DOCUMENT RESUME

ED 471 360 JC 030 032

| | |
|---|---|
| AUTHOR | McCall, H. Carl |
| TITLE | City University of New York--Availability of Student Computer Resources. Report. |
| INSTITUTION | New York State Office of the Comptroller, Albany. Div. of Management Audit and State Financial Services. |
| REPORT NO | R-2001-S-45 |
| PUB DATE | 2002-11-25 |
| NOTE | 37p. |
| AVAILABLE FROM | For full text: http://www.osc.state.ny.us/audits/allaudits/093003/093003-m/01s45.pdf. |
| PUB TYPE | Reports - Research (143) |
| EDRS PRICE | EDRS Price MF01/PC02 Plus Postage. |
| DESCRIPTORS | *Access to Computers; *Appropriate Technology; Budgets; Community Colleges; Computer Uses in Education; *Computers; *Educational Technology; Information Technology; *Technological Advancement; Two Year Colleges |
| IDENTIFIERS | *City University of New York |

ABSTRACT

This audit reports on the availability of computer resources at the City University of New York's (CUNY) senior colleges. CUNY is the largest urban and the third largest public university system in the United States. Of the 19 CUNY campuses located throughout the five boroughs, 11 are senior colleges offering four-year degrees. For the fall 2001 semester, enrollment at these colleges totaled 129,710. CUNY colleges maintain computers for student use in classrooms and in computer labs, and provide information technology (IT) support staff in the labs to assist students. Each college decides how much of its budget to spend on technology. As of the fall 2002 semester, CUNY students will be assessed a technology fee to help defray campus computer-related costs. This audit explores whether student computer resources at CUNY Senior Colleges are up to date, adequate, and accessible. The audit found that there was one computer for every three students at York, while there was one for every 42 students at Hunter. Hunter had 0% out-of-date computers, while John Jay and Brooklyn each had 41% out-of-date. Nine of eleven colleges acknowledged that they did not provide enough computer lab hours to meet the needs of their students, a problem attributed to IT staffing shortages. This audit concludes with recommendations to the colleges. Appended are: a list of major contributors to the report; comments of CUNY Central and College Officials; and the State Comptroller's Notes. (NB)

# A REPORT BY THE NEW YORK STATE OFFICE OF THE STATE COMPTROLLER

H. Carl McCall
STATE COMPTROLLER



# CITY UNIVERSITY OF NEW YORK

## *AVAILABILITY OF STUDENT COMPUTER RESOURCES*

## *2001-S-45*





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H. Carl McCall
STATE COMPTROLLER

**Report 2001-S-45**

Dr. Mathew Goldstein
Chancellor
City University of New York
555 East 80th Street
New York, NY 10021

Dear Chancellor Goldstein:

The following is our report on the availability of student computer resources at the City University of New York's (CUNY) senior colleges.

This audit was performed pursuant to the State Comptroller's authority as set forth in Article V, Section 1 of the State Constitution and Article II, Section 8 of the State Finance Law. Major contributors to the report are listed in Appendix A.

*Office of the State Comptroller*
*Division of Management Audit*
*and State Financial Services*

November 25, 2002

# EXECUTIVE SUMMARY

# CITY UNIVERSITY OF NEW YORK
# AVAILABILITY OF STUDENT COMPUTER RESOURCES

## SCOPE OF AUDIT

The City University of New York (CUNY) is the largest urban and the third largest public university system in the United States. CUNY has committed to academic excellence and to equal access to education for its students. Of the 19 CUNY campuses located throughout the five boroughs, the following 11 campuses are Senior Colleges (Colleges) offering four-year degrees: Baruch, Brooklyn, City, Hunter, John Jay, Lehman, Medgar Evers, NYC Technical, Queens, Staten Island and York. Although CUNY Colleges all possess a level of autonomy in educational, administrative and disciplinary affairs, they must adhere to CUNY-wide policies and procedures. For the Fall 2001 semester, enrollment at these Colleges totaled 129,710.

At CUNY, as at educational institutions nationwide, computing and networking are a growing component of campus infrastructure. Toward this end, each College maintains computers for students' use in classrooms and in computer labs, and provides information technology (IT) support staff in the labs to assist students. Some Colleges also enable students to access the College network through hardwired connections (nodes) on campus or through wireless networks. Each College decides how much of its budget to spend on technology. As of the Fall 2002 semester, CUNY College students will be assessed a technology fee to help defray campus computer-related costs.

Our audit addressed the following question concerning CUNY Senior Colleges for the period October 12, 2001 through March 8, 2002:

- Are student computer resources at CUNY Senior Colleges adequate, up-to-date and accessible?

## AUDIT OBSERVATIONS AND CONCLUSIONS

We found the extent to which Colleges provide students with access to computers ranged widely from campus to campus, as did the percentage of outdated student computers. Further, Colleges do not have an adequate number

of hardwired nodes or wireless connections to the College networks to enable students to use their own notebook computers on campus. To enhance students' access to computer resources, CUNY Colleges should identify and maintain an adequate number of up-to-date computers for student use, plan and budget for computer purchases for students, increase accessibility to lab computers and establish adequate network access for students' personal notebook computers.

