


Slide 1

Infrastructure, Hardware,  
Software, Technical  
Support

Harvey Barnett  
Senior Research Associate  
WestEd RTEC




Hello. This is Harvey Barnett. Welcome to “Infrastructure, Hardware, Software and Technical Support.” These four support components are essential if your technology investment is going to support increased student achievement. During this presentation, I will share key considerations to keep in mind when developing your technology plans.

Slide 2

Infrastructure

- Wiring, routers, servers...
- Consider long-term needs.
- New apps require more bandwidth.
- Aim for balance.
- Seek expert advice.



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Infrastructure is the backbone of your district’s system. It includes all the components of the network such as wiring, routers, and servers. Before planning your network, remember that today’s infrastructure may not support your needs in the next 5 to 10 years. Take wireless connectivity for example. Five years ago, few if any technology plans incorporated a wireless network. Today, any networking plan must make provisions for both wireless and hard-wired systems. One thing you can be sure of: new applications and hardware will require more bandwidth and speed over time!

Your network plan may be developed either by your own employees or by consultants. Either way, aim for balance. There are so many options and neat things possible with technology that you’ll be tempted to add more and more features. That’s fine to a point, but you’re not trying to build a digital Taj Mahal. By the same token, if you play Scrooge and cut costs at every opportunity, you may end up with a network that won’t meet even


your minimum needs.

Even if you don't use a consultant to create your network plan, having one take a look at your plan is a good idea. A competent consultant can evaluate your plan and help ensure that it will do what you want it to do, and will keep doing it for the next five years. This is money well spent.

### Slide 3

Access

- For staff
- For students
- For parents



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As you develop your network plan, consider carefully who will have access to your network, and under what conditions. This is becoming a very important issue with the increase in the number of homes with Internet access and the expansion of mobile computing options.


Obviously, staff will need to have access to the network as appropriate to their roles. Will you provide staff access only from within school or do you want them to be able to get to their network files and resources 24 hours a day, 7 days a week? In today's world, more and more students want and expect access to the school network. They want to be able to find homework assignments and have the capability of exchanging files with their teachers and other students.

Communication and support can be greatly enhanced if parents have access to appropriate areas of the network. You may want to enable them to view assignments, attendance, grades and samples of their child's work.

## Slide 4

### Security Issues

- Passwords
- User logs
- Firewalls
- Spam



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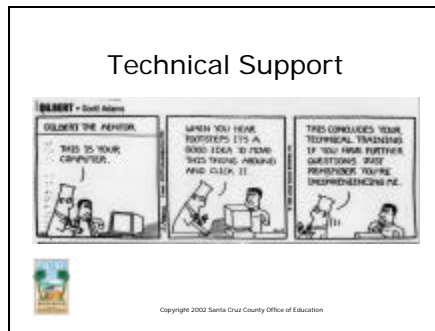
Providing easy access to staff, students and parents presents a host of security issues. You want to have a level of security high enough to protect your data but not so high that access is limited only to selected users. Here are four security issues to think about

Passwords are one of your best tools to protect the integrity of your system. Passwords should be used both at the log on level but also to allow or deny access to specific data. Passwords are not fool proof, but you can increase their effectiveness by making sure users choose sound passwords and change them frequently.

Users logs should be maintained and reviewed on a regular basis. These logs help you to determine who's using your network and for what purposes. Knowing that logs are being reviewed also encourages users to practice acceptable use. A firewall is a software solution designed to prevent unauthorized users from accessing your network. Your technical staff can help ensure that firewalls do not inhibit legitimate use.

Spam is unwanted email. You probably already receive more spam than regular emails. Recent studies suggest that 40% or more of all email people receive is spam. Spam also takes up valuable disc storage space. It's impossible to prevent all spam, but installing a spam filter on your mail server can help keep it within limits.

