Document responses and Forms
- Future online NYS CCLS assessments

Data-driven instruction is a critical part of the district's expectation for teacher planning. Student data, both formative and summative, determines the effectiveness of instructional delivery and student achievement. Student data is collected, shared, and discussed with grade level or course teams to shape decisions for instruction and academic interventions. Having this data immediately available is crucial in order for teachers to make "in time" instructional decisions. This allows teachers to be responsive to students' needs.

Access to this timely data is essential in supporting teachers' abilities to affect student performance. Technology will provide a systemic approach which allows teachers immediate and direct access to student assessment results. The district is currently using online, web-based standardized tests. In addition, there is a need to put the district's common assessments and teachers' formative assessments online. The web based assessment system, LinkIt! is being used in addition to web-based applications for formative assessments. With these online systems, teachers obtain immediate results and comparison data to identified standards and criteria. This provides teachers, and students, with automatic feedback to student assessment results.

In addition to the content standards being assessed, the 21st century skills being taught will need to be assessed in a standardized manner. Performance based assessments will be developed and included as required assessments, which will be documented on district curriculum maps. A district 21st century skills rubric will also be developed and used as the measurement of student achievement on district performance based assessments. This rubric will provide clear, concise criteria to assess skills such as collaboration, communication, critical thinking, and creativity. Once the rubric has been established, it will be used consistently to assess students' 21st century skill performance.

IV.   The Availability and Accessibility of Technology Resources:

All staff and students will have access to technology resources both during and outside the school day. This **availability and accessibility of technology resources** will be established through the district Infrastructure and user devices. This will include:

- Access to the Internet: Connectivity, Bandwidth, Antivirus protection, Network Security
- Learning Management System
- Activated Applications / Subscriptions
- Devices

The "digital divide" is a great concern for all students, especially for students living in poverty. Technology has become a more common "staple" in our society and there is a greater need for all students to have access to technology. As technology becomes more critical in the lives of students, it becomes more important to ensure that all students have access to similar technology recourses regardless of their ability to possess personal technology devices and access to the Internet.

Infrastructure
The district infrastructure includes all hardware, software, and services needed to provide network communication within the district. The infrastructure includes components such as routers, switches, wireless controllers, network cards, cabling, fileservers, network management and security software, and communication to an Internet Service Provider. The infrastructure needs to support all staff and students working simultaneously on devices to access data stored internally and on the Internet through the district's network. The district's goals for the infrastructure include reliable connectivity, high-speed bandwidth, and security.

Network Design and Connectivity
The Rush-Henrietta Central School District's campus network consists of ten school buildings and three administrative buildings, all connected together using 10 gigabits per second (Gbps) single mode fiber cabling. There are network drops in all classrooms that provide connectivity to the district's networks. These classroom drops connect to centralized network closets in each building to create a local area network (LAN) within the building. The building network closets in turn connect each building to the district's wide area network.

See: Appendix B, Rush-Henrietta Central School District Network Diagram

Data Centers
All buildings are connected to two data centers, which house the district's fileservers and telecommunication systems. Both data centers host and manage systems that are active throughout the school day, providing services for staff and students, such as computer management, file storage, network management, and a variety of information systems. These information systems include our primary student management system that is used for everything from enrollment to scheduling to grading, our food service system, transportation system, parent portal, and many others. A unique feature of our two data centers is their ability to provide

redundancy. This means that if any systems fail in one of the data centers, the system can be quickly relocated to the other data center.

Internet Access

Each of the district's 10 Gbps data centers connects to one of two Monroe 1 BOCES facilities. Monroe 1 BOCES is the district's Internet Service Provider. This means that all the district's communications to and from the Internet are routed through BOCES.

Wireless Network

The district provides wireless access in all schools and administrative buildings. Wireless access provides a connection to the district's network using wireless access points. These access points send and receive data to the district's network using radio frequencies. The district also has a guest wireless network that is available in all buildings. The purpose of the guest wireless network is to provide secure Internet access by computer devices that are not owned by the school district. This allows staff, students, and guests to bring their own device onsite and connect to the Internet via the district wireless network. The district's wireless network also provides redundancy. This means that if any of the wireless controllers that manage the network should fail, their functions can be transferred quickly to another set of wireless controllers.

