Council for Education Policy, Research and Improvement

Overview of Technology in Florida's K-12 Public School System

School Year 2001-2002

March 12, 2002

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Executive Summary

What is the status of the Florida K-12 education infrastructure for technology at the school level? An in-depth look into data and information contained in an annual survey from all schools yields some interesting conclusions:

- **The existing infrastructure for technology in Florida's public schools continues to be improved and is now ready to be made an integral part of the instructional process.**

- **It is clearly evident that the most effective use of this infrastructure is not being attained.**

- **Educators need better preparation and support to fully utilize the existing infrastructure and integrate it into the instructional delivery process.**

Florida's K-12 education system began to recognize the value of computational capability to the educational process during the mid-1970's. As most states, Florida tends to set policy through its appropriations legislation. The 1977 legislative session established the Florida Education Computing Project (FECP) in the appropriations act and allocated funding to support coordination and collaboration among districts with regard to administrative computing. Even in this initial effort to improve education through the statewide use of computational systems, the value of such technology in the instructional process was not only recognized, but emphasized by having a portion of this effort dedicated toward the computer literacy of educators in districts.

Twenty five (25) years later, Florida continues to earmark appropriated funds for technology in K-12 education and places an emphasis on having technology deployed in the schools. After a quarter century of investment, where does the state stand with respect to the technological infrastructure within the K-12 system of education?

Each year, the Department of Education (DOE) sends a Technology Resources Survey (TRS) to all school districts that asks a series of questions about the deployment of technology in each school and how technology is being utilized. This survey is completed by the technology focal point in the school and is then reviewed and approved by the district. Once submitted to the DOE, it is combined into a database with all other schools and districts and used to respond to questions related to technology that come to the DOE.

CEPRI staff have delved deeply into this collection of information, and, along with other details on educational technology deployment, sought to derive a realistic statewide overview of computer and video technology in the Florida K-12 educational system. Once having this overview, this research then identifies positive trends over the last school year TRS survey. Finally, the report takes an in-depth look at two issues that appear to be barriers toward incorporating technology into the instructional curriculum: these are 1) the actual application

of technology into the instructional process and 2) the preparation of educators for the use of technology in the instructional process.

The following table highlights some of the more recognizable parameters for measuring computer technology in K-12 schools and provides the percentage of improvement over the prior school year:

Measurement in School Year 2001/2002	Value	Change from 2000/2001
Total Instructional Desktop Workstations	669,000	+10.8%
Percentage of Obsolete Workstations	16%	-36%
Student-to-Instructional Computer Ratio	3.7:1	-7%
Schools having Internet Access	97%	+8%
Classrooms having Internet Access	88%	+25%

These values are impressive and certainly compare favorably when viewed with similar data from other states (See an example of this at:
http://www.edweek.org/sreports/tc01/states/tc01state_compare.html
where Education Week offers an opportunity to review multiple states in terms of technology infrastructure). The improvements over the prior school year are likewise encouraging. Yet these data alone do not accurately portray the status of technology in the schools. When attention is directed at survey responses addressing the usage of technology in the schools by both students and teachers, a more realistic picture of the infrastructure and its position in the learning process is obtained. Such is the intent of this analysis.

The report makes the following recommendation in response to this survey analysis and conclusions.

1) **It is imperative that the Department of Education coordinate an effort with the districts and schools to complement the existing infrastructure with having appropriate projection equipment and a standard workstation for each classroom teacher. This can be done while continuing to pursue a long range goal of having as close to a one-to-one ratio of students to instructional workstations as is possible.**

2) **The Department of Education must provide the leadership necessary to develop standards and training for functional classroom management software systems that aid teachers in deploying technology and having it enhance the learning experience, as well as the development and deployment of technology training programs and standards for educators on how to best utilize the current technology infrastructure and available resources for instructional delivery.**

3) **The Florida educational system must strive to provide instructional materials via Internet access with sufficient bandwidth to satisfy needs in every Florida classroom.**

4) **The Florida Board of Education (FBOE) must consider ways of encouraging teachers to be more proactive in the utilization of video technology for delivery of instructional materials and in classroom management.**

5) **As an FBOE policy, establish a statewide goal of having 1-FTE technical resource coordinator established within each school.**

6) **The FBOE must establish information technology proficiency standards, within the Sunshine State Standards, for students at various grade levels.**

7) **The release of any public schools technology funds must be tied directly to the submission of a complete survey.**

Overview of Technology in Florida's K-12 System

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I. Introduction:

Florida's public K-12 school system has made significant progress over the past decade in building up the technology infrastructure to support both the instructional process and administrative functions. This migration and deployment has been made possible through a combination of federal, state and district initiatives on technology. By and large, the current status would not have been possible without school districts placing a high priority on introducing and administering technology. There are five sources of funding that have played a significant part in the development of this infrastructure:

1. The Florida Legislature has dedicated funding toward public school technology for the past nine fiscal years, in the amount of $577 million. These funds have been distributed to the districts according to the FEFP student population formula.
2. The school wiring retrofit program in the early 1990's invested $135 million in school buildings and enabled the start of creating a digital based infrastructure within the schools.
3. Florida has maximized the use of the Technology Literacy Challenge Fund (TLCF) grant over its five-year existence. This federal grant source has seen $80.5 million flow to 202 projects in school districts or through consortiums based on specific proposals for the adaptation of technology.
4. Several Technology Challenge Integration Grants, including one to Florida's three educational consortiums and administered through the Florida Learning Alliance, have funds available to use in assisting rural schools with the deployment of technology.
5. Florida has participated in the federal E-Rate program since it's inception. E-Rate is funded from a Universal Service Fund, fed by revenues of telecommunications companies and returned to eligible educational entities based on pre-defined criteria. To date, $232 million has flowed to Florida districts as a result of this program.