To provide students with the tools they need to succeed in the information age, every CUNY College should have an adequate inventory of up-to-date computers for student use. However, we found significant disparities among Colleges in the number of computers available to students and in the extent to which these units were outdated. For example, the number of available student computers ranged from 1 for every 3 students at York to 1 for every 42 students at Hunter. Similarly, the percentage of outdated computers ranged from zero percent at Hunter to 41 percent at both John Jay John Jay and Brooklyn. These disparities result in CUNY students having unequal access to basic technology tools that all of them need to complete their coursework. We also found that Colleges were making computer purchasing decisions without knowing the number of computers that were available for student's use (versus faculty and administration). To increase the availability of up-to-date computers for CUNY students, we recommend that Colleges properly identify and track computer assets, establish minimum student to computer ratios, identify and regularly replace outdated computers, and plan and budget for meeting student computing needs. (See pp. 5-12)

During our audit, 9 of the 11 Colleges acknowledged they did not provide enough computer lab hours to meet the needs of their students, a problem they attributed mainly to IT staffing shortages. Further, we found Colleges provided students with inadequate access, or no access, to the College network through their personal notebook computers. To improve student access to information resources, we recommend that Colleges implement a number of best practices that can extend lab hours at little cost, and that they establish or improve dedicated hardwired and wireless networks on campus. (See pp. 13-19)

## *Comments of CUNY Officials*

CUNY officials generally agree with our recommendations. They indicate that the recommendations were either implemented or were in the process of being implemented. Officials pointed out that acquiring technology improvements and the resources needed to support them was a costly investment and they pointed out that our recommendations did not address funding requirements.

# CONTENTS

# INTRODUCTION

## Background

The City University of New York (CUNY) is the largest urban university, and the third-largest public university system, in the United States. With almost 198,000 students in more than 1,200 degree programs on its 19 campuses, and more than 205,000 students in adult and continuing education programs, CUNY offers a broad array of educational opportunities to diverse populations within the greater New York City area. CUNY's mission is to "educate the whole people:" to uphold a commitment to academic excellence while providing equal access to and opportunity for education.

CUNY's 11 Senior Colleges (Colleges) offer four-year degrees and are located throughout the five boroughs. CUNY Colleges possess a level of autonomy in educational, administrative, and disciplinary affairs; however, each must adhere to CUNY-wide policies and procedures. CUNY's Board of Trustees consists of 17 members and is responsible for the overall governance, maintenance, and development of both College and community college units of the university. CUNY's Chancellor is the chief educational and administrative officer of the university and is responsible for unifying and coordinating college business and financial procedures and management. In addition, each College is governed by its own president, who has general superintendence over the College. Recently, CUNY established the Information Technology Steering Committee that is comprised of senior representatives from each senior and community college and from Central Office. The Committee will address technology data security, training, disaster recovery, communication, funding, procurement standards and infrastructure. The Committee will make recommendations to the Council of Presidents and the Chancellor.

For the Fall 2001 semester, the 11 Colleges had a total enrollment of 129,710 students, as shown in the following chart.

| CUNY Senior Colleges | Enrollment |
|---|---|
| Baruch | 15,773 |
| Brooklyn | 15,137 |
| City | 10,378 |
| Hunter | 20,397 |
| John Jay | 11,469 |
| Lehman | 8,889 |
| Medgar Evers | 4,715 |
| NYC Technical | 11,028 |
| Queens | 15,391 |
| Staten Island | 11,325 |
| York | 5,208 |
| Total Enrollment | 129,710 |

Each College maintains computer labs to enable students to complete their coursework, and provides technical support staff in the labs to help students with computing problems. Each College decides how much of its budget to spend on technology. Effective Fall 2002, all CUNY College students will be assessed a technology fee to help pay for campus computer-related costs.

## *Audit Scope, Objective and Methodology*

We audited the computer resources of CUNY's 11 Senior Colleges for the period October 12, 2001 through March 8, 2002. The objective of our performance audit was to determine whether computer resources at CUNY Colleges were adequate, up-to-date and accessible to students. To accomplish this objective, we reviewed all the Colleges' computer inventory records, lab hours and days of operation and technical staffing. We also interviewed CUNY Central officials, College officials and computer lab staff. We visited all 11 Colleges, where we observed computer labs and verified computer equipment.

We conducted our audit in accordance with generally accepted government auditing standards. Such standards require that we plan and perform our audit to adequately assess those CUNY operations that are included in our audit scope. These standards also require that we understand CUNY's internal

control structure and compliance with those laws, rules and regulations that are relevant to the CUNY operations included in our audit scope. An audit includes examining, on a test basis, evidence-supporting transactions recorded in the accounting and operating records and applying such other auditing procedures, as we consider necessary in the circumstances. An audit also includes assessing the estimates, judgments and decisions made by management. We believe that our audit provides a reasonable basis for our findings, conclusions and recommendations.

We use a risk-based approach to select activities for audit. We therefore focus our audit efforts on those activities we have identified through a preliminary survey as having the greatest possibility of needing improvement. Consequently, by design, finite audit resources are used to identify where and how improvements can be made. Thus, little audit effort is devoted to reviewing operations that may be relatively efficient and effective. As a result, our audit reports are prepared on an "exception basis." This audit report, therefore, highlights those areas needing improvement and does not address those activities that may be functioning properly.

## *Response of CUNY Officials to Audit*

A draft copy of this report was provided to CUNY officials for their review and comment. Their comments were considered in preparing this report and are included as Appendix B.

Within 90 days after the final release of this report, as required by Section 170 of the Executive Law, the Chancellor of the City University of New York shall report to the Governor, the State Comptroller, and the leaders of the Legislature and fiscal committees, advising what steps were taken to implement the recommendations contained herein and where the recommendations were not implemented, the reasons therefor.

# COLLEGE COMPUTER INVENTORY

To achieve CUNY's commitment to academic excellence, and to provide equal access and opportunity for CUNY's diverse student population, Colleges need to have an adequate number of computers that are both up-to-date and accessible for students' use. However, we found that accessibility to computers ranged widely from campus to campus, and that some Colleges had a significantly greater number of outdated computers than did other Colleges. Colleges were making computer-purchasing decisions without knowing the number of computers that were available for student's use. To adequately provide for students' access to basic technology tools that are critical in preparing them to compete in a knowledge-based economy, Colleges should take steps to identify the number of computers available to students, set minimum computer to student ratios, develop criteria for identifying outdated computing equipment, and develop three to five-year replacement cycles for computer hardware. Additionally, standards should define what is minimally required to deliver basic service.