As access to the Internet and cloud-based systems increases, the district must continue to expand its wireless access. At the present time, all elementary classrooms have their own dedicated wireless access point. The district will continue to assess and expand the wireless network to support this five-year instructional technology plan.

Security

The district has deployed both content filtering and antivirus protection software on its computers. The district uses Lightspeed, a content-filtering software that is supported by Monroe 1 BOCES. Antivirus and malware protection is executed through ESET software.

Cloud Computing

Cloud-based computing refers to access to a system that is delivered through the Internet. Data is stored on vendor-owned systems rather than on district-owned systems. The software application itself runs through a web browser. For these reasons, cloud computing has many advantages, including accessibility from both home and school, platform independence, and fewer district resources. Cloud-based learning management systems provide equal access to files at any time, from anywhere. Students and teachers use a variety of district-owned and privately owned devices to access these systems.

<u>The Learning Management System/Applications</u>
The cloud based learning management system the district has decided to use is Google Applications for Education. The district is currently developing a Google Domain for staff and students to use. Google applications provide word processing, presentation tools, spreadsheets, email, group sharing, synchronized calendars, quiz and survey creation, and discussion forums. These applications are known as: Google docs, forms, slides, sheets, calendar and are all maintained in the Google drive. Google Drive is a file storage and synchronization service provided by Google, which enables user cloud storage, file sharing and collaborative editing.

See: Appendix C, Google Applications in Education

<u>Devices</u>
In order to access the Learning Management System, and other district required applications, the district will be purchasing devices that will provide every student with access to the Internet. The devices will vary depending on student grade and program need. In order to achieve the 1:1 learning environment in the core academic areas tablets, laptops and/or Chromebooks will be utilized. PC laptops and iMac laptop mobile labs will be used in the technology, music, and art "STEAM" courses.

See: Appendix D, Five Year Technology Hardware/Device Purchase Plan

<u>Equity in Access</u>
The district will need to investigate all the ways to provide opportunities during and after the school day. Students will be able to obtain their learning management system from home via the Internet. Students who do not have a device or access to the Internet at home will be given additional opportunities at school to access the Internet and use devices (before school, after school, and during study halls and lunch periods). In the years to come, the district may consider students taking devices home or providing evening hours at school for students and/or parents to access the Internet. The district may also consider assisting families in need of resources for their homes. These individuals may obtain assistance through local agencies and federal programs to acquire internet access and a mobile device. The district will assess what resources would be required to make these opportunities available to students.

Between home and school, and from classroom to classroom, the "digital divide" must be avoided. Efforts must be made to ensure that all students are getting comparable experiences using technology and developing their digital literacy skills.

V.   Professional Development for Teacher Support:

All staff will have access to consistent, sustained, and varied methods of **embedded professional development** in the area of technology use and its integration using web based applications. This will include:

- Library Media Specialists and Technology Teaching Assistants (Tech TAs) in each school
- District Instructional Technology Specialist (TOSA)
- Online resources and learning, web based and intranet
- Training (workshops, webinars, coaching)

In implementing the Five Year Instructional Technology Plan, the district will need to provide sufficient resources to ensure that teaching and support staff receive ample opportunities for training and support on the use and integration of technology within the classroom. The district Instructional Technology Specialist (TOSA) and Library Media Specialists and Tech TAs in each school have currently provided instructional technology support to teachers. This support has been delivered in a supplemental manner (assistance with a special project requiring the use of technology, assigned lab time). In order to transform the teaching methodologies to include technology as an integral part of everyday classroom instruction, the Library Media Specialists and Tech TAs' job responsibilities will evolve into a coaching role, where the Library Media Specialists assist in the planning of instruction and the Tech TAs are available to provide technical assistance within the classroom. At times, resources or consultants may be utilized to provide training to the Instructional Technology Specialist, Library Media Specialists and Tech TAs to further develop their skills and to provide turnkey training to teachers.

Through the Instructional Technology Specialist, Library Media Specialists, and Tech TAs, teachers will have access to consistent, sustained, and varied methods of embedded professional development in technology use and integration. The district will also support study groups and workshops that will allow teachers to work together on how technology can be integrated into their classroom instruction at a deeper level. Identified lead teachers, those who have exhibited an expertise integrating technology within their instruction, will facilitate building level study groups and workshops.