II. School Year 2001/2002 Status:

This overview uses data from the Department of Education (DOE), Bureau of Educational Technology, Technology Resources Survey (TRS) for the 2001/2002 school year (as of December 13, 2001), with 100% of the Districts reporting. This analysis and summary is based on reported survey information from 86% of Florida's 3715 schools, along with other pertinent information provided to CEPRI from the DOE Division of Technology; specifically the Florida Information Resource Network (FIRN), the Bureau of Educational Information and Accountability Services and the Distance Learning, Instructional Technology and

Instructional Television offices within the Bureau of Educational Technology. Where possible, estimates and projections have been made so that these summary data are applicable to the statewide K-12 student population.

This analysis will focus on the deployment of infrastructure to support the use of information technology in the administrative and instructional process. The following points are used to present a high level view of two predominate types of technology, specifically computer systems and video presentation equipment. These points also give insight as to how technologies are used across the K-12 system:

III. Computer Systems

- Major administrative functions within the school districts (student record systems, human resource management systems, financial systems…) are automated applications. These functions are provided either from dedicated district platforms or from a variety of host platforms located across the state and generally in a host district, college or university.

- The applications software for these functions will be quite varied. There continue to be "home grown" applications, however, most districts use licensed software that has been tailored to the needs of K-12 education. This fact can best be illustrated by noting that 52 of Florida's 67 districts utilize at least one of the five modules of the Total Education Resource Management System (TERMS) commercial package of software for school district administrative purposes.

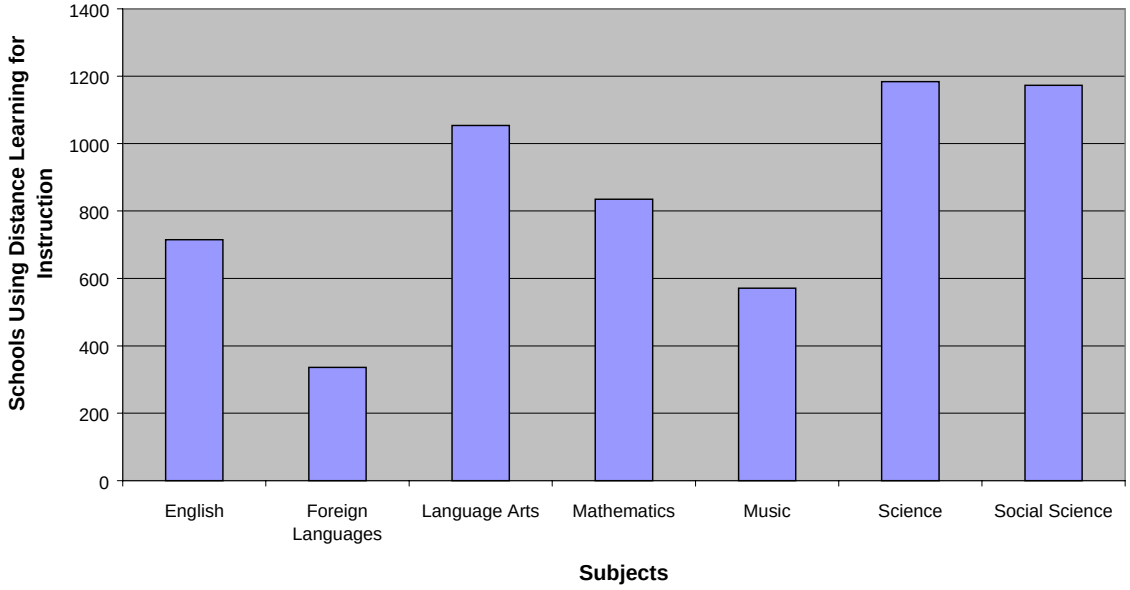
- Districts that are members of or participant in one of the three educational consortiums (Panhandle Area Educational Consortium - PAEC, Northeast Florida Educational Consortium - NEFEC, and the Heartland Educational Consortium - HEC) will utilize administrative and instructional software from platforms provided or coordinated and maintained by the consortium. Thirty three (33) districts obtain computing services in this manner.

- In school year 2001/2002, reports document 68% of the schools have a school-based network dedicated to instruction, while 73% of the schools have a school-based administrative network. Two thirds (66%) of the schools report having personnel resources serving as a coordinator of technology at their school.

- Statewide, there exists a ratio of 1 instructional desktop computer system for every 3.7 students. Approximately 16% of these systems are older models (less than the equivalent of a Pentium I processor) and the need for continual upgrading is always a challenge for Districts.