## *Available Computers*

Technology is changing at a rapid pace. At educational institutions nationwide, computing and networking are a growing part of campus infrastructure. To fulfill CUNY's commitment to academic excellence and to provide CUNY students with the tools they need to succeed in the information age, every CUNY College should have an adequate inventory of computers for student use.

To determine if the Colleges do maintain an adequate number of computers available to students, we requested that the Colleges provide us with inventory lists of the computers available to students. Although the Colleges did produce the inventory lists, we found that none of the Colleges maintain inventory listings that identify the units that are "student access" computers. Instead, inventory listings record only the total number of computers campus-wide without differentiating between computers for student use and computers dedicated

for administrative or faculty use. If Colleges track only campus-wide counts of computers without identifying the users of the computers, they cannot assess the extent to which they are meeting, or not meeting, the computing needs of students.

After we verified the users of the computers shown on the Colleges' inventory lists, we determined the total number of computers available to students at each College. Computers available to students are classified as either restricted access or open access. Computers designated as restricted access are generally located in the departmental classrooms for the exclusive use of students attending specific classes. These computers are often equipped with specialized software needed for department coursework. Open access computers are generally found in the public computer labs and are available to all students during the lab's stated hours and days of operation. Since a computer's classification effects its availability, we also determined the number of restricted access and open access computers at each College. As shown in Table 1 on the following page, our comparison of computer availability at CUNY Colleges revealed wide disparities among campuses in the numbers of computers (total computers, restricted access computers and open access computers) they maintain for student use.

| Table 1: Number of Computers Available for Students at CUNY Colleges | | | | | | | |
|---|---|---|---|---|---|---|---|
| Senior College | Enrollment | Computers Available for Student Use | Ratio: Computers /Students | Restricted Access Computers | Ratio: Restricted Access Computers /Students | Open Access Computers | Ratio: Open Access Computers /Students |
| Baruch | 15,773 | 1,196 | 1:13 | 743 | 1:21 | 453 | 1:35 |
| Brooklyn | 15,137 | 1,026 | 1:15 | 505 | 1:30 | 521 | 1:29 |
| City | 10,378 | 537 | 1:19 | 332 | 1:31 | 205 | 1:51 |
| Hunter | 20,397 | 485 | 1:42 | 201 | 1:101 | 284 | 1:72 |
| John Jay | 11,469 | 516 | 1:22 | 329 | 1:35 | 187 | 1:61 |
| Lehman | 8,889 | 1,093 | 1:8 | 675 | 1:13 | 418 | 1:21 |
| Medgar Evers | 4,715 | 447 | 1:11 | 156 | 1:30 | 291 | 1:16 |
| NYC Technical | 11,028 | 395 | 1:28 | 146 | 1:76 | 249 | 1:44 |
| Queens | 15,391 | 1,059 | 1:15 | 682 | 1:23 | 377 | 1:41 |
| Staten Island | 11,325 | 1,128 | 1:10 | 490 | 1:23 | 638 | 1:18 |
| York | 5,208 | 1,741 | 1:3 | 1,042 | 1:5 | 699 | 1:7 |

In comparing availability at the 11 Colleges, we found that the number of total computers available for student use ranged from 1 computer for every 3 students at York College to 1 computer for every 42 students at Hunter College. When we took accessibility into consideration, we found that computer to student ratios increased, but also continued to vary widely from campus to campus. However, York consistently maintained the greatest availability of computers for student use, for both restricted access (1 computer per 5 students) and open access (1 computer per 7 students) classifications, while Hunter continued to show the fewest computers available for student use for both open access (1 computer per 72 students) and restricted access (1 computer per 101 students). We believe these variations exist, in part, because neither CUNY Central

nor most of the Colleges have set guidelines or goals as to the acceptable ratio of computers to students. Instead, Colleges provide for student computers as funding and space allows. Also, Colleges are not maintaining computer inventory lists that identify computers dedicated for students' use. As a result, Colleges with relatively few available computers may be limiting students' access to the information they need to complete coursework.

(In response to our draft audit report, Queens College officials stated that they are now maintaining a separate inventory of student access machines.)

## *Outdated Computers*

Since both computer hardware and software change rapidly, Colleges need to continually upgrade or replace their technology on a regular basis to provide their students with the computing capabilities needed to access current computer based applications. Processor speed, memory requirements and other computer parameters have increased significantly over relatively short periods of time, thereby shortening a computer's useful life. When a computer can no longer provide an adequate level of service to the user, it is considered outdated. An adequate level of service can be defined as being able to use efficiently the most current versions of operating system(s) and software available.

To determine the number of outdated computers at each College, we reviewed computer inventory listings that Colleges had provided at our request. We then determined whether listed computers were outdated based on criteria related to processor-speed and age. Specifically, we considered a computer to be outdated when:

- The computer could not adequately run current operating systems (i.e., units that had first generation Pentium processors and models that were pre-Power Mac G-3);

- The computer was more than five years old (these units generally have insufficient memory, slow hard-drives, small monitors; some lack CD ROM drives); and

- the College itself identified the unit as "outdated and obsolete."

