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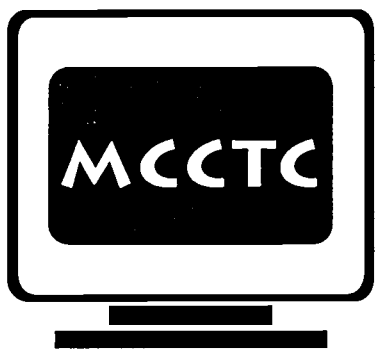
ABSTRACT

During June and July of 1997, the Maryland Community Colleges Technology Council conducted a survey of all 18 community colleges in Maryland to determine the existing state of campus instructional and administrative technologies, and to learn the technology needs and plans of the colleges for the following five years. The survey asked about instructional technology, intercampus networks and distance learning initiatives, technology support, administrative systems, and campus technology infrastructure. Results indicated that the 18 community colleges in Maryland used 11,599 personal computers for instructional purposes, and 4,831 for administrative functions. However, only 28% employed current technology, and the colleges anticipated needing 6,974 additional computers by the year 2003. To fulfill college plans, 1,190 faculty needed to be trained in multimedia instructional techniques between July 1997 and 2003. A total of 797 needed training in distance learning methodologies, and 226 additional technical support staff will be needed to install and maintain needed instructional and administrative networks, hardware, and software. Administrative systems needed improvements at a majority of campuses, because less than half had fully integrated systems running on relational databases on client-server platforms. Infrastructure upgrades were also needed at most campuses. (YKH)

Funding Information Technology in Maryland Community Colleges

Executive Summary
Technical Report
Survey Questionnaire
General Assembly Bill



Maryland Community Colleges Technology Council

1997-98

Maryland Community Colleges
Technology Needs Assessment Survey

Sponsored and Conducted by the

Maryland Community Colleges Technology Council

With Support from the
Maryland Community College Research Group

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Maryland Community Colleges Technology Council

Mission and Goals
1997-98

MCCTC Mission

- Develop a clear vision for statewide information technology development within and among the community colleges and their community partners.

- Provide an information exchange about exemplary programs and activities that utilize information technology to improve teaching and learning, enhance student access and community outreach, and facilitate the delivery of services to students and communities.

- Identify and recommend technology-related staff development and training programs for Maryland's community colleges.

- Provide advice on technology issues as requested by the Maryland Association of Community Colleges and the Maryland Council of Community College Presidents.

1997-98 Goals

- Develop, administer, and analyze a statewide community college technology needs assessment survey to document the current status and forecasted needs for instructional and administrative technologies at the 18 community colleges in Maryland.

- Work with the Maryland Association of Community Colleges to develop a technology funding strategy for the 1998 session of the Maryland General Assembly.

- Examine technical support staffing at Maryland community colleges, including turnover and salary analyses.

- Explore the feasibility and cost effectiveness of alternative means of providing a voice, video, and data network linking all 18 Maryland community colleges.

Maryland Community Colleges Technology Council

Technology Needs Assessment Survey
September 1997

Executive Summary

During June and July of 1997, the Maryland Community Colleges Technology Council conducted a survey of all 18 community colleges in Maryland to determine the existing state of campus instructional and administrative technologies, and to learn the technology needs and plans of the colleges for the following five years. The survey asked about instructional technology, intercampus networks and distance learning initiatives, technology support, administrative systems, and campus technology infrastructure. Highlights included:

- The 18 community colleges in Maryland employed 11,599 personal computers for instructional purposes, and an additional 4,831 personal computers for administrative functions. Only 28 percent of the total 16,430 computers were current technology, defined as using a Pentium 133 or faster processor.

- The colleges anticipated needing 6,974 *additional* computers for instructional and administrative purposes by the year 2003, for a total planned statewide computer inventory of 23,404.

- To fulfill college plans, a total of 1,190 full-time faculty needed to be trained in multimedia instructional techniques between July 1997 and the year 2003. A total of 797 needed training in distance learning methodologies.

- By the year 2003, college plans called for constructing or retrofitting 474 multimedia classrooms, 61 classrooms for interactive video distance learning, and 292 classrooms with satellite downlink connections.

- The colleges needed 226 *additional* technical support staff to install and maintain instructional and administrative networks, hardware, and software.

- Administrative systems needed improvements at a majority of campuses. Less than half of the campuses had fully integrated systems running on relational databases on client-server platforms. Electronic interfaces were scarcely used, and few functions were Web-enabled.

- Infrastructure upgrades were needed at most campuses.

Background

In October 1996, the Maryland Community College Facilities Planners Council presented *A Proposal for Enhancing Information Technology in Maryland Community Colleges* to the Maryland Council of Community College Presidents. The facilities planners described the following challenge facing the state's community colleges:

> Maryland community colleges face a major challenge posed by the rapid pace of change accompanying the emerging Information Age. Every five years, or less, a major new development cycle begins in one of the many new technologies associated with communicating information. Maintaining current state-of-the-art technology is crucial to the success of community colleges, especially as they broaden services to Maryland's business and industry community. Furthermore, to achieve currency with the state of the art in many of the newer information age technologies, Maryland's community colleges need to make substantial expenditures to upgrade campus telecommunications infrastructure and equipment, classroom and laboratory instructional technology, and training for faculty and staff in the use of these technologies.
>
> To successfully meet this challenge, Maryland community colleges must have a reliable source of funding that will help the colleges catch up in those areas where they lag technologically, and that will be dedicated to funding the enormous, reoccurring investment costs associated with keeping the technology up to date.

Among the initiatives advocated in the proposal for prompt action were creation of a statewide technology affinity group, administration of a statewide technology needs assessment survey, and development of a statewide community college technology plan and funding strategy. (See the appendix for a copy of the full proposal.) The council of presidents approved these initiatives.

The first meeting of the Maryland Community Colleges Technology Council took place February 20, 1997, at Catonsville Community College. The Council membership of 14 included facilities planners, institutional research directors, data processing directors, a business officer, continuing education deans, instructional vice presidents and deans, and a student services dean. Ex-officio members included representatives from the Maryland Higher Education Commission, Maryland Department of Budget and Management, and the Maryland Information Technology Center. Dr. Joseph F. Shields, president of Carroll Community College, represented the community college presidents on the Council. The Council co-chairs were Jon Larson of Frederick Community College and Joseph White of Montgomery College.

During March, April, and May, four subgroups of the Council drafted questions for a statewide community college technology needs assessment survey. Craig Clagett of Prince George's Community College prepared a 15-page questionnaire, with five sections covering instructional technology, intercampus networks and distance learning initiatives, technology support, administrative systems, and campus technology infrastructure. The questionnaire was finalized in early June. On June 13, 1997, questionnaire packets including guidelines for completion were mailed to the presidents of all 18 Maryland community colleges. (Copies of the cover letter, guidelines for completion, and the questionnaire are in the appendix.)

During July and August, responses from the colleges were entered into a file for analysis. Response frequency tables for three college cohorts (based on FTE enrollment) were circulated for review and evidence of consistency in question interpretation. Wallace Knapp of Catonsville Community College and Ray Perry of Cecil Community College served as reviewers. During August, this report was prepared by Craig Clagett.

Overview of Findings

In this section, tables displaying major findings of the survey are presented. More detailed tables are found in the analyses comprising the balance of this report. Individual college responses to each questionnaire item are appended.

As of July 1997, the 18 Maryland community colleges were using 16,430 personal computers on their campuses. A total of 4,639, or 28 percent, were current technology, defined as having a Pentium 133 (or equivalent) or faster processor. Thus seven in ten computers were already out of date, a generation behind the technology used in business.

Personal Computer Inventory, Statewide, July 1997
Maryland Community Colleges

	Instruction	Administration	Total
Current technology	3,372	1,267	4,639
Old technology	8,227	3,564	11,791
Total PC inventory	11,599	4,831	16,430

To meet planned facilities expansion and anticipated enrollment increases, the 18 colleges identified needs for nearly 7,000 additional computers, with over 90

percent needed for instructional purposes. Together with the existing inventory, the colleges collectively would compile a personal computer inventory of over 23,000 computers by the year 2003 if current plans were fulfilled. More significant than the monies needed for this growth, however, was the implication of the *replacement costs* necessary to keep this inventory up to date on a continuous basis. Personal computer technologies become obsolete every three years, and community colleges must keep up with the market to fulfill their mission of preparing a capable, well-trained workforce meeting the needs of today's business and industry. A three-year replacement cycle would imply purchase of 7,800 computers annually.

Anticipated Personal Computer Inventory, Statewide, 2003
Maryland Community Colleges

	Instruction	Administration	Total
Existing inventory	11,599	4,831	16,430
Additional PCs needed	6,406	568	6,974
Total anticipated inventory	18,005	5,399	23,404

Equal to or greater than the challenge of maintaining hardware and software currency, however, may be the human resources challenge. Community college faculty, both full-time and adjunct, must be fully trained in the new technologies of instruction. As of July 1997, only a few hundred community college faculty statewide were proficient in the use of the new instructional technologies associated with distance learning and multimedia classrooms. The survey found a need for over 1,800 faculty to be trained in distance learning technologies, and for nearly 3,000 faculty to be trained in using external telecommunications networks and presenting mediated information in the classroom.

Faculty Training Needs, Statewide
Total Needing Training by Year 2003

Mode of Instruction	Full-time Faculty	Adjunct Faculty
Distance learning	797	1,009
Multimedia	1,190	1,758

To exploit the new technologies, classrooms must be properly outfitted. As a 1991-92 state-appointed study group said in *The Telecommunications Requirements of Academic Facilities*, "all instructional spaces should be designed to allow faculty members to utilize electronic instructional devices--computer-generated graphics, video display screens, video monitors, access to electronic networks external to the building and to the campus." In the survey the 18 community colleges identified the need to retrofit or construct 474 classrooms to meet this capability standard. In addition, the colleges expressed their needs to provide satellite downlinks to 292 classrooms, and to construct and equip 61 additional classrooms for interactive distance learning.

Electronic Classroom Needs, Statewide
Total Current, Additional Classrooms Needed by Year 2003

Classroom Capability	Existing Classrooms	Additional Classrooms Needed
Distance learning (interactive video)	35	61
Multimedia	215	474
Satellite downlink	65	292

Maryland community colleges employed the equivalent of nearly 277 full-time employees to support instructional and administrative technologies as of July 1997. The colleges said they needed 226 *additional* full-time staff to adequately support the technologies they envisioned using in the year 2003. A third of the colleges cited technical support staffing among their top three campus technology priorities.