As we continue to expand the district's Professional Development webpage on the district intranet, instructional technology resources and online professional development opportunities will be available. This online method of support is currently being used to provide teachers with professional development for using the Teachscape system, which has proven to be successful. In addition, the district's Professional Development webpage will be used to share materials with teachers across the school district. Teachers will have on demand access to professional development as needed.

An analysis of the technology needs and skills necessary for support staff to be successful within the school learning environment will be conducted. Once the needs are identified, the professional development plan for technology will include training for support staff.

APPENDIX

From Common Core/Empire State Information Fluency Continuum Alignment
(Developed by NYC School Library) System

CCLS on Technological Information Literacy

Grade 1
- With guidance and support from adults use a variety of digital tools to produce and publish writing, including in collaboration with peers

Grade 2
- Uses online encyclopedias, magazines, databases, and other technology resources with guidance
- Uses technology tools chosen by teacher or librarian to create written products
- Credits sources by siting author and title
- Identifies the names of sources used
- Uses online tools to read, send, or post electronic messages to peers, experts, and family members with guidance

Grade 3
- Use text features and search tools (e.g., keywords, sidebars, hyperlinks) to locate information to a given topic efficiently
- With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others
- Uses visuals and multimedia to communicate meaning

Grade 4
- Uses appropriate print and electronic material on an individual level
- Use text features and search tools (e.g., keywords, sidebars, hyperlinks) to locate information to a given topic efficiently
- With guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others: demonstrate sufficient command of keyboarding skills to type a minimum of one page in single setting
- Understands the basic concept of plagiarism as copying the work of others
- Selects appropriate print and electronic materials on an individual level
- Paraphrases and summarizes information that answers research questions
- Identifies and evaluates the important features for a good product

Grade 5
- Selects and uses multiple appropriate print, nonprint, electronic and human sources to answer questions
- Evaluates print and electronic information for usefulness, relevance, and accuracy
- Uses navigation tools of a Website to find information
- Cites all sources used according to model provided by teacher

From Common Core/Empire State Information Fluency Continuum Alignment
(Developed by NYC School Library) System

Grade 6
- Combines information and weighs evidence to draw conclusions and create meaning
- Uses online catalog independently to locate specific books, get classification numbers, and browse shelves
- Uses both primary and secondary sources
- Discusses privacy and cyberbullying related to safe and responsible use of information and communication technology
- Abides by the "Acceptable Use Policy" by accessing only appropriate information and using technology responsibly

Grade 7
- Selects print and nonprint materials based on personal interests, knowledge of authors, and reading level
- Cites all sources used according to local style formats
- Evaluates quality of electronic and print information for usefulness, currency, authority, and accuracy
- Publishes final product for a particular audience and purpose
- Discusses security, piracy, and downloading related to safe and responsible use of information and communication technology
- Uses program and Internet sites responsibly, efficiently, and ethically
- Observes Internet safety procedures, including safeguarding personal information and equipment

Grade 8
- Revises the question or problem as needed to arrive at a manageable topic for Inquiry
- Use different formats as sources of information
- Creates products for authentic reasons and audiences
- Works collaboratively to develop, publish, and present projects involving 1-2 media that effectively communicate information and ideas about the curriculum to authentic audiences
- Identifies own strengths and sets goals for improvement
- Understands the concept of freedom of expression and the role that it plays in democracy

From Common Core/Empire State Information Fluency Continuum Alignment
(Developed by NYC School Library) System

Grade 9
- Identifies key words, concepts, and synonyms for topic and uses them to further research
- Takes notes using one of more note-taking strategies
- Develops a schema or mind map to express the big idea and the relationships among supporting ideas and topic of interest
- Identifies own strengths and sets goals for improvement
- Observes Internet safety procedures including safeguarding person information and equipment
- Uses programs and Internet sites responsibly, efficiently, and ethically

Grade 10
- Conducts advanced Web searches using Boolean logic and other sophisticated search functions
- Records individual experiences of the inquiry process – the hardest part, the best part, skills learned, insights experienced, etc. - with suggestions for future improvement
- Analyses the consequences and costs of hacking, spamming, consumer fraud, virus setting, intrusion, and other unethical uses of information and communication technology and identifies ways for addressing these risks

