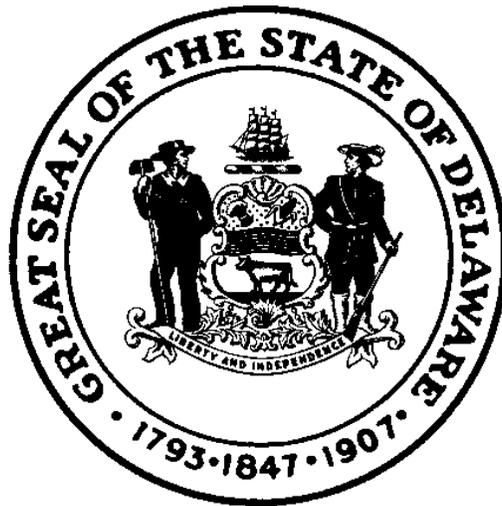


# **DELAWARE CENTER FOR EDUCATIONAL TECHNOLOGY**

## **STRATEGIC PLAN FY2003 – FY2005**

**SEPTEMBER 2001**



**STATE OF DELAWARE**

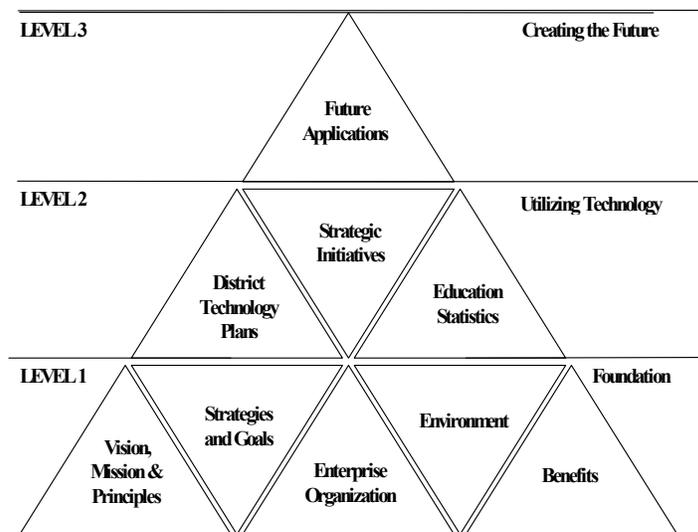
# FOREWORD

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## Structure of the Plan

This strategic plan for the Delaware Center for Educational Technology (DCET) has been compiled in a format consistent with the Delaware Office of Information System's strategic plan in order to facilitate collaborative planning efforts. This plan follows the information Technology System model emphasizing three levels of planning and analysis: Foundation, Utilizing Technology, and Creating the Future.

### Information Technology System Model



## Objectives

The Delaware Center for Educational Technology's Strategic Plan is designed to be a living, strategic document that will be updated continuously. The objectives are to:

- Develop, define and communicate long-term goals for the use of educational technology.
- Provide input to the annual budget process.
- Promote cooperation among school districts and state agencies.
- Identify, prioritize and highlight strategic initiatives.

# ACKNOWLEDGEMENTS

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## Visionary Leadership

**Honorable Ruth Ann Minner**

**Governor, State of Delaware**

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## DCET Board of Directors

**John Carney**

**Chairperson, Secretary of Finance**

**Jennifer Davis**

**Associate Secretary of Education**

**Henry Decker**

**Director of Computer Services, Delaware Technical & Comm. College**

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**Superintendent, Delmar School District**

**Lorayne Titter**

**Teacher, Baltz Elementary School (Red Clay)**

**Geri Williams**

**Teacher, Rehoboth Elementary School (Cape Henlopen)**

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**Consultant, Technology Technician**

# EXECUTIVE SUMMARY

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## Introduction

**“If we deny our children the basic tools of a knowledge-based economy, we will be less able to attract high-paying, quality jobs to Delaware and less likely to keep those that we have. The simple fact is that students graduating from high school today who do not know how to use technology are immediately disadvantaged whether they enter the world of work or go on to higher education.”**

**Governor Thomas R. Carper**

*speaking before the Delaware Educational Technology Committee,  
September 30, 1994*

There is a national consensus that public education needs to be reformed systemically. There is a sense of urgency and agreement that there are no quick fixes. However, there is one common denominator among the many ideas being debated: *technology must play a major role in the movement to improve education*. Just as technology has enhanced our nation’s business competitiveness in a global context during the past decade, technology holds the promise of turning our classrooms into world-class learning places of the 21<sup>st</sup> century.

The State of Delaware is uniquely qualified to use technology to ensure high standards of education and prepare the workforce of the future. Our state’s size is an asset. It facilitates easy access to government officials and successful partnerships among the public, private and independent sectors. Delaware offers an ideal environment within which to effect systemic education reform through the use of educational technology.

This strategic plan is a framework for the technological transformation of public education in Delaware and achievement of the vision: *The First State in Education: Every Classroom, Every Teacher, Every Child*.

In a very short period of time, Delaware has leaped from being technology poor in education to building a solid foundation for growth in educational technology.

The classroom networking project, or as most refer to as the wiring project, was drawn to a successful completion in October 1998. Every public school classroom was wired with voice, data, coaxial, and fiber optics cable with at least one data port fully connected to the Delaware Education Network (DEN) and the Internet.

The efforts of the Delaware Center for Educational Technology have been recognized nationally, as DCET has received a Computerworld Smithsonian Award for the Classroom Networking Project. The project is part of the 1998 Information Technology

Innovation Collection that was formally presented to the Smithsonian Institution on April 6, 1998. The case study on the project and associated support material are part of the Smithsonian Institution's Permanent Research Collection on Information Technology at the National Museum of American History.

These accomplishments should not be taken lightly. DCET completed a large-scale, state government project, *on-time and within budget*, that made Delaware the first state in the nation to have Internet and wide-area network access in every public school classroom.

Since the completion of the wiring project, DCET has implemented the Server and Infrastructure Enhancement Project and the CATV / Video Broadcast Project. The Server and Infrastructure Enhancement Project has allowed the DCET to purchase the servers for the statewide pupil accounting system, ensure an instructional server in every school, and begin to upgrade the LAN electronics in the schools. The CATV / Video Broadcast Project is ensuring the schools can broadcast a cable television and multiple video signals to every classroom. In addition, the Legislature has provided funding to the districts for classroom technology and maintenance/support.

Delaware has made a tremendous commitment to make technology an important tool in the classroom. Working together, we have put in place the roadbed for connecting Delaware public schools to the information highway. We are very appreciative of the encouragement and support that we have received to date!

The next phases of our project are the most challenging and important for the success of the entire initiative. These phases entail acquiring and putting in place the operational resources to achieve and nurture the full potential of the Information Highway in our classrooms.

We are off to a solid start. The classroom technology funding has allowed the districts over the past two years to more than double the number of computers in the schools to over 30,000. During the 2000-2001 school year, 98% of the classrooms in the state had a computer located in the classroom and 96% of the classrooms had a computer connected to the Internet. The Technology Block Grant is providing funding to the district to address maintenance and support needs. We have put into place a maintenance and support initiative for the statewide wire and electronics, and have provided educators with access to the network from remote sites. We will continue to set priorities and incrementally implement this Strategic Plan.

## **Background**

The Delaware Center for Educational Technology was formed as a result of recommendations made by the Educational Technology Committee (established in 1994 by House Joint Resolution No. 27) in a report titled *Educational Technology: A Report to the Governor, Legislature, and Citizens of Delaware* dated February 1995.

In the spring of 1995, the Delaware Legislature accepted the recommendation of Governor Thomas R. Carper to establish the Delaware Center for Educational Technology (DCET). The Center is intended to create a modern educational technology infrastructure in Delaware's public schools for the purpose of enabling students, through the use of educational technology to meet the academic standards set by the State Board of Education and to develop the skills needed by a world-class work force.

## **Board of Directors**

The Delaware Center for Educational Technology is governed by a ten-member Board consisting of three members who have expertise in the field of computer information, three public school superintendents, two public school teachers, the Secretary of Education or designee, and the Executive Director of the Office of Information Systems. The State Librarian, Budget Director, Controller General, Secretary of Finance or their designees, and one representative designated by each of the Presidents of the three Delaware public institutions of higher education, are ex-officio, non-voting members of the Board.

## **Vision**

The **vision** of the Delaware Center for Educational Technology is to help Delaware become ***The First State In Education: Every Classroom, Every Teacher, Every Child.***

Our vision reflects our absolute commitment to the principle of equity: ensuring every teacher and child, in each of our public schools and classrooms is provided with an equal opportunity to utilize technology in the educational process. This vision also reflects our fundamental belief that technology in education is critical to the creation of a competitive 21<sup>st</sup> century workforce and that a competitive workforce is a major contributing factor to strengthening and maintaining Delaware's economic viability.

## **Mission**

The **mission** of the Delaware Center for Educational Technology is to **help empower children, through the use of information technology, to achieve higher standards in education.**

All of our efforts are dedicated to achieving this mission.

- *Children* are the future. Although DCET will target various programs to support others, the ultimate goal is empowerment of our children.
- DCET is focused on the use of *information and technology* in education as the primary means to achieve this mission. We recognize that other factors may also be involved, but our efforts will remain centered on the value of technology.
- Our success will be measured by the abilities of Delaware students to *achieve higher educational standards*. We recognize that assessments are controversial and that there are other metrics to be considered, but we believe

that if a student is able to accomplish more and learn better, while using technology as an enabler, then we will have accomplished our mission.

## Principles

*Guidance for Expenditures from the 21<sup>st</sup> Century Fund:*

- Fund long-term capital investments.
- Utilize existing funding structures so as not to create additional bureaucracy.
- Leverage monies to maximize private and public sector leadership and investment.
- Establish clear guidelines for the expenditure of funds and incorporate these into the State's long range strategic planning.

There are six fundamental principles that will drive our efforts:

- We will be *standards* driven.

Standards are critical because education will never be able to afford the resources to allow an undetermined number of solutions to proliferate throughout the state. We will standardize on elements when standardization provides benefits in support, cost and/or maintenance. Where a standard is not a requirement, we will explicitly describe the exception.

- *Manageability* will be considered in all decisions.

With few resources available, management of technology needs to occur wherever the expertise can most efficiently be provided. In the State of Delaware Education Network (DEN), we will operate with both a centralized and distributed model. For example, appropriate, simple to use, network management tools will be provided at the school, District, Center for Educational Technology and the State Office of Information Systems levels. We will not create additional bureaucracy or manage activities based on "turf." We will leverage expertise wherever it is available.

- Everything we do must be easily *scalable*.

Education in Delaware will continue to grow. Recent projections in the State show an average growth rate of 2% per year, thus guaranteeing additional students and continuing to drive the need for more buildings and teachers. We will operate under a general principal of installing only what is necessary to operate with today, but providing for easy, rapid, modular growth.

- We will only implement what we can *afford*.

One can easily be fooled into believing that the initial \$30M in funding will cover the cost of educational technology. However, the real costs are recognized to be 3 to 4 times this initial investment. The most critical cost issues beyond the infrastructure

are hardware/software procurement, maintenance/support, and professional development. We must be fiscally prudent in our design, implementation, and procurement. We will always focus on the most cost-effective solution, balanced with other appropriate criteria.

- We will always plan for *migration*.

In technology, nothing is certain, other than the fact that the technology will change and it will do so rapidly. Given this simple fact, everything we do will be designed for modular replacement and easy migration paths to higher speeds, different networking protocols or different vendors.

- We will ensure each school is treated *equitably*.

As with many aspects of our society, there are the technology *haves* and *have-nots*. Access to technology in schools is often dependent on District leadership, taxes, and referendums. DCET is committed to ensuring that equal capability is provided to every school.<sup>1</sup>

## Strategies

### Six Strategies

- Ensure voice, data and video connectivity to every public school classroom.
- Coordinate the evaluation and implementation of educational technology and administrative applications.
- Provide for support of the infrastructure.
- Develop public and private educational technology initiatives and partnerships.
- Ensure integration of technology and curriculum.
- Provide for professional development.