Slide 5



Technical support is a crucial and on-going issue. As this cartoon indicates, what your technical support staff provides and what the user needs may not always be the same. One thing is certain: the “spray and pray” approach will not do. If you want your staff to use the hardware and software you are providing, and to be competent users, good technical support is essential. Let’s look at some hallmarks of model technology support at both the district and school levels.

Slide 6

**District Infrastructure Support**

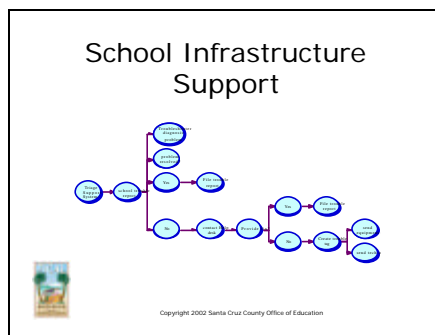
- 24/7
- Ratio of tech support to employees
  - Business = 1:80
  - Schools = 1:200 (yikes!)
- Scale back if necessary
- Involve students

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You can never tell when a staff member, student or parent will want to access information. So, be prepared to make sure your network is up and running 24 hours a day, 7 days a week. How many people do you need? Your network plan must allow for the costs of providing the personnel to support it, along with anticipated new hardware acquisitions. New computers, wireless PDAs, software, servers, routers and other equipment will require more support. More support means more personnel. There are no set

standards for support, but business generally provides at least one technical support person for every 60 to 80 employees. Unfortunately, school districts often struggle with a ratio of 1 to 200 or more. The key point here is this: if you can't afford very much technical support, scale back your plan so that it will be manageable with the staff available. And don't miss opportunities to augment your paid technical staff. One place to look for free or low cost support is right on your middle and high school campuses. Use students! Companies like Cisco and 3Com have programs that will help you to train students to support networks. It's a win-win. You augment your support staff and the students learn marketable skills.

Slide 7



A creative way to provide more school support with little or no additional cost is to establish a triage system for technical support. A typical triage system looks like this.

The district trains a classified employee from each school on simple troubleshooting issues for hardware, printers, servers, routers etc. Often this person is an aide who has an interest in technology. For serving as the school's troubleshooter, the person receives a small stipend and attends a monthly training workshop.

When a problem occurs, it is reported to the troubleshooter who attempts to resolve the problem. If the problem is not resolved, then the troubleshooter calls the district help

desk. The help desk provides telephone support.


If this doesn't solve the problem, then the help desk files a trouble ticket and decides whether to have the equipment sent in for repair or if a tech will go to the site to fix the problem.

This system ensures that most problems are fixed quickly so that hardware remains on line and that highly trained tech support staff spend the time resolving the more complicated problems. It also means that equipment is not being sent through the district's mail system for minor problems.

Slide 8

### Hardware

- Plan for future needs.
- Obsolete equipment is costly or impossible to repair.
- Maintain an accurate inventory.



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Hardware is almost anything you plug into the wall. Computers, VCRs, printers, faxes, CD-ROMs, digital cameras, Personal Digital Assistants--all require on going support and will eventually need to be upgraded or replaced.

At the same time you purchase your hardware, you also need to make a plan for replacing it. Business generally replaces old equipment every 3-5 years. Educators like you don't have that luxury. Even so, most equipment either becomes uneconomical to repair or becomes obsolete after 5-8 years and will need to be replaced.

Before your friendly UPS truck starts dropping off your new equipment, be sure you have a plan for keeping track of it. State law generally requires that each piece of hardware costing over a certain amount be entered into the district's inventory system. You need to go beyond this. Each school or department should maintain an inventory of each piece of

equipment, when it was received and where it is located. An inventory should be conducted yearly to ensure that the equipment is where it is supposed to be and help to reduce the chance of theft.

Slide 9

Software

- Productivity
- Instructional
- Licenses
- Inventory



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There are 2 major types of software that will be needed by users. Staff needs a productivity suite that includes a word processor, spreadsheet, database and presentation tool. In addition, most staff members will need various specialized tools for their unique tasks.