Grade 11
- Presents different perspectives with evidence for each
- Chooses the most appropriate format, tone, and language to communicate ideas clearly in real world formats to different audiences
- Applies technology productively tools to meet personal needs and establish a responsible online personal presence.
- Demonstrate awareness of fair use guidelines and acquires permission from creator when necessary

Grade 12
- Evaluates own product and process throughout the work and uses self-assessment, teacher feedback, and peer feedback to make revisions when necessary
- Asks: "What about this topic is personally interesting and important to me? What about this topic do I want to pursue when I have an opportunity? Does this topic have implications for future career or college choices?

1. **Creativity and Innovation**
   Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:
   a. apply existing knowledge to generate new ideas, products, or processes.
   b. create original works as a means of personal or group expression.
   c. use models and simulations to explore complex systems and issues.
   d. identify trends and forecast possibilities.

2. **Communication and Collaboration**
   Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:
   a. interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
   b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.
   c. develop cultural understanding and global awareness by engaging with learners of other cultures.
   d. contribute to project teams to produce original works or solve problems.

3. **Research and Information Fluency**
   Students apply digital tools to gather, evaluate, and use information. Students:
   a. plan strategies to guide inquiry.
   b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
   c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
   d. process data and report results.

4. **Critical Thinking, Problem Solving, and Decision Making**
   Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students:
   a. identify and define authentic problems and significant questions for investigation.
   b. plan and manage activities to develop a solution or complete a project.
   c. collect and analyze data to identify solutions and/or make informed decisions.
   d. use multiple processes and diverse perspectives to explore alternative solutions.

5. **Digital Citizenship**
   Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:
   a. advocate and practice safe, legal, and responsible use of information and technology.
   b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
   c. demonstrate personal responsibility for lifelong learning.
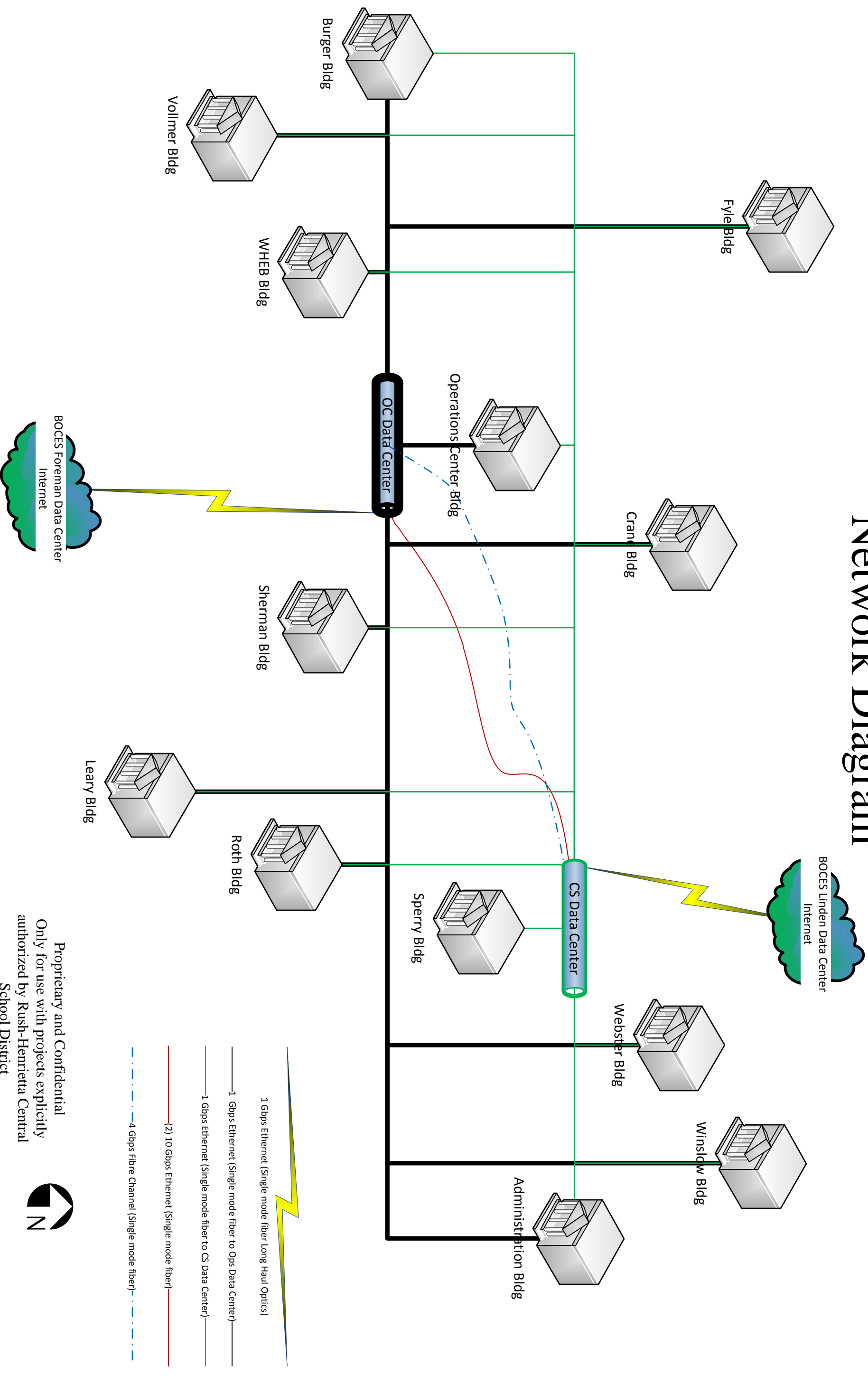   d. exhibit leadership for digital citizenship.