Technical Support Staff Needs, Statewide
Total Current, Additional FTE Staff Needed by Year 2003

Technology Supported	Currently Employed	Additional Staff Needed
Administrative networks	78.5	59.0
Interactive video/distance learning	38.0	58.0
Multimedia classrooms/laboratories	160.3	109.2
Total technical support staff	276.8	226.2

Members of the Technology Council agreed that campus administrative systems should be fully integrated, maintained on a relational database, run on client-server platforms, year 2000 compliant, and accessible by a Web browser. None of the 18 colleges met this standard in July 1997. Less than half of the colleges reported integrated systems or full use of relational databases. Only five colleges had all their systems ready for the year 2000. Only three had transitioned to client-server platforms. Administrative systems were Web-enabled at only one campus. Council members also advocated increased use of electronic interfaces for administrative functions, yet with the exceptions of payroll direct deposit and student transcript distribution, electronic transactions were underutilized.

Effective use of technology requires an appropriate campus infrastructure. A majority of community college campuses had all buildings connected to a fiber optic backbone, administrative and faculty offices connected to the Internet, and remote locations linked to the main campus via a wide area data communications network. Less than half, however, had network access in all classrooms and laboratories. Only ten had conduit adequate for campus needs through the year 2003. Only seven reported adequate fire detection, security, or energy management networks. Respondents at six colleges reported a need to upgrade campus telephone systems.

Organization of this Report

The remainder of this technical report on the statewide technology needs assessment survey provides more detailed analyses of college responses, grouped by college size. The survey findings are reported under the following headings:

Responses were aggregated by college size, in terms of full-time-equivalent (FTE) enrollment, as follows:

Small colleges (‹1,700 FTE)	Allegany, Carroll, Cecil, Chesapeake, Garrett, Wor-Wic
Mid-size colleges	Charles, Dundalk, Frederick, Hagerstown, Harford, Howard
Large colleges (›5,000 FTE)	Anne Arundel, Baltimore, Catonsville, Essex, Montgomery, Prince George's

Individual college responses to each questionnaire item are in the appendix.

I. Instructional Computer Inventory

In July 1997, the 18 Maryland community colleges had 11,599 personal computers in use in instruction, student assignments, library research, faculty offices, student testing and assessment, and other instructional support activities. Only three in ten were current with the market, possessing a Pentium 133 or faster processor. The colleges indicated a need for over 6,400 additional computers to fulfill instructional plans through the year 2003. In total, the colleges anticipated an instructional computer inventory of 18,005 in place within five years.

Existing and Planned Instructional Computer Inventory
Community Colleges Statewide

Location and Use of Computers	Computers in Use Now		Additional Computers Needed by Year 2003	Total Computers Needed in Year 2003
	Less than current technology	Current technology		
Instructional classrooms/labs	4,634	2,148	3,040	9,822
Open computer laboratories	1,161	329	1,494	2,984
Library (student use)	262	269	627	1,158
Faculty offices	1,716	533	574	2,823
Placement, testing, and assessment	383	58	421	862
Other computers used for instruction	71	35	250	356
Total instructional computers	8,227	3,372	6,406	18,005

The six smaller colleges reported an instructional computer inventory of 1,738, an average of nearly 300 per campus. They planned for 1,048 additional computers.

Existing and Planned Instructional Computer Inventory Small Colleges				
	Computers in Use Now		Additional	Total
Location and Use of Computers	Less than current technology	Current technology	Computers Needed by Year 2003	Computers Needed in Year 2003
Instructional classrooms/labs	622	349	480	1,451
Open computer laboratories	274	9	242	525
Library (student use)	52	74	73	199
Faculty offices	244	40	89	373
Placement, testing, and assessment	58	4	89	151
Other computers used for instruction	8	4	75	87
Total instructional computers	1,258	480	1,048	2,786

The mid-size colleges had an inventory of 2,960 instructional computers, or nearly 500 per campus. They planned to add over 2,100 more during the next five years.

Existing and Planned Instructional Computer Inventory Mid-size Colleges				
	Computers in Use Now		Additional	Total
Location and Use of Computers	Less than current technology	Current technology	Computers Needed by Year 2003	Computers Needed in Year 2003
Instructional classrooms/labs	1,300	557	1,050	2,907
Open computer laboratories	270	65	321	656
Library (student use)	72	42	329	443
Faculty offices	415	88	140	643
Placement, testing, and assessment	91	8	134	233
Other computers used for instruction	37	15	130	182
Total instructional computers	2,185	775	2,104	5,064

The six larger colleges, with an average FTE enrollment in 1995-96 of 8,057 students, employed 6,901 computers for instruction and academic support (an average of 1,150 computers per college). They reported plans for 3,254 additional computers for instructional purposes, bringing the total inventory in five years to over 10,000.

Existing and Planned Instructional Computer Inventory Large Colleges				
	Computers in Use Now		Additional	Total
Location and Use of Computers	Less than current technology	Current technology	Computers Needed by Year 2003	Computers Needed in Year 2003
Instructional classrooms/labs	2,712	1,242	1,510	5,464
Open computer laboratories	617	255	931	1,803
Library (student use)	138	153	225	516
Faculty offices	1,057	405	345	1,807
Placement, testing, and assessment	234	46	198	478
Other computers used for instruction	26	16	45	87
Total instructional computers	4,784	2,117	3,254	10,155

The 18 colleges had total FTE enrollment in 1995-96 of 72,868 students and employed 11,599 computers for instructional purposes, for an average of 6.3 FTE students per computer. The average number of students per PC varied by college size, with the smaller colleges (1,309 average FTEs and 290 computers per campus) having 4.5 students per machine, the mid-size colleges (with an average 2,779 FTEs and 493 machines per campus) averaging 5.6 FTE per computer, and the larger colleges (with an average enrollment of 8,057 FTEs and 1,150 computers per college) averaging 7.0 students per computer.

The above calculations included all computers identified with instructional functions, including those in faculty offices, testing centers, and libraries. Restricting the counts to computers used by students in classrooms and laboratories, the statewide average in July 1997 was 8.8 FTE students per computer. By size, the smaller colleges averaged 6.3 students per computer, the mid-size colleges 7.6 students per computer, and the larger colleges 10.0 students per computer.

II. Faculty Instructional Technology Proficiencies and Training Needs

Perhaps surpassing the equipment challenges was the need for faculty training in the new instructional technologies. Statewide, the 18 community colleges reported a total of 554 faculty proficient in multimedia instruction, equally split between full-time and adjunct faculty. The colleges anticipated needing over 3,500 such faculty by the year 2003. Thus, they had approximately one-sixth the trained faculty they anticipated needing in 2003. Nearly 3,000 faculty would need training during the next five years to meet the need for multimedia instruction.

Similarly, the colleges reported that the number of faculty proficient in interactive video distance learning techniques represented only 15 percent of their anticipated needs. Statewide, 324 faculty were identified as possessing these skills, while the colleges foresaw a need for 2,130 distance learning faculty in the year 2003. Over 1,800 faculty would need training in distance learning to meet the anticipated demand.

Full-time and Adjunct Faculty Proficiencies and Training Needs
Community Colleges Statewide

	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Full-time faculty proficient in using multimedia classrooms	276	1,190	1,466
Part-time, adjunct faculty proficient in multimedia	278	1,758	2,036
Full-time faculty proficient in distance learning techniques	202	797	999
Part-time, adjunct faculty proficient in distance learning	122	1,009	1,131

The need for faculty training in multimedia classroom instruction and interactive video distance learning techniques was shared among colleges of all sizes. The number of instructors needing training was far greater than the number currently proficient in these teaching methods at all colleges. The following three tables summarize the need for training by college size.

Full-time and Adjunct Faculty Proficiencies and Training Needs Small Colleges			
	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Full-time faculty proficient in using multimedia classrooms	68	202	270
Part-time, adjunct faculty proficient in multimedia	33	203	236
Full-time faculty proficient in distance learning techniques	50	144	194
Part-time, adjunct faculty proficient in distance learning	16	157	173

Full-time and Adjunct Faculty Proficiencies and Training Needs Mid-size Colleges			
	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Full-time faculty proficient in using multimedia classrooms	125	406	531
Part-time, adjunct faculty proficient in multimedia	164	745	909
Full-time faculty proficient in distance learning techniques	53	217	270
Part-time, adjunct faculty proficient in distance learning	28	220	248

Full-time and Adjunct Faculty Proficiencies and Training Needs Large Colleges			
	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Full-time faculty proficient in using multimedia classrooms	83	582	665
Part-time, adjunct faculty proficient in multimedia	81	810	891
Full-time faculty proficient in distance learning techniques	99	436	535
Part-time, adjunct faculty proficient in distance learning	78	632	710

III. Existing and Planned Electronic Classrooms

Statewide, the 18 community colleges had 35 classrooms equipped for interactive distance learning in July 1997. To meet state and local initiatives for expanding the reach and scope of distance learning, 61 additional interactive video classrooms were needed by the year 2003. Sixty-five classrooms were capable of receiving satellite feeds in July 1997; the colleges saw a need for five times that many. A total of 215 classrooms were equipped for multimedia instruction at the time of the survey. The colleges identified plans for retrofitting or constructing 474 more.

Existing and Planned Electronic Classrooms Community Colleges Statewide			
Classroom Capabilities	Classrooms in Use Now	Additional Classrooms Needed by 2003	Total Classrooms Needed in Year 2003
Interactive fiber-optic video	16	25	41
Interactive digital compressed video	19	36	55
Satellite downlink	65	292	357
Multimedia	215	474	689

Existing and planned electronic classrooms by college size were as follows:

Existing and Planned Electronic Classrooms Small Colleges			
Classroom Capabilities	Classrooms in Use Now	Additional Classrooms Needed by 2003	Total Classrooms Needed in Year 2003
Interactive fiber-optic video	5	10	15
Interactive digital compressed video	5	11	16
Satellite downlink	13	126	139
Multimedia	48	113	161

Existing and Planned Electronic Classrooms Mid-size Colleges			
Classroom Capabilities	Classrooms in Use Now	Additional Classrooms Needed by 2003	Total Classrooms Needed in Year 2003
Interactive fiber-optic video	7	7	14
Interactive digital compressed video	9	10	19
Satellite downlink	26	109	135
Multimedia	132	146	278

Existing and Planned Electronic Classrooms Large Colleges			
Classroom Capabilities	Classrooms in Use Now	Additional Classrooms Needed by 2003	Total Classrooms Needed in Year 2003
Interactive fiber-optic video	4	8	12
Interactive digital compressed video	5	15	20
Satellite downlink	26	57	83
Multimedia	35	215	250

IV. Distance Learning Systems and Intercampus Networks

In 1993, three community colleges in Western Maryland--Allegany, Garrett, and Hagerstown--were linked by a fiber-optic, full-motion video network installed by Bell Atlantic. This became the prototype for the Maryland Interactive Distance Learning Network (MIDLN), created in September 1994 with the signing of contracts between Bell Atlantic, AT&T, and the state of Maryland. In addition, individual colleges have invested in compressed video and other interactive video systems, as well as satellite, cable, Internet, and other distance learning technologies. The survey documented the extent of distance learning capabilities among Maryland community colleges in July 1997, as well as plans for the following five years.