As a result of our review, we found significant variances among the Colleges in the percentage of available student computers that are outdated. For example, while none of Hunter's computers, either restricted or open access, were outdated 41 percent of both Brooklyn and John Jay were deemed outdated. Table 2 below lists the number of and percentages of outdated computers at the Colleges

| Table 2: Outdated Student Computers | | | |
|---|---|---|---|
| College | Computers Available for Student Use | Total Number of Outdated Computers | Percentage of Outdated Computers |
| Baruch | 1,196 | 89 | 7% |
| Brooklyn | 1,026 | 419 | 41% |
| City | 537 | 50 | 9% |
| Hunter | 485 | 0 | 0% |
| John Jay | 516 | 213 | 41% |
| Lehman | 1,093 | 207 | 19% |
| Medgar Evers | 447 | 134 | 30% |
| NYC Technical | 395 | 142 | 36% |
| Queens | 1,059 | 251 | 24% |
| Staten Island | 1,128 | 151 | 13% |
| York | 1,741 | 679 | 39% |

When we separated the number of outdated student computers into restricted/open access categories, we found that only 6 percent of City College restricted access computers were deemed outdated, while at John Jay, 56 percent of restricted computers were outdated. Our review of open access computers found that only 6 percent of Staten Island's computers were outdated, but 43 percent of Brooklyn's open access computers were outdated. Table 3 lists the breakdown

of the number of and percentages of restricted and open access outdated student computers at the Colleges.

Table 3: Outdated Student Computers (Restricted Access and Open Access)

| College | Total Number of Outdated Computers | Restricted Access Computers | Outdated Restricted Access Computers | Percentage Outdated Restricted Access Computers | Open Access Computers | Outdated Open Access Computers | Percentage Outdated Open Access Computers |
|---|---|---|---|---|---|---|---|
| Baruch | 89 | 743 | 1 | 0.13 | 453 | 88 | 19 |
| Brooklyn | 419 | 505 | 197 | 39 | 521 | 222 | 43 |
| City | 50 | 332 | 20 | 6 | 205 | 30 | 15 |
| Hunter | 0 | 201 | 0 | 0 | 284 | 0 | 0 |
| John Jay | 213 | 329 | 185 | 56 | 187 | 28 | 15 |
| Lehman | 207 | 675 | 45 | 7 | 418 | 162 | 39 |
| Medgar Evers | 134 | 156 | 73 | 47 | 291 | 61 | 21 |
| NYC Technical | 142 | 146 | 46 | 32 | 249 | 96 | 39 |
| Queens | 251 | 682 | 168 | 25 | 377 | 83 | 22 |
| Staten Island | 151 | 490 | 115 | 23 | 638 | 36 | 6 |
| York | 679 | 1,042 | 420 | 40 | 699 | 259 | 37 |

As was the case with determining student computing needs, neither CUNY Central nor the Colleges have established guidelines stating what computer configurations should be considered outdated. Since there are no standards established for obsolescence, Colleges do not formally monitor computer inventories for outdated student computers. However, Colleges told us they knew they had outdated computers on their campuses, and some campus officials were able to identify certain outdated units. For example, the College of Staten Island identified 127 computers (11 percent) as being outdated. During our review of the College of Staten Island's computer inventory, we identified additional first generation Pentium

computers as being outdated bringing the outdated total to 151. At some Colleges, officials told us that the outdated computers in labs often sit idle, since students prefer to wait, if necessary, to use whatever newer units the College has available for student use. As result of the variations among Colleges in the number of student computers that are outdated, we concluded that some CUNY students are able to use up-to-date computers, while others may be using old and less efficient equipment. CUNY has acknowledged that students suffer from a lack of access to up-to-date computers. "It is a terrible tragedy," according to the Chancellor, "that on some of our campuses, students today are not getting access to the very basic technology that I think they are going to need in order to compete in an economy that requires that certain level of knowledge."

(Queens College officials responded that with the advent of the Student Technology Fee, a three year recycle plan for upgrading student access labs has been approved.)

## *Computer Purchases*

In expending funds to purchase computer assets, as for any asset, College officials should acquire the information necessary to make informed decisions so that purchases are appropriate and targeted to meet documented needs. However, as our report shows, Colleges were making computer purchasing decisions without knowing the number of computers that were available for students' use. We found that College purchases of computer-related equipment were generally opportunistic, and tended to occur if money was available and if there was space for the equipment. The effect of this unsystematic approach to purchasing is a hit-or-miss provision of basic computer equipment for CUNY students.

To fulfill CUNY's commitment to academic excellence and to provide students with adequate access to computers, Colleges should develop plans that identify both the College's specific computing needs by user category and the best ways to meet those needs, including making scheduled upgrades to equipment. Existing College master plans may state overall goals for computing capability, but they are too general to provide the kind of specific direction Colleges need for purchasing equipment on an annual basis. Furthermore, when Colleges identify the specific costs associated with student

computing needs, they should build this cost into their budgets, and make the allocations necessary to pay for student computing resources.

## Recommendations

To CUNY Colleges:

1. Establish a set of performance standards to define what type, capability and number of available computer hardware is minimally required to deliver adequate basic service to students. Have these standards reviewed by the CUNY Information Technology Steering Committee.

2. Prepare computer inventory listings that identify each unit and the primary student or administrative user.

3. State criteria for defining outdated computers and annually monitor to identify this hardware.

4. Develop a three to five-year computer replacement cycle.

   (CUNY officials responded in general terms that our recommendations were either implemented or were in the process of being implemented.)

# STUDENT ACCESS TO COMPUTER RESOURCES

Access to computing resources means access to a host of information resources and campus services. Access to College computers is available in campus computer labs staffed by College technical support personnel (open access), or in departmental classrooms where they are designated for the use of students enrolled in specific classes (restricted access). Alternately, campuses can provide locations for students to hook up their personal computers to the College network through either hardwired or wireless connections. However, we found that all but one CUNY College have relatively limited lab hours, mostly due to lab staffing shortages. Further, none of the Colleges have adequate resources for connecting personal notebook computers to the College network. Since these constraints further restrict access to already limited computer resources on College campuses, CUNY students - particularly non-traditional students - may find it difficult to complete their course work and achieve their education goals.

## *Available Lab Hours*

The open access computers that are available to all CUNY students are located in computer labs. The labs are staffed by technical support personnel whose function it is to manage or resolve both hardware and software problems on College computers and to assist students with computing problems they encounter in the lab. The labs are open and accessible to students only when technical support staff are on duty.