- Distance Learning technologies are being used to enhance a wide variety of subject areas. This deployment is now approaching one quarter to one third of the schools in primary use subject areas. The largest number of schools report usage of distance learning technology in science, followed closely by social science and language arts (see Figure 1).

Figure 1
Distance Learning Technology

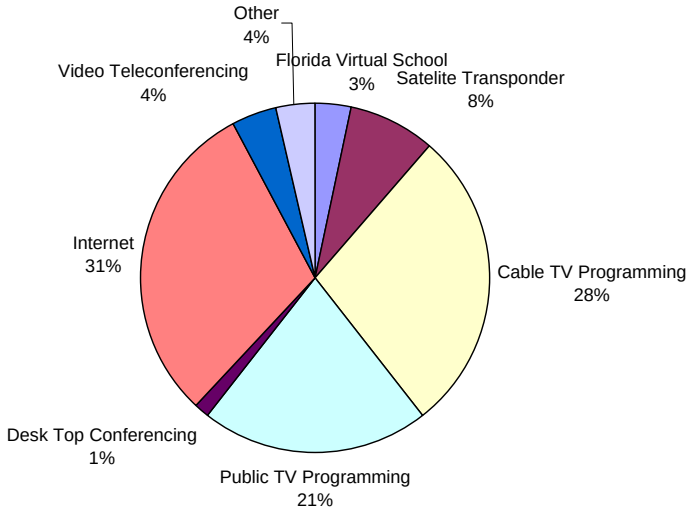


Source: *School Year 2001/2002 District Technology Resource Survey*

Distance Learning is defined as imparting instruction outside the traditional face-to-face classroom environment, through technology.

There are a rather wide variety of sources used to deliver instruction through distance learning techniques. Figure 2 shows that most distance learning is provided through cable and public broadcasting programming, along with Internet based instruction:

Figure 2
School Sources for Distance Learning



Source: *School Year 2001/2002 District Technology Resource Survey*

- Resources to acquire information technology for instruction in schools come primarily from the state (33%) or from district resources (20%). Federal grants and local school-based resources account for another 20% (10% each). The remaining sources are very small percentages and center around the local school support community. (PTA, private donations, local government, fund-raisers…)

- All 67 school districts now have filtered access to the Internet, most of which is provided by the Florida Information Resource Network (FIRN). This Internet access is used to visit web sites containing materials posted specifically for instruction and research by teachers and students.

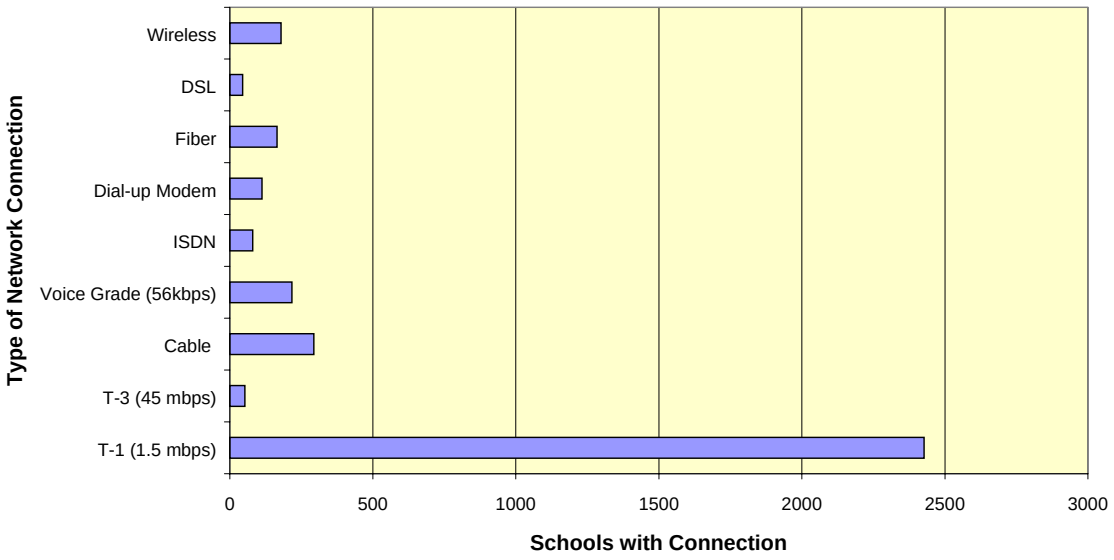
- FIRN is Florida's statewide data network, dedicated to education. FIRN provides data communications services to all school districts, community colleges and state universities. In addition to Internet access, FIRN provides access to statewide applications (such as tracking of Bright Futures scholarships and the FASTER transcript sharing system), E-Mail services for teachers, web page hosting for schools and teachers, inter-district video conferencing, directory information on districts, colleges and universities, along with pointers to instructional resource materials for research and instruction.

- Survey data estimates that 97% of Florida's 3715 public schools now have some type of access to the Internet. The ratio of students to computers having Internet access is 4.6 to 1.

- Within these schools, it is further estimated that 88% of Florida's public school classrooms now have some sort of Internet access.