A majority of community colleges offered interactive distance learning in 1997, through the Maryland Interactive Distance Learning Network, interactive compressed video systems, or the Integrated Services Digital Network (ISDN). Only one college--Cecil--did not have a video network capability, instead opting for Internet-based instruction for all its distance learning offerings. Most colleges provided satellite downlinks, but none had uplink capability. Twelve colleges provided instruction over their own cable television channels. Ten of the 18 colleges offered instruction over the Internet. Only four colleges delivered instruction over college intranets.

Current Distance Learning Networks and Activities
Number of Campuses

	Small Colleges	Mid-size Colleges	Large Colleges	Total
MIDLN	4	4	3	11
Interactive Compressed Video	3	4	3	10
ISDN	3	4	3	10
Other interactive video	1	2	2	5
College cable TV channel	3	4	5	12
Satellite downlink	4	5	5	14
Satellite uplink	0	0	0	0
Audio/phone instruction	0	1	4	5
BBS instruction	2	1	4	7
Internet instruction	4	2	4	10
Intranet instruction	1	1	2	4
Video-based courses	4	4	5	13

Distance learning plans for the next five years included increased use of interactive video networks, with 14 of the 18 colleges anticipated to be on MIDLN and 17 planning to use interactive compressed video. All 18 colleges expected to have satellite downlink capability, and eight hoped to have uplink capability as well. All but one college planned on offering instruction on the Internet. Intranet instruction was in the plans of 16 of the 18 colleges--four times the number offering it in July 1997.

Anticipated Distance Learning Networks and Activities, 2003
Number of Campuses

	Small Colleges	Mid-size Colleges	Large Colleges	Total
MIDLN	5	5	4	14
Interactive Compressed Video	5	6	6	17
ISDN	5	4	5	14
Other interactive video	5	5	3	13
College cable TV channel	5	5	6	16
Satellite downlink	6	6	6	18
Satellite uplink	3	4	1	8
Audio/phone instruction	2	3	4	9
BBS instruction	3	5	3	11
Internet instruction	6	6	5	17
Intranet instruction	5	6	5	16
Video-based courses	6	6	5	17

V. Administrative Systems

Respondents were asked to describe several features of their current administrative systems (including facilities, financial, foundation, human resources, payroll, and student databases). For most questions, respondents were asked to indicate whether all (defined as 95 percent or more), half but not all, some but less than half, or none of their systems met certain criteria. Individual responses to each item are appended. In the table below, a college was counted as having met the standard if it responded all (95 percent or more).

Administrative Systems, July 1997 Number of Colleges Meeting Standard				
Standard	Small Colleges (N=6)	Mid-size Colleges (N=6)	Large Colleges (N=6)	Total (N=18)
All systems integrated	4	2	2	8
On client-server platform	1	2	0	3
On relational database	3	2	2	7
Year 2000 compliant	2	2	1	5
All systems Web-enabled	0	1	0	1
Running Windows 95	1	1	1	3

As can readily be seen, administrative systems across the state generally fell short of the standards of full integration, client-server platforms, relational databases, year 2000 compliant, and full Web access. Less than half had all administrative systems integrated or on a relational database system. Thirteen colleges were not ready for the year 2000. Only three colleges had administrative systems on client-server platforms. A single college had administrative systems Web-enabled. Three campuses had fully adopted Windows 95.

The questionnaire asked what vendors were used for administrative systems. A college could indicate more than one. Colleges reported great diversity in vendors, with SCT the most popular, with five college users--primarily large colleges. Computing Options and Datatel were next most popular, used by three colleges each. The only other vendor used by more than one college was AMS, with two users. Five colleges used systems developed in-house for at least some functions (see table on next page).

Administrative Systems Vendors, July 1997 Number of Campuses				
Vendor	Small Colleges (N=6)	Mid-size Colleges (N=6)	Large Colleges (N=6)	Total (N=18)
SCT	0	1	4	5
Computing Options	1	0	2	3
Datatel	2	1	0	3
AMS	0	0	2	2
Ameritech	0	0	1	1
BiTech	1	0	0	1
Case Technologies Development	0	1	0	1
CMDS	1	0	0	1
Condata	0	1	0	1
FMIS	0	0	1	1
ISI	0	0	1	1
Software AG	0	1	0	1
In-house campus systems	1	2	2	5

Increasingly, organizations are providing information to others by transmitting data electronically. Most of Maryland's community colleges provided direct deposit of payroll into employee bank accounts, and two-thirds distributed student transcripts electronically. However, use of other possible electronic interfaces was scarce in July 1997.

Eight colleges made payroll tax payments electronically, five submitted Maryland State Pension System contributions electronically, and four deposited 403b retirement plan contributions electronically. Three or fewer colleges provided for electronic recording of purchase requisitions, purchase order distribution to vendors, employee time and attendance recording, or student grade reporting by faculty. No college made vendor payments by EDI technology.

Electronic Interfaces in Use, July 1997 Number of Colleges				
Function	Small Colleges (N=6)	Mid-size Colleges (N=6)	Large Colleges (N=6)	Total (N=18)
Employee time/attendance	0	1	1	2
Payroll direct deposit	3	5	5	13
Payroll tax payments	3	3	2	8
Pension System contributions	2	2	1	5
403b plan contributions	2	2	0	4
Purchase requisition recording	1	1	1	3
Purchase order distribution	0	1	0	1
Vendor payments	0	0	0	0
Student grade recording	0	0	1	1
Student transcript distribution	3	4	5	12

VI. Administrative Computer Inventory

The 18 colleges used 4,831 computers in administrative offices in July 1997. Three-fourths of these machines were old technology, with processing speeds below 133 MHz.

Administrative Computer Inventory, July 1997 Maryland Community Colleges				
	Small Colleges	Mid-size Colleges	Large Colleges	Total
Current technology	159	283	825	1,267
Old technology	511	917	2,136	3,564
Total administrative PCs	670	1,200	2,961	4,831

By the year 2003, an additional 568 personal computers would be needed for administrative purposes, according to the survey respondents.

Anticipated Administrative Computer Inventory, 2003 Maryland Community Colleges				
	Small Colleges	Mid-size Colleges	Large Colleges	Total
Existing inventory	670	1,200	2,961	4,831
Additional PCs needed	98	145	325	568
Total anticipated inventory	768	1,345	3,286	5,399

VII. Technical Support Staffing

The explosive growth in computer inventory, campus networks, and software applications used at Maryland's community colleges has placed great demands on information systems staff. Six colleges listed support staffing among their college's top technological priorities. All colleges indicated that additional technical support personnel were needed to install and maintain the instructional technology, distance learning technology, and administrative systems they planned to have in place in the year 2003. Collectively, the colleges reported a need for 226 more full-time staff.

Technical Support Staff Community Colleges Statewide			
Employee Category	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Instructional technology technical support staff (FTE)	160.3	109.2	269.5
Distance learning technology technical support staff (FTE)	38.0	58.0	96.0
Administrative PCs/networks technical support staff (FTE)	78.5	59.0	137.5
Total support staff (FTE)	276.8	226.2	503.0

The six smaller colleges had less than 50 full-time-equivalent staff supporting technology in July 1997. Together, they anticipated needing 87 FTE employees by the year 2003.

Technical Support Staff Small Colleges			
Employee Category	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Instructional technology technical support staff (FTE)	20.0	16.5	36.5
Distance learning technology technical support staff (FTE)	10.5	10.5	21.0
Administrative PCs/networks technical support staff (FTE)	18.0	11.5	29.5
Total support staff (FTE)	48.5	38.5	87.0

Collectively, the mid-size colleges reported a need to double their technical support staff by the year 2003:

Technical Support Staff Mid-size Colleges			
Employee Category	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Instructional technology technical support staff (FTE)	35.3	31.2	66.5
Distance learning technology technical support staff (FTE)	8.0	20.0	28.0
Administrative PCs/networks technical support staff (FTE)	23.5	15.5	39.0
Total support staff (FTE)	66.8	66.7	133.5

The six larger colleges had a combined full-time-equivalent technical support staff numbering slightly over 160 in July 1997. This represented 57 percent of the total staffing they anticipated needing in 2003.

Technical Support Staff Large Colleges			
Employee Category	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Instructional technology technical support staff (FTE)	105.0	61.5	166.5
Distance learning technology technical support staff (FTE)	19.5	27.5	47.0
Administrative PCs/networks technical support staff (FTE)	37.0	32.0	69.0
Total support staff (FTE)	161.5	121.0	282.5

All together, the 18 colleges indicated a need to hire 226 additional technical support staff over the next five years.

VIII. Campus Infrastructure

Effective use of technology requires an appropriate campus infrastructure. Preferably, all campus buildings would be connected to a fiber-optic backbone network using category 5 UTP cabling. All classrooms, laboratories, and offices would be connected to the network. All faculty and administrative offices would have Internet access. All campus workstations could be linked to any appropriate campus computing resource. All remote sites would be linked to the central campus by a wide area network. Systems would be in place for building security, fire detection, and energy management. Campus conduit would be adequate for current and planned campus facilities, preferably with redundant pathing to all buildings.

Collectively, the 18 colleges fell short of this ideal. Half to three-quarters of the colleges met the standards for basic infrastructure components such as conduit, backbone, cabling, and faculty and administrative office access to networks. Only half had all student classrooms and laboratories connected. Less than half had adequate building security, fire detection, and energy management systems. The larger colleges were less likely to meet the infrastructure standards than the small and mid-size colleges.

Campus Infrastructures, July 1997 Number of Colleges Meeting Standard				
Standard	Small Colleges (N=6)	Mid-size Colleges (N=6)	Large Colleges (N=6)	Total (N=18)
All buildings connected to fiber backbone	3	6	4	13
All buildings have category 5 UTP cabling	3	5	2	10
All laboratories connected to Internet	3	3	2	8
All classrooms with voice/data/video link	3	4	2	9
All administrative offices with Internet	5	6	3	14
All faculty offices with Internet	5	5	2	12
All faculty offices connected to admin. systems	4	5	2	11
Link any workstation to any campus computer	6	6	6	18
Wide area network linking all remote sites	5	5	4	14
Network management system	3	4	4	11
Building energy management network	3	3	1	7
Adequate fire detection network	4	2	1	7
Adequate campus security network	3	2	0	5
Existing conduit in adequate condition	5	3	6	14
Redundant pathing to all buildings	0	1	1	2
Conduit will support planned construction	4	1	5	10

The questionnaire asked what local area network bandwidths were currently in use. All colleges reported use of 10 MB Ethernet. Ten colleges had mainframe LANs. Half the colleges used 100 MB Ethernet. No other bandwidth was used by more than a third of the colleges.