Since students need access to computers to be able to effectively complete their course work, each College should set computer lab hours that allow the students adequate access to computer resources. Some of the students who attend CUNY are non-traditional students, that is, approximately 45 percent are 25 years old or older, and almost 67 percent work part or full time while in school. These students require lab hours that are flexible enough to allow them access to computers during evening hours and on the weekends.

To determine if CUNY students have adequate access to computer resources, we calculated the average number of computer lab hours available per students per week at each College. We calculated this average by dividing the number of students by the number of open access student computers. We then multiplied that figure by the number of lab hours per week. We also documented the closing hours and the weekend hours of operations. As a result of our calculation, we concluded that students at York have the most weekly access to computer labs at over eight hours per week per student. By contrast, students at Hunter have the least weekly access to computer labs at less than one hour per week per student. In addition, three Colleges (Medgar Evers, NYC Technical and York) do not offer any lab hours on Sundays and five Colleges (Hunter, John Jay, Lehman, Queens and York) close before 10:00 p.m. Table 4 shows the disparities in access hours among CUNY Colleges, and the relative levels of accessibility to labs in the evenings and on the weekends.

Table 4: Access to Computer Labs at CUNY Colleges

| College | Open Access Lab Hours Available per Week | Open Access Hours per Week per Student | Latest Closing Time | Lab(s) Open on Sunday |
|---|---|---|---|---|
| Baruch | 110.25 | 3.17 | 11:45 p.m. | Yes |
| Brooklyn | 91.38 * | 3.15 | 24/7 | Yes |
| City | 74.50 | 1.47 | 11:00 p.m. | Yes |
| Hunter | 64.25 | 0.89 | 8:45 p.m. | Yes |
| John Jay | 66.00 | 1.08 | 9:45 p.m. | Yes |
| Lehman | 70.50 | 3.32 | 9:45 p.m. | Yes |
| Medgar Evers | 73.00 | 3.86 | 10:00 p.m. | No |
| NYC Technical | 84.50 | 1.91 | 10:00 p.m. | No |
| Queens | 69.25 | 1.70 | 9:45 p.m. | Yes |
| Staten Island | 83.00 | 4.68 | 11:00 p.m. | Yes |
| York | 62.50 | 8.39 | 8:45 p.m. | No |

* Weighted average (One of the labs at Brooklyn has 50 computers and is open 24/7.)

When asked, 9 of the 11 Colleges acknowledged that they did not provide adequate lab hours for their students (Medgar Evers officials stated that they did provide adequate access and officials of NYC Technical did not respond). Officials at these nine Colleges stated the main reason for the lack of adequate lab hours is information technology (IT) staffing shortages. Officials told us they do not have enough personnel funding to provide the level of staff needed to monitor the labs on an ongoing basis. For schools that already have a high student to computer ratio, lack of lab access compounds the computer availability problem.

For many students, especially those who are not computer-literate and are prone to computer-related problem, technical support is a critical university service. Neither CUNY Central nor individual Colleges have established written lab staffing standards. However, the 2000 Campus Computing Survey performed by the Campus Computing Project reported that the Gartner Group generally recommended one IT support position for every 50-75 users. We asked each College to provide us with IT support personnel data to determine whether any College met the above standard and how Colleges compared to one another for lab staffing. We requested that Colleges include only those persons who provide direct assistance to students in using computer hardware and software (i.e., not administrative personnel). We found that no College came close to meeting the Gartner standard. Lehman had the lowest ratio of staff to students, at 1 IT staff for 198 students, while Queens had the highest ratio at 1 IT staff for 789 students. As shown in Table 5, our review showed wide disparities in computer lab staffing among the Colleges.

| Table 5: Ratio of Lab Staff to Students at CUNY Colleges | | | |
|---|---|---|---|
| College | Total Number of Students | Total Number of IT Support Staff (FTE) | IT Support Ratio Students to Staff |
| Baruch | 15,773 | 46 | 343:1 |
| Brooklyn | 15,137 | 42 | 360:1 |
| City | 10,378 | 38.5 | 270:1 |
| Hunter | 20,397 | 47 | 434:1 |
| John Jay | 11,469 | 29.5 | 389:1 |
| Lehman | 8,889 | 45 | 198:1 |
| Medgar Evers | 4,715 | 14.5 | 325:1 |
| NYC Technical | 11,028 | 17 | 649:1 |
| Queens | 15,391 | 19.5 | 789:1 |
| Staten Island | 11,325 | 30.5 | 371:1 |
| York | 5,208 | 7 | 744:1 |

College officials indicated they need more funds to solve the shortage in IT staffing. CUNY's Chancellor supports Colleges' efforts to secure more funds to increase the number of IT staff, who provide what he calls "the backbone of computing" on campuses. Until CUNY does obtain the additional funds, however, Colleges could consider implementing a number of techniques to help mitigate the impact of limited IT staffing on CUNY students who need access to computer labs. These are techniques that we observed in use at several CUNY campuses during the course of our audit. If these techniques, or "best practices," were implemented system wide, we believe they could help Colleges provide more computer access for their students at very little cost. These best practices are as follows:

- Place as many computers as possible in one lab room rather than using multiple rooms. This limits the number of lab support personnel needed to provide coverage.

- Introduce television cameras for surveillance in the smaller lab rooms, thereby centralizing the lab support

personnel while reducing the number of lab personnel needed.

- Automate the process of restoring (ghost) lab computers weekly to bring them back to the desired default setting. Regularly scheduled restoration eliminates computer problems caused by students who disrupt computer settings. Automating the process saves cost, since it minimizes the need for manual intervention.