To achieve its mission, DCET has adopted the following six strategies:

- *Ensure voice, data and video connectivity to every public school classroom.*

October 1998 marked the completion of a statewide education data network connecting each of the state's 7000 classrooms. We have prepared each classroom for

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<sup>1</sup> Definition of equity: adopted by the DCET Board on February 29, 1996.

The Delaware Center for Educational Technology is committed to the principle of equity. At this stage of our efforts, we will focus on providing equity of opportunity to access technology through the wiring of all schools. We will provide every public school, every classroom, and every student the opportunity to participate. The intent is to provide a "level playing field" for all schools.

To the extent possible, and within the resources available, we will assist in providing equitable access to computer resources. Schools will be individually accountable for how well they make technology available and for how well they utilize technology.

future applications of video and voice technology by providing a basic cabling infrastructure including coaxial cable and fiber optics.

- *Coordinate the evaluation and implementation of educational technology and administrative applications.*

We will establish statewide evaluation, purchasing and licensing procedures to ensure purchased software is supportive of the state's educational standards and is provided in the most cost-effective manner. We will work with other state agencies to define business processes within education, simplify these processes and automate processes only when the value can be clearly articulated.

- *Provide for support of the infrastructure.*

We will work with schools, districts, and state agencies, such as, the Office of Information Systems to clearly define the necessary support requirements for educational technology. We will be customer focused and maintain a sense of urgency and priority in everything we do, recognizing that in technology there will never be enough time or money to meet everyone's desires.

- *Develop public and private educational technology initiatives and partnerships.*

We will leverage the resources and experience of any organization that can contribute to our mission. We will explore and develop creative partnerships to help address the need for hardware, software and technical resources in our schools.

- *Ensure integration of technology and curriculum.*

We will foster and encourage the use of technology as an integral part of the school curriculum. Technology is not a panacea and does not stand alone. Technology is a tool, like many other tools, that is best utilized with a specific purpose in mind. Our goal is to ensure that teachers have access to and can use the technology tool(s) that is right for the job.

- *Provide for professional development.*

DCET will provide guidance and help set expectations for the types of technology skills that are necessary; provide access to new technologies for evaluation purposes; assist districts in planning for and partially funding educational technology professional development; and ensure that technology professionals in schools and districts are appropriately trained. We will utilize a process that ensures clear accountability and specific roles for DCET and the school or district.

## **Goals**

The State of Delaware has taken a giant step forward by building a world-class

infrastructure for our schools, providing the resources to ensure a computer in every classroom, and providing maintenance and support resources. We will continue this effort by building upon the infrastructure with additional services and applications.

1. Increase instructional server capacity in all schools
2. Provide for maintenance and support of the enterprise, both statewide and locally
3. Upgrade/enhance the infrastructure to meet current demands
4. Ongoing Professional Development so 80% of educators are comfortable with and using technology as part of their curriculum
5. Single state-wide network operating system

## **Conclusion**

Delaware has made a tremendous commitment to turn our classrooms into learning places of the future. We are off to a good start with the success of the classroom networking project, the funding source for classroom technology, and the maintenance and support initiative. There is practically no limit to what we can do technologically.

*There was consensus that beyond the initial infrastructure efforts, statewide commitments toward hardware/software procurement, maintenance/support, and professional development were a necessity.*

We have begun to address these issues with the support of the Legislature committing \$20.0M for classroom technology (\$13.0M state and \$7.0M local) and an annual appropriation for the Technology Block Grant of \$1.0M for maintenance and support.

We will face many challenges over the next three to five years prioritizing and committing resources. We are pleased with the recent commitments to hardware/software procurement, and maintenance and support. We know professional development needs to be in the forefront. This strategic plan is dedicated to identifying the most important challenges and suggesting strategies to help address them.

Most importantly, this strategic plan will be used to manage expectations. Much is possible, but little can be accomplished without identifying and following a plan.

**DELAWARE CENTER FOR EDUCATIONAL TECHNOLOGY**

**Our vision is to help Delaware become the**

**First State in Education: Every Classroom, Every Teacher, Every Child.**

**Our mission is to help**

**empower children,  
through the use of information technology,  
to achieve higher standards in education.**

As a CENTER, we organize our efforts according to the following concepts:

- Community - parents, teachers, & students as customers
- Equity - technology access, regardless of location
- Networking - collaboration beyond school or district
- Teachers - facilitate a changing role in the classroom
- Education - encourage passion & skills to support life-long learning
- Results - higher standards produce better employees & citizens

**We will follow these principles,**

- We will be *standards* driven.
- *Manageability* will be considered in all decisions.
- Everything we do must be easily *scalable*.
- We will only implement what we can *afford*.
- We will always plan for *migration*.
- We will ensure each school is treated *equitably*.

**and utilize these strategies,**

- Ensure voice, data and video *connectivity* to every public school classroom.
- Coordinate the evaluation and implementation of educational technology and administrative *applications*.
- Provide for *support* of the infrastructure.
- Develop public and private educational technology initiatives and *partnerships*.
- Ensure *integration* of technology and curriculum.
- Provide for *professional development*.

**to accomplish the following goals.**

- Increase instructional server capacity in all schools
- Provide for maintenance and support of the enterprise, both statewide and locally
- Upgrade the infrastructure to meet current demands
- Ongoing Professional Development so 80% of educators are comfortable with and using technology as part of their curriculum
- Single state-wide network operating system

**To meet our goals, we will successfully complete these 25 initiatives over the next 3-5 years ➡**

**Staff Development & Technology Utilization**

- Process
- Access
- Integration
- Productivity
- Resources
- Communication

**Infrastructure**

- Improvement
- Web Services
- Distance Education
- Electronic Mail
- Dial-in Access

**Information Retrieval**

- Media Specialists
- Automate School Library/Media Collections
- Subscription Services
- IPAC

**Operations**

- Support Infrastructure
- Help Desk
- Regional Centers

**Educational Technology Management**

- Building Plans
- Needs Assessment
- Partners in Education
- Grantsmanship
- Internet, Copyright & Filtering Policies
- Purchasing Policy
- Technology Survey

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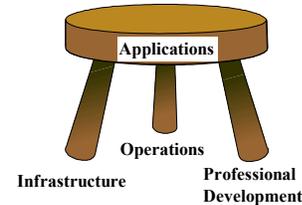
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# PLANNING PROCESS

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## Collaboration

- Staff Development & Technology Utilization
- Infrastructure
- Information Retrieval
- Operations
- Educational Technology Management



The Delaware Center for Educational Technology is a very small organization with an awesome responsibility. Decisions made by or on behalf of DCET have the potential to impact every student, teacher and administrator in Delaware! That is one reason why DCET's planning process has been defined to be lengthy, collaborative and has involved hundreds of people representing all of our major constituencies.

Many influential and informed leaders have provided input into the strategic plan. Throughout the planning process, five (5) critical areas emerged: Staff Development and Technology Utilization, Information Retrieval, Infrastructure, Operations, and Educational Technology Management.

In addition to focusing on the 5 critical areas mentioned above, this plan has been written to correlate with the OIS Information Technology System planning triangle including: Foundation, Utilizing Technology, and Creating the Future.

## Foundation

In a very short period of time, Delaware has leaped from being technology poor in education to building a foundation for growth. So far, Delaware has committed some excellent leadership and funding for a world-class infrastructure (Wiring Project, Server and Infrastructure Enhancement Project), hardware/software procurement (Classroom Technology), maintenance/support (Technology Block Grant), but we are still struggling with the challenges of statewide professional development initiatives and keeping up with current technology to meet the demands of the education community.

The major portion of this strategic plan discusses initiatives to help build a stronger foundation.

## Utilizing Technology

When DCET discusses technology initiatives with business managers, the first questions they ask are: "What are you going to use the technology for? What critical

information is being provided? What business process has been analyzed and is being simplified?"

Sometimes we don't have an answer. Some districts have done an excellent job of planning how to utilize technology but that is often the exception rather than the rule.

Many of our strategic initiatives are focused on professional development (facilities, tools and training) to help our teachers use information technology effectively in the classroom.

Although it is clear and demonstrable that technology in the classroom truly does improve learning, we are also cognizant of the fact that technology can be used to improve administrative processes. Classroom tools, student profiles, standard student transcripts, improved and standardized financial reporting are all administrative applications that can improve efficiency.

## **Creating the Future**

Technology tools (hardware and software) are changing at an ever-increasing rate. Product life-cycles for personal computers are now less than three years. Major breakthroughs in communications, Internet and intranet services, and handheld devices are occurring every six to nine months.

It would be foolhardy to say that education should stay on the leading edge of technology. We could never afford the resources to do so. Likewise, it is equally foolhardy to say that all we need is paper, chalk and stand-alone personal computers. Our challenge will be in choosing those aspects of technology which we should invest in and those which would be nice to have but which we must choose to forgo.

DCET will emphasize improved Internet access, intranet services, multimedia distribution, educated decision-making, proper uses of technology, cost effective alternatives, and database technology initiatives over the next three to five years.

## **Scope**

The scope for each of the 5 critical areas is described below:

### **Staff Development and Technology Utilization**

The vision of the Staff Development and Technology Utilization (SDTU) subcommittee is that every staff member in each school will be able to utilize technology effectively as an essential tool to promote student learning and to assist students in meeting the state's academic content standards.

The scope encompasses examination of the instructional impact of technology; curriculum integration and development; education applications/software (development, acquisitions, upgrades); and staff development.

Technology is a potentially powerful educational tool but not a panacea for the myriad challenges of education. Moreover, the value of that tool depends upon its effective utilization in the promotion of student learning, not its innate technical features. In this context, it is expected that staff development is and will continue to be an on-going requirement for effective use of technology in Delaware schools. The support system for staff development needs to be institutionalized within the general structure of our state educational community in order that a strengthened technological infrastructure for our schools can be used effectively. It is also expected that effective staff development must involve a variety of providers and paths, as well as technical support at the school level and support to enable teachers and other staff to take advantage of staff development programs on a continuing basis.

### **Infrastructure**

The goal within the Infrastructure area is to ensure a minimal level of uniform and comprehensive technology to create an effective and efficient educational network. The scope includes communication tools (e-mail, discussion databases, groupware), networks (management, servers, hubs, wire and cable), and standards (hardware, software).

### **Information Retrieval**

The vision of Information Retrieval is to expand, evaluate and consolidate the current information services provided by the state and to create a shared information retrieval offering that ensures students, parents, and educators have equitable access to and use of quality information resources independent of location.

The creation of a shared information infrastructure for the school community of Delaware is a new concept and a significant challenge, but has the potential to have a high payback. A shared information retrieval system includes access to: instructional and administrative databases (e.g. instructional management and pupil accounting.); CD-ROMS, subscription services (e.g. Encyclopedia Britannica Online, Scholastic Network, etc.); the Internet; interactive professional development; electronic mail; and multimedia applications (e.g. satellite programming, public television, VHS tapes, laserdisc, etc.).

### **Operations**

Operations deal primarily with the issues of staffing, planning/funding, and models for centralized vs. distributed support.

### **Educational Technology Management**

The vision for Educational Technology Management is that DCET will become the educational technology focal point for development of statewide policies; management of statewide initiatives; resolution of issues; and large-scale acquisition of technology for school districts. The scope includes purchasing, policy, allocation of resources, and planning.

# **ENTERPRISE ORGANIZATION**

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## **Preface**

The Delaware Center for Educational Technology is somewhat unique. Educational technology impacts a wide number of constituencies across the state. To help ensure DCET's success and provide an opportunity for DCET to move rapidly, while representing all of the various constituencies, DCET was established as an independent state agency. The primary accountability for DCET rests with the Board of Directors, whose members are identified in the Delaware Code with the Governor appointing business representatives and the chairperson. The Board was carefully designed to ensure that all major constituent groups were represented.

DCET is intentionally sparsely staffed. The theory of this design is that DCET should seek first to develop partnerships and leverage existing resources and as a last resort, add staff.