Local Area Network Bandwidths in Use, July 1997 Maryland Community Colleges				
Bandwidth	Small Colleges (N=6)	Mid-size Colleges (N=6)	Large Colleges (N=6)	Total (N=18)
10 MB Ethernet	6	6	6	18
100 MB Ethernet	1	5	3	9
4 MB Token Ring	1	0	1	2
16 MB Token Ring	1	1	3	5
ATM	1	0	1	2
FDDI	1	3	2	6
Mainframe	1	4	5	10

Two-thirds of the colleges reported that their telephone systems supported PBX technologies such as processing video and data, T1 and PRI-based links to service providers, and systemwide faxing. The same proportion also reported their telephone systems were adequate to meet campus needs anticipated in the year 2003. A third of the colleges provided students with touch-tone phone registration. Five colleges could handle bill payment and course add/drop through their phone network.

Telephone System Capabilities, July 1997 Maryland Community Colleges				
Function	Small Colleges (N=6)	Mid-size Colleges (N=6)	Large Colleges (N=6)	Total (N=18)
Adequate capacity through 2003	4	3	5	12
Support new PBX technologies	4	4	4	12
Touch-tone registration	1	2	3	6
E-mail	0	0	1	1
Internet	0	0	1	1
Add/drop courses	0	2	3	5
Bill payment	0	2	3	5

A dial-in capability is necessary to provide maximum access to campus computing resources. A third of the colleges did not provide this. Only five colleges had provisions for all faculty and staff to dial in from off campus. Students at only three colleges had this access.

Dial-in Capabilities, July 1997
Maryland Community Colleges

Group	Small Colleges (N=6)	Mid-size Colleges (N=6)	Large Colleges (N=6)	Total (N=18)
All faculty and staff	1	1	3	5
Selected staff members	5	5	2	12
Students	0	0	3	3

IX. Campus Technology Plans

The survey asked if the colleges had prepared a Technology Master Plan since 1995. Nine colleges responded that they had; an additional eight colleges said they had partial plans. Only one college reported having no recent plan.

Most college technology plans included standards for fiber and copper cabling, equipment, and communication protocols. Fifteen of the colleges with plans included Internet/World Wide Web and campus intranet goals. Sixteen had plans incorporating interactive video distance learning systems. Fourteen specifically addressed faculty and staff training needs. Libraries were included in a similar number of campus plans. Thirteen colleges had established replacement schedules for PCs and other equipment included in their plans. Eleven colleges had plans for retrofitting classrooms for multimedia instruction.

Only half of the colleges had plans for energy management, security, or fire detection systems. Eight colleges included fiber and cable documentation in their plans. Seven of the 17 colleges with recent technology plans included alternative funding options such as leases, trade-ins, or private gifts.

Campus Technology Plans, July 1997 Number of Colleges				
Plan Attribute	Small Colleges (N=6)	Mid-size Colleges (N=6)	Large Colleges (N=6)	Total (N=18)
Fiber and copper cabling standards	6	5	6	17
Equipment standards	5	4	5	14
Communication protocol standards	5	4	6	15
User training standards	4	3	4	11
Telephone network	6	4	5	15
Video network	5	4	4	13
Data network	6	5	6	17
Internet/intranet network	6	4	5	15
Energy management systems	3	2	4	9
Fire protection systems	3	2	3	8
Security systems	3	2	4	9
Building conduits	4	5	6	15
Fiber/cable documentation	1	3	4	8
Replacement schedule for PCs	5	4	4	13
Retrofit multimedia classrooms	5	4	2	11
Interactive video/distance learning	5	5	6	16
Internet/WWW technology	6	4	5	15
Faculty and staff training needs	6	4	4	14
Library/learning resources systems	6	4	4	14
Alternative funding proposals	2	4	1	7

X. Campus Priorities

Respondents were asked, "Of all your campus technology needs, what are your college's top three priorities?" The colleges responded as indicated in the following table:

Campus Technology Priorities, July 1997	
Small colleges	
Allegany	1. Computer equipment upgrades to current technology 2. Distance learning equipment upgrades 3. Multimedia instructional equipment and training
Carroll	1. Ongoing replacement of labs, networks, and work stations on a 1/3 per year basis to maintain effective instructional delivery and administrative support 2. Continuing development of all distance learning delivery systems, with emphasis on Internet-based instruction and learning, and student support services 3. Expand computercentric instructional delivery by providing faculty with state-of-the-market technology and supporting resources
Cecil	To provide up-to-date equipment bringing voice/data/video capabilities to classrooms, labs, and faculty and administrative offices. This implies 1. regular upgrading of PCs, networks, and connectivity to the outside world 2. distance learning equipment 3. funding additional staff needed to support the equipment and training faculty and staff to use the equipment.
Chesapeake	1. Identifiable and sustainable funding 2. Cross-platform compatibility 3. Training for users and technical staff
Garrett	1. Interactive compressed video 2. Intranet/Internet 3. Computer labs
Wor-Wic	1. Implementing distance learning network 2. Upgrading computer laboratories to current technology 3. Upgrading existing computer network servers
Mid-size colleges	
Charles	1. New administrative system 2. Touch-tone registration 3. Enhancing Internet/intranet capability
Dundalk	1. Personnel, personnel, personnel 2. Hardware upgrades 3. New labs
Frederick	1. Interactive distance learning 2. Internet 3. Multimedia classrooms

Hagerstown	1. Technical support staff 2. Training/skill maintenance 3. Equipment upgrades
Harford	1. Incorporating WWW technologies into classroom instruction 2. Maintenance of current technologies 3. Upgrading to new technology
Howard	1. Planned replacements of PCs, networking equipment, administrative and financial systems 2. Telephone/computer integration 3. Acquiring new technology and corresponding curricular enhancements, including staff and faculty training
Large colleges	
Anne Arundel	1. Integrate technology into instruction across curricula 2. Maintain currency of hardware and software, including building the college network 3. Provide ongoing training and technical support
Baltimore City	1. Instructional network 2. Open computer labs 3. Web/intranet enabled applications
Catonsville	1. Paying wages comparable to the industry to recruit, keep, and reward technical staffs 2. Implementing new administrative systems to support year 2000 processing 3. Technology refresh program/budgeting/funding to replace PCs on a regular basis as they become obsolete
Essex	1. Support staff 2. Infrastructure 3. Training
Montgomery	1. Update hardware to operate state-of-the-market academic software 2. Additional student open labs and electronic access 3. Replace current administrative systems
Prince George's	1. Support staff 2. Connectivity in outer parts of campus 3. User training

The most frequently mentioned campus priority was the need for immediate and ongoing equipment upgrading. Eleven of the colleges specified the need to upgrade existing inventory to current market standards, and/or the need to maintain equipment currency on an ongoing basis. Faculty and staff training was the second most mentioned priority. The need for more technical support staff was third, with seven colleges asserting this as a top priority.

College Technology Priorities Mentioned by Three or More Colleges	
Priority	Number of Colleges
Equipment upgrades, immediate and ongoing	11
Faculty and staff training	8
Technical support staffing	7
Distance learning	6
Internet/World Wide Web/intranet	5
Additional student computer laboratories	4
Multimedia classrooms	3
New administrative systems	3

A third of the colleges had distance learning as one of their top three priorities. Five of the six specifying distance learning were small colleges. Five colleges placed a priority on developing Internet and intranet capabilities. Four colleges specified the need for more student computer laboratories. Multimedia classrooms and new administrative systems were priorities of three colleges each.

Conclusions

This survey was based on the technology plans of the 18 individual community colleges in Maryland. Each college determined its own needs, independently of the others, and these campus needs were then aggregated to identify statewide needs. While cross-college discussions have taken place, among statewide affinity groups for example, the technology needs data presented here reflect a summation of the plans and philosophies of the 18 colleges. This methodology can be contrasted to an alternative approach, where technology standards based on college missions, geographic locations, enrollment, and other factors might be applied uniformly across institutions. For example, a standards approach might assert that all small colleges should have four fiber-optic interactive video classrooms. The survey of individual college plans reported here allows for differences in philosophy and goals, even among colleges similar in size and situation. Wor-Wic Community College anticipates having a total of eight distance learning classrooms; Cecil Community College plans on none, instead opting for Internet instruction to meet distance learning needs.

This survey has documented extensive and widespread needs for technology enhancements at all 18 Maryland community colleges. While the need for improvements to campus infrastructures and administrative systems varied by college, all 18 faced the challenges of maintaining equipment currency, training faculty and staff in the new technologies, constructing or retrofitting classrooms and laboratories, and employing adequate technical support staff. The magnitude of the statewide challenge is suggested by the following minimum requirements to meet college plans for the next five years:

- Maryland community colleges will need to purchase over 23,000 personal computers over the next five years. This number includes the need to replace currently obsolete computers, purchase additional computers to meet anticipated enrollment and program growth, and replace today's market-current machines which will be out of date in the year 2003.

- Over 1,000 full-time faculty will need to be trained in multimedia instructional techniques over the next five years.

- To fully exploit the potential of distance learning, 800 faculty will need training in interactive video teaching techniques.

- During the next five years, at least 400 classrooms will need to be equipped for multimedia instruction, 50 for interactive video distance learning, and 250 with satellite downlink connections.

- The colleges will have to employ an additional 200 technical support staff to install and maintain the above technologies.

These figures have been rounded down from the aggregate survey findings to emphasize that they are estimates based on college plans, and to provide a conservative view on a challenge of great magnitude.

Maryland's community colleges are committed to providing state-of-the-market education and training to meet the needs of Maryland's employers and workers. The colleges have the plans and talent to do this. They need reliable and ongoing funding support to acquire and maintain the equipment, train the faculty and staff, and hire the technical support necessary to fulfill their mission.

Appendices

Survey cover letter

Survey Guidelines for Completion

Survey questionnaire

Maryland General Assembly House Bill 621

MAHE Journal article

Prince George's Journal article

MARYLAND COMMUNITY COLLEGES
TECHNOLOGY COUNCIL

June 13, 1997

Dr. Donald L. Alexander, President
Allegany Community College
P.O. Box 1695
Willowbrook Road
Cumberland, MD 21502

Re: Technology Needs Assessment Survey

Dear Dr. Alexander:

The technology survey that has been developed by the Technology Council is enclosed. As you know, this survey is a critically important step in our efforts to enhance funding for technology in Maryland's Community Colleges. ***Your assistance is needed*** to assure that this survey is given prompt, serious attention by the appropriate staff and faculty of Allegany Community College.

The Technology Council has been working hard to accomplish the initial goals of the group. Dr. Joseph Shields, President of Carroll Community College, has attended every meeting of the Technology Council and has been keeping you up-to-date on the Council's activities at MCCCP meetings.

Please note: the survey must be **completed and returned by July 1, 1997**, to:

Dr. Craig A. Clagett
Director of Institutional Research and Analysis
Prince George's Community College
301 Largo Road
Largo, MD 20774

Guidelines for completing the survey are attached. Contact Craig with questions (telephone: 301-322-0723; e-mail: cc5@pgstumail.pg.cc.md.us).

At the August MCCCP meeting, we will have a report on the survey results available to share with you along with our tentative plans for requesting funding for technology. Copies of these documents are also enclosed for your reference. Thank you for your support of this important initiative.

