Wagging the Dog in Educational Technology:
Elevating 'IT' Into the Classroom
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In public education as well as the business world, there is often a wide gap between the people who use computers and those who provide technical support for those computers. End users, including teachers and students, are often intimidated by the vocabulary of information systems employees. These "techies," known also as "IT" personnel because of their focus on "information technology," talk glibly about sending packets, transfer rates measured in megabits, switched hubs, and mapping drives on client computers. Classroom teachers, on the other hand, are focused on teaching reading, writing, and math, and (within Texas) preparing students for success on the Texas Assessment of Academic Skills. Unfortunately, the vocabulary and associated challenges of "IT" are being elevated into classrooms across the United States. The purpose of this article is to highlight this significant and correctable trend within K-12 schools relating to the acquisition of educational technology. As schools race headlong to meet the perceived challenges of the information age, many districts are purchasing computer systems which are comparatively detrimental to the instructional goals of the classroom. If we consider "the dog" to be instructional, classroom goals, and "the tail" to be district IT and business departments: the tail is wagging the dog in instructional technology.

A copy of this article, including links to all referenced resources, is available online at www.wtvi.com/teks.

Educational Technology Purchasing Trends

It can be difficult, as a classroom teacher, to gain perspective on an issue which transcends one's own district or region, such as the purchasing of educational technology . The examples and opinions expressed in this article are, therefore, based on more than personal experience. They are based on conversations with educators throughout the state, email submitted from teachers in small as well as large districts, and visits to elementary and secondary campuses across Texas.

The dominant mindset among most school board personnel and other school district decision makers today is to purchase Windows 95/98

compatible computers for classrooms. If asked their specific opinions on educational technology, many of these leaders will state their decision to purchaseWindows computers is to be "like those used by most people in the business world." Sadly, this focus on the platform misses one of the main goals of educational technology use, and frames the debate over what computer systems to purchase on "what many in the business world use" rather than on systems which offer the greatest long term educational benefit to both students and teachers in the classroom environment.

The Texas Essential Knowledge and Skills (TEKS) for Technology, effective in the 1998-99 academic year, do not specify platform-specific knowledge and skills which students must master. Parents upset that their child is not receiving computer instruction on a Windows compatible computer are ignorant of the pace of change in the computer industry. Any parent claiming to know what computer platform the kindergartners of today will be using when they graduate from high school should either be put in charge of your stock portfolio, or politely ignored. The fact is, NO ONE knows what the computer platform of the future will be. Our goal as educators is to train students to be flexible in their use of technology and performance of computer-related tasks, so they will be able to successfully adapt to the changing nature of the electronic global village. To this end, school districts require computer systems which primarily meet the instructional needs of the classroom. Unfortunately, these needs can be ignored when educational technology is purchased.

Two Worlds Divided

The educational technology environment, as noted above, is sharply divided into two basic worlds. The information technology, or "IT" branch, is often focused on issues far removed from those of classroom teachers. While IT personnel are concerned with issues like configuring desktop security settings and wiring T1 communication lines into school networks, teachers are concerned with using the computer to teach students about John Glenn's historic return to space in October of 1998. Classroom teachers are concerned with how to use technology to enhance and extend instructional opportunities for students. IT staff are concerned with making the computers work: keeping networks up, making computers print correctly, installing software, etc.

Classroom teachers and IT staff speak different languages and operate from entirely different perspectives. While the classroom teacher is most

interested in having a computer that is easy to use and intuitive, IT personnel tend to be focused on the technical aspects of installing software and configuring hardware. IT people feel totally at home at "the C prompt," typing in DOS commands like "cd progra~1/rblaster", "erase *.*", "cd..", and "rmdir rblaster". Classroom teachers are often intimidated by the technical vocabulary of IT staff, and prefer to focus on the instructional applications of computers rather than the technical details.