- Most of Florida's schools are connected to the Internet via T-1 or Integrated Services Digital Network (ISDN) circuits, which transmit information at 1.5 million bits per second (68%). Some schools continue to utilize low speed (56 kilobit and dial-up facilities) access links (9%) for Internet access. 14% of the schools have moved to broadband services (T-3 circuits, cable modems, DSL services) to increase the capability for student usage and to improve the response time from Internet access inquiries. Figure 3 gives an illustration of this school connectivity from the TRS survey:

Figure 3
School Network Connectivity



Source: *School Year 2001/2002 District Technology Resource Survey*

- Wireless workstation technology is now being considered by numerous districts, with several actively deploying wireless technology within their schools. Current data reports 17% of the reporting schools have wireless networks deployed and 5% of the reporting schools gain access to the Internet via wireless technology.

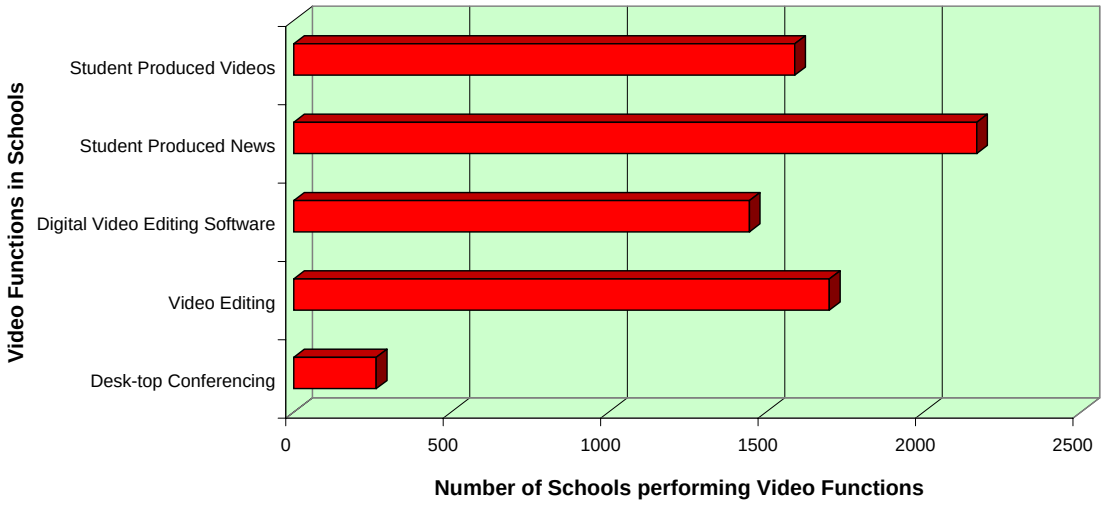
IV. Video Technology

- Video technology is deployed throughout the state. All of Florida's public school districts have satellite downlink capability with access to the Department of Education satellite transponder.

- 43% of the districts have the ability to further distribute video-based instructional materials to their schools, either with school-based satellite receive dishes, licensed instructional television channels or through cable facilities.

- All schools have the ability to distribute and present instructional materials on video tape and 69% of the schools have some measure of audio/video production capability for student use. Figure 4 illustrates this capability:

Figure 4
School Video Capability



Source: *School Year 2001/2002 District Technology Resource Survey*

- Several districts have sophisticated video teleconferencing presentation systems that perform live distance learning instruction. For example, the Florida Learning Alliance provides all of it's member districts with one 2-way compressed video teleconferencing capability. These type systems are not wide spread and seem to be directly related to the commitment from district top management and the dedication of the using instructional staff. Where these two factors exist, these technologies are highly productive.

- In September, 2001, the Department of Education began broadcasting selections from its library of licensed video-based instructional materials over one of the recently acquired digital satellite transponder channels. Schools are now able to take in real time feeds of these materials or record them for replay at later times. Heretofore, all of these materials had to be copied and mailed to the districts.

- As a result of Florida's school retrofit program and other commitments by districts, 90% of Florida's classrooms have wiring for cable signaling, along with some minimal control and management (ie: head-end) capability in the school.

- The Florida cable industry has been very active in making cable signals available in the classroom, along with having public access channels available for education.

V. Positive Observations on the School-Year 2001/2002 TRS Data

In comparing the 2001/2002 school year TRS data with the past year, there are some encouraging trends in terms of the metrics used to measure the technology infrastructure. The first measurement is the number of workstations in the system dedicated to instructional usage. This survey shows a 10.8% growth in one year, up to 669,000 total workstations from 604,000 in school year 2000/2001. With the continuing legislative support through the Public School Technology funds, growth is to be expected, although not at the level indicated in this latest survey. There is reason to question the accuracy of the published school-year 2000-2001 results for total workstations (several school tallies were found to be left out), which would be a factor in what appears to be an extraordinary jump in inventory.

An even more encouraging statistic is the reduction of older workstations (those having less than Pentium I processing capability) in this count. It has been reduced from a level of 25% of the total workstations in school year 2000-2001, down to 16% (a 36% improvement) in 2001-2002. Even taking into account the questionable accuracy of the prior year data, this is a very positive trend and illustrates an increased commitment in the Districts to providing state-of-the-art technology equipment for instruction.