## *Network Access*

As notebook computers become more popular, students are likely to bring their personal notebook computers to school. To access the College network and the Internet, students need designated locations where they can connect their notebook computers, either through hardwired network connections or through wireless network connections. Access through a hardwired connection involves physically plugging the student's notebook computer into an available node. A node is a cable that physically connects the student's computer to the College network. A wireless connection uses radio waves to transmit signals from wireless access points to the College network.

Since Colleges can provide students with only limited availability to up-to-date computers, and since access to lab computers is also limited, adequate network access for personal computers would provide some students with an alternate means of computing on campus. However, we concluded that Colleges do not have an adequate number of hardwired nodes or wireless access points available at this time to alleviate the problem of limited computer lab accessibility. Table 6 on the following page shows comparative network access at CUNY Colleges.

| Table 6: Network Access at Colleges for Personal Notebooks | | |
|---|---|---|
| College | Dedicated Hardwired Nodes Available | Wireless Network |
| Baruch | No | Yes* |
| Brooklyn | Yes | Yes |
| City | Yes | Yes |
| Hunter | No | Yes |
| John Jay | Yes | Yes |
| Lehman | No | No |
| Medgar Evers | No | Yes |
| NYC Technical | Yes | Yes |
| Queens | No | Yes |
| Staten Island | Yes | Yes* |
| York | No | No |

* Only these schools have wireless networks that can accommodate more than 100 students at this time. Baruch's network can serve the highest number of students.

We found that 6 of 11 Colleges did not provide any dedicated hardwired nodes on campus for personal laptop computers; York and Lehman have neither dedicated hardwired nodes nor wireless networks. Only five colleges (Brooklyn, City, John Jay, NYC Technical and Staten Island) offer both dedicated hardwired nodes and wireless networks for students' personal notebook computers. We did find that Colleges were in the process of implementing wireless network technology on their campuses. Given the limited availability of up-to-date equipment at most Colleges, we encourage the Colleges to continue their progress in creating wireless networks with adequate access points. Colleges should also focus on providing a sufficient number of dedicated hardwired nodes on campuses for personal notebooks. To the extent they can provide alternate access to computing for students, Colleges can improve students' ability to complete their course work and alleviate the demand for College lab computers.

## Recommendations

To CUNY Colleges:

5. Implement the best practices identified in this report to help provide adequate computer lab access to CUNY students, including those students who need late night and weekend access.

6. Identify the access needs for students who have personal notebook computers and strive to meet these needs, taking into consideration security and privacy issues.

7. Establish standards for student IT support and have these standards reviewed by the CUNY Information Technology Steering Committee.

   (CUNY officials responded in general terms that our recommendations were either implemented or were in the process of being implemented.)

# MAJOR CONTRIBUTORS TO THIS REPORT

Jerry Barber
William Nealon
Tony Carbonelli
Stephen Lynch
Bebe Belkin
Joseph Giaimo
Orin Ninvalle
Nancy Varley

*The City University of New York*

*OFFICE OF INTERNAL AUDIT AND MANAGEMENT SERVICES*
*535 East 80th Street, New York, NY 10021*
*Voice:(212) 997-5820 Fax:(212)997-2301*
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August 29, 2002

Mr. Jerry Barber
Audit Director
State of New York
Office of the State Comptroller
110 State Street
Albany, NY 12236

Dear Mr. Barber:

I write in response to your request for comments regarding the draft audit report on the availability of student computer resources at the senior colleges of The City University of New York (2001-S-45). As with the preliminary report, the University and its senior colleges appreciate the opportunity to respond again to the use of computers in our expanding academic learning and support efforts. The attached responses provided by the senior colleges (see **Attachment I**) specifically address the findings and recommendations contained in the report. My comments below address the cost of technology in higher education and supplement my previous response to the preliminary report (see **Attachment II**).

Generally, the draft report was adequate in addressing the subject of student computer availability. The recommendations were useful, but provided nothing of substantial benefit to the colleges. This is not a complaint about the content of the report, but instead, a criticism about an audit that took nearly a year to complete and never progressed much farther than extrapolations generated from a statistical inventory analysis. The State auditors spent little time delving behind these statistical numbers and as a result, provided several recommendations that generally offered little more than "band-aid" solutions for allocating available resources and for using existing resources. Many of the current and prior responses by the senior colleges indicated that these recommendations were either implemented or in the process of being implemented. The recommendations did not address the reality of the situation that all computer and telecommunications systems will always need to be dynamic and that acquiring technology improvements and the resources needed to support them will remain a costly investment. Any plans to increase capacity, acquire additional equipment, or expand capabilities, as well as to improve support services will require an

* Note 1

* See State Comptroller's Notes, Appendix C

**Appendix B**

enormous amount of funding. For example, the audit report noted that Baruch College was one of the few colleges with wireless networks, but the report failed to mention that this technology and other state-of-the-art instructional technology would not have been possible without a capital investment of $319 million to build a new academic complex. Technology remains expensive to acquire and maintain.

Technology is an added expense for CUNY colleges and accordingly, it must not only be applied cost effectively among the users: students, faculty and staff, but must compete budgetarily with other student needs such as increased tutoring, counseling, childcare and new academic initiatives aimed at raising academic standards. Keeping up with the rapid changes in technology has proven extremely difficult with the constraints of a heavily committed operating budget. The City University like most public educational institutions was not "born with a silver spoon in its mouth" and thus, must constantly work to secure adequate funding support to update technical infrastructure, to upgrade and modernize computer labs and classrooms, purchase computer equipment and to enhance instructional computing and distributed learning.

All CUNY colleges have engaged in a comprehensive strategic planning process and developed a multi-year information technology plan to upgrade each college's network infrastructure for high-speed data communications and access to the internet and to provide capacity for applications such as access to e-mail servers, web servers, databases, and multi-media applications. While these plans are extremely important priorities for the colleges, funding restrictions require that these plans be phased-in over several years. In addition, the State's current fiscal crisis and further budget reductions have temporarily halted the implementation of the University's administrative applications strategic plan intended to upgrade and unify the major administrative systems. The uncertain economy and State and City budget reductions provide little opportunity at this time to take on any new projects involving technology.