## **Organization Guiding Concepts**

The Delaware Center for Educational Technology (DCET) is designed to facilitate and broker educational technology resources while representing a broad number of constituent groups. It is a Center or focal point for educational technology. As a Center, DCET works with these guiding concepts:

<b>Community</b>	- parents, teachers, & students as customers
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<b>Equity</b>	- technology access, regardless of location
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<b>Networking</b>	- collaboration beyond school or district
-------------------	---

<b>Teachers</b>	- facilitate a changing role in the classroom
-----------------	---

<b>Education</b>	- encourage passion & skills for lifelong learning
------------------	--

<b>Results</b>	- higher standards yield better employees/citizens
----------------	--

## Key Stakeholders

### *Service Providers include:*

- Department of Technology and Information / Office of Information Systems
- Department of Education
- NCC Data Service Center
- District Technology Coordinators
- School Technology Coordinators
- University of Delaware
- Delaware Technical & Community College
- Delaware State University
- State Division of Libraries
- School Library Media Specialists
- Vendors

### *Customer Groups include:*

- School Chiefs (District Superintendents)
- Delaware Association of School Administrators [DASA]
- Delaware State Education Association [DSEA]
- Delaware School Library Media Association [DSLMA]
- Governor's Task Force on School Libraries
- Parent Teacher Organizations [PTO / PTA]
- Administrators, Faculty, and Staff
- Students
- OIS Advisory Committee

## Board of Directors

The Board of Directors consists of 16 members: 10 voting members and 6 ex-officio, non-voting members. Voting members include: three Superintendents (representing New Castle County, Kent County, and Sussex County), Secretary of Education (or designee), two teachers, OIS Executive Director, and three business representatives. Ex-officio, non-voting members include: Secretary of Finance, Controller General, Budget Director, Delaware State University Representative, University of Delaware Representative, and State Librarian.

- ◆ The Board of Directors has oversight responsibility for the Delaware Center for Educational Technology (DCET). Oversight is defined as:
  - ◆ operating as a resource to DCET and the Executive Director
  - ◆ consensus on the DCET strategic plan
  - ◆ consensus on all continued funding requests
  - ◆ consensus on DCET permanent staffing levels and role descriptions
  - ◆ consensus regarding legislation/policy
  - ◆ development of shared expectations and evaluation of performance of the staff against those expectations

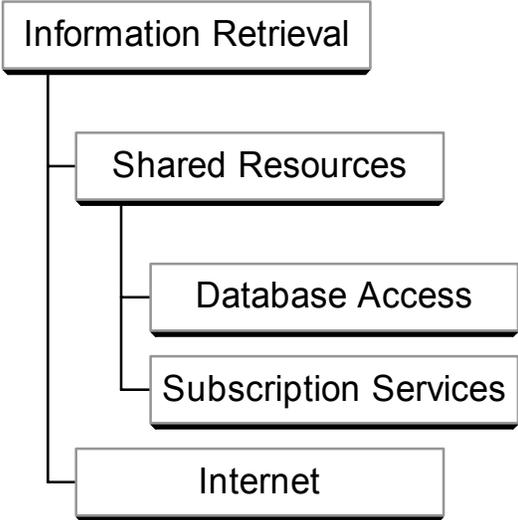
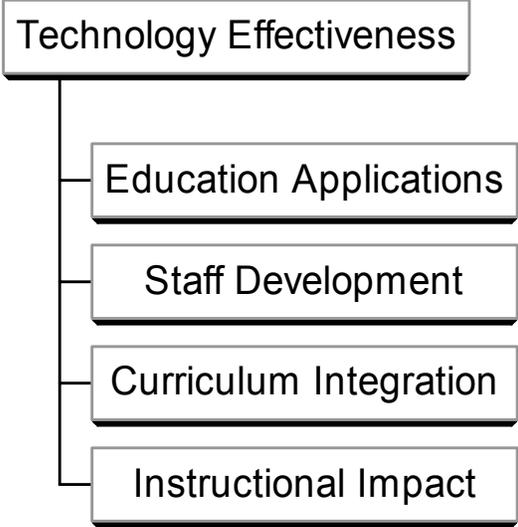
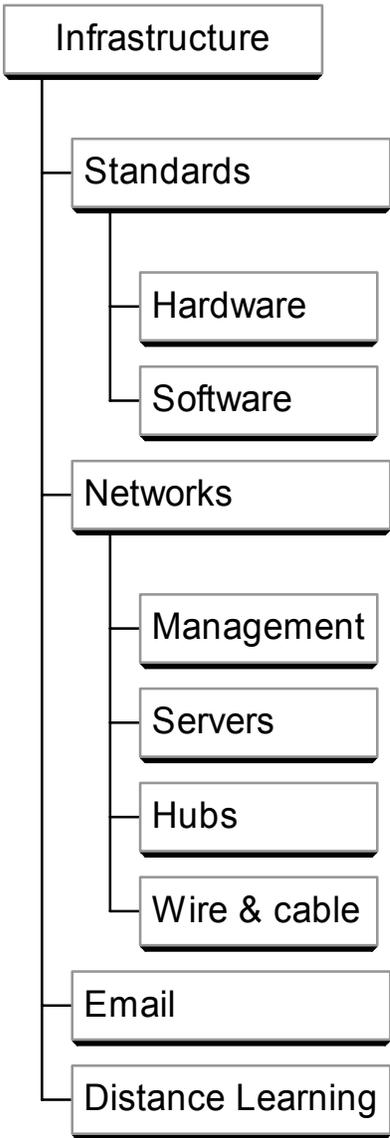
- ◆ input on major tactical/operational decisions
- ◆ promulgation of policy
- ◆ approval of bid contracts which are valued at greater than \$100,000
- ◆ The primary accountability and responsibility for all operational activities of DCET rest with the Executive Director. The Board intends to provide the Executive Director with freedom to manage and administer the Center.
- ◆ The Executive Director will seek guidance from the Board when necessary.
- ◆ The Executive Director is authorized to apply for grants on behalf of DCET and will report such applications to the Board.

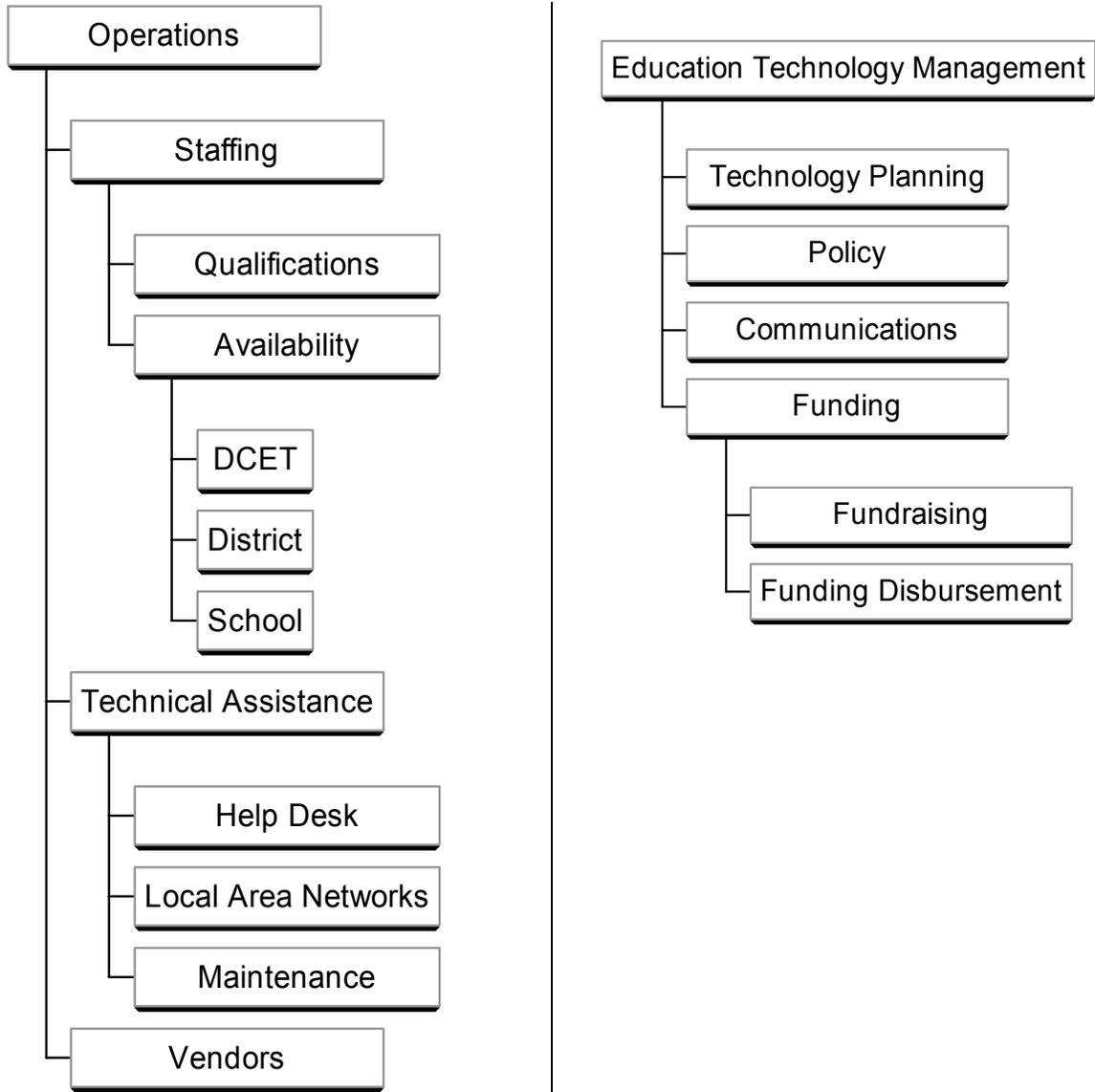
## **Organization**

DCET is a small organization that relies heavily on others to assist in accomplishing its mission. DCET will need to grow in order to be successful. The current organization has seven positions: Executive Director; Administrative Secretary; Consultant, Special Projects; Consultant, Instructional Technology; Consultant, Technical Support; and two Consultant, Technology Technician.

## **Functional Organization**

Functionally, DCET is accountable for a wide variety of tasks in support of educational technology. Although other individuals and organizations may be responsible to provide the actual services, DCET is accountable for: infrastructure, technology effectiveness, information retrieval, operations, and educational technology management.





## **Infrastructure Responsibilities**

The state Office of Telecommunications Technologies (OTT) and the Delaware Center for Educational Technology are jointly responsible for the wide area network.

**OTT** is specifically responsible to:

- design, provision, test and maintain wide area network connections
- design, provision, test and maintain wide area network routers and access lists
- design, provision, test and maintain statewide Internet services
- assign and manage IP addresses
- design, implement and maintain the state education firewall, proxy servers, FTP server, world wide web server, and email server
- design, implement and maintain filtering software
- adjust or modify WAN services to meet educational needs such as Lotus Notes replication servers, access to subscription services etc.
- proactively manage and troubleshoot the wide area network with appropriate network management tools
- design, provision, implement and manage remote access services

**DCET** is responsible specifically for wiring, hubs and servers, to include:

- design, provision, test and maintain internal wiring
- design, provision, test and maintain ethernet switches and hubs (in the backbone)
- design, provision, implement and manage critical wide area network and intranet servers
- proactively manage and troubleshoot the wide area network with appropriate network management tools
- train school and district technical support staff

# **ENTERPRISE TECHNICAL ENVIRONMENT**

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## **Preface**

An understanding of the current state of the entire Delaware Education Network (DEN) is essential to the planning process. Multiple organizations contribute to the operation and use of the DEN: the Office of Information Services, the Office of Telecommunication Technologies, the Department of Education, the Delaware Center for Educational Technology, and all school districts including charter schools. However, because of the dispersed and decentralized nature of Delaware's 19 school districts, the current state of educational technology is constantly changing and at times is difficult to grasp. Since the creation of the Delaware Center for Educational Technology, educational technology has advanced at a rapid pace and our knowledge base has improved.