Sincerely,

Jon H. Larson
Co-Chair

Joseph W. White
Co-Chair

jhl/coverlet/encl.
cc: Kay Bienen
Dr. Fred Walsh

Maryland Community Colleges Technology Council

Technology Needs Assessment Survey

Guidelines for Completion

1. Completion of the survey will likely require more than one person at each college to ensure accurate responses to all sections. Individuals who might be expected to contribute to survey completion include instructional administrators (including continuing education deans), data processing and information systems administrators, facilities planners, physical plant directors, student services deans, business officers, institutional research directors, and persons involved with telecommunications and distance education.

2. It is strongly suggested that one person be designated to coordinate the institution's response, but that an initial meeting be held including the above personnel as appropriate so that the college can identify those persons best able to answer each section of the survey.

3. In answering the questionnaire, include all equipment and services purchased during fiscal year 1997 in "current" totals even if not yet installed or operational.

4. If precise information is unavailable, please provide your **best estimate** for each question. Several survey items, such as the computer inventories and the first seven questions in Section V (Infrastructure), request specific counts. Please make the effort to provide these counts, as they will enable us to compile systemwide totals and percentages.

5. Responses are needed by July 1, 1997. Return the questionnaire even if all items are not completed by that date. Please provide the names of contact people for each section as requested on page 15.

I. Instructional Technology

Instructional Computer Inventory

1. In this section, please report the number of microcomputer or computer workstations used to support instruction. Do not double count; each computer/workstation should be reported in only one row. If a machine or room serves multiple purposes, select the *one category* that fits best. All computers used for instructional purposes should be included. Include all such computers owned or leased by the college, including portables (laptops) and machines at extension or other off-campus locations.

> "Current technology" is defined as a Pentium-133 (or equivalent) or faster processor. Please classify your existing computers in the appropriate column under "computers in use now."

We also want to learn how many *additional* computers your college will need by the year 2003. (Do not include the need for replacing or upgrading existing machines.) The final column is the sum of the preceding three.

Existing and Planned Instructional Computer Inventory				
	Computers in Use Now		Additional	Total
Location and Use of Computers	Less than current technology	Current technology	Computers Needed by Year 2003	Computers Needed in Year 2003
Instructional classrooms/labs including continuing education				
Open computer laboratories and instructional support (student use)				
Library computers for student/visitor use and bibliographic instruction				
Faculty offices, including faculty resource centers				
Placement, testing, and assessment offices and laboratories				
Other computers used for instruction Specify:				
Total instructional computers				

Faculty Technological Competencies and Training Needs

2. Please estimate below the number of full-time instructional faculty and part-time, adjunct faculty (including continuing education faculty) currently capable of using multimedia and distance learning technologies. In a multimedia classroom, a faculty member has access to external telecommunications networks (Internet/World Wide Web) and is able to present mediated information from the network or originating in the room (e.g., from CD-ROMs). In a distance learning teleclassroom, a faculty member is able to provide interactive instruction to students located at remote sites. A faculty member proficient in both multimedia and distance learning technologies should be reported in both applicable rows of the table below.

In the next column, estimate the number of additional full-time and adjunct faculty that the college desires to be trained in using multimedia and distance learning technologies. The final column is the sum of the first two and represents the total number of faculty in each category the college anticipates needing in the year 2003.

Full-time and Adjunct Faculty Proficiency in Instructional Technologies			
	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Full-time faculty proficient in using multimedia classrooms			
Part-time, adjunct faculty proficient in multimedia			
Full-time faculty proficient in distance learning techniques			
Part-time, adjunct faculty proficient in distance learning			

Electronic Classrooms

3. Please report the number of classrooms that have interactive video technology for distance learning, satellite downlink capability, and the number outfitted for multimedia instruction. In a multimedia classroom, an instructor has access to external telecommunications networks (Internet/World Wide Web) and is able to present mediated information from the network or originating in the room (e.g., from CD-ROMs).

Existing and Planned Electronic Classrooms			
Classroom Capabilities	Classrooms in Use Now	Additional Classrooms Needed by 2003	Total Classrooms Needed in Year 2003
Interactive fiber-optic (e.g. Bell Atlantic) distance learning			
Interactive digital compressed video distance learning systems			
Satellite downlink classroom			
Classrooms outfitted for multimedia instruction			

II. Intercampus Networks and Distance Learning Initiatives

4. Please check all that apply to your campus now, and those that you anticipate by the year 2003 (check both columns if a current capability will also be used in 2003):

	Now	Anticipated Year 2003
Maryland Interactive Distance Learning Network	☐	☐
Interactive Compressed Video Network	☐	☐
ISDN	☐	☐
Other interactive video distance learning networks	☐	☐
Instruction via the Internet	☐	☐
Instruction via college intranet	☐	☐
Instruction using bulletin board service	☐	☐
Audio instruction via automated phone system	☐	☐
Satellite/microwave downlink capability	☐	☐
Satellite/microwave uplink capability	☐	☐
College cable television broadcast channel	☐	☐
Video-based courses	☐	☐

5. Please provide estimates of your college's *annual* expenditures for distance learning network fees. Assume today's fee rates and structures in estimating your year 2003 expenditures.

Estimated Annual Expenditures for Distance Learning Network Fees		
	Estimated 1997 Fiscal Year	Projected Year 2003
Interactive video fees (including Interlata and Intralata fees, line charges)	$	$
Satellite/microwave uplink and downlink charges	$	$

III. Technology Support

6. In the table below, report the number of technical support staff *currently responsible* for installing and maintaining instructional and administrative technologies, including classroom and laboratory computers, distance learning equipment, and administrative/staff personal computer networks. An individual should be counted only once. Count part-time technical support staff as 0.5 FTE (two part-timers equal to one full-timer) to calculate a full-time-equivalent total. Include paid student workers.

In the second column, estimate the *additional* full-time-equivalent technical staff your college will need to support technology in the year 2003. The final column is the sum of the first two.

Technical Support Staff			
Employee Category	Current Number	Additional Needed by Year 2003	Total Needed in Year 2003
Instructional technology/PC technical support staff (FTE)			
Distance learning technology technical support staff (FTE)			
Administrative PCs/networks technical support staff (FTE)			
Total support staff (FTE)			

7. Does your college have a current Technology Master Plan (prepared since 1995)?

☐ Yes
☐ Partial plan
☐ No (skip to question 11)

8. Please indicate if your technology plan incorporates accepted *standards* for each of the following (check box if included in plan).

- ☐ fiber and copper cabling
- ☐ equipment
- ☐ communication protocols
- ☐ user training

9. Please indicate if your technology plan includes each of the following elements of your technology infrastructure (check box if included in plan):

- ☐ telephone network
- ☐ video network
- ☐ computer/data network
- ☐ Internet/intranet network
- ☐ energy management
- ☐ fire protection
- ☐ security
- ☐ building conduits for fiber and copper wiring
- ☐ fiber/cable management documentation

10. Please indicate if your technology plan includes each of the following components:

- ☐ replacement schedule for PCs and other equipment (e.g., every 3 years)
- ☐ retrofit of existing classrooms for multimedia instruction
- ☐ interactive video/distance learning
- ☐ Internet and WWW technology
- ☐ faculty and staff training needs
- ☐ library/learning resource systems
- ☐ alternative funding proposals (leases, trade-ins, private gifts, etc.)

11. Of all your campus technology needs, what are your college's top three priorities?

1.

2.

3.

IV. Administrative Systems

12. To what extent are administrative systems (human resources, payroll, financial, student, facilities, and foundation systems) integrated?

- ☐ 95 - 100%
- ☐ Half or more but not all
- ☐ Some but less than half
- ☐ None

13. To what extent do administrative systems run on client/server platforms (without mainframes or proprietary mid-range computers)?

- ☐ 95 - 100%
- ☐ Half or more but not all
- ☐ Some but less than half
- ☐ None

14. To what extent are administrative systems maintained on a relational database system?

- ☐ 95 - 100%
- ☐ Half or more but not all
- ☐ Some but less than half
- ☐ None

15. To what extent are administrative systems Year 2000 compliant?

- ☐ 95 - 100%
- ☐ Half or more but not all
- ☐ Some but less than half
- ☐ None

16. To what extent are administrative systems Web-enabled or accessible via a Web browser?

- ☐ 95 - 100%
- ☐ Half or more but not all
- ☐ Some but less than half
- ☐ None

17. What administrative functions can be performed through the Web?

- ☐ Admissions application
- ☐ Course schedule lookup
- ☐ Registration
- ☐ Drop/add
- ☐ Financial aid application
- ☐ Grade lookup
- ☐ Grade posting
- ☐ Payments

18. Please check all electronic interfaces currently in use whereby data are transferred electronically between college administrative systems and the office or agency:

- ☐ Employee time and attendance recording
- ☐ Federal Reserve Payroll Direct Deposit
- ☐ Payroll tax payments
- ☐ Maryland State Pension System contributions
- ☐ 403b retirement plan contributions
- ☐ Purchase requisition recording by requesting department
- ☐ Purchase order distribution to vendors via EDI technology
- ☐ Vendor payments via EDI technology
- ☐ Student grade recording by instructors
- ☐ Student transcript distribution to other institutions

19. Who is your major administrative systems vendor?

- ☐ Datatel
- ☐ SCT
- ☐ Computing Options
- ☐ Other (specify): _____

20. Does your college need to replace current administrative systems? If yes, by what date do you expect to complete the conversion?

- ☐ Systems do not need replacing
- ☐ Currently replacing systems, expect completion by: _____
- ☐ Not underway, but expect to replace systems by: _____

21. In the following table, please report the number of microcomputers or computer workstations used for non-instructional administrative and staff use. Include portables (laptops) and machines used at extension or other off-campus locations.

> "Current technology" is defined as a Pentium-133 (or equivalent) or faster processor. Please classify your existing computers in the appropriate column under "computers in use now."

We also want to learn how many *additional* administrative/staff PCs your college will need by the year 2003. (Do not include the need for replacing or upgrading existing machines.) The final column is the sum of the preceding three.

Existing and Planned Administrative/Staff Computer Inventory				
	Computers in Use Now		Additional	Total
	Less than current technology	Current technology	Computers Needed by Year 2003	Computers Needed in Year 2003
Total administrative/staff PCs				

22. What percentage of existing administrative/staff PCs are running Windows 95?

- ☐ 95 - 100%
- ☐ Half or more but not all
- ☐ Some but less than half
- ☐ None

V. Infrastructure

Effective use of technology requires an appropriate campus infrastructure. The first seven questions ask for proportions or percentages. If you can, please provide the specific numbers requested on the right. Otherwise, check the box on the left that best describes your situation.