Another encouraging metric is the observation that the student-to-instructional workstation ratio improved from 4:1 in school year 2000-2001, down to 3.7:1 in 2001-2002. This represents a 7% improvement in having workstation technology applied into the learning process. It is also encouraging to observe both the school-based instructional and administrative networks (ie; the local area networks within the schools) each growing in the schools by 6%. These improvements provide the infrastructure mechanisms needed to support the concept of using technology to increase student achievement and teacher productivity.

Survey data can be utilized to provide an accurate projection for two highly indicative measures of technology in the schools. These are:

1) the number of schools having access to the Internet, which has increased from an estimate of 90% in school year 2000-2001, up to 97% in 2001-2002; and
2) the number of classroom having access to the Internet, which shows solid data to support an 88% level, up from last year's estimate of 70%.

Wireless activity in districts has moved from the planning and feasibility phases into measurable deployment. This survey documents that 17% of the reporting schools have functional wireless networks in place, with 5% of the schools using wireless technology to gain access to the Internet. This is a very positive indication that wireless technology is robust enough to perform properly in a public school environment. There are many instances in older schools, where wireless deployment may indeed be more cost effective than wired local area networks and traditional telecommunications access to wide area network facilities.

VI. Issues with Incorporating Technology into the Instructional Curriculum

The School Year 2001/2002 TRS data details significant progress in building up the technology infrastructure within the schools over this past year. A close evaluation of data dealing with the actual application of technologies into the learning process and with the preparation of teachers for this application indicates Florida must place more emphasis on these two aspects at the school level. Consider the following analysis of reported data from the survey:

Application of Technology into the Instructional Process:

- Schools report that students are using computer workstations in their classrooms (81%), in computer laboratories (82%) and within the media centers (71%) as part of the on-going instructional program. These indicators are encouraging. Further review of the data is not so positive. Only 49% of the schools report that the majority of their students are able to independently conduct electronic information searches. This is a rather routine use of computational devices. It may be performed either in stand-alone mode (via CD-ROM, diskette or DVD) or through access to data communications networks (ie; the Internet, district or school-based servers) to teacher-defined repositories of information. These two reported occurrences give a conflicting view. Together, they certainly suggest that effective instructional usage of the available computational devices has yet to be achieved.

- Educators for years have touted that having a computer for every student is desirable and would be a boon to instructional provision. Continuing to strive for a student-to-computational device relationship that is as close to a 1:1 ratio as is economically possible, technically feasible and in a fashion that addresses having sufficient instructional computational devices to challenge and enable students to obtain the highest levels of academic achievement, should continue to be a long range goal of the Florida K-12 system. Even with the noted progress in student-to-workstation ratio, achieving a 1-workstation for every student is a very expensive venture. Perhaps an interim step toward this goal would be to consider the acquisition of appropriate projection equipment for every classroom. It would seem logical that a teacher would begin introducing workstation technology into their portfolio of instructional tools by using it to display materials and techniques to their classes. Acquisition of projection devices for classrooms would provide a means for having teachers incorporate technology into their style of delivery by using a workstation as a part of their classroom presentation style.

  In reviewing survey data, 87% of the schools report having multi-media projection devices that are capable of displaying a computer screen to an entire class. These data further show there is a statewide average of 11 of these type devices in each school. When one considers the fact that there are an average of 39 classrooms per school statewide, this indicates that only about one quarter of such projection devices are available for teachers to begin using workstation technology projection in the daily distribution of teaching techniques and materials. With a proper projector, the workstation can replace or certainly supplement the blackboard or an overhead for class presentation.

The combination of teacher, standardized workstation and projector can be used as a classroom presentation unit in a variety of ways, to include but not be limited to:

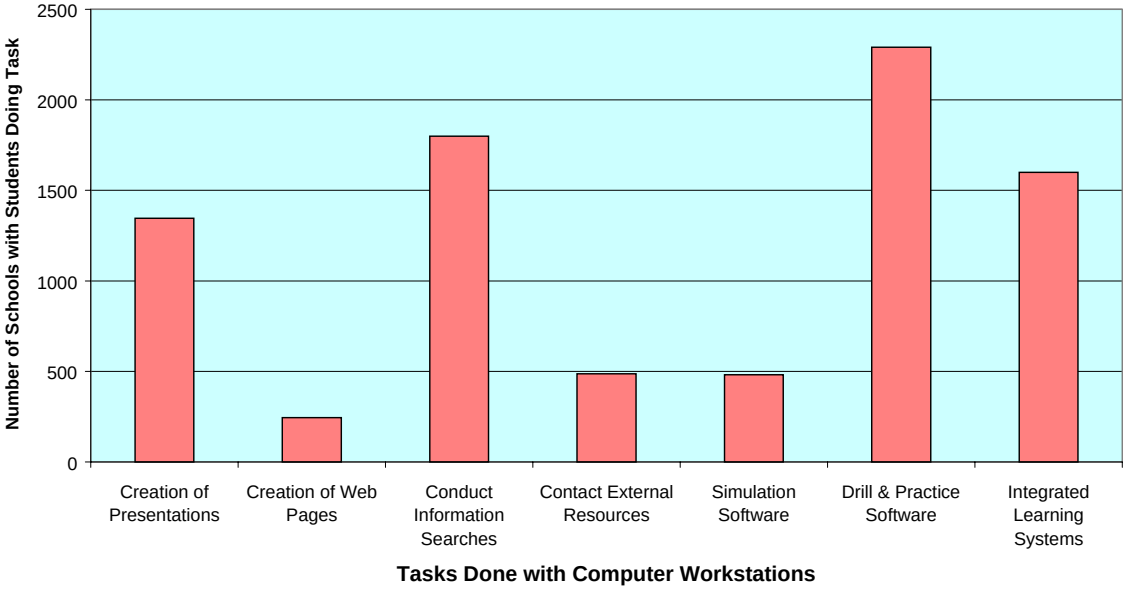
- present instructional techniques in both a pre-defined and spontaneous venue,
- demonstrate proper ways for accessing available video and data libraries,
- illustrate finding Internet based instructional and research content,
- training students on application product usage for continuing learning,
- displaying CD-based or streaming video instructional materials,
- provide information on automated assignment repositories,
- teach students to use school, district and state based applications.