The significant funding reductions in this year's operating budget also forced the University to secure other sources of funding to support the cost of technology already operating on the campuses. The colleges indicated that additional resources were needed to cover existing technology costs related to running computer labs and providing technical support services. As a result, effective Fall 2002, all students are being charged a technology fee to meet the rising technology costs and to make up for State cuts in technology spending. The quote by the Chancellor that is noted in your report about students not getting access to basic technology is directly related to the imposition of the technology fee and the fact that State and City funding cannot meet the increasing student needs for technology and technology support services.

The funds generated by the technology fee are being earmarked by campus-based committees to support the technology needs of students. A large portion of the first year's funds is being used to acquire and install large numbers of student desktop computers at each campus. In addition, cost savings generated by productivity and procurement initiatives undertaken by the University-wide IT Steering Committee are

also being used to purchase more computer laboratory workstations available to students at each campus.

Finally, the same survey referenced in the report about information technology (IT) support standards also indicated that (1) retaining current IT personnel, and (2) helping IT personnel stay current with new technologies were at the top of the list of technology issues confronting colleges and universities. The survey went on to say that colleges and universities remain significantly understaffed in the area of user support. On a personal note, a significant amount of time is spent by one of my staff to handle computer hook-up problems, dealing with software packages that interfere with each other in mysterious ways, instructing staff on how to use the computer and the various applications, and communicating with Central Office "techies" about network and server problems. The scope and quality of support services for computing is directly related to the success in integrating technology into academic and administrative practices and instruction. The need for additional resources and improved support services is not just a CUNY problem. Accordingly, I would appreciate whatever assistance the State Comptroller's Office could provide in benchmarking IT support services (and their costs) at other State agencies and institutions of higher education and if possible, addressing the following issues:

- Identify a core of IT services that should be common to most agencies/institutions.
- Develop ranges for the unit costs of providing IT services based on agency/institutional characteristics.
- Identify exemplars for each IT service, that is, agency/institution approaches that deliver exceptionally high levels of service at identified cost levels.
- Develop benchmarks that are useful for comparing the costs of providing IT services among various agency/institutional categories.

* Note 2

Thank you again for the opportunity to respond to this draft report. If you have any questions regarding the attached responses, please call me at (212) 997-5820.

Sincerely,

Louis Chiacchere

Louis Chiacchere

c: Senior Vice Chancellor Allan Dobrin
Interim Vice Chancellor Ernesto Malave
Senior College Vice Presidents of Administration
Brian Cohen, Chief Information Officer
Michael Ribaudo, Chief Technology Officer
Colette Wagner
Rochelle Alper

IA#1322

Attachment I

Baruch College

Baruch COLLEGE
The City University of New York

One Bernard Baruch Way
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New York, NY 10010-5585
Tel: 212-802-2849
Fax: 212-802-2797
www.baruch.cuny.edu

OFFICE OF THE VICE PRESIDENT
FOR ADMINISTRATION AND FINANCE

August 26, 2002

Mr. David Rankert
Offices of Internal Audit and Audit Control
535 East 80th Street
New York, NY 10021

Re: State's Formal Draft Audit Report on Availability of Student Computer Resources at CUNY

Dear Mr. Rankert:

On page 15 of the report, Baruch is listed as not responding to a request for information regarding total number of IT support staff. It's not clear to me why there was no response to the auditors when they requested the information but I hope this can be corrected. Total IT support staff for Baruch College, during the timeframe of the audit, was 46 FTEs. This converts to a ratio of students to staff of 343:1. If you need additional information, please let me know.

Sincerely,

Mary Finnen

C: Frederick J. Hammond, Jr.
Arthur Downing

John Jay College



Date: Fri, 23 Aug 2002 15:54:12 -0400
From: Bob Banowicz <bbanowicz@jjay.cuny.edu>
Subject: Availability of student computer resources report
To: David Rankert <darbh@cunyvm.cuny.edu>
Cc: Robert Pignatello <rmp@jjay.cuny.edu>
X-Mailer: Mozilla 4.7 [en] (Win98; U)
X-Accept-Language: en

David Rankert - Vice President Robert Pignatello asked me to review the state audit report for availability of student computer resources and respond to you about the results. All information concerning John Jay is correct for the time period specified, October 12, 2001 through March 8, 2002. However, as you know, because of the new student technology fee program, much of this will change. For the first year of the program, we plan to replace 50% of all student computers and add 124 new machines. If you require additional information, please contact me.

Bob Banowicz

–
Robert A. Banowicz
Interim Executive Director
Department of Information Technology

John Jay College of Criminal Justice
The City University of New York
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Queens College

QUEENS COLLEGE
THE CITY UNIVERSITY OF NEW YORK
FLUSHING, NEW YORK 11367-1597

OFFICE OF THE VICE PRESIDENT
FOR FINANCE AND BUSINESS

718 997-5775
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**MEMORANDUM**

August 26, 2002

**TO:** David Rankert

**FROM:** M. Hratch Zadoian

**RE:** Student Computer Resources Audit

Attached are the comments from our Office of Information Technology (OIT) concerning the Draft Audit Report.

Thank you, as always, for your assistance.

| | |
|---|---|
| From: | **"Donna Lipper" <Donna@Qc1.Qc.Edu>** |
| Organization: | **Queens College, CUNY** |
| To: | **MHratch.VPFB.QC@Qc1.Qc.Edu** |
| Date sent: | **Wed, 21 Aug 2002 13:45:20 -0400** |
| Subject: | **student computer resources audit** |
| Send reply to: | **donna@qc1.qc.edu** |
| Copies to: | **Jim.FCS.FS.QC@Qc1.Qc.Edu** |
| Priority: | **normal** |

Hratch,

here are my comments on the Draft report on student computer resources.