Data Connectivity

23. What proportion of campus buildings are connected to a fiber optic backbone network?

☐ 95 - 100%
☐ Half or more but not all
☐ Some but less than half
☐ None

| Number buildings connected:_____
|
| Total campus buildings:_____

24. What proportion of campus buildings have category 5 UTP cabling to student labs, faculty and administrative offices?

☐ 95 - 100%
☐ Half or more but not all
☐ Some but less than half
☐ None

| Buildings with 5 UTP cabling:_____
|
| Total lab/office buildings:_____

25. What proportion of your student laboratories are connected to the Internet via the network?

☐ 95 - 100%
☐ Half or more but not all
☐ Some but less than half
☐ None

| Labs connected to Internet:_____
|
| Total student laboratories:_____

26. What proportion of classrooms (not computer laboratories) are wired to provide the instructor with access to a voice/data/video link to the campus backbone?

☐ 95 - 100%
☐ Half or more but not all
☐ Some but less than half
☐ None

| Classrooms with link:_____
|
| Total classrooms:_____

27. What proportion of administrative offices are connected to the Internet?

☐ 95 - 100%
☐ Half or more but not all
☐ Some but less than half
☐ None

|Offices connected to Internet:_____
|
|Total administrative offices:_____

28. What proportion of faculty offices are connected to the Internet?

☐ 95 - 100%
☐ Half or more but not all
☐ Some but less than half
☐ None

|Offices connected to Internet:_____
|
|Total faculty offices:_____

29. What proportion of faculty offices are connected to administrative systems?

☐ 95 - 100%
☐ Half or more but not all
☐ Some but less than half
☐ None

|Faculty connected:_____
|
|Total faculty offices:_____

30. Does your infrastructure provide the ability to link any workstation to any appropriate campus computing resource?

☐ Yes
☐ No

31. Do you support a wide area data communications network linking all the college's remote locations to the central campus?

☐ Yes
☐ No

32. Who can dial in to connect to on-campus computing resources?

☐ Selected staff only
☐ All faculty and staff
☐ Students

33. Does the college use a network management system to control and manage the network, respond to outages, and monitor traffic bottlenecks?

☐ Yes
☐ No

34. What local area network bandwidths are currently in use?

☐ 10 MB Ethernet
☐ 100 MB Ethernet
☐ 4 MB Token Ring
☐ 16 MB Token Ring
☐ ATM
☐ FDDI
☐ Mainframe
☐ Other

Telephone/Voice

35. Year your telephone PBX was installed/upgraded: _____

36. Was the voice cabling supporting the PBX replaced when the PBX was installed/upgraded?

☐ Yes
☐ Partially
☐ No

37. Does your existing telephone system have sufficient expansion capability to meet the needs of new buildings and additional users anticipated by the year 2003?

☐ Yes
☐ No

38. Can your existing telephone system support changing PBX technologies such as processing data and video, T1 or PRI-based links to service providers, and system-wide faxing?

☐ Yes
☐ No

39. Do you have plans to replace your telephone PBX?

☐ Yes (When is this anticipated: _____)
☐ No

40. Can students register for courses using a touch tone telephone?

☐ Yes
☐ No

41. What other functions can be performed through the telephone network?

☐ E-mail
☐ Internet
☐ Add/drop
☐ Bill payment
☐ Other (specify): _____

Building Automation/Energy Management/Fire Detection/Security

42. Do you have a network supporting campus building automation/energy management?

☐ Yes, adequate for next five years
☐ Yes, but in need of major improvement or replacement
☐ No

43. Do you have a fire detection network?

☐ Yes, adequate for next five years
☐ Yes, but in need of major improvement or replacement
☐ No

44. Do you have a campus/building security network?

☐ Yes, adequate for next five years
☐ Yes, but in need of major improvement or replacement
☐ No

Conduit Support

45. Please rate the condition of your existing conduit system:

☐ Adequate for next five years/only minor improvement needed
☐ In need of major improvement or replacement

46. Does your conduit system provide redundant pathing to buildings?

☐ Yes, to all buildings
☐ Yes, to some but not all buildings
☐ No

47. Is your existing conduit system capable of supporting new building construction anticipated by the year 2003?

☐ Yes
☐ No

Please identify a person to contact for each section should questions arise regarding your responses:

	Name	Phone
Instructional Technology:	_____	_____
E-mail:	_____	
Distance Learning:	_____	_____
E-mail:	_____	
Technology Support:	_____	_____
E-mail:	_____	
Administrative Systems:	_____	_____
E-mail:	_____	
Infrastructure:	_____	_____
E-mail:	_____	

Thank you for completing this survey. Please return it to:

Craig A. Clagett
Office of Institutional Research and Analysis
Prince George's Community College
301 Largo Road K-231
Largo, Maryland 20774-2199

HOUSE BILL 621

File Code: Higher Education

Sponsored By:
Delegates Kopp, Taylor, Busch, Guns, Harrison, Hixson, Rawlings, Heller, R. Baker, W. Baker, Baldwin, Barve, Bobo, Bonsack, Bozman, Cadden, Crumlin, Cryor, DeCarlo, Dembrow, Dewberry, Dypski, Faulkner, Finifter, Franchot, Frank, Frush, Genn, Goldwater, Healey, Hubbard, B. Hughes, Klausmeier, Leopold, Love, Mandel, McIntosh, McKee, Miller, Minnick, V. Mitchell, Mohorovic, Morgan, Petzold, Pitkin, Preis, Proctor, Rudolph, Shriver, Slade, Stup, Turner, Wood, and Workman

Entitled:
Higher Education - Community Colleges - Innovative Partnerships for Technology Program

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Synopsis:

Establishing an Innovative Partnerships for Technology Program for State community colleges; defining terms; setting forth how funds from private donors and the State will be matched and how the payments will be made; requiring that the payments made to eligible institutions not exceed $500,000; establishing eligibility criteria; providing for the application of the funds; prohibiting funds paid by the State to eligible institutions from being included in the computation of the State General Fund or capital fund; etc.

History by Legislative Date

House Action

2/9
First Reading Appropriations
2/18
Hearing 3/5 at 11:00 a.m.

Senate Action

No Action

Sponsored by:

Delegate Nancy K. Kopp, District 16
Delegate Rushern L. Baker, III, District 22B
Delegate Wheeler R. Baker, District 36
Delegate Robert C. Baldwin, District 33
Delegate Kumar P. Barve, District 17
Delegate Elizabeth Bobo, District 12B
Delegate Rose Mary Hatem Bonsack, District 34
Delegate K. Bennett Bozman, District 38
Delegate Michael Erin Busch, District 30
Delegate Joan Cadden, District 31

Delegate Joan Cadden, District 31
Delegate Michael A. Crumlin, District 25
Delegate Jean B. Cryor, District 15
Delegate Diane DeCarlo, District 6
Delegate Dana Lee Dembrow, District 20
Delegate Thomas E. Dewberry, District 47B
Delegate Cornell N. Dypski, District 46
Delegate Patricia Anne Faulkner, District 14A
Delegate Michael J. Finifter, District 11
Delegate Peter Franchot, District 20
Delegate Robert L. Frank, District 11
Delegate Barbara Frush, District 21
Delegate Gilbert J. Genn, District 16
Delegate Marilyn R. Goldwater, District 16
Delegate Ronald A. Guns, District 36
Delegate Hattie N. Harrison, District 45
Delegate Anne Healey, District 22A
Delegate Henry B. Heller, District 19
Delegate Sheila Ellis Hixson, District 20
Delegate James W. Hubbard, District 23
Delegate Brenda B. Hughes, District 25
Delegate Katherine Klausmeier, District 8
Delegate John R. Leopold, District 31
Delegate Mary Ann E. Love, District 32
Delegate Adrienne A. Mandel, District 19
Delegate Maggie L. McIntosh, District 42
Delegate Robert A. McKee, District 2A
Delegate Ellen L. Willis Miller, District 5
Delegate Joseph J. Minnick, District 7
Delegate Van T. Mitchell, District 28
Delegate Jacob J. Mohorovic, Jr., District 7
Delegate John S. Morgan, District 13B
Delegate Carol Stoker Petzold, District 19
Delegate Joan B. Pitkin, District 23
Delegate Mary Louise Preis, District 34
Delegate James E. Proctor, Jr., District 27A
Delegate Howard P. Rawlings, District 40
Delegate David D. Rudolph, District 35B
Delegate Mark K. Shriver, District 15
Delegate John F. Slade, III, District 29B
Delegate J. Anita Stup, District 3
Delegate Casper R. Taylor, Jr., District 1C
Delegate Frank S. Turner, District 13A
Delegate John F. Wood, Jr., District 29A
Delegate Betty Workman, District 1B

Bill indexed under the following Subjects:

COMMUNITY COLLEGES
COMMUNICATIONS -see also- LANGUAGE; TELECOMMUNICATIONS
COMPUTERS
ELECTRONIC TRANSMISSION
GIFTS
HIGHER EDUCATION -see also- STATE UNIVERSITIES AND COLLEGES,
HIGHER EDUCATION COMMISSION
INDUSTRY AND TECHNOLOGY
PARTNERSHIPS
REPORTS -see also- RECORDS
RULES AND REGULATIONS
STATE AID -see also- WELFARE

Bill affects the following Statute:

Education

Unofficial Copy
F2

1998 Regular Session
8lr1157

By: Delegates Kopp, Taylor, Busch, Guns, Harrison, Hixson, Rawlings, Heller, R. Baker, W. Baker, Baldwin, Barve, Bobo, Bonsack, Bozman, Cadden, Crumlin, Cryor, DeCarlo, Dembrow, Dewberry, Dypski, Faulkner, Finifter, Franchot, Frank, Frush, Genn, Goldwater, Healey, Hubbard, B. Hughes, Klausmeier, Leopold, Love, Mandel, McIntosh, McKee, Miller, Minnick, V. Mitchell, Mohorovic, Morgan, Petzold, Pitkin, Preis, Proctor, Rudolph, Shriver, Slade, Stup, Turner, Wood, and Workman

Introduced and read first time: February 9, 1998
Assigned to: Appropriations

A BILL ENTITLED

AN ACT concerning

Higher Education - Community Colleges - Innovative Partnerships for Technology Program

FOR the purpose of establishing an Innovative Partnerships for Technology Program for State community colleges; defining certain terms; setting forth how a certain match will be determined and how certain payments will be made; requiring that the payments made to certain institutions not exceed a certain amount; establishing certain eligibility criteria; providing for the application of certain funds; prohibiting certain funds from being included in the computation of a certain type of aid; providing for the administration of the Program; and generally relating to an Innovative Partnerships for Technology Program for State community colleges.

BY adding to
Article - Education
Section 16-317
Annotated Code of Maryland
(1997 Replacement Volume and 1997 Supplement)

Preamble

WHEREAS, Public-private partnerships are becoming increasingly important to the success of Maryland's community colleges; and

WHEREAS, A good example of such a partnership is the Advanced Technology Center Initiative, which has led to regional cooperative training efforts in the area of technology amongst community colleges, local businesses, and county governments; and

WHEREAS, While public-private partnerships have grown dramatically over the last decade, community colleges continue to face fiscal constraints in providing the most up-to-date technology required by today's businesses and students; and

WHEREAS, The creation of an Innovative Partnerships for Technology Program would provide a means of acquiring technology through a public-private effort, whereby State funds can be used to leverage private and local support for community colleges; now, therefore,

SECTION 1. BE IT ENACTED BY THE GENERAL ASSEMBLY OF MARYLAND, That the Laws of Maryland read as follows:

Article - Education

16-317.