The goal of educational institutions, indeed the rationale for their very existence, is to educate students and help prepare them for future success. It is ironic, therefore, that in deciding what computers to purchase for their school districts, board members have often NOT considered the realities of today's classroom. Rather than buying computers which will benefit students and teachers the most, many school boards have mistakenly allowed their IT department and business office to "call the shots" in purchasing educational technology. The results include purchases of computers which IT staff love but teachers struggle to use and support. These computers can end up costing more to maintain in the long run , and yield fewer educational benefits for students (Understanding the Total Cost and Value of Integrating Technology in Schools: An IDC White Paper - http://www.apple.com/education/k12/leadership/LSWTF/IDC1.html).

The Mistake of Buying "Like Businesses"

One of the first mistakes school district leaders make when purchasing computers "like the business world" is ignoring the difference between the rate at which businesses acquire new computer equipment and the acquisition rate for educational institutions. Historically (which is a term used very loosely in relation to computers), school districts have been much slower than businesses to replace computer equipment. The result is that computer systems purchased for educational institutions must be utilized by students and teachers for a comparatively longer time than equipment purchased by businesses.

> Comparatively speaking, Macintosh computers have a longer useful life in the classroom than equivalent Windows based computers, and yield comparative educational benefits that should not be ignored.

As an example, both Macintosh LCIII computers and Windows based 386 computers were purchased in large quantities when a medium sized, junior high school in Texas opened in 1993. Today, in the 1998-99 school

year, those same computers still predominate throughout the campus. Unlike businesses, which most likely would have upgraded to PowerPC or PentiumII processor computers, teachers and administrators are forced by budget constraints to press more mileage out of these older computers. This fact reflects a current trend in K-12 schools across the United States. The fact that 386 vintage Windows computers cannot be upgraded and configured to multi-task (run a web browser and a word processor simultaneously), while all the Macintosh computers can and have been, is significant. Comparatively speaking, Macintosh computers have a longer useful life in the classroom than equivalent Windows based computers, and yield comparative educational benefits that should not be ignored (http://www.apple.com/education/k12/leadership/LSWTF/IDC1.html.)

In addition to the different time schedules for hardware turnover between the worlds of business and education, support environments also differ greatly. While school districts have IT personnel, few schools are staffed with a full-time, network administrator dedicated to supporting computers on each campus. IT staffs in businesses are often stretched thin, but not to the extent currently seen in educational settings. As school districts deploy plans to create wide area networks and local area networks on each school campus, the demands on IT staff will continue to grow at a steady rate. Networked environments can make life easier for teachers and IT staff in many ways, but the chosen platform is a key determinant.

The key difference is whether the IT staff are required to support Windows computer networks or Macintosh networks. Consider this quotation from a computer consultant in the business world:

> "My consulting practice supplies both Mac and PC Support Technicians to a Fortune 500 client that currently has about 1000 Macs and 3500 PCs. The 1000 Macs are cared for by four Support Technicians. That's 250 computers per Tech. Those four techs are like Maytag repairmen. They often find themselves bored stiff. Their internal customers? Happy as clams. In fact, they are the only people in the whole company who are happy with their computers and the support that they receive. The average PC tech at this company services about 80 end users. The PC users hate the MIS department and think the support they get is substandard. They complain constantly." (http://www.microtimes.com/177/bmug.html)

The enormous demands placed upon IT departments should be expected to only increase. School districts should not, however, fall into the trap of focusing on purchasing Windows computers "like the business world." The

costs to classroom instruction created by this single-minded approach are too high.

Classroom Focus is Paramount

Where purchasing choices regarding educational technology are concerned, the key consideration for school districts should be: "What computer systems can meet our instructional objectives, offer the best ease of use for our teachers and students, will be the easiest for our staff to support, and are cost effective?" These questions should be asked in contrast to the single question now asked by many school districts, "Where can we buy the cheapest Windows compatible computers?"