PAGE 4
The College's inventory system does not have a field for identifyit g computers as student access vs faculty, administrative, etc. We did subset the inventory system for them and we are now maintainin a separate inventory of student access machines.

PAGE 7
We are maintaining computer inventory list indicating student access machines.

PAGE 9

With the advent of the Student Technology Fee, the subcommitte has approved a 3 year recycle plan for upgrading student access labs.

PAGE 12

ALL of the OIT labs, whether open access or classroom, have wireless access in the room. There are signs in each room indicating this.

Hope this helps,
Donna
Donna J. Lipper, Ass't. Vice President
Office of Information Technology phone: (718) 997-3009

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May 20, 2002

Mr. Anthony Carbonelli
Audit Supervisor
New York State
Office of the State Comptroller
123 William Street, 21st Floor
New York, NY 10038-3804

Dear Mr. Carbonelli:

I write in response to your request for comments regarding the preliminary draft audit report on use, safeguards and operability of student computers (2001-S-45). The University and its senior colleges appreciate the opportunity to respond to this preliminary report. The attached responses provided by the University Office of Instructional Technology and Information Services (see **Attachment I**) and by the senior colleges (see **Attachment II**) specifically address the findings and recommendations contained in the report. My comments below address the University's efforts to prepare students to use new technologies and to work in a virtual electronic network environment.

The University shares your view regarding the role of technology as an important learning tool for classrooms and an essential skill in the workplace. The University is committed to providing state-of-the-art technology to college users, maximizing computer access for students, streamlining administrative applications, and effectuating cross-campus compatibility in computer hardware, software, applications and connectivity. The University is taking a proactive and integrated approach to achieving these goals. This approach entails the establishment of an Information Technology (IT) Steering Committee to guide the development and implementation of several major technology initiatives including projects to:

- continue the upgrade and maintenance of computers for students, faculty and staff,
- expand the use of technology in teaching and learning,
- fully deploy network connections in the labs and offices at all CUNY colleges,

- modernize and computerize colleges' libraries through the installation of state-of-the-art open systems wiring and smart web-ready workstations, and

- improve the many information systems by utilizing web portals and advanced applications that meet the needs of University and college users.

The IT Steering Committee is comprised of senior representatives from each of the colleges and key Central Office staff. In addition to overseeing major technology initiatives, the Committee will address University-wide technology-related issues such as standards, security, retention, disaster recovery, communication, funding and procurement.

The timely completion of these initiatives is contingent on the availability of State funds. In the past, budget considerations oftentimes resulted in computer upgrades and technology improvements being phased in on a piecemeal basis. The University has learned to remain flexible in implementing computer and technology enhancements with respect to State funding.

Historically, State funding for the senior colleges decreased throughout the 1990s. Now because of the uncertain economy and the effects of the September 11 crisis, the State has imposed significant funding reductions for the University's 2002-2003 operating budget. The senior colleges continue to share a reduced level of resources to support both core academic and administrative functions, as well as to undertake educational technology improvements and expand computer services for student use in labs, libraries and research facilities. To augment these resources, the University and its senior colleges are identifying private funding sources to supplement the public funding available for these technology initiatives. Private funding will continue to be sought from foundations and corporate sources to sustain the process currently underway to implement these ongoing projects.

In addition to seeking private funding, the University will also be imposing a mandatory technology fee on all students to help support technology initiatives that directly impact technology used by students and strengthen their college learning experience. The increasing cost of providing students with greater access to computer facilities and the expense incurred for support services and supplies has become more of a financial burden as State funding has leveled off in recent years. As a result, the senior colleges have been forced to allocate more of their finite resources to this area to the detriment of other worthwhile programmatic initiatives. Beginning with the Fall 2002 semester, a technology fee will be charged to all students to help support the University's commitment to incorporating and integrating state-of-the-art technology into the college teaching and learning environment, now and in the future. The proceeds from this fee will supplement and not replace the colleges' existing technology budgets.

While aware of the rising cost of technology, the University and its senior colleges are committed to providing students with a quality education, which includes meeting their technology needs. The University recognizes the funding limitations of the State and will continue to work hard towards augmenting public funding with other revenue sources.

Thank you again for the opportunity to respond to this draft report. If you have any questions regarding the attached responses, please call me at (212) 997-5820.

Sincerely,

Louis Chiacchere

c: Senior Vice Chancellor Allan Dobrin
Vice Chancellor Sherry Brabham
Senior College Vice Presidents of Administration
Brian Cohen, Chief Information Officer
Michael Ribaudo, Chief Technology Officer
Colette Wagner
Rochelle Alper

la#1256

# State Comptroller's Notes

1. Early in the audit process we concluded that neither CUNY Central nor the colleges had developed standards for assessing the availability and the accessibility of student computer resources. Furthermore, we were unable to identify applicable standards from our research into computer resources for university settings. Developing such standards and reaching consensus about them in a university-wide setting was not feasible for our audit scope. Therefore, our performance audit focused on analyzing the extent and variation of computer resources among the senior colleges. This was something that CUNY had not provided and that would be necessary for any attempt to establish standards. The analysis required considerable audit time and resources. We acknowledge CUNY's position that technology improvements and the resources necessary to support them are a costly investment. However, such investment needs to be planned in a context that fully identifies available computer resources and standards of performance.

2. As discussed in the preceding note, our research was not able to establish computer resource standards applicable in a university-wide setting. However, as we continue with our audit planning processes for CUNY and the State University of New York, we will continue to be alert to the issues that CUNY seeks assistance with. We will share whatever applicable information we identify.

**U.S. Department of Education**
*Office of Educational Research and Improvement (OERI)*
*National Library of Education (NLE)*
*Educational Resources Information Center (ERIC)*

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