Instructional software for use by students should be linked to the content standards. CLRN—the California Learning Resource Network—is a database of software that has been screened for high quality and alignment to California’s content standards. All software purchased by schools or the district office should meet district standards. We discuss standards in depth on the next slide. Rather than purchasing single copies of standard software, it is more economical to purchase a district license. Requiring a purchase order when purchasing software will go a long way towards maintaining copyright compliance. For your protection, it is important that you maintain a complete, up-to-date district software inventory in case of a software audit by

Microsoft, the Business Software Alliance or others.

Slide 10

**Special Needs**

- Review IEPs.
- Adaptive hardware?
- Special software?
- Be proactive.




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Remember your special needs students when planning for hardware or software purchases. With your special education staff, establish a system for reviewing students' IEPs. Many students require special hardware adaptive devices as a part of their IEP. Other students will require special software often linked to specific pieces of hardware. Being proactive in this area will ensure that your special needs students have appropriate technology—and keep you from unnecessary meetings with angry parents and student advocates.

Slide 11

**Student Information Systems**

- Ease of use
- Web based
- Multiple means of data analysis
- Cross platform capability



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A student information system contains student enrollment information, attendance, test results, discipline records and a myriad of other details. When selecting a student information system cost should be the last criteria considered.

Consideration should be given to the following factors:

Ease of use

Web-based


Data analysis

Cross platform capability

Slide 12

**Ease of use**

- Everyone will use it.
  - Teachers
  - Administrators
  - Classified staff
- Technophobes, too!




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The system will be used by all teachers as well as administrators and other district personnel. Make sure all of the capabilities of the system are easy to use by even the most techno-phobic user. If the system requires a high level of technical proficiency to use then it is probably not the system for you.

Slide 13

**Web Based**

- No special software needed on home computer.
- Everyone will be able to use the system from any computer connected to the Internet.




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Does the system have a web-based component? A web-based system doesn't require specific software application on the user's computer. A web-based component is important if teachers, parents or others will be able to access parts of the system from home or other locations.

Slide 14

**Data Analysis**

- Manipulate data to
  - Learn about students.
  - Improve instruction.
  - Design interventions.
- Generate wide range of reports.




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A major reason for gathering all of this data in one place is to be able to manipulate the data in multiple ways to learn more about students. The more the teacher, administrator or others can learn about a student or group of students, the more powerful instructional or intervention program they will be able to offer. Reports must be easy to generate with multiple options the user can select from to answer almost any question they might pose or even some they might not of thought of!

Slide 15

**Cross Platform Capability**

- Make sure your system can handle all operating systems in use (e.g. Apple, Windows, etc.)




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Finally, if your staff is using a mixture of Apple and Windows operating systems, then the student information system must be capable of supporting both operating systems. If the system isn't cross platform capable, then expect to hear the complaint, "I can't use my Mac so what good is it?" This is less of an issue if the student information system is entirely web-based.

Slide 16

**Standards**

- Support one or two brands of hardware.
- The same for software.
- Set standards and stick to them.



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Adopting standards is one way you can maximize your technology investment. It's more cost-effective to maintain and support one or two brands of hardware rather than whatever a school chooses to buy at your local computer store. Training, technical support, repair and maintenance are all simplified when they are only one or two brands of hardware to deal with. The same is true for software. Yes, there are 15 different multimedia programs available. Picking and supporting one is cheaper, allows for district licenses and enables the

sharing of files between teachers, students and other staff. So, set district standards and stick to them. Only support and repair items purchased off of the district's standards list.

Slide 17

### Finding Resources

- Go to Portical.org home page.
- Click the "Find" button.
- Enter keywords to describe what you are looking for.



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I hope you've found this brief overview on Infrastructure, Hardware, Software, Technical Support helpful and that you'll want to share the information with others. The Portical resource database includes links to many related resources. Finally, return often to Portical. In the upcoming months, you'll find a growing collection of presentations like this and other resources on a variety of topics to assist you in your technology leadership role. For now, this is Harvey Barnett saying, "Good by until next time."