Few people intimately familiar with both the Windows and Macintosh operating systems will deny the comparative ease of use of Macintosh over Windows based computers. To ask a person who principally uses Windows computers to compare Mac versus Windows, is to ask the wrong person. Ask someone who uses both Windows and Macintosh computers on a daily basis for similar tasks to obtain a valid opinion. Although there are many "converts" from the Windows computing world to the Macintosh world, one rarely meets a teacher who eagerly gave up their Mac and is now a devoted Windows user. An independent study conducted by Evans Research Associates and published in May 1996, entitled "Personal Computer Satisfaction," found that "dual users" (those who routinely use both Macintosh computers and PCs running Windows 95) preferred Macintosh in ten out of ten categories of comparison. They rated Macs higher in stability, overall ease of use, ease of troubleshooting, overall productivity, and overall satisfaction. A large majority rated Macintosh computers more enjoyable to use, and the computer system which allows them to be more creative (http://ra.apple.com/ftp/pub/whymac/evans.pdf).

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What is the big difference? On a basic level, the fact that Windows is still based on DOS makes the file system much more difficult to understand and navigate. Try teaching a third grade student (or tougher yet, a teacher) to save a document to the network on a Windows computer, and then try a Macintosh. Or try explaining where to open a file template on the hard drive. On the Windows computer, rather than being presented with simple

folder names, users must often deal with C: drive, H: drive, and "truncated" (shortened) filenames on network servers (like "Novellst" instead of "Novell Student Files."

When it comes to supporting and troubleshooting computers, the ease of use of Macintosh computers over Windows based machines is clear. Because of ever increasing demands on their time, troubleshooting and networking tasks which were previously handled by district IT personnel are often left to teachers and building technologists to figure out. This year, our school acquired a Novell server. In configuring Windows95 computers to access the network and print to a network printer, 41 different steps were required, including three restarts. In contrast, the same configuration for each Macintosh computer required 16 different steps and only one restart. As illustrated by this quantitative example, the difference in ease of use and ease of support between these platforms is staggering. (These steps and more helpful Mac and Win95 tips are available at http://www.wtvi.com/teks/exchange.)

Cross Platform Software and Open Standards

The abundance of cross-platform software and the open standards of the internet make arguments against purchasing Macintosh computers even more difficult to accept. ClarisWorks 5.0, now called Appleworks 5.0, offers a complete suite of productivity software tools which are fully compatible between Windows 95 computers and Macintoshes. AppleWorks 5.0 can even run well on computers as old as the Macintosh LC (with 4 megabytes of RAM). HyperStudio 3.1, Accelerated Reader, the STAR testing program, and many other programs can seamlessly share files and student data records over a school network between Macintosh and Windows computers.

If school users love Microsoft Office, Office 98 for Macintosh is fully cross platform compatible for MS Word, Excel, and PowerPoint. A disadvantage is that a 100Mhz processor is recommended by Microsoft to run Office 98, so older machines may not work efficiently with this application. In that case, consider ordering the new iMac with its blazing G3 processor, at $1249 each, for classrooms.

The open standards of the internet and the world wide web permit data to be shared more easily than ever between computers with different operating systems. The same webwhacked (copied) websites on a school server can be shared, without translation, to Macintosh and Windows

computers, because they operate according to the same open standard: HTTP (hyper text transfer protocol). Open standards are responsible for a great deal of the rapid growth in the internet and the proliferation of information services now available on the world wide web. The continued success of open internet standards (as opposed to proprietary ones controlled by one company) should continue to maintain the viability of alternative computing platforms besides Windows 95/98/2000. The outcome of the US Department of Justice's case against Microsoft Corporation will strongly affect the future of open computing standards, and deserves our professional interest as educators. You can visit the US Department of Justice's website at http://www.usdoj.gov/atr/ for more information about the trial.

The advent of Windows95/98 emulation software, like Virtual PC (http://www.connectix.com) and Soft Windows (http://www.insignia.com/softwindows), allows Macintosh computers to completely mimic the Windows computing environment. Schools using Macintosh G3 computers with Virtual PC software can, therefore, enjoy the benefits of Macintosh ease of use and support while still offering training for students and staff in the Windows operating system when desired. This alternative has been embraced by public schools in Cody, Wyoming, and the results have been extremely positive. In the November 1998 words of Biff Beck, Director of Technology for Cody schools:

"We are currently configuring 325 G3s in a $600,000.00 upgrade program. We have pulled out 75 PCs and replaced them with G3s using Virtual PC and Windows 95. This move made it possible to provide two platforms, greater speed, easier troubleshooting and tech support, and all at less cost that an equivalent PC. I think you can imagine the time it takes to program [setup] a computer, and with 325 it is a massive effort, but because of the Mac platform two of us have completed 185 in 30 days (thanks to Network Assistant software which lets us clone 23 at one time.)"