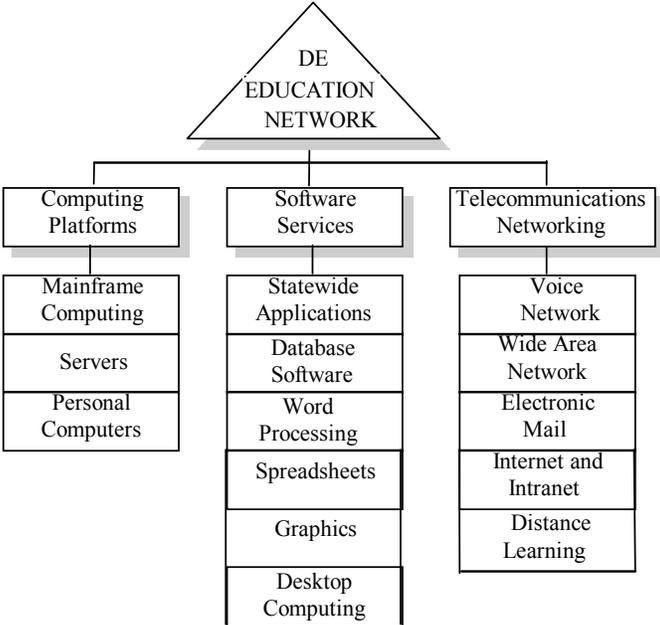
We have taken an "enterprise" approach to the management and expansion of the Delaware Education Network. Wherever we can find appropriate, cost-effective resources that add value to education, they are incorporated into the overall enterprise. Rather than recreate services, we attempt to partner with other groups and agencies using a service-level approach to describe customer expectations and agree on costs and accountability. This service level approach helps ensure that resources are applied where the customer has the most value and assists in avoiding duplicative or redundant services.

Describing all the components of the DEN is monumental, but as part of the Long-term Maintenance and Support of the Statewide Education Telecommunications Network Report from December 1999, a comprehensive description of the DEN has been written.

In recent years, our knowledge base has improved. We will continue yearly evaluations and assessments. With respect to the Enterprise Technical Environment, we will address:

- computing platforms,
- software services, and
- telecommunications networking.

**ENTERPRISE TECHNICAL ENVIRONMENT**



**Computing Platforms**

Large, statewide applications are run on the State of Delaware mainframe. Education uses some of these mainframe applications, predominantly those that provide financial or human resources information. New Castle County also uses mainframe applications written and supported by the Data Service Center. Most other applications in education are server-based or stand-alone personal computer applications.

Personal computers are utilized for client-centered tasks, some work-group services, and office tasks such as word processing, spreadsheets, electronic mail, terminal emulation, and small data-management tasks.

**Mainframe Computing**

DCET does not own or manage mainframe computing resources. Education uses some mainframe applications managed by the Office of Information Systems and others managed by the Data Service Center.

The New Castle County Data Service Center (DSC) runs a DEC data center and manages numerous applications for the Brandywine, Christina, Colonial and Red Clay districts. The DSC is responsible for:

- student and administrative records,
- some training, and
- some 2000+ programs for batch and custom report generation.

Data Service Center applications include:

- student applications such as: student accounting, grade reporting, transportation, attendance, test scores, free lunch/food service, etc.,
- administrative applications such as: personnel/payroll, attendance, finance, petty cash, food service and purchasing, etc.,
- planning and evaluation applications such as: district reporting, court reports, enrollment projections, annual unit count, etc., and
- central bidding applications such as: vendor lists, vendor awards, user orders, etc.

### **Mid-tier Computer Systems**

Statewide standards, policies, and support for mid-tier computer systems are being developed by the Office of Information Systems and the IRM Committee. Education has been partially represented (through the Department of Education and the Data Service Center) in the development of these standards.

In some cases, education needs will be unique and will require separate standards. Education recognizes that standards are vital for connectivity and reduced maintenance costs and will always endeavor to ensure compatibility between state and education standards.

Specifically, all servers must be Network Operating System (NOS) certified. Banyan-Vines is the preferred file server in state agencies. Within the education community, Banyan Vines servers are only used in the Data Service Center and in the schools that the Data Service Center supports directly. Currently, the installed base of servers in education is split between Novell Netware and Windows NT.

The general direction for the state and for education has been to migrate to one statewide network operating system that supports open standards identified by OIS. DCET had identified Windows NT as the network operating system of choice, but Microsoft is currently in the process of releasing their new network operating system, Windows 2000. Windows 2000 will eventually replace Windows NT. In the interim, we will continue to support network operating systems that support open standards. When Windows 2000 is released, an evaluation will be conducted to determine the future network operating system of choice.

In limited instances, education may use a Sun or HP platform for an enterprise-wide application server. In any instance where this occurs, support will be provided by and negotiated with the Office of Information Systems.

The Office of Telecommunications Technologies owns the name server for the State and thus assigns names for the servers that education connects.

Finally, the Department of Education runs a micro-Vax. Over time, the functionality of this computer will be replaced by more powerful servers.

## Personal Computers

There is an installed base of approximately 35,000 personal computers statewide. Most of these computers are multimedia computers and connected to the Internet. In fact, 99% of the classrooms statewide have at least one computer connected to the Internet.

Generally the State and education standard for PCs is IBM or IBM compatible. If the PC is to be used as a client in a client/server environment, it should be a Pentium class. Districts should buy the industry-recognized top manufacturers' machines only -- for example, Compaq, Dell, or IBM.

Some districts bid large PC purchases and installed off-brand computers that appeared to be significantly cheaper. Industry experience has proven that the acquisition cost is only a fraction of the total life-cycle cost of the computer. Unless a district can guarantee ongoing maintenance, support and upgrades as a part of their purchasing process, they should generally avoid off-brand machines.

Education has a large installed base of Apple Macintosh computers. Historically, Apple has been the predominant player in education and had better educational software, particularly for younger children. Arguably, an advantage of Apple computers is in maintaining a simpler, possibly easier to support environment within a school.

The most important factor in a Macintosh vs. PC decision will continue to be the ability of the specific platform to run the specified application. Standards drive curriculum and curriculum drives educational applications which then drives the choice of platform. Schools should carefully scrutinize their purchases and ensure that whatever platform they purchase best meets their curriculum and application needs.

PCs will often be linked to client/server applications, and the following recommendations apply to such applications.

### OIS Client/Server Constraints

The server operating environment should be Windows NT 4.0 / Windows 2000
The client operating environment should preferably be Microsoft.
Database access languages: ODBC SQL
Client/Server development tools should be object-oriented (Visual Basic, C++)
TCP/IP is the protocol.
The Network Operating System should be Microsoft NT / Windows 2000
The Desktop Operating System will eventually be NT Client / 2000 Pro, however, today Microsoft Windows 95, Windows 98, and Macintosh System 7.1 or higher are acceptable.

## **Enterprise Software Services**

The State has several examples of enterprise software systems, and the emphasis on enterprise-wide solutions has been demonstrated by the cooperative efforts put forth by OIS and other agencies in the development of the IMS Project, which will link State agencies into one massive financial/management information network.

## **Statewide Applications**

Several large, statewide applications exist to support education. These systems provide centralized functions for purchasing and personnel on the mainframe. In addition, an education specific application is the statewide pupil accounting system being implemented by DOE.

## **Database Software**

Data sharing and a common data design and dictionary will become increasingly important as education begins to develop statewide applications. Guidelines for database software will be developed in the future as application needs become better defined.

## **Word Processing**

Microsoft Word is the preferred application, and is included in the MS Office suite of office-automation programs, which DCET recommends. Many education users still use and prefer WordPerfect, but when appropriate the direction should be to Word.

## **Spreadsheets**

Lotus 1-2-3 and MS Excel are both used in education, but DCET recommends Excel due to its availability in the MS Office suite and its easy compatibility with MS Windows applications.

## **Graphics**

DCET recommends MS Powerpoint, especially as a tool for making charts and graphs, as well as slide-show presentations. Powerpoint is an excellent tool for in-classroom presentations. Powerpoint is a part of MS Office.

**Microsoft Office Professional** is a suite of products that includes Microsoft Word, Excel, Powerpoint, and Access. With the educational discount, this package is the best all-around value for either the Apple or PC platform.

## **Integrated Desktop Computing Services**

Some education administrators utilize desktop application software packages that allow

individuals to communicate and exchange information and documents with each other. Examples of this are Novell's Groupwise and Lotus Notes.

Standards for desktop computing services and products are being developed, as use of standard products facilitates the exchange of documents, data, and information, and facilitates the training of employees. There are no specific recommendations at this time.

### **Library Automation Software**

There are many types of library automation software packages in use today. According to a 1993 survey, the two most used automation software packages are those by Follett and Winnebago. The software package chosen is not important if the database follows the Z39 American National Standards as developed by the National Information Standards Organization (NISO) for libraries, information science and publishing. If these guidelines are not followed, schools would be prevented from sharing resources between schools, the State Library system and the University Library.

The Delaware Standards for School Library Media Centers, April 1996, page 7 suggests that "the school library should be automated and linked through an integrated library information system. This system should support:

- a. a comprehensive listing of school library resources in Delaware
- b. public remote access to the catalog
- c. Z39.50 connection with Delaware's public and academic integrated library information systems
- d. TCP/IP based network communications, and
- e. gateway access to library and information resources available via the Internet."

### **Telecommunications Networks**

The State of Delaware, Office of Information Systems, Office of Telecommunications Technologies provides voice and data communications for the educational institutions throughout the state.

This "enterprise" network is one of Delaware's greatest information technology strengths, as substantial savings can be realized through the economies of scale of managing a few networks for the entire state.

Education, today, participates in three separate networks, which will be discussed in more detail below:

- Data Communications Network
- Voice Communications Network
- Distance Learning Network

As education begins to re-engineer work processes, the advantages of information and data sharing will become clear, thus driving new applications. The enterprise network

must be proactive in devising strategies for interfacing heterogeneous databases. OIS continues to help develop and support upgrades and expansions to handle the increased network traffic, and is developing more specific and useful network policies and standards (in conjunction with the IRM Committee).

## **Data Communications Network**

Education users are aggressively supplementing legacy systems and applications with solutions based on personal computers (PCs) and Local Area Networks (LANs). Most school Districts already have some type of LAN, and there are current initiatives to expand LANs to every school. Growth is explosive as networking has reached every classroom.

OTT began to build a statewide TCP/IP multi-protocol digital network in 1992. Each of our 180 schools currently participates in the Delaware Education Network with high speed (T-1) connections to a statewide TCP/IP Wide Area Network (WAN). These connections allow for:

- Network based services such as Internet access, e-mail gateways, security, and Web Services both internally and between internal and external users;
- Future development of client/server-based applications; and
- Integration of network management functions to relieve the tremendous workload associated with administration and troubleshooting.

The WAN uses Verizon's SMDS (Switched Multi-Megabit Service) to obtain transport capacity when required and where required -- without the need for large, up-front investments. SMDS is the equivalent of connectionless ATM technology and can be readily migrated to ATM when that technology matures. Furthermore, OTT has negotiated favorable volume discounts for SMDS and related hardware. It costs approximately \$10,000 to install a site and approximately \$450/month for the high speed T1 access (per location).

The architecture consists of separate State and Education secure router network (Secure Net), an Insecure Net providing an Internet presence to the public, and two-way access to the Internet for education via Firewalls. Network services include traditional network functions such as security, message routing, network management, etc., as well as enterprise-wide applications such as e-mail, File Transfer, and Web sites.

The Office of Information Systems (OIS) and the Data Services Center also operate an IBM Systems Network Architecture (SNA) network for core applications.

These SNA networks are important today, however, the router network (WAN) represents the future of State networking and will eventually replace the SNA networks.

## **Voice Communications Network**

Education requires voice communications access for approximately 3,000 administration employees throughout the state. Many of these are in the Department of Education in Dover. With telephone lines having been installed in each of the State's classrooms, there is great potential for growth in the education voice network.

Most schools participate in the State voice network by purchasing Centrex lines at a reduced rate, under the State contract. Each school/District is responsible for purchasing its own telephone switching or key equipment. OTT has a voice consulting team that can help with these purchase decisions. Again, there is a statewide contract available, but with 16 vendors on the contract and a plethora of equipment choices, it is strongly suggested that schools consult OTT on all voice equipment purchases.

Approximately 50% of the schools are utilizing the telephone lines DCET installed during the wiring project. With the standard wiring, the process is inexpensive and easy.