This type of classroom presentation application would then provide for a much-improved usage of the existing statewide ratio of 3.7 students to each instructional workstation (as noted on Page 3), as students could take techniques and information gleaned from such classroom instruction, and apply it in their next school workstation access session.

While any statewide acquisition effort represents a sizable investment, this interim step concept can be cost justified. Consider that the acquisition of sufficient workstations to achieve a 1:1 ratio to current student population would require a sizable purchase outlay. The actual number would depend on the type devices acquired. In an effort to develop some reasonable estimate, an assumption is made that half of the required devices would be desktop units, while the other half would be handheld devices with wireless infrastructure deployment in the schools. These assumptions produce a range of from $1.2 to $1.7 billion. A similar exercise for the acquisition of sufficient projectors so that one exists in each classroom would be in the range of from $238 to $465 million. The high end of this range is based on having a laptop per teacher standard established, and factors in the cost of required additional laptops. From an efficiency standpoint, equipping each teacher with a laptop would increase the capability and functionality of integrating workstation-based material presentation into the classroom. The idea of a proper projector per classroom is certainly more feasible and attainable than is achieving the 1:1 student to computer ratio.

- Computers are gaining a more varied use within the schools. While drill and practice software remain the top usage driver in the schools, other tasks are making progress as more workstations become available for student usage (see Figure 5). There is still a long way to go, as even the greatest usage only exists in the majority student population of 62% of the schools.

Figure 5
Student Use of Computers for Instruction



Source: *School Year 2001/2002 District Technology Resource Survey*

- Only 58% of the schools say they have a standard classroom technology configuration defined. How can effective incorporation of computational server/workstation technology be deployed unless such a standard is both defined and adhered to? Without a standard, keeping the infrastructure (ie; the school local area network and the workstation interface to this network) functioning properly will be extremely difficult, particularly with limited technical expertise, of which there is documented data to such limitations (To wit, only 57% of the schools report that they have a full time network/technology coordinator in place). Without such a standard, teachers will experience difficulty and frustration in having applications of technology become an integral part of their style of imparting knowledge.

- With a very high percentage of schools reporting Internet access from their classrooms (projected at 88%), it is distressing to note that only 52% of the schools report that the majority of their students utilize the Internet for academic research. There is a wealth of outstanding instructional and research content available at no cost to schools on the Internet. Florida (as do all other states) constantly struggles to provide sufficient network bandwidth for educational Internet access. The state has invested heavily in connections to districts and in backbone networks with bandwidth capable of supporting desired instructional Internet access. Districts have invested in local networks that bring school traffic to the district for access to these facilities. Why are these resources not being utilized more by students? The answer can be complex, and certainly a function of workstation access, but one part of the answer is that teachers do not incorporate such usage into their teaching style.

Preparing Educators for the Use of Technology in the Instructional Process

The professional development of teachers to effectively incorporate computers and associated technology into their own personnel instructional delivery styles will be a key element of any plans to improve the product of the Florida K-20 education system. The current TRS survey gives an interesting view into the status of teacher profession development with respect to technology. The following bullets are summarized from the survey:

- The Milken Family Foundation, Education Technology, has been researching the use of technology in education for two decades. Research by this foundation features a series called "Teaching in American Schools: Seven Dimensions for Gauging Progress". Dimension 3 of this series is termed Professional Competency Continuum (PCC), Professional Skills for the Digital Age Classroom. There is a quotation in Dimension 3 that captures the essence of having technology applied to learning:

  > "As a catalyst to change in classroom practice, learning technology can help educators promote active and participatory student learning. But the key to success isn't in the computers, probeware, graphing calculators or access to networks and the Internet. It is liberated educators, whose understanding and creative use of technology can help them to achieve undreamed-of levels of excellence for themselves and for their students."
  >
  > *Lowell Milken, President, Milken Family Foundation*

  For the school year 2001-2002 TRS, the section dealing with teacher professional development included questions that reference the stages of progress in using technology from this Milken Professional Competency Continuum. Schools were asked to estimate what percentage of their faculty could be considered in each stage. These stages and the statewide status percentage of teachers being in a stage are summarized in the following Table I:

Table I

Stage I – Entry	Stage II – Adaptation	Stage III – Transformation
Operate computers at a basic level, with instruction mostly teacher-centered and tasks are structured as exercises	Technology is integrated into the classroom in support of existing practices. Educators use variety of applications.	Adept at transferring skills from current technology tools to new ones and often learn independently.
Statewide – 36.5%	Statewide – 48.2%	Statewide – 15.3%

According to the response to these three questions, approximately half of the

Florida teachers are at a Stage II level of being able to integrate technology into curriculum. The generalized definition of this stage includes skills related to the use of technology, but the primary application of these skills is directed toward enhancing the teaching and learning strategies already in place. While this is certainly a logical first step, it does not address optimal usage with creative concepts.