(A) (1) IN THIS SECTION THE FOLLOWING WORDS HAVE THE MEANINGS INDICATED.

(2) "BASE YEAR" MEANS JULY 1, 1997 THROUGH JUNE 30, 1998.

(3) "CONTRIBUTION" MEANS MONETARY AND EQUIPMENT DONATIONS THAT HAVE BEEN ASSESSED A MONETARY VALUE AMOUNT FOR THE PURPOSES OF DETERMINING THE STATE PAYMENT.

(4) (I) "ELIGIBLE DONOR" MEANS ANY INDIVIDUAL, CORPORATION, PARTNERSHIP, OR OTHER FORM OF BUSINESS ORGANIZATION, PUBLIC OR PRIVATE FOUNDATION, LOCAL GOVERNMENT, OR OTHER NONPROFIT ORGANIZATION.

(II) "ELIGIBLE DONOR" DOES NOT INCLUDE THE STATE, THE FEDERAL GOVERNMENT, OR ANY FOREIGN GOVERNMENT.

(5) "ELIGIBLE INSTITUTION" REFERS TO THE FOLLOWING COMMUNITY COLLEGE CAMPUSES:

(I) ALLEGANY;

(II) ANNE ARUNDEL;

(III) BALTIMORE CITY;

(IV) CARROLL;

(V) CATONSVILLE;

(VI) CECIL;

(VII) CHARLES;

(VIII) CHESAPEAKE;

(IX) DUNDALK;

(X) ESSEX;

(XI) FREDERICK;

(XII) GARRETT;

(XIII) GERMANTOWN;

(XIV) HAGERSTOWN;

(XV) HARFORD;

(XVI) HOWARD;

(XVII) PRINCE GEORGE'S;

(XVIII) ROCKVILLE;

(XIX) TAKOMA PARK; AND

(XX) WOR-WIC.

(6) "ELIGIBLE PROGRAM" MEANS ANY CONTRIBUTION FOR TECHNOLOGY WHICH DOES NOT CONTAIN UNREASONABLE RESTRICTIONS AS TO USE AS FURTHER DEFINED BY THE MARYLAND HIGHER EDUCATION COMMISSION.

(7) (I) "TECHNOLOGY" MEANS THE HARDWARE, SOFTWARE, COMMUNICATIONS INFRASTRUCTURE, AND ASSOCIATED TRAINING AND CONTRACTED SERVICES THAT ENABLE LOCAL OR GLOBAL PRESENTATION, EXCHANGE, AND TRANSMISSION OF INFORMATION IN DIGITAL OR ANALOG FORM FOR TEACHING, LEARNING, STUDENT SUPPORT SERVICES, AND ADMINISTRATION.

(II) "TECHNOLOGY" MAY INCLUDE CAPITAL EXPENDITURES.

(III) "TECHNOLOGY" DOES NOT INCLUDE STAFF.

(B) EACH COMMUNITY COLLEGE SHALL RECEIVE FROM THE STATE, IN THE MANNER AND SUBJECT TO THE LIMITATIONS OF THIS SECTION, WITH RESPECT TO THE CONTRIBUTIONS MADE BY ELIGIBLE DONORS AS VOLUNTARY DONATIONS AT ANY TIME DURING FISCAL YEARS 1999, 2000, AND 2001 TO THE ELIGIBLE INSTITUTION FOR ELIGIBLE PROGRAMS, AN AMOUNT EQUAL TO THE FIRST $500,000 OR ANY PORTION THEREOF FROM CONTRIBUTIONS BY ELIGIBLE DONORS.

(C) PAYMENTS SHALL BE MADE BY THE STATE:

(1) ONLY WITH RESPECT TO CONTRIBUTIONS WHICH ARE PAID BY THE ELIGIBLE DONORS TO THE ELIGIBLE INSTITUTION BEFORE JULY 1, 2001; AND

(2) IN THE FISCAL YEAR FOLLOWING THE FISCAL YEAR DURING WHICH THE CONTRIBUTIONS ARE MADE.

(D) CONTRIBUTIONS MADE BY THE STATE UNDER THIS SECTION MAY NOT EXCEED $500,000 TO EACH ELIGIBLE INSTITUTION.

(E) (1) TO DETERMINE ELIGIBILITY FOR STATE PAYMENTS, EACH CONTRIBUTION SHALL BE COMPARED TO THE AMOUNT CONTRIBUTED DURING THE BASE YEAR. THE FOLLOWING CRITERIA SHALL BE THE BASIS FOR COMPARISON:

(I) EACH CONTRIBUTION MUST BE FROM A NEW DONOR; OR

(II) EACH CONTRIBUTION MUST REPRESENT AN INCREASE OVER THE AMOUNT CONTRIBUTED BY THE DONOR DURING THE BASE YEAR.

(2) A CONTRIBUTION RECEIVED DURING THE BASE YEAR THAT FULFILS A PLEDGE MADE PRIOR TO THE BASE YEAR MAY NOT BE INCLUDED IN THE DETERMINATION OF THE CONTRIBUTION MADE DURING THE BASE YEAR.

(3) EACH CONTRIBUTION MUST BE SPECIFICALLY DESIGNATED FOR TECHNOLOGY.

(F) CONTRIBUTIONS MADE BY THE STATE UNDER THIS SECTION MAY BE APPLIED TO ANY ELIGIBLE TECHNOLOGY EXPENSE AT AN ELIGIBLE INSTITUTION TO WHICH THE PAYMENT IS MADE.

(G) CONTRIBUTIONS MADE BY THE STATE TO ANY ELIGIBLE INSTITUTION UNDER THIS SECTION MAY NOT DIRECTLY OR INDIRECTLY REDUCE THE STATE GENERAL FUND OR CAPITAL FUND SUPPORT FOR THE ELIGIBLE INSTITUTION.

(H) THE MARYLAND HIGHER EDUCATION COMMISSION SHALL:

(1) ADOPT REGULATIONS NECESSARY FOR THE ADMINISTRATION OF THIS SECTION; AND

(2) SUBMIT TO THE GOVERNOR AND, IN ACCORDANCE WITH § 2-1246 OF THE STATE GOVERNMENT ARTICLE, TO THE GENERAL ASSEMBLY AN ANNUAL REPORT SUMMARIZING THE TOTAL AMOUNT OF FUNDS PLEDGED BY ELIGIBLE DONORS AND TOTAL AMOUNT OF FUNDS RAISED.

SECTION 2. AND BE IT FURTHER ENACTED, That this Act shall take effect July 1, 1998.

Assessing and Meeting the Technology Needs of Maryland's Community Colleges

Craig A. Clagett

Community colleges must be able to provide the technology training demanded by business and industry. This requires hardware and software commensurate with that used in the marketplace, faculty trained in their use, properly-equipped classrooms and laboratories for instruction and study, adequate technical support staff, and appropriate campus infrastructure. To determine the current state and anticipated needs in these areas, the Maryland Community Colleges Technology Council conducted a statewide survey in the summer of 1997. The survey reflected the technology plans of the 18 colleges and documented a need for $95 million to fund selected technologies over a five-year period.

Background

In October 1996, the Maryland Community College Facilities Planners Council presented *A Proposal for Enhancing Information Technology in Maryland Community Colleges* to the Maryland Council of Community College Presidents. The facilities planners described the following challenge facing the state's community colleges:

> Maryland community colleges face a major challenge posed by the rapid pace of change accompanying the emerging Information Age. Every five years, or less, a major new development cycle begins in one of the many new technologies associated with communicating information. Maintaining current state-of-the-art technology is crucial to the success of community colleges, especially as they broaden services to Maryland's business and industry community. Furthermore, to achieve currency with the state of the art in many of the newer information age technologies, Maryland's community colleges need to make substantial expenditures to upgrade campus telecommunications infrastructure and equipment, classroom and laboratory instructional technology, and training for faculty and staff in the use of these technologies.

> To successfully meet this challenge, Maryland community colleges must have a reliable source of funding that will help the colleges catch up in those areas where they lag technologically, and that will be dedicated to funding the enormous, re-occurring investment costs associated with keeping the technology up to date.

Among the initiatives advocated in the proposal for prompt action were creation of a statewide technology affinity group, administration of a statewide technology needs assessment survey, and development of a statewide community college technology plan and funding strategy. The council of presidents approved these initiatives.

The first meeting of the Maryland Community Colleges Technology Council took place February 20, 1997, at Catonsville Community College. The Council membership of 14 included facilities planners, institutional research directors, data processing directors, a business officer, continuing education deans, instructional vice presidents and deans, and a student services dean. Ex-officio members included representatives from the Maryland Higher Education Commission, Maryland Department of Budget and Management, and the Maryland Information Technology Center. Dr. Joseph F. Shields, president of Carroll Community College, represented the community college presidents on the Council. The Council co-chairs were Jon Larson of Frederick Community College and Joseph White of Montgomery College.

During March, April, and May, four subgroups of the Council drafted questions for a statewide community college technology needs assessment survey. The questions were compiled into a 15-page questionnaire, with five sections covering instructional technology, intercampus networks and distance learning initiatives, technology support, administrative systems, and campus technology infrastructure. The questionnaire was finalized in early June. On June 13, 1997, questionnaire packets including guidelines for completion were mailed to the presidents of all 18 Maryland community colleges.

During July and August, responses from the colleges were entered into a file for analysis. Response frequency tables were reviewed by several council members for evidence of consistency in question interpretation. A final report of the survey finding was presented to the council of presidents at their September 19, 1997 meeting. Highlights from the survey follow.

Personal Computer Inventory

As of July 1997, the 18 Maryland community colleges were using 16,430 personal computers on their campuses. A total of 4,639, or 28 percent, were current technology, defined as having a Pentium 133 (or equivalent) or faster processor. Thus seven in ten computers were already out of date, a generation behind the technology used in business.

To meet planned facilities expansion and anticipated enrollment increases, the 18 colleges identified needs for nearly 7,000 additional computers, with over 90 percent needed for instructional purposes. Together with the existing inventory, the colleges collectively would compile a personal computer inventory of over 23,000 computers by the year 2003 if current

plans were fulfilled. More significant than the monies needed for this growth, however, was the implication of the *replacement costs* necessary to keep this inventory up to date on a continuous basis. Personal computer technologies become obsolete every three years, and community colleges must keep up with the market to fulfill their mission of preparing a capable, well-trained workforce meeting the needs of business and industry. A three-year replacement cycle would imply purchase of 7,800 computers annually.