6. **Technology Operations and Concepts**
   Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:
   a. understand and use technology systems.
   b. select and use applications effectively and productively.
   c. troubleshoot systems and applications.
   d. transfer current knowledge to learning of new technologies.

Rush-Henrietta Central School District
Network Diagram

Burger Bldg

Vollmer Bldg

WHEB Bldg

Fyle Bldg

OC Data Center

Operations Center Bldg

BOCES Foreman Data Center Internet

Crane Bldg

Sherman Bldg

Leary Bldg

Roth Bldg

Sperry Bldg

CS Data Center

BOCES Linden Data Center Internet

Webster Bldg

Winslow Bldg

Administration Bldg

1 Gbps Ethernet (Single mode fiber Long Haul Optics)

1 Gbps Ethernet (Single mode fiber to Ops Data Center)

1 Gbps Ethernet (Single mode fiber to CS Data Center)

(2) 10 Gbps Ethernet (Single mode fiber)

4 Gbps Fibre Channel (Single mode fiber)

N

7 things you should know about...

Google Apps

Scenario

To support her master's thesis in sociology, Sylvia developed a project that brought together students from a high school in downtown Chicago with students from Monroe High School in Monroe, Wisconsin. Despite being just a two-hour drive away, the schools were worlds apart culturally, and the project's goal was to investigate attitudes that students in each school held about those at the other. The instrument for the project was a fiction-writing exercise in which a group of students at each school would write a story set in the other school's town. As the stories developed, the students at each school would review and make edits to the story from the other school. Both schools suffered from outdated computers with a range of software (though all of it was PC-based) and no prospect of district funding for hardware or software improvements. Sylvia was a dyed-in-the-wool Mac user, which presented another compatibility concern. They all had Internet connections, however, at least at school, and most of the students selected to participate also had Gmail accounts.

Sylvia set up blank documents on Google Docs and granted access to the participating students. She left the story ideas and development entirely up to the students. Once a week, the two groups would "trade" papers, seeing how the story—ostensibly about *them*—was progressing and making comments in the file itself about how their town and its culture differed from the story's portrayal. Sylvia also reviewed the files and made her own suggestions. Because all of the writing and reviewing happened through web browsers, there were no problems with file compatibility, and Google Docs kept a record of the many versions of each story. Initially, Sylvia thought she and the students would keep in touch using Gmail, but the students soon began using Google Talk among themselves, so Sylvia did too. Those students who had Internet access at home could access the files and the software to work on them, which was vital because many of the students could not afford to buy traditional software. Sylvia spent spring break visiting her family in Arizona and, without having to take her computer, could access and comment on the stories from there. The ability to share documents—and to communicate—with others, regardless of platform or software, allowed Sylvia's project to succeed. Students in both groups saw how stereotypes influenced their ideas about urban and rural culture, and they came away with an appreciation for their differences—and their similarities.