Unfortunately, over a third of Florida teachers are at the Stage I level. The generalized definition for Stage I points to educators lacking appropriate access to technology and in having the requisite skills to implement and sustain significant changes in practice. The survey does not offer insight as to a detailed analysis of this estimate by level and grade, however, it is clear that Florida simply needs to get more of its teachers up to the Stage III level. The generalized definition for the Stage III level includes new learning opportunities being possible through the creative application of technology to the entire school community.

There are some encouraging trends in comparing the responses to this question over the last two school years. The percentage in Stage I decreased by 6%, while the percentage for Stages II & III increased by 4% and 5% respectively from the 2000-2001 to the 2001-2002 school year.

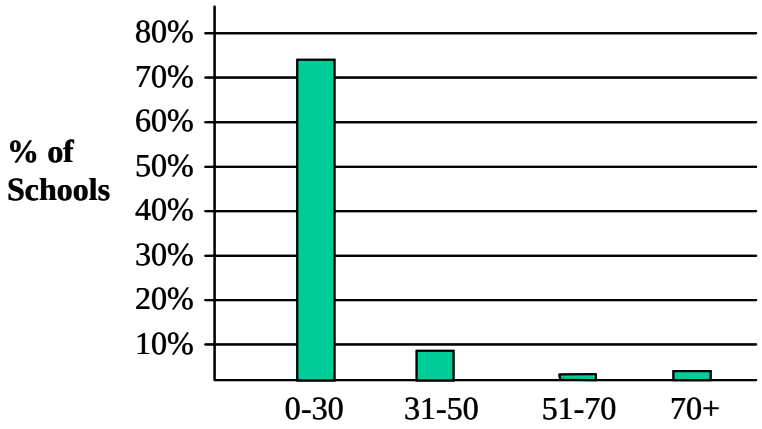
Based on this opinion from the schools, as approved by the Districts, and independent of the small but positive 1-year trend, Florida has not done a very good job of preparing its teachers to effectively use the existing technology infrastructure. This conclusive statement is further borne out by other teacher preparation indicators in the survey, as set forth below.

- In 58% of the schools, the majority of teachers are provided regular preparation time for learning and integrating technology into their curriculum. Should all teachers be afforded this time if Florida is ever to achieve a sound application of technology into the learning process?

- The majority of teachers in 68% of the schools use the Internet for communications (e-mail) and academic research. This fact sounds good, until further research into this current year survey data shows only 24% of the schools report that the majority of their teachers use the Internet for instructional delivery. This is alarming and indicative of a lack of commitment toward having a sound application of technology into instructional delivery. With a vast amount of Internet based instructional content available at no cost, are additional efforts to inform teachers about this content and enhanced classroom delivery capability warranted?

- Attempts are being made by the Districts to address this need for technology related teacher professional development. 62% of the schools report that on-line professional development capabilities are provided for teachers by their district. Yet the majority of teachers statewide (from 74% of the schools – see Figure 6 below) completed less than 30 hours of technology-related professional development hours during school year 2000-2001.

Figure 6
Teacher Professional Development in Technology



Annual Technology Related Professional Development Hours Completed by a Majority of Teachers

Source: *School Year 2001/2002 District Technology Resource*

The Division of Professional Educators in the Department of Education indicates the trend in teacher professional development is toward short-term on-going school-based exposure to best practices, examples and techniques. This is in lieu of traditional day-or-week duration formal training classes. Division personnel provide a very rough estimate that this exposure is on the order of 2.5 hours bi-weekly, during the school term. This equates to approximately 50 hours annually. This information indicates that the status of teacher technology-related training is not at the level observed for overall professional development.

In a follow-up conversation with the Division of Professional Educators, actual data for school year 2000/2001 show 686,000 hours in technology related professional development by 74,000 participants. This equates to 9.3 hours per year per participant. While this average is up from 8.7 hours per year per participant in the previous school year, it does not seem to be adequate in light of the measurement criteria gathered from this survey.

VII. Conclusions and Recommendations for the Future

The results of the school year 2001-2002 Technology Resources Survey and associated information can be summarized into three statements:

- **The existing infrastructure for technology in Florida's public schools continues to be improved and is now ready to be made an integral part of the instructional process.**

- **It is clearly evident that the most effective use of this infrastructure is not being attained.**

- **Educators need better preparation and support to fully utilize the existing infrastructure and integrate it into the instructional delivery process.**

The following **Recommendations** are made in response to the above survey analysis and summary. Actions on these recommendations will be important milestones in order for Florida to achieve the accountability and overall quality desired in its newly defined K-20 education system:

1) **It is imperative that the Department of Education coordinate an effort with the districts and schools to complement the existing infrastructure with having appropriate projection equipment and a standard workstation for each classroom teacher. This can be done while continuing to pursue a long range goal of having as close to a one-to-one ratio of students to instructional workstations as is possible.** It has long been the goal of technology-oriented educators to strive for a 1:1 ratio between students and computational devices. These devices may be hand-held, desktop or laptop configurations with either wired or wireless access to school based local area networks, which then provide access to the Internet for material content and to school and district intranets containing assignments, schedules and other necessary repositories of information. In the Fall of 2001, this ratio is 3.4 students per computational device. While having a goal to achieve a statewide 1-1 ratio of computational devices to students is laudable, the economics of this venture make it highly problematic. Once more, even if it were to be attained, keeping the inventory current with an ever-changing technology would represent a sizable and expensive objective. In such a proposed interim step, Florida would be better served by concentrating on how best to utilize the existing infrastructure, in terms of encouraging and enabling teacher and staff productivity increases.

2) **The Department of Education must provide the leadership necessary to develop standards and training for functional classroom management software systems that aid teachers in deploying technology and having it enhance the learning experience, as well as the development and deployment of technology training programs and standards for educators on how to best utilize the current technology infrastructure and available resources for instructional delivery.**

There are a wide variety of systems and products that have been designed to offer classroom management functions for teachers. Few have been thoroughly and successfully tested in a dynamic classroom environment. Standards for such systems would make it easier for teachers to use and adapt their features to individual styles of teaching. The training programs would assist teachers in gaining optimal use of the existing ratio between students and instructional workstations, making the most of opportunities to utilize video presentation equipment and identifying viable and cost effective electronic material content and products for use as reference sources.

3) **The Florida educational system must strive to provide instructional materials via Internet access with sufficient bandwidth to satisfy needs in every Florida classroom.** Florida has a very high percentage of its classrooms with Internet access. Focus must now be on both achieving 100% of classrooms with Internet access and in having sufficient bandwidth available as usage grows. This is a concern among district technical coordinators now and congestion will get worse as more appropriate applications within classrooms mature. This will involve cooperation among the DOE, districts and the Legislature. The Florida Information Resource Network (FIRN) and its ability to keep up with school and district bandwidth demands will be a key issue with this effort.

4) **The Florida Board of Education (FBOE) must consider ways of encouraging teachers to be more proactive in the utilization of video technology for delivery of instructional materials and in classroom management.** Video presentation of information is now an integral part of our society, from cradle to grave. Children are exposed to this media prior to entering the education system. Using it to enhance the instructional process just makes good sense.

5) **As an FBOE policy, establish a statewide goal of having 1-FTE technical resource coordinator established within each school.** These resources are vitally needed to perform planning, technical assistance and the deployment of specific technology. For school year 2001-2002, 66% of the schools now have such a resource on staff, yet only 57% report the responsibility is full time.

6) **The FBOE must establish more definitive information technology proficiency standards, within the Sunshine State Standards, for students at various grade levels.** In the Sunshine State Standards, there are references to computers and software under the standards for writing, communications, reading and earth sciences. Generally, these standards address a high level of usage, such as using word processing software to create and verify information, or use databases and software to gather information. What is needed is a more comprehensive suite of standards that should include **computer architectural concepts** (ie; basic understanding of processors, memory, operating systems, applications software, interfaces, peripherals and networks), **applications product feature knowledge** (ie; understanding the features and functions of word processing, spreadsheet, database and presentation/publication software products) and best practices **ways to apply these technologies** toward solutions for a variety of issues.

7) **The release of any public schools technology funds must be tied directly to the submission of a complete survey.** This can be addressed in proviso language contained in the General Appropriations Act . The Department of Education has experienced increasing difficulties in obtaining timely responses to the Technology Resources Surveys from districts.

VIII. Reaction from the Districts

In early February, 2002, a draft of this research was sent to each district Superintendent and Management Information Systems (MIS) director. The following are excerpts from some of the comments returned by the MIS Directors:

"I like the recommendations, especially the one for the technical resource coordinator in the schools" Jefferson

"I do believe the DOE should offer assistance to the educational entities. This assistance should go toward establishing statewide practice standards for schools. One specific area where the DOE could assist us is in the area of overall security". Seminole

"We have found that the classroom projection capability is very useful to us and favored by teachers. This is an excellent return on investment initiative, more so than each student having a computer." Leon

"We support the document. We would hope that the criticisms bring about policy and funding to improve." Monroe

"The projection device and computer in every classroom is a good idea. Teachers have limited time to devote to incorporating these technologies into their style, and this would be a big help them." Hernando

"We agree with your conclusions, but would add to bullet 3 "and support" after "preparation". (Note: this suggested change has been applied) **We support recommendation #1. We are currently including classroom projection devices in our instructional technology projects for teacher's instruction…Our two biggest challenges continue to be dealing with adequate time for technology training and technology support at school centers."** Palm Beach

"The report captures the major issues and identifies the critical barriers – the need for on-site support and teacher training" Hillsborough

"I strongly agree that concentrating on improving use of existing resources is better than striving for a 1:1 ratio…The number one complaint I hear from schools is the lack of adequate technical support. Recommendation five is critical to any statewide plan…I also endorse the concept of the Department of Education taking a leadership role in developing standards for instructional technology usage and professional development." Dade