### **Distance Learning Network**

Verizon Distance Learning Sites:

- Christiana HS
- Delcastle HS
- Glasgow HS
- Hodgson HS
- Howard HS
- Newark HS
- Woodbridge
- DelTech-Owens
- DelTech-Stanton
- DelTech-Terry
- UD Newark Hall
- UD Georgetown
- UD Lewes
- Verizon

Seven public schools participate in a high-speed (OC-3) Distance Learning network and two Higher Education institutions in Delaware are also part of the network. Educational, 2-way interactive video represents a significant networking demand.

There are currently 14 installations of Bell Atlantic Distance Learning facilities in the State. These are high quality, real-time, fully interactive links allowing up to three locations to participate interactively in a session. Other locations can receive the broadcast, but cannot interact due to system limitations.

The Distance Learning services are excellent but expensive. Each facility can cost between \$25,000 and \$40,000 depending on room configuration and options. The fiber optic transport can cost between \$1200 and \$1500 per month per location.

Prior to implementing this type of Distance Learning, districts need to carefully analyze and prepare a business case. Distance learning technology can expand student access to curriculum by enabling students to take classes not typically offered at their own schools. Distance learning can also facilitate use of higher quality or specialized instructors to reach a broader audience. These facilities can be cost-effective, but early experience indicates that utilization in some locations is low and that some installations may have been implemented without a clear plan.

It is likely that video will become the largest driver of network capacity for education. These systems require huge amounts of bandwidth. There are less bandwidth intensive applications that will be tested and analyzed as the network grows. However, it is anticipated that most schools will eventually participate in some form of Distance Learning. Because of the bandwidth requirements and the potential cost, any video network implemented statewide will be closely coordinated with OTT.

## **Electronic Mail**

Electronic mail (e-mail) is extensively used in State government for exchanging messages, documents, and files. E-mail is a relatively “new” application for most of education. E-mail can bring about significant worker productivity gains, cost savings, and faster, more efficient service delivery. No other single application can so quickly and dramatically impact the way an organization works.

The State’s standard “enterprise” e-mail system consists of Banyan “Blue Mail” and “Beyond Mail,” this system is being migrated to a Windows Exchange system.

E-mail accounts (username@district.k12.de.us) are provided to all educators through a POP based email server located at OTT in Dover. This system allow for an efficient management of e-mail accounts at the district level.

Some Districts have implemented their own local mail servers to provide faculty, staff, and student e-mail accounts.

## **Internet and Intranet**

The information superhighway concept was meant to modernize the telecommunications infrastructure in the U.S. so that everyone has access to information and educational materials. The State of Delaware has had a class B Internet license for several years and has an Internet presence with World Wide Web sites. In theory, every student in the State has the access to take advantage of the Internet.

Each personal computer on the network must have a unique IP address, similar to a “house number.” In order to support the huge potential number of addresses in education, OIS has implemented a special IP addressing scheme in the Delaware Education Network. Each school has been assigned a “10-net” address which is an address that **can only be recognized within the State** intranet. The advantage of this

system is that each school essentially has an unlimited number of IP addresses. The alternative, due to the limited number of Class B addresses available, would have been to limit each school to no more than 20 or 30 addresses per school. The disadvantage of the “10-net system” is that these special addresses can not be recognized outside of the state network. This requires a mapping of addresses from the “inside network” to the “outside network”. This mapping takes place in a **proxy-server**, which is managed by the Office of Telecommunications Technologies.

In order to provide security and prevent “hackers” from entering and damaging the state’s networks, OIS runs a **firewall**. This is software and a server that keeps unauthorized people out of the state network but allows all users in the state to access anything on the Internet worldwide.

In the education network, we also run **filtering software**, using a product called WebTrack. This software blocks students and teachers from accessing inappropriate material, such as, sexually explicit material that provides no educational value. The lists of sites that are blocked are updated weekly. Each site is personally reviewed and categorized by the staff of the WebTrack company. There are 27 categories: sex; illegal drugs; sports; hate speech; criminal skills; worthless; on-line sales; gambling; personal pages; job search; games and fun; humor; alternative journal; entertainment; alternative lifestyle; extreme; chat gateway; investing; general news; politic, opinion, religion; dating; art, culture; usenet news access; occult/cults; self help; travel; and non-essential. OTT and DCET have selected six lists to block. The blocked lists are sex; illegal drugs; hate speech; criminal skills; gambling; and alternative lifestyle.

Occasionally, although rarely, this may result in blocking access to a legitimate site. To access a site that is blocked, any teacher may request that the site be removed from the list. OTT will generally process such a request within the week requested. In addition, the filter is not foolproof. With new Internet sites added across the world, every day, it is entirely possible that a student or teacher will discover a site that should be blocked but isn’t. Likewise, a request to OTT will result in blocking these inappropriate sites.

In addition to having access to the Internet, each school has access to the intranet (the internal statewide education network behind the firewall). The intranet will become the primary means for education to share and access databases and reports. In the near future, many educational reports that were previously provided on paper will be provided electronically on the intranet.

All public schools and districts in Delaware are provided a World Wide Web site through the OIS Web Hosting Services. This arrangement minimizes cost and provides a supportable Web environment. Although Web sites are provided, some districts/schools have opted to operate their own Web servers, and many are operating intranet servers for sharing information within the network.

# **BENEFITS OF EDUCATIONAL TECHNOLOGY**

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## **Delaware Objectives**

As a public agency, the Delaware Center for Educational Technology is accountable to ensure efficient and effective results. DCET is part of a long range, statewide plan to improve Delaware.

Governor Carper has announced five major objectives for Delaware; DCET is focused on directly helping to achieve the 2<sup>nd</sup> and 3<sup>rd</sup> objectives: Promoting Economic Development and Improving the Education System, while indirectly contributing to the other 3 objectives.

<b>Governor's Objectives</b>	<b>Educational Technology Contribution</b>
<b>1. Increase the Government's Efficiency</b>	<b>Implement standard, efficient statewide IT systems and applications.</b>
<b>2. Promote Economic Development</b>	<b>Create a technologically literate 21<sup>st</sup> Century workforce which will help draw and retain high technology companies in Delaware.</b>
<b>3. Improve the Education System</b>	<b>Infuse Delaware's education system with modern telecommunications and better instructional and administrative tools, and help ensure that the schools have Internet access.</b>
<b>4. Help and Strengthen Families</b>	<b>Involve parents in the educational process by providing parents with better access to information on their schools and their children's curriculum.</b>
<b>5. Fight Crime</b>	<b>Encourage sharing of information among students, parents, teachers and the community. Provide students with some alternative entertainment.</b>

In addition to Governor Carper’s goals for Delaware, DCET supports President Clinton’s vision for the nation: that every student be technologically literate in the 21<sup>st</sup> century. There are four pillars that help provide focus for this challenge:

President Clinton’s Objectives	Educational Technology Contribution
1. All teachers in the nation will have the training and support they need to help students learn using computers and the information superhighway.	Upgrade teacher training.
2. All teachers and students will have modern multimedia computers in their classrooms.	Make computers readily accessible.
3. Every classroom will be connected to the information superhighway.	Connections to networks, especially the Internet.
4. Effective software and on-line learning resources will be an integral part of every school’s curriculum.	High quality, engaging software which is directly related to the school’s curriculum and the state’s standards.

## 21<sup>st</sup> Century Workforce

“Technology, in and of itself, is not a magic wand. Technology is not going to fix the problems associated with schooling, but, at the same time, the problems that plague our educational system are not going to be remedied without the presence of technology.”

- Researcher, Northeast Regional Forum

Technology in the educational process is a relatively new phenomenon, occurring only within the last five years. Until recently there were few, definitive studies demonstrating the value of educational technology. In June 1996, the United States Department of Education and Secretary Richard W. Riley published a report titled *Getting America’s Students Ready for the 21<sup>st</sup> Century*. This report removes whatever doubt may have existed. **Decision makers involved in education should read this report in its entirety.** Others may be satisfied with the summary below:

1. Schools make minimal use of technology in education. Only 9 % of classrooms are connected to the Internet. Only 4 % of schools meet the recommended ratio of 1 computer for every 5 students.
2. Technological literacy (computer skills) is now as fundamental as the traditional skills of reading, writing and arithmetic. “By the 21<sup>st</sup> century, 60% of all jobs in the nations will require skills in computer and network use.”

3. Schools alone cannot shoulder the cost. Nationwide estimates are between \$10 billion and \$20 billion a year will be required over 5 years.
4. 80% of Americans feel that teaching computer skills is absolutely essential.
5. “We now know - based on decades of use in schools, on findings of hundred’s of research studies, and on the everyday experiences of educators, students and their families - that properly used, technology can enhance the achievement of all students.....” “A U.S. Department of Education-funded study of nine technology-rich schools, concluded that the use of technology resulted in educational gains for all students regardless of age, race, parental income, or other characteristics.”
6. There are four key features of successful high technology schools.
  - 6.1 Concentrated, conscious and explicit technology planning among school leaders, families and students.
  - 6.2 Standards for student achievement are clearly articulated.
  - 6.3 Willingness to reorganize the school classrooms, rethink use of time and revise curriculum to support use of technology.
  - 6.4 Near universal access to computers - at least one for every five students.

Why do we need technology in schools? If supporting the President’s goals and the Governor’s goals isn’t reason enough, perhaps these specific benefits will help clarify why we need technology. Expanding the use of technology in schools helps:

Benefits	Rationale
<p><b>1. Support and improve teaching and learning by increasing access to people and information.</b></p>	<p>A classroom with access to the latest in technology will allow each student's individual learning style and interests to become part of the classroom learning environment, and enable students to become active producers and users of information, not just passive recipients and observers. Properly applied, technology becomes a tool to support and improve students' ability to meet the higher academic standards expected.</p>
<p><b>2. Motivate students.</b></p>	<p>Working with technology and quality software that assesses, but does not criticize, a student's work can positively impact student attitudes toward learning, self-confidence, and self-esteem.</p>
<p><b>3. Equip students with the job skills needed for today and in the future.</b></p>	<p>In today's job market, knowledge and application of technology is a requirement. The jobs of the future will only increase the demand for individuals experienced in using technology.</p>
<p><b>4. Increase community involvement in schools.</b></p>	<p>The effective application of technology in schools opens opportunities for parents and community members to become more active partners and participants in the learning process, and expands students' and teachers' access to community resources and expertise.</p>
<p><b>5. Expand and improve staff development opportunities for educators.</b></p>	<p>Educators prepared to apply available technologies will be the key to successful integration of technology into the classroom. Technology has the potential to break down the traditional isolation of the classroom by providing every educator with access to effective teaching and learning strategies and to the teachers who use them.</p>
<p><b>6. Break the barriers of time and place.</b></p>	<p>Equitable access to technology can enable students in any community, no matter how remote or impoverished, to have access to high-quality instruction. With specialized equipment, students with disabilities have access to learning tools previously unavailable.</p>

# ***INFORMATION TECHNOLOGY PLANS***

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## **Preface**

Every school district has some form of technology plan that is required to receive e-rate funding. In future years, district technology plans will be summarized.

Each district will need to maintain and continuously update their plan, while ensuring that a technology plan is developed for each of their individual schools. Planning at the district level is not enough, each individual school must have a plan to ensure unique needs are met.

## **Common Problems**

Where technology implementation has failed, research has uncovered 5 key factors that these failures often held in common:

- A lack of vision regarding technology, specifically a lack of understanding how technology would be used in administration, instruction and personal productivity.
- Short-sighted purchasing decisions leading to incompatible technology.
- Hardware and software are outdated with poor replacement planning.
- Severe under-investment in training and technical support.
- Lack of in-house leadership and capacity to develop comprehensive, long-range technology plans.

The major problem is not that districts do not have a plan. The major problem is the lack of implementation.

# STRATEGIC INITIATIVES

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## Preface

The strategic initiatives highlighted below reflect a broad consensus of the educational community as related to the Delaware Center for Educational Technology. Although the plan is written through DCET, the plan is written for the educational community and the implementation of the plan can take place at any level – state, district, or school. Five critical areas are addressed with specific strategic initiatives.

