

## MEMORANDUM

May 7, 1997

TO: County Council

FROM: Karen Orlansky<sup>Ko</sup>, Director  
Office of Legislative Oversight

SUBJECT: ***Final Report of the Global Access Performance Measurement Team***

In January 1996, the Council and Board of Education jointly appointed the Global Access Performance Measurement Team. The Council and Board asked the Team to develop a recommended performance measurement system to monitor and analyze the costs, schedule, and performance of the MCPS' Global Access project. The Team represented a cross-section of the project's stakeholders, including MCPS, Council, and Executive staff, parents, and community members.

The Steering Committee for the project consisted of the three Councilmembers who serve on the Council's Education Committee and three Board members who serve on the Board's Research and Evaluation Committee. The Steering Committee provided valuable input to the Team's work at key points during the course of the project.

The final report of the Global Access Performance Measurement Team is attached, including a transmittal letter from the Team Chair to the Council and Board of Education. The report includes:

- a description of the Team's appointment and work plan;
- an overview of performance measurement;
- a summary chart of the recommended performance measures;
- a detailed description of each performance measure; and
- a discussion of implementation issues.

**The report is scheduled to be presented to the Board of Education on May 13th, and to the full Council on June 10. The report is tentatively scheduled for an Education Committee worksession on June 25th.**

Staff support for the project was provided jointly by OLO and MCPS staff from the Office of Global Access Technology and Department of Educational Accountability. Please call me (7-7996) if you have any questions.

Attachment

**GLOBAL ACCESS PERFORMANCE MEASUREMENT TEAM**  
Rockville, Maryland

May 6, 1997

President and Members  
Montgomery County Council  
100 Maryland Avenue  
Rockville, Maryland 20850

President and Members  
Montgomery County Board of Education  
850 Hungerford Drive  
Rockville, Maryland 20850

Dear Council and Board Members:

On behalf of the Global Access Performance Measurement Team, I am pleased to transmit to the County Council and Board of Education our report.

In January 1996, the County Council and Board of Education established the thirteen-member Global Access Performance Measurement Team. The Council and Board asked the team to develop a recommended performance measurement system to monitor and analyze costs, schedule, and performance of the Montgomery County Public Schools (MCPS) Global Access project. The team represented a cross-section of the project's stakeholders, including MCPS staff, Council and Executive branch staff, parents, and community members.

The team recognized from the beginning that it would be difficult to develop qualitative and quantitative ways to measure the progress of Global Access and especially challenging to venture beyond traditional measures of implementing the technology itself. Performance measurement literature acknowledges that few, if any, school systems have successfully developed a means to measure the effects of technology on student learning.

Developing meaningful output and outcome performance measures for Global Access will be an ongoing learning process. The team's report recommends an initial plan for collecting data and tracking the performance of Global Access. In order to improve the measurement system over time, the team recommends that MCPS staff continue to compile examples from other organizations that are measuring the performance of technology in schools. In particular, MCPS should seek cost-effective measures of the impact of Global Access on student learning.

May 6, 1997

The team report is organized as follows:

- Chapter I of the report describes the background of this performance measurement project, the appointment of team members, and the team's work plan.
- Chapter II defines performance measurement and describes criteria for selecting effective performance measures.
- Chapter III lists the team's recommended initial set of 22 performance measures for Global Access. It contains a one-page description of each measure that includes potential data sources, presentation ideas, comments on how the data will be used, and an estimated cost of data collection.
- Finally, Chapter IV provides comments on implementing a first-year pilot of measures selected from the team's initial set of measures. This chapter emphasizes that developing and implementing a performance measurement system is a continuous process. Devising measures is only the first step, followed by data collection and dissemination, project adjustment, and performance measure review and revision.

The next step in the process of developing a performance measurement system for the Global Access project is to decide which of the 22 recommended measures to implement in a first-year pilot and to assign responsibility for overseeing implementation. After the first-year experience, the performance measurement system should continue to be expanded, updated, and revised to meet the needs of MCPS Board members, Council members, and other stakeholders of the project. The Board and the Council may choose to ask some of the current team members to remain involved in the process of review and revision.