Anticipated Personal Computer Inventory, Statewide, 2003
Maryland Community Colleges

	Instruction	Administration	Total
Existing inventory	11,599	4,831	16,430
Additional PCs needed	6,406	568	6,974
Total anticipated inventory	18,005	5,399	23,404

Faculty Training

Equal to or greater than the challenge of maintaining hardware and software currency, however, may be the human resources challenge. Community college faculty, both full-time and adjunct, must be fully trained in the new technologies of instruction. As of July 1997, only a few hundred community college faculty statewide were proficient in the use of the new instructional technologies associated with distance learning and multimedia classrooms. The survey found a need for over 1,800 faculty to be trained in distance learning technologies, and for nearly 3,000 faculty to be trained in using external telecommunications networks and presenting mediated information in the classroom.

Faculty Training Needs, Statewide
Total Needing Training by Year 2003

Mode of Instruction	Full-time Faculty	Adjunct Faculty
Distance learning	797	1,009
Multimedia	1,190	1,758

Electronic Classrooms

In 1991-92 a state study *(The Telecommunications Requirements of Academic Facilities)* asserted that, "all instructional spaces should be designed to allow faculty members to utilize electronic instructional devices—computer-generated graphics, video display screens, video monitors, access to electronic networks external to the building and to the campus." In the survey the colleges identified the need to retrofit or construct 474 classrooms to meet this capability standard. In addition, the colleges expressed their needs to provide satellite down-

links to 292 classrooms, and to construct and equip 61 additional classrooms for interactive distance learning.

Electronic Classroom Needs, Statewide Total Current, Additional Classrooms Needed by Year 2003		
Classroom Capability	**Existing Classrooms**	**Additional Needed**
Distance learning (interactive video)	35	61
Multimedia	215	474
Satellite downlink	65	292

Technical Support

Maryland community colleges employed the equivalent of nearly 277 full-time employees to support instructional and administrative technologies as of July 1997. The colleges said they needed 226 *additional* full-time staff to adequately support the technologies they envisioned using in the year 2003.

Technical Support Staff Needs, Statewide Total Current, Additional FTE Staff Needed by Year 2003		
Technology Supported	**Currently Employed**	**Additional Staff Needed**
Administrative networks	78.5	59.0
Interactive video/distance learning	38.0	58.0
Multimedia classrooms/laboratories	160.3	109.2
Total technical support staff	276.8	226.2

Administrative Systems

Members of the Technology Council agreed that campus administrative systems should be fully integrated, maintained on a relational database, run on client-server platforms, year 2000 compliant, and accessible by a Web browser. None of the 18 colleges met this standard in July 1997. Less than half of the colleges reported integrated systems or full use of relational databases. Only five colleges had all their systems ready for the year 2000. Only three had transitioned to client-server platforms. Administrative systems were Web-enabled at only one campus. Council members also advocated increased use of electronic interfaces for administrative functions, yet with the exceptions of payroll direct deposit and student transcript distribution, electronic transactions were rare.

Infrastructure

Effective use of technology requires an appropriate campus infrastructure. A majority of community college campuses had all buildings connected to a fiber optic backbone, administrative and faculty offices connected to the Internet, and remote locations linked to the main campus via a wide area data communications network. Less than half, however, had network access in all classrooms and laboratories. Only ten had conduit adequate for campus needs through the year 2003. Only seven reported adequate fire detection, security, or energy management networks. Respondents at six colleges reported a need to upgrade campus telephone systems.

Estimated Cost over Five Years

To calculate the magnitude of the financial challenge associated with these technology needs, estimated unit costs were developed for personal computers, faculty training, electronic classrooms, and support staffing.

The average cost of a personal computer now installed in a Maryland community college is $1,500. The estimated cost for a new mid-level computer, with a 166 MHz processor, 32 MB RAM, 2 GB hard drive, 15" SVGA monitor, network card, keyboard, and mouse, from a first or second tier manufacturer (e.g. IBM, Compaq, Gateway) was set at $2,500.

The cost of training a full-time faculty member in the new technologies of instruction equals the cost of hiring adjunct faculty to cover their course sections, plus the actual cost of training. Training a full-time faculty member in multimedia instructional techniques was estimated to cost $12,000. Training in distance learning technologies was estimated to cost approximately $6,000 per faculty member.

The cost of construction or retrofitting a multimedia classroom with a high level PC, various TV, accelerator, and voice cards, modem, videodisk player, videocassette recorder, fixed overhead camera, LCD projector, screen, cabinetry, and installation, was estimated to be $19,000. The cost of constructing or retrofitting an interactive video distance learning classroom including two large video monitors, two cameras with zoom lenses, three microphones, two speakers, remote control, pen pal tablet, one Visual Presenter, keyboard, CODEC, audio mixer, multimedia PC with SCSI, FAX machine, speakerphone, surge protector, electronic white board, Scan-It box, wireless microphone, network card, SCSI zip drive, wireless mouse, and cabinetry was estimated to be $85,000. For a campus already possessing a receiving dish, the cost of installing a satellite down link to a classroom, including two monitors, mounting, FAX machine, telephone, and cabling, was estimated to be $4,000. To install a satellite downlink to a classroom on a campus without a receiving dish would require a three-meter receiving dish, interface unit, and mounting in addition to the above classroom equipment for a total estimated cost of $10,000. Four colleges did not have downlink capability in July 1997.

The salary cost of technical support staff, including local area network administrators, data communications and networking specialists for local and wide-area networks, PC hardware and software support technicians, and computing help center staff, would range from $25,000 per year for entry level staff with associate degrees to $45,000 per year for senior staff with bachelor's degrees, professional certifications (e.g. CNE, MCSE), and five years experience. Adding 30 percent for benefits, the estimated costs per support staff would range from $32,500 to $58,500. Assuming three entry-level for every senior-level technology support employee, the cost estimate used below for technical staffing was $39,000 per employee.

Applying these estimated unit costs to the needs identified in the survey permitted calculation of the total expenditure required to fulfill these selected technology needs of Maryland community colleges over the next five years. For purposes of cost estimation, the raw data from the survey were rounded down to emphasize their tentative nature and to yield a conservative estimate of the funding challenge. Training of adjunct faculty was omitted, as getting the current full-time instructional staff technology-literate by the year 2003 seemed formidable enough. The satellite downlink estimate included single receiving dishes at four campuses currently without such capabilities. As support staffing would be incrementally increased over time, for cost estimating purposes this item was conservatively priced by the Council at the recommended staffing level for one year.

An estimated $95 million dollars are needed over the next five years to meet the personal computer, faculty training, electronic classroom, and technical support needs of Maryland's 18 community colleges. Individual campuses may need additional funding for infrastructure and administrative systems. The $95 million estimate is derived as shown in the following table:

Estimated Cost of Selected Technology Needs
Equipment, Training, Classrooms, and Staff Needed by the Year 2003

Technology Need	Quantity Needed	Unit Cost	Total Cost
Personal computers	23,000	$2,500	$57,500,000
Faculty trained in multimedia	1,000	12,000	12,000,000
Faculty trained in distance learning	800	6,000	4,800,000
Multimedia classrooms	400	19,000	7,600,000
Interactive video classrooms	50	85,000	4,250,000
Satellite downlinked classrooms	250	4-10,000	1,024,000
Technical support staff (one year)	200	39,000	7,800,000
Total cost through year 2003			$94,974,000

Craig A. Clagett is director of institutional research and analysis at Prince George's Community College and co-chair of the Maryland Community Colleges Technology Council.

Opinion

Higher education faces $95 million technology gap

Viewpoint

Anthony G. Brown

Giant Foods encourages us to save our purple receipts to provide computers for our public schools. If only there were a similar way to provide information technology for our public colleges.

The information technology revolution in education is upon us. Almost no one denies that today's college students must become technology literate. At Prince George's Community College, business and industry leaders tell us they need computer-skilled employees. Universities expect us to send them computer-literate transfer students.

In recognition of such needs, we have added computer literacy to our list of general education requirements. In addition to courses in English, social sciences, humanities, mathematics, science and cross-cultural studies, students cannot graduate from PGCC unless they have demonstrated hands-on ability with word processing, electronic spread sheets and using the Internet.

Furthermore, Prince George's Community College is part of the Suburban Maryland Advanced Technology Consortium, which will provide customized, high-tech training to Maryland employers to enhance the technological capacity and competitiveness of the state's work force.

Community colleges are not the only institutions of higher education responding to the information revolution. The University of Maryland, College Park recently disclosed its technological dream: Maryland will become the hub of the nation's most successful information technology economy — a new Silicon Valley of the Information Age.

There are, however, a few problems arising from such a dream. At Prince George's Community College, limited resources make it almost impossible for us to keep pace with Bill Gates and his industry associates. Old computers cannot accommodate the newest software. Only Pentiums will do.

We are replacing the not-so-old computerized catalog system in our library. The earlier system is now a veritable dinosaur in cyberspace. Our computerized registration system — although the envy of many colleges in the state and region — is no longer fast enough for the Home Shopping Network set.

In response to the enormous needs generated by the information technology revolution, the state's 18 community colleges recently completed a Technology Needs Assessment Survey in which a statewide inventory of computer technology was matched with an assessment of computer needs. The result: a $95 million gap.

The report describes how an estimated $95 million is needed over the next five years to meet the personal computer, faculty training, electronic classroom and technical support needs of Maryland's community colleges. Individual campuses may need even more funding for infrastructure and administrative systems.

The report concludes Maryland's community colleges are committed to providing state-of-the-market education and training to meet the needs of Maryland's employers and workers. The colleges have the plans and talent to do this. They need reliable and ongoing funding support to acquire and maintain equipment, train the faculty and staff, and hire the technical support necessary to fulfill their mission.

Purple or paisley receipts at Giant Foods will not close the $95 million gap. Neither will our community colleges' foundations; most donations go to four-year colleges. Counties strained to provide good teachers, adequate facilities, current textbooks and up-to-date computers for public schools have little extra revenue left for their local community colleges.

The dream of making our state the Silicon Valley of the Information Age cannot be realized if the workers needed by such industries are not technology literate. Even the usually taciturn Alan Greenspan, chairman of the Federal Reserve Board, has expressed continued concern about the shortage of a trained work force in information technology.

Community colleges enroll about half of the undergraduate college students in Maryland. Many of these students are in or will enter the work force before going to a four-year college. The businesses that employ community college students need them to be computer literate. But without the appropriate hardware, software, infrastructure and technical staff at the community college level, there is little hope that the information technology dream can come true.

The $95 million gap can be bridged by building partnerships between community colleges, state and county government, and the industries that expect to hire computer-literate employees. Without such support, the $95 million gap will grow. And the wider the gap, the less hope there is for students expecting to land an upwardly mobile, good paying job in an information-based economy.

It is in the interest of the state, our communities and our dreamers to wake up the well-documented needs of two-year colleges in the area of information technology.

Anthony G. Brown of Bowie is chairman of the board of trustees of Prince George's Community College.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement (OERI)
Educational Resources Information Center (ERIC)

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Author(s): Craig A. Clagett	
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