## Staff Development and Technology Utilization

The vision for Staff Development and Technology Utilization is that every staff member in each school will be able to utilize technology effectively as an essential tool to promote student learning and to assist students in meeting the state's academic content standards.

The scope encompasses examination of the instructional impact of technology; curriculum integration and development; education applications/software (development, acquisitions, upgrades); and staff development.

Technology is a potentially powerful educational tool but not a panacea for the myriad challenges of education. Moreover, the value of that tool depends upon its effective utilization in the promotion of student learning, not its innate technical features. In this context, it is expected that *staff development is and will continue to be an on-going requirement for effective use of technology in Delaware schools. The support system for staff development needs to be institutionalized within the general structure of our state educational community in order that a strengthened technological infrastructure for our schools can be used effectively.* It is also expected that effective staff development must involve a variety of providers and paths, as well as technical support at the school level and support to enable teachers and other staff to take advantage of staff development programs on a continuing basis.

Within this context, Staff Development and Technology Utilization activities must address three goals:

- Provide for the Effective Integration of Technology Skills and Concepts into the K-12 curriculum;
- Promote Staff Collaboration and Communication in the Utilization of Technology to Improve Efficiency, Resource Sharing and Professional Growth; and
- Assure that New Technology and Human Support Resources Meet Classroom-Level Instructional Requirements.

## Process (FY2001 Priority, FY2002 Priority)

### **Strategic Initiative #1**

*Establish a structure and process to develop, manage, and assess staff development for technology.*

The educational community in Delaware needs to adopt a model that delineates the scope and sequence for staff development for technology skills and concepts. The scope and sequence for staff development must ensure successful acquisition of skills needed for meeting the teacher standards and the requirements for certification and recertification.

A four-tier, Levels of Technology Expertise model has been widely used in the national surveys concerning technology in schools. The DCET has adopted this model for data collection in the annual school technology survey so comparisons can be made across states. The four tiers are: Beginner, Intermediate, Advanced, and Instructor/Innovator.

<b>Beginner</b>	The individual does not have to possess working knowledge of the technology. However, the individual should know about the basic use technology can provide in the classroom or for administrative purposes. The individual should functionally be able to use or know more about the technology application or issue. Functional use is defined as the capability the given technology can provide in the classroom or for administrative use.
<b>Intermediate</b>	The individual must possess working knowledge of the technology and demonstrate uses of technology, as well as, how it can be integrated into classroom or administrative activities.
<b>Advanced</b>	The individual should be able to: (a) perform the more advanced uses, (b) manage or oversee the operation of the technology, and (c) report on the scope of its applicability to improve classroom or administrative activities.
<b>Instructor/Innovator</b>	The individual creates and invents new uses of educational technology.

Although the model does not specifically address technology skills, the levels are described in sufficient detail so districts, DOE, and DCET can determine what specific skills are needed by various levels of professionals to accomplish or reach a Level of Technology Expertise.

The DCET has been collecting data on technology in Delaware schools for three years. The data shows that professional development is taking place in technology, slowly, but surely. The number of teachers at the Beginner level is decreasing while the number of teachers at the Intermediate level is gradually increasing.

Higher educational institutions should incorporate the Levels of Technology Expertise into their teacher preparation programs so all graduates are at the Intermediate level.

A core set of technology skills need to be developed based on the National Educational Technology Standards for Students (NETS\*S), the National Educational Technology Standards for Teachers (NETS\*T), and the National Educational Technology Standards for Administrators (NETS\*A). The National Educational Technology Standards (NETS) were developed through the International Society of Technology in Education (ISTE) by

leading educators from across the country. The DCET has adopted the NETS for Students, Teachers, and Administrators as guidelines for the implementation of technology into the educational community.

Staff development programs and services should be targeted to these specific requirements sequentially, and need to be implemented concurrent with the implementation of new expectations for technology utilization.

### **Access (FY2000 Priority, FY2001 Priority, & FY2002 Priority)**

#### ***Strategic Initiative #2***

*Provide access to ongoing professional development opportunities for instructional staff in the utilization of technology.*

The Delaware Center for Educational Technology sponsors the annual *Delaware Instructional Technology Conference*. The conference provides an opportunity for Delaware educators to share their knowledge, listen to nationally recognized speakers, and explore new and existing technologies.

The Delaware Technology Academy provides a professional development opportunity over the summer for educators.

The DCET supports a *Train the Trainer* model for curricular personnel preferably at the building level. Through DCET leadership, *districts should identify one person at each school, an Instructional Technology Specialist, who is responsible for supporting integration of technology into the curriculum.* Through the *Train the Trainer* model, DCET would provide access to training so the Instructional Technology Specialist is at the Mastery level of expertise. The intent is to have a technology resource person in the building who is responsible for training other educators in the proper use of technology.

Marco Polo is a partnership between the MCI WorldCom Foundation and seven renowned educational organizations. They provide free, high-quality Internet content to K-12 teachers. After review and approval of the curricular content by the appropriate DOE education associates, the DCET entered into an agreement with Marco Polo to provide free, train the trainer professional development and access to their standards-based educational content.

The DCET operates a meeting/training facility in Smyrna at the DCET Office Suite. The DCET should identify other training centers available statewide, and establish additional centers as needed. All training centers should be easily accessible to staff, preferably at the district level. The DCET should partner with other institutions, such as, the Delaware Teacher Center and institutions of higher education.

The DCET, working with Delaware institutions of higher education, should establish a statewide referral service to provide teachers and other educational staff with accurate and up-to-date information on available staff development opportunities and sources of instructional software and other educational materials on technology utilization.

The DCET should conduct a comprehensive inventory of all available Delaware providers of professional development programs that assist teachers and other educational staff to effectively utilize technology. The inventory should include public, private and non-profit providers, be updated continuously, be accessible to all educational staff and be published on the World Wide Web.

To accomplish these responsibilities, the DCET hired a full-time professional staff person to coordinate the staff development program statewide.

### **Integration (FY2001 Priority, FY2002 Priority)**

#### ***Strategic Initiative #3***

*Identify the substance and sequence of technology skills and concepts and augment content standards to include specific technology applications into instructional curriculum.*

Delaware has formally adopted technology requirements for graduating high school seniors and is considering adopting guidelines for teacher certification. However, the use of technology as a tool must be integrated into all levels of curriculum. Properly positioned, technology can facilitate problem solving, research, organization and communication in grades as early as kindergarten.

Instructional technology must be an integral part of the academic standards movement. Educators need guidance to determine what technology skills need to be taught and when to teach them so they can integrate technology into the curriculum.

The NETS project is an International Society for Technology in Education initiative supported by 11 other educational organizations. Complete information about the NETS Project can be found on the World Wide Web at <http://www.iste.org>. The DCET recommends that the National Educational Technology Standards (NETS) be endorsed as a critical adjunct to the content standards.

The National Educational Technology Standards for Students (NETS\*S) can be used to provide this guidance. The NETS\*S “go beyond” just technical skills students need to learn. The standards offer a guide to establishing enriched learning environments supported by technology. The *Computer Skills Growth Chart* was developed by a group of Delaware educators based on the NETS\*S and can be used to determine what skills a student can be expected to have at what grade level.

The National Educational Technology Standards for Teachers (NETS\*T) and the National Educational Technology Standards for Administrators (NETS\*A) will be analyzed and support documents, similar in scope to the *Computer Skills Growth Chart*, should be developed.

The *Teacher-to-Teacher Technology Cadre* should be created to provide support to individual teachers who are developing technology-enhanced units. The DCET should

help identify, recruit, and train teachers for the expanded cadre. Recruitment should center on teachers who are already at the Instructor/Innovator level of technology expertise. Training should focus on individual needs to expand the expertise of the cadre members.

### **Productivity (FY2000 Priority, FY2001 Priority, & FY2002 Priority)**

#### ***Strategic Initiative #4***

*Provide technologies and training to improve operational productivity.*

In addition to technology applications for curriculum, school districts working with DCET, DOE, and institutions of higher education should provide staff development training in technologies that may improve professional and support staff productivity. This includes such areas as classroom management, scheduling/time management, grading, portfolios, support services, and integrated pupil accounting and curriculum management systems.

The DCET, in conjunction with the DOE, should facilitate a process to identify, evaluate, and disseminate information about the best technologies and applications to support on-site improvements in operational productivity.

The DCET Traveling Integration Lab is used to demonstrate the use of wireless technology while using laptops to integrate technology into the curriculum.

### **Resources (FY2002 Priority)**

#### ***Strategic Initiative #5***

*Establish and maintain a statewide resource base of best practices in staff development and technology utilization.*

DCET and DOE should partner with local and national institutions to create and sustain a comprehensive, easily accessible inventory of best practices for both staff development and technology utilization.

Instructional best practices should be catalogued and referenced to the content standards / performance indicators and made available to all educators through a curriculum management system. The *Teacher-to-Teacher Technology Cadre* should be utilized to support the identification and dissemination of best practices.

DCET and DOE should develop criteria for identifying and evaluating best practices in staff development. In the long-term, DCET and DOE should record and share Delaware's own best practices and the conditions that promote and support such practices.

Over time, DCET should track the various paths towards effective technology utilization, with associated staff development, undertaken with success in our state and identify conditions for future success.

## **Communication (Ongoing Priority)**

### ***Strategic Initiative #6***

*Create communication channels to promote collaboration among educators on instructional and operational issues and best practices in technology utilization.*

The DCET hosts monthly meetings of the district technology coordinators. The group is called TechMACC, **T**echnology **M**anagers and **C**oordinators **C**ouncil. These individuals are responsible for maintaining and supporting the networks and workstations in the districts. The meetings are intended to keep an open line of communications between the state level agencies and the districts.

The DCET hosts monthly meetings of the district instructional technology coordinators, and members of DOE, OIS, and higher education . The group is called INTEGRATE, **I**Nstructional **T**Echnology **G**uiding **R**igorous **A**cademics and **T**eaching **E**xcellence. These meetings provide a forum for open discussion and sharing of instructional technology activities across the state and feedback on the activities' impact on instruction and curriculum.

The DCET has provided the impetus to create, organize, and conduct operations for a professional organization in technology. The group has been in existence for over a year and currently has almost 200 members. Monthly meetings are held to discuss and learn about various aspects of instructional technology. The listserv facilitates sharing and gives members almost instant answers to their technology questions. The name of the organization is ITUG – Delaware (Instructional Technology Users Group - Delaware).

The DCET should work with the Office of Information Services to create various electronic communication channels for educators.

The DCET currently operates numerous e-mail lists for the distribution of technology related news and information relevant to Delaware educators. Other e-mail lists should be created to promote the diffusion of ideas and collaboration among educators.

The DCET World Wide Web site should be used to promote communication between DCET, DOE, the higher education institutions, and the Delaware K-12 educational community. Using the Web site as the communication medium, electronic forums should be created to promote collaboration among educators on instructional issues, operational issues, and best practices. The DCET should recruit and appoint forum facilitators with appropriate background and experience and should rotate them periodically. These facilitators will promote the diffusion of ideas and collaboration among educators at diverse sites and provide up-to-date referrals and advice concerning the statewide resource base.

## **Infrastructure**

The goal within the Infrastructure area is to ensure a minimal level of uniform and comprehensive technology to create an effective and efficient educational network. The

scope includes communication tools (e-mail, discussion databases, groupware, Web servers), networks (management, servers, hubs, wire and cable), and standards (hardware, software).

Everyone has heard the saying, “If you don’t know where you’re going, any road will get you there.” That may be true in life, but in networking, if you don’t have a “road” you’re not going anywhere at all. *Infrastructure is our road that provides the basic functionality to allow us to make connections and travel the information highway.*

Delaware’s basic infrastructure is world-class. However, the voice, data and video we have installed to every classroom is really just the beginning. When DCET “completed” a school, every classroom had at least one data connection to the Internet. Although the line for voice (telephone) was installed, connectivity, and associated costs, was left to the discretion of the school districts.

There are numerous possibilities for expanding the infrastructure use, but all have budgetary implications. Possibilities include, but are not limited to: a telephone in every classroom, a television in every classroom to fully utilize the coaxial cable for cable TV, satellite downlinks, Channel One, or live student produced news programs, and a multimedia distribution system to share videos, laserdiscs and CD-ROMs.