What is it?

Google Apps is a collection of web-based programs and file storage that run in a web browser, without requiring users to buy or install software. Users can simply log in to the service to access their files and the tools to manipulate them. The offerings include communication tools (Gmail, Google Talk, and Google Calendar), productivity tools (Google Docs: text files, spreadsheets, and presentations), a customizable start page (iGoogle), and Google Sites (to develop web pages). The tools are free, or users can pay for a Premium Edition that adds more storage space and other features. Alternatively, an Education Edition includes most of the extras in the Premium Edition and is offered at no cost to K–12 and higher education. Google Apps allows institutions to use their own domain name with the service and to customize the interface to reflect the branding of that institution. In this way, a college or university can offer the functionality of Google Apps in a package (and with a URL) that is familiar and comfortable to constituents.

Who's doing it?

Since its launch, Gmail has been a popular choice among students—higher education as well as K–12—and many of these same students are users of Google Apps. For them, being able to access their documents from any Internet-connected computer, without having to worry about software versions or compatibility, fits well with their always-connected, just-in-time lifestyles. Many faculty, however, have been hesitant to store their files on someone else's servers, given perceived concerns over security and the stewardship of their data. Some institutions have adopted Gmail for student and alumni accounts while maintaining in-house mail services for faculty and staff. Still, a number of colleges and universities have migrated to Google Apps, often only for e-mail but increasingly for the entire suite of communication and productivity tools.

How does it work?

All of the applications in Google Apps work through a web browser. Users must have a Google account and, once logged in, can access familiar—if scaled-down—functionality for word-processing, calendaring, chat, and other tools. Google Docs, for example, allows basic formatting of text documents but without higher-level functions (such as style sheets and templates) found in traditional software. Spreadsheets support formulas and simple functions but not macros or the creation of figures and tables. Each file has a creator/owner, who determines who is allowed to access the file,

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either as a viewer (with read-only rights) or a collaborator (who can change the file). Because Google stores all of the files and content centrally, collaboration and document management become far simpler than when distributing files to multiple people and keeping track of different versions. For a text document, for example, the application maintains the file, allowing authorized users to see or edit the text while keeping track of all the changes and who makes them. This version history is available and allows comparing any two versions of the document. Similarly, the content in a user's calendar can easily be shared with other users, and Google Sites provides a simple tool for groups to collaborate on developing web pages or whole websites. When a file is complete, it can be "published," which gives it a unique URL, or it can be exported. In the case of a text document, export options include PDF, Word, RTF, OpenOffice, and others. A spreadsheet can be exported as a PDF, a text file, or an .xls file, among others. Much of the Google Apps functionality is available on mobile devices.

Why is it significant?

Particularly for higher education, the notion of providing software to constituents as services rather than as products offers several key benefits. Such an approach transfers responsibility for software updates and maintenance away from the institutional IT department, freeing IT staff from a considerable amount of software support. The resources saved can be directed at making the IT department more innovative and agile, attributes that are increasingly important in responding to rising student expectations of technology on campus. Sharing content is as simple as granting someone access, which facilitates collaboration without having to transfer files or worry about software compatibility. The limited functionality available through Google Apps is sufficient for the needs of most users, who have access to their files and related software any place they have a computer and an Internet connection. In addition, Google Apps can work with existing single sign-on programs, and hardware (and hardware failures) becomes less of a concern.

Although Google is not the only provider of web-based applications, it is in a strong position to make this concept acceptable to a broader audience, in part because of the cost savings it offers and in part because of Google's reputation as a "good citizen." Google is seen as responsive to the concerns of its users and as a company that is not likely to disappear overnight.

What are the downsides?