Another perspective on platform comparisons is offered by Lowell T. McCoy, the K-12 Instructional Technology Coordinator in Wisconsin Rapids, Wisconsin. He answers the question, "Do you find that Macs or PC's provide a better environment?" by stating:

> "It all depends on how stable your use of computers has become. If the equipment will be doing basically the same thing for their useful lives, the platform issue is pretty neutral. However, if the equipment will be moved about, used for a variety of tasks, some of which you don't yet know about (who thought internet was important for K-12

> four years ago?), go with Macs. I have Apple II's, Macs, DOS, Windows, Windows 95 systems. The most widely used are the Macs, because they do everything pretty well. The DOS boxes do better at some tasks but are difficult to alter and learn and support in a school situation. Things like SCSI ports, localtalk ports, and system software common to all machines helps modify for different locations and uses. Putting on a scanner, an external hard drive, and a digitizer is a piece of cake on any Mac that I have but is a half day project on a WINTEL. Let alone setting up an impromptu sharing setup in a classroom for a small collaborative project. I do this regularly for HyperStudio and DTP projects.

For the user, the difference between platforms becomes less important each passing day as they all tend to become the same. However, for the support and extension of the particular uses which schools make of computers, Macs make new things easy and inexpensive to do."

Once IT departments are educated about not only the ease of use offered by Macintosh computers, but also the ease of support and maintenance, they can become enthusiastic advocates of Macintosh computers in the classroom rather than cynical critics.

What Do We Do?

School boards, superintendents, and district technology directors need to stop IT departments and business offices from "wagging the dog" of classroom instruction by forcing the purchase of Windows-based computer systems. As the Apple ad campaign exhorts us, it is time to "think different" and purchase computer products which have longer comparative viability, greater ease of use, and are much easier to support. Districts need to support and purchase products which follow "open" internet standards rather than strictly proprietary ones, and plan for the unexpected computer platform of tomorrow rather than locking classrooms into a Windows-only environment.

If a dialog in your school district and community about the issues discussed in this article has not already started, take it upon yourself to initiate the discussion. Circulate copies of this article and referenced resources to leaders within your department or building. Check out the resources at http://www.apple.com/whymac/, especially the study

entitled "Understanding the Total Cost and Value of Integrating Technology in Schools" which examines long term viability comparisons of Macintosh versus Windows computers in greater detail.

Particularly at the elementary level but also in secondary settings where multimedia, graphic design, and web design are taught, Macintosh computers should be the platform of choice. For the large number of creative professionals in the graphic arts and printing industry, there is simply no substitute for the straightforward power of the Macintosh operating system. Our children and students deserve the same advantages in their school environment.

A discussion of platform issues comparing Macintosh to Windows computers many become an emotional one. Often, individuals defending Windows computers are in need of more information from the classroom perspective. Reason and logic will not always win this debate, however. People must persuade themselves. Remember that Macintosh advocates are in the minority, but "Research has shown that when a minority persists in its judgment, the majority tends to make more thoughtful and more creative decisions that incorporate minority viewpoints" (http://www.macaddict.com/ammo/tactical.html). When "apple to apple" comparisons are made between Macintosh and Windows computers, there is a clear conclusion. It's time to stop letting the tail wag the dog in educational technology.

Wesley Fryer is a Windows95 computer lab teacher in the Lubbock Independent School District. He is also a workshop presenter, web designer, and technology consultant. He invites your questions and comments.

Wesley's perspective on operating systems (including Windows 95/98/2000, Linux, and Macintosh) is online at www.wtvi.com/wesley/os.html.

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