The following initiatives are focused on addressing these issues for the areas of infrastructure with the highest perceived payback.

### **Improvement (FY2000 Priority, FY2001 Priority, & FY2002 Priority)**

#### ***Strategic Initiative #7***

*Continue to implement improvement and expansion of the infrastructure to meet the needs of the educational community.*

Currently, Delaware has a world-class infrastructure in place that connects not only schools, but classrooms, to the world through the Internet. Even though the infrastructure is world-class, we must be cognizant of the ever-increasing demand placed on the infrastructure. The development of statewide applications, the addition of end user hardware, and instructional servers has increased the load on the network and has challenged the capacity of the existing infrastructure. This demand has required continuous support, adjustments, enhancements, replacements, and additions. This demand has also driven the need to upgrade the LAN electronics during the Server and Infrastructure Enhancement Project.

DCET, DOE, and OIS are continuing to evaluate services and providers to enhance competition, improve services, and lower total operational costs.

DCET, in conjunction with DOE and OIS, has committed to the purchase of servers at the state, district, and school levels that meet administrator, teacher, and student needs. The DCET Board has approved the purchase and installation of administrative and instructional servers as part of the Server and Infrastructure Enhancement Project. During

the project, servers for the statewide pupil accounting system were installed and an instructional server in every school was ensured.

The Legislature has been very supportive of the acquisition of technology for staff and students to complement the wiring project. The Legislature has allocated \$13M in funds to the DOE, with a \$7M matching funds requirement from the districts, to purchase classroom technology. The intent of the funding is to ensure that every professional within the school system has access to a quality, high-end computer.

With the proliferation of technology in the schools, the Technology Block Grant was created to provide funds to the districts to offset some of the costs of maintenance and support.

The CATV / Video Broadcast Project ensured that the coaxial cable going to every classroom would distribute video and multimedia programming from a central location. This includes VHS tapes, laserdiscs, CD-ROM, satellite programming, cable TV, and live student presentations.

### **Web Services (Ongoing Priority)**

#### ***Strategic Initiative #8***

*Develop and continually enhance the DCET World Wide Web site and provide for a World Wide Web presence for every school and district.*

The World Wide Web is growing exponentially. Thousands of new sites and resources are added each month. Software tools used to publish, access, and/or display information on the Web are averaging a product life cycle between 3 and 6 months! The Web is and will continue to be the primary use of our Delaware Education Network. The DCET needs to continuously explore, demonstrate and use the latest tools and techniques so that our students do not lose opportunities to participate in this information explosion.

Currently, every district and school is provided with a World Wide Web site on the Delaware Education Network.

### **Distance Education (FY2001 Priority)**

#### ***Strategic Initiative #9***

*Research and define alternatives for linking remote sites interactively and for receiving or transmitting curriculum at low cost and reasonable quality. Prepare recommendations for Delaware educators.*

Distance education is defined as: *education conducted via communication media (teleconferences, computers, correspondence, radio, television and other technologies) with little or no face-to-face contact between students and the teacher.* Distance education is a means of extending instruction beyond the boundaries of a single classroom and may include instruction between home and school, between schools in the same or different districts, between secondary and post-secondary institutions, between

states and even between countries. Distance learning can help smaller schools share limited curricula, allow teachers to leverage their expertise and can provide access to advanced programming such as college level courses. Nationwide, some 33% of school districts utilize some form of distance learning.

Verizon has implemented full motion video, distance learning labs at both K-12 and higher education locations in Delaware. Each site costs between \$30,000 and \$50,000 to construct the room and purchase the appropriate television monitors and control devices. At a cost of \$1500-\$1800 per month per location, access is expensive. This cost is incurred whether or not the service is actually used. Only experience will tell us whether this is a worthwhile investment, but many schools are currently seeking alternate solutions.

Several Districts in Delaware utilize direct broadcast satellite as a means for receiving curriculum based material. These services are expensive but generally high-quality.

When using distance education, one must consider a host of management implications, including: scheduling, site supervision, student support (face-to-face, labs, media resources etc.), teacher training to utilize a distance medium effectively, funding, evaluation, equitable access etc.

Although Districts will always have freedom to select among a variety of distance education resources, it is clear that some statewide planning, involving a broad cross-section of K-12 and university educators, as well as public broadcasting providers is required.

### **Electronic Mail (Ongoing Priority)**

#### ***Strategic Initiative #10***

*Implement a statewide education e-mail system that can efficiently handle access and directory services for 10,000 teachers and administrators and be scalable to possibly serve 110,000 students.*

Electronic mail is one of the most critical applications for education today. Teachers and administrators need a fast, easy, and reliable method of communication. E-mail services this need.

The current e-mail system used in education is iMail. The iMail system provides an efficient method for maintaining accounts by creating virtual domains for each district, such as, capital.k12.de.us or irsd.k12.de.us. Management of accounts takes place at the district level. During the 2000-2001 school year, the iMail system was utilized by 14 districts, 6 charter schools, and 3 educational organizations. There are 5 districts and 1 charter school that operate and maintain their own e-mail system.

DCET is prohibited from providing e-mail accounts to all students. DCET should support OIS in their efforts to provide support to districts that choose to provide e-mail accounts to students.

## **Dial-in Access (FY2000 Priority, FY2001 Priority, & FY2002 Priority)**

### ***Strategic Initiative #11***

*Develop recommendations for dial-in and/or remote access to Delaware technology resources for educators.*

Education uses the OISNet dial-in system that is available to all state agencies on a fee for service basis. DCET has been appropriated funds to subsidize 3,000 OISNet accounts for educators with the educator (or district) paying \$25 for the year.

## **Information Retrieval**

The vision of Information Retrieval is to expand, evaluate and consolidate the current information services provided by the state and to create a shared information retrieval offering that ensures students, parents, and educators have equitable access to and use of quality information resources independent of location.

The creation of a shared information infrastructure for the school community of Delaware is a new concept and a significant challenge, but has the potential to have a high payback. A shared information retrieval system includes access to: integrated pupil accounting and curriculum management systems, CD-ROMS, subscription services (e.g., Britannica Online, Scholastic Network), the Internet, interactive professional development (e.g., conferences, Computer Based Training), electronic mail, and multimedia applications (e.g., satellite programming, public television, VHS tapes, laserdisc).

## **Media Specialist**

### ***Strategic Initiative #12***

*Support the recommendations of the Delaware Task Force on School Libraries that each school building should have a professional media specialist. Provide communications and training to support this role.*

Some states have been able to use the media specialist as their technology support specialist. The Kentucky Education Technology System requires each school to have such a position.

There are some advantages to this approach. First, the media specialist is an educator. They should have an overall understanding of the curriculum and knowledge about how to access and use information to support the curriculum.

Second, the media specialist is often an instructional consultant with knowledge of learning strategies and resources. In this role they can help teachers integrate information resources into classroom presentations, assignments and activities.

Third, the media specialist understands and appreciates the wealth of material available. There is no single source for research. Research may include books, audiovisual material, magazines or the Internet. The media specialist knows how to access it all.

### **Automate School Library Media Collections**

#### ***Strategic Initiative #13***

*Support the automation of all school library media collections in the state and investigate the creation of a state union catalog for schools that would include an automated inter-library loan system.*

A powerful use of a shared information retrieval system is the sharing of resources. The State of Delaware has an extensive information base. This information base is the resource base available in school libraries, public libraries, and higher education libraries. The Delaware Information Retrieval system needs to provide access to these resources and enforce standards that will allow all systems to "talk" to each other.

### **Subscription Services (FY2001 Priority, FY2002 Priority)**

#### ***Strategic Initiative #14***

*Support the UDLib/Search initiative to provide a shared subscription fee service to Delaware schools and expand this service to include curriculum subscriptions.*

There is an awareness that the educational community represents a diverse group with many information needs, and the State needs to "buy good information" to be made available on the network. UDLib/Search, an innovative project between the University of Delaware Libraries and the State of Delaware, provides access to an electronic library of online magazine and encyclopedia articles (research material) through the network to high schools and middle schools. The research material is available from online databases: SuperTOM, Expanded Academic ASAP, SIRS Researcher, and Britannica Online. DCET supports expanding UDLib/Search to the elementary schools.

DCET supports providing curriculum material, as well as, research material on the network. DCET should investigate the purchasing of statewide subscriptions for curriculum material on the Web to augment the UDLib/Search services.

### **IPAC (FY2000 Priority, FY2001 Priority, & FY2002 Priority)**

#### ***Strategic Initiative #15***

*Support the Department of Education's Integrated Pupil Accounting and Curriculum (IPAC) Management initiative.*

The Integrated Pupil Accounting and Curriculum Management System consists mainly of two components: a pupil accounting system and an instructional (curriculum) management system. Although these systems can be mutually exclusive, the intent is to develop a system that will allow the systems to communicate and minimize redundancy. The IPAC system is also intended to communicate with State agencies outside of

education to provide information from outside sources. The DOE has implemented the pupil accounting system and is in the research phase of the curriculum management system.

A Pupil Accounting system can be defined as a comprehensive software package and computer hardware used to efficiently manage student record administration. The DOE is currently using Pentamation.

An Instructional (Curriculum) Management System is an integrated tool that helps manage critical information at every step of the instructional design process, to include designing, developing, delivering, assessing and evaluating instruction. It allows educators at every level to align standards, curriculum, instruction, assessment, and evaluation to achieve superior student outcomes.

DCET supports DOE's implementation of the IPAC Management system and will offer any needed technical support related to the project. The DCET Board purchased the servers for the Pentamation pupil accounting system.

## **Operations**

Operations deal primarily with the issues of staffing, planning/funding, and models for centralized vs. distributed support.

Many organizations have made a mistake in believing that they could fund technology with one-time costs. Typically, state funding has focused on buying technology, not on insuring that people are hired to keep it running.

Experience shows that in any major technology initiative or project, only 15% of the cost is up-front. The rest is recurring. The largest component of recurring cost is staff or personnel, followed by training, software and hardware. The Delaware Educational Technology Committee provided guidelines on the make-up of operational staffing. The report called for a tiered organization focused on response to the client. The support tiers included:

- Building: Solve simple problems, define more complex situations
- District: Solid operating knowledge of desktops, networks, and operating systems
- Central Help Desk: Solve operational questions
- Central Engineering: Mobile experts capable of restoring inoperable networks

Most of these positions are not teaching positions and should be in addition to the unit count used for determining faculty positions. In general, Districts will not be successful if they attempt to staff technology positions with part-time media specialists or classroom teachers.

Districts must be prepared to pay salaries beyond normal teaching salaries in order to recruit and retain high quality technical people for the most technical positions. Districts

must also commit to the ongoing professional development of these technical specialists. Finally, Districts and schools must learn to develop partnerships and use students, staff and volunteers to supplement their professional staff.

### **Support Infrastructure (FY2000 Priority, FY2001 Priority, & FY2002 Priority)**

#### ***Strategic Initiative #16***

*Establish formal organizational roles and responsibilities, as well as, pay schedules for a variety of support personnel, both technical and curricular, at the school, district, and state levels.*

Delaware is making great strides toward providing a network infrastructure and placing technology in the classrooms. The State of Delaware has one of the best student to computer ratios (3.8:1) in the nation and has over 30,000 computers in the schools. Provisions for a support staff to maintain the hardware and professional development on using the hardware and software is being addressed.

The support staff includes a District Technology Manager, Technical Support Specialist (building level), and Instructional Technologists. We believe that Delaware will eventually need at least 180 people at the building and district level to support the technology goal of 5 computers per classroom.

The District Technology Manager plans for and oversees technology within the district. Such a role would include: responsible for overall effectiveness of systems operations, works to develop low-cost of ownership systems operations infrastructure, ensures that organizational needs are being met to ensure customer satisfaction, defines needed resources including capital outlay items and personnel, identifies barriers for information systems and business management, and leads migration to new technologies when appropriate. Needed knowledge includes personnel management, overall technology expertise in systems and network technologies, communication skills, and leadership.