The greatest concern about Google Apps and similar services is the loss of control. Because access rights are shared across the service, users rely—to some extent—on how carefully others protect their login credentials. Even though providing e-mail and other applications is complex and expensive, many in academia see this as a core responsibility of the IT department. Given concerns about long-term availability, security, and privacy, storing files, e-mail, calendar entries, and other content on non-institu-

tional servers is a deal-breaker for some colleges and universities. From an administrative standpoint, Google doesn't offer as much granularity in managing user accounts as many institutions want and need. For users, the menus and tools are not consistent from one application to another, and applications running over the web do not work as smoothly and predictably as those running locally. Users who find themselves without an Internet connection cannot access the applications or their files.

Where is it going?

Google owns several companies including YouTube and GrandCentral, and Google Apps may see increased integration across the family of Google companies. GrandCentral, for instance, gives users a single phone number that, when called, will ring on any of the user's phones. All of that person's contacts can use the same number, even if that person graduates or transfers to another institution, changes jobs, or otherwise changes numbers. Google may incorporate these and other tools into Google Apps, and we may see more integration with applications outside the Google family. Because each new added feature affects the speed of the service, however, Google will need to balance complexity with performance. In addition, Google is said to be working on offline functionality, which would allow users to access the software and their files even when not connected to the Internet.

What are the implications for teaching and learning?

While the financial incentives to use Google Apps might compel a university to try it, the benefits for building a more collaborative teaching and learning environment could be the reason to stay. These benefits potentially include peer review of academic work and the ability to observe and participate in the creation of scholarly material. Today's students are generally comfortable sharing content and collectively generating knowledge. The Google Apps model of application delivery and file storage provides a set of tools and an infrastructure to make this happen. By leveraging student interest in and use of such tools, institutions might be able to encourage more experimentation with collaborative learning. Google Apps also facilitates sharing of information such as syllabi, and it offers an easy way to publish student work. Google Apps allows students and instructors to forget about the tools and focus on creative ways to use technology in their disciplines.

Five Year Technology Hardware/Device Purchase Plan

School Year	K – 5	6 – 8	9 – 12
2013-14	Gr. K – LearnPads: 2 Classroom Sets (pilot) Gr. 1 – LearnPads: All classes Gr. 2 – LearnPads: 1 Classroom (pilot)	Roth Gr. 8 – Laptops: 4 teams, 4 class sets Roth Gr. 7 – Chromebooks: 1 class set Burger Gr. 7 – Laptops: 4 teams, 4 class sets Burger Gr. 7-Chromebooks: 1 class set	Gr. 12 Civics Course – Laptops: 2 class sets (14 sections) Gr. 12 English 12 – Chromebooks: 1 class set (3 sections) Gr. 9 Social Studies – Chromebooks: 1 class set (4 sections)
2014-15	Gr. K – LearnPads: 5 Devices per classroom: (Move from K and 2 Pilots) Gr. 2 – LearnPads: All classes	Roth & Burger Gr. 7 – Chromebooks: All students (new) (Laptop mobile labs available to Gr. 6 & Gr. 8)	Follow replacement plan for mobile labs and Netbooks NGA - Laptops: Mobile Lab II Sperry – Laptops: Mobile Lab III Replace all Netbooks with Chromebooks
2015-16	Gr. 3 – Laptops: All classes (Distribute Laptop Mobile Labs from Middle Schools)	Roth & Burger Gr. 6 & Gr. 8 – Chromebooks: All students (new) (Laptop Mobile Labs to Gr. 3)	Follow replacement plan for mobile labs Embed purchase of more Chromebooks
2016-17	Gr. 4 – Laptops: All Classes (Distribute laptops from NGA and other surplus) Gr. 1 - Replace Tablets: All classes	Replace devices as needed.	NGA – Chromebooks: All students (new) Vollmer – Chromebooks: All students (new) *BYOD may be an option if students choose
2017-18	Gr. 5 – Laptops: All classes (Redistribute laptops from high school) Gr. 2 - Replace Tablets: All classes	Gr. 7 - Replace Chromebooks	Gr. 10-12 – Chromebooks: All students (New) (amount purchased will be remaining balance of Chromebooks) *BYOD may be an option if students choose
2018-19	Grade K - Replace Tablets: All Classes	Gr. 8 – Replace Chromebooks	Replace as needed.
2019-20	Replace Laptops with Chromebooks	Gr. 6 – Replace Chromebooks	Replace as needed