The Technical Support Specialist focuses primarily on PC hardware and software support at the building level. Experience dictates that most full-time technical resources should be assigned at the building level. A typical, slightly conservative, ratio used for planning support requirements is 1 support person per 100 desktops.

The Instructional Technologist works with teachers in both a training and instructional application capacity. For the next 3 years, while we are initially implementing technology in the classroom, we need dedicated, knowledgeable Instructional Technologists. A ratio of 1 specialist for 200 teachers will be required. A proven model used to develop the high degree of personal interaction and number of workshops needed is the Teacher-to-Teacher Technology Cadre.

DCET supports DOE's position of funding a building level Technical Support Specialist for every school. In addition, DCET has two technician positions dedicated to supporting the infrastructure at the school level.

DCET produced a report on long-term maintenance and support issues at the state, district, and school levels that led to the creation of the Technology Block Grant that provides maintenance and support funding to the districts.

### **Help Desk (FY2000 Priority, FY2001 Priority, & FY2002 Priority)**

#### ***Strategic Initiative #17***

*Develop and staff a centralized help desk to provide support for wide scale applications with reasonable response times to the educational community.*

One critical aspect of support, that can save tremendous time and money if done well, is a centralized help desk with appropriate network management tools. The OIS Help Desk is currently filling this role. DCET utilizes the OIS Help Desk to support the infrastructure.

### **Regional Centers**

#### ***Strategic Initiative #18***

*Develop a physical DCET presence in each of the three counties to minimize cost and response time in providing the designated services. Cost of offices will be minimized by partnering with other agencies or schools.*

Training facilities, access to educational software, and access to expensive equipment can be provided at lower cost by leveraging these services across all districts in a county. The more we move towards client-server computing and the implementation of servers at the school level, rapid response time of technical experts will be required. In the early adoption years of technology, much of this assistance will need to be hands-on, face-to-face with building and district support staff.

### **Education Technology Management**

The vision for Educational Technology Management is that DCET will become the educational technology focal point for development of statewide policies; management of statewide initiatives; resolution of issues; and large-scale acquisition of technology for school districts. The scope includes purchasing, policy, allocation of resources, and planning.

DCET should:

- Be an agent for technology issues. Represent schools in relationships with other state agencies. Clearly identify roles & responsibilities.
- Develop and support funding for educational technology.
  - purchase support
  - vendor negotiations
- Incorporate, support and promote educational goals and policies of the districts and state. Use Governor's office, legislative process and public/private partnerships as tools to help achieve goals.
- Establish technology guidelines and policies.

- Assist districts and schools in planning for technology.
- Communicate with schools and the public regarding technology.
- Facilitate creative and effective applications of technology through the allocation of resources and funds.

## **Building Plans**

### ***Strategic Initiative #19***

*Develop ongoing building-level plans for the effective utilization of technology to support and enhance instructional and operational goals.*

The technical complexity of new information technologies often overwhelms the capacity of schools to plan, manage, and use them effectively. Second, most schools either do not possess or do not allocate human, technical, and financial resources in ways sufficient to achieve substantial changes supported by technology.

Technology planning must be combined with instructional and organizational planning so that consistent and achievable objectives are defined. Each school should develop a building-level plan consistent with its district plan to determine its instructional and operational priorities for the improvement of teaching and learning.

Although there will be numerous ways a district and the State can leverage technology, planning based on applications and needs within a school must start with the school and must involve the community. Committees should be broad-based and include representation from teachers, school-based technical support, parents, local Board of Education members, local businesses and students. The committee should operate *collaboratively*. The school library media specialist is often a good choice for leading the planning committee. Committees work best where they are provided responsibility for and held accountable for technology spending within their school. Clear roles and responsibilities need to be defined between the school, district and state organizations.

A successful technology plan will:

- address specific educational problem(s) or goal(s),
- include all of the systemic elements associated with the problem (such as curriculum development, user support, access and evaluation),
- be curriculum-driven,
- be extensible, e.g. able to be repeated in other schools,
- focus on changing the teaching, learning and management cultures,
- promote equity,
- address funding, support, training and community involvement,
- encourage collaboration among all stakeholders, and
- develop new, sustainable partnerships.

## **Needs Assessment (FY2002 Priority)**

### ***Strategic Initiative #20***

*Establish a process for identifying ongoing technology and human resources needs at the classroom level.*

An initial step in evaluating technology and resource requirements is to conduct needs assessments at the school level to determine administrative and operational practices that may be candidates for improvement.

The CEO Forum on Education and Technology is a unique partnership among business and education leaders. The mission of the CEO Forum is to build a common understanding of the issues and realities associated with the use of technology in education today, and to assess how ready our schools are for teaching and learning in the 21<sup>st</sup> century.

The CEO Forum has developed the *School Technology and Readiness Chart (STaR Chart)* to provide a clear framework for assessing how prepared American schools are to meet the challenges of the 21<sup>st</sup> century. The STaR Chart describes technology presence, use, and integration in a typical school in four school profiles ranging from the “Low Technology” school that uses technology primarily for administrative functions, to the “Target Technology” school that integrates technology throughout the curriculum.

The STaR Chart also highlights the potential educational benefits each level (Low, Mid, High, Target) of technology integration offers. Together, this information can help a school identify its current educational technology profile and, based on the educational outcomes it values, target its future profiles. Information can be found on the World Wide Web at <http://www.ceoforum.org>

DCET recommends that schools use the STaR Chart to assess their level of technology integration and use this information to plan accordingly.

## **Partners in Education**

### ***Strategic Initiative #21***

*Seek resources to implement the Partners In Education (PIE) program to develop and sustain public/private partnerships.*

The Partners in Education program is a means to help motivate businesses to stay directly involved with education over time instead of just from time to time. However, being successful with developing these partnerships has a strong prerequisite. Schools and districts must plan for and document their need for technology.

Many donations of cash or equipment from businesses to schools have historically gone for “stuff”. Teachers and administrators, accustomed to dealing with limited school budgets, have developed a preoccupation for acquiring stuff, much of which may be underutilized. The model DCET will attempt to enforce is to develop a clear understanding of the need, then work with partners to meet that need, and hold educators accountable for their stated goals in using the technology.

## **Grantsmanship**

### ***Strategic Initiative #22***

*Monitor the numerous grant opportunities available in educational technology, inform schools and districts, and assisting in the application process when appropriate.*

There are significant sources of Federal and non-state funds that can be monitored and aggressively pursued. Most of the grant processes involve significant lead-time and many hours of preparation. Most grants must also be written at the school or district level.

DCET should support schools and districts in the application process for grants related to educational technology.

## **Internet, Copyright, and Filtering Policies (Ongoing Priority)**

### ***Strategic Initiative #23***

*Define a standard statewide acceptable use policy and procedures to ensure that all educators and students agree to this policy. Such a policy must include Internet use, ethics, copyright and filtering, at a minimum.*

K-12 education is different from other enterprises in that children are its main constituents. As minors, they require and deserve some special protections. Some of the issues include concerns about violations of copyright, acceptable use of the “Internet” and preventing access to information or conversations with adults that could be harmful. Obviously, when you build policies to protect 110,000 students and those same policies apply to 10,000 teachers and administrators, it is expected that some of the adults may not be pleased with having their access restricted. These adults will always have the freedom to seek out private Internet providers that do not restrict access to information. However, our Delaware Education Network, provided with public funds, will follow reasonable standards.

Although a statewide acceptable use policy exists, it has not been universally and equitably enforced throughout education. Some districts have modified the policy; others have accepted it as is; while some other districts do not yet have a policy in place. Due to recent Federal legislation, Children’s Internet Protection Act (CIPA), concerning Federal funding through the ESEA and E-Rate, all schools will need to have, at a minimum, an Internet Safety Policy. The Internet Safety Policy can either be a stand-alone document or part of the acceptable use policy.

In addition, the CIPA regulations require a Technology Protection Measure that blocks or filters Internet access. This is nothing new to the State of Delaware as a statewide filtering system has been in place since 1996.

## **Purchasing Policy (Ongoing Priority)**

### ***Strategic Initiative #24***

*Establish a focal point within DCET, working closely with the Division of Administrative Services, for the preparation of technology related RFPs, vendor negotiations, and site licenses for software.*

Schools are not required to use the state contracts so there is no central point to consolidate demand and negotiate volume purchase agreements or site licenses. In addition, numerous services are provided to schools by inexperienced or untrained vendors in a manner that may appear to be inexpensive up-front but neglects longer-term service and quality considerations.

DCET maintains the Microsoft Education Select purchasing agreement and continues to be the lead agency. This agreement allows the educational community, including public and private schools, DOE, public libraries, and higher education institutions, to purchase site licenses for Microsoft software products at substantial savings. DCET has also entered into similar agreements with Apple Computers and Educational Resources.

DCET should issue an RFP for master software licensing agreements for education related software including subscription services on the World Wide Web.

### **Technology Survey (Ongoing Priority)**

#### ***Strategic Initiative #25***

*Conduct an annual technology survey of every school and determine what exists as a foundation for future planning.*

One of the keys to planning and developing sound strategies is to understand your current state. DCET has collaborated with Quality Education Data (QED) and Market Data Retrieval (MDR) in the past to conduct technology surveys. During the fall of 2000, the DCET conducted the annual survey internally and will continue this practice in the future.

DCET recommends that the survey become part of the School Profiles.

# **ENTERPRISE STATISTICS**

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## **Preface**

The Delaware Center for Educational Technology, a small organization, has an awesome responsibility. Decisions made by or on behalf of DCET have the potential to impact every student, teacher, and administrator in the State of Delaware.

## **IS&T Expenditures**

The Delaware Center for Educational Technology was appropriated \$30 million to wire all public schools with voice, data, coaxial, and fiber optics cable to every classroom.

The wiring project began on February 1, 1996 and was completed in October 1998. Thus, Delaware became the first state in the nation to have network access in every public school classroom in the state.

After completing the Wiring Project, the funding supported the Server and Infrastructure Enhancement Project and the CATV / Video Distribution Project. In addition, funding has been used to provide professional development and enterprise network management tools.

## **DCET Budget**

DCET conducts day-to-day business with a small operational budget (\$1,088.6) that consists of funding for seven employees (\$662.4), their support costs (\$151.0), maintenance and support of the infrastructure (\$100.0), and subsidizing OISNet dial-in accounts for educators (\$175.2). The budget also includes the Technology Block Grant (\$1,000.0) that is distributed to the districts for maintenance and support.

# **STRATEGIC NEW TECHNOLOGY**

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## **Preface**

The whole educational technology marketplace will grow exponentially over the next 3 to 5 years as schools scramble to join the information age and vendors rapidly introduce new products and technologies to meet the demand. There are a number of areas where Delaware will likely be impacted by new technologies. These include:

## **Wireless**

Wireless technology is growing but as of now it is too expensive to be used internally, within a school. There are opportunities to connect schools together and extend the wide area network at a competitive price. This is currently being piloted in Colonial School District and the Caesar Rodney School District.

## **WAN Access**

Cable companies are entering the marketplace for voice, data and video. Recently, power companies have announced plans to compete as well.

As use increases, our current system of a T1 line to every school will eventually run out of capacity. Alternatives need to be explored.

Video will continue to drive the need for higher and higher bandwidth, possibly forcing a move to ATM in the 3 to 5 year timeframe.

It will be difficult to predict who will be the winners, but the competition will definitely produce new offerings and technologies, meaning we should avoid long-term lock-ins with any vendor.

## **Personal Digital Assistants (PDAs)**

Personal Digital Assistants are handheld devices that merge handwriting recognition, personal organization tools, and mobile telecommunications. The most exciting PDAs that could affect education are electronic textbooks and the CrossPad. Electronic textbooks are book size devices capable of storing and displaying large amounts of text and reference material. The CrossPad enables a user to digitally capture up to 50 pages of handwritten notes and/or drawings that can be transferred to a PC.

## **Explosive Growth of the Intranet**

The intranet's capabilities to connect schools, students, teachers and administrators will continue to grow. New publishing tools will be introduced making it extremely easy for anyone to publish a database for use across the network. This will cause some experimentation and expense as schools try new applications but the opportunity to move off most mainframe applications will provide decreased cost and improved productivity.