I want to congratulate team and staff members on the results of their collaboration and thank them for their time, ideas, and belief in the efficacy of appropriate educational technology use. I have enjoyed participating with them in the process of developing and recommending performance measures for the Global Access project and in helping to make a difference for Montgomery County students.

Sincerely,



Helene Jennings, Chair  
Global Access Performance Measurement Team

HJ:bks

Enclosure

# PERFORMANCE MEASURES FOR THE GLOBAL ACCESS PROJECT:

## **TEAM REPORT & RECOMMENDATIONS**

**Global Access Performance Measurement Team**

Jointly Appointed by the  
Montgomery County Council  
and the  
Montgomery County Board of Education  
Rockville, Maryland

**May 1997**

# **Global Access Performance Measurement Team**

## **Chair**

Helene Jennings      Technical Director, Macro International

## **Members**

Gordon Aoyagi	Senior Assistant Chief Administrative Officer, County Government
Lucie Ling Campbell	Churchill Cluster Coordinator, MCCPTA
Steven Goldstein	President and CEO, CPC Health Corp.
Carol Hyatt	Technology Committee Chair, MCCPTA
Lee Meiners	Principal, Cresthaven Elementary School
Glenn Orlin	Deputy Staff Director, County Council
Sharon Pugh	Information Technology Consultant
Susan Ragan	Computer Science Magnet Teacher, Montgomery Blair High School
David Rodbard	Director, Information Resources Outreach, Assoc. of American Medical Colleges
Rosalva Rosas	Principal, Roberto Clemente Middle School
Steven Seleznow	Associate Superintendent, Office of School Administration

## **Staff**

Karen Orlansky, Director, Office of Legislative Oversight  
Joseph Villani, Associate Superintendent, Office of Global Access Technology

Teri Busch, Executive Assistant, Office of Legislative Oversight  
Jennifer Kimball, Research Assistant, Office of Legislative Oversight

Patricia Cutlip, Instructional Specialist, Office of Global Access Technology  
Deeva Garel, Director, Network and Computer Services Team  
Elizabeth Glowa, Director, Instructional Technology Support Team  
Marlene Hartzman, Director, Department of Educational Accountability  
Brenda Schaub, Secretary to the Associate Superintendent

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# **Performance Measures for the Global Access Project: Team Report and Recommendations**

## **Executive Summary**

In January 1996, the Montgomery County Council established the Global Access Performance Measurement Team with the task of developing a set of performance measures for the Board of Education's Global Access technology initiative. The County Council and the Board of Education each appointed six team members and jointly appointed the team chair. A steering committee composed of the three Councilmembers who serve on the Council's Education Committee and the three Board of Education members who serve on the Board's Research and Evaluation Committee was established.

Performance measurement is a tool for assessing the progress of a program toward accomplishing its intended goals and for maintaining accountability. Performance measurement involves identifying program goals, developing relevant measures, collecting data, and then analyzing and using the data to change and improve a program. A complete system includes input, process, output, and outcome measures of short range, intermediate, and long range duration that provide both quantitative and qualitative data.

The Global Access Performance Measurement Team recommends an initial set of 22 measures that fall into four categories: (1) The Technology Itself, (2) MCPS Staff Use, (3) Teaching and Learning, and (4) Fiscal Indicators. The 22 measures include input, process, output, and outcome measures. They include progress and effectiveness measures of short range (1-2 years), intermediate (3-5 years), and long range (ongoing) duration. Each measure includes data sources and an estimated cost of data collection categorized by range defined as low (<\$10,000), medium (\$10,000-\$50,000), and high (>\$50,000).

All of the 22 measures are not intended to be implemented at once. Some of the recommended measures can be put readily into place using available data. Some are more appropriate for the early phases of the Global Access project. Others rely on years of technology use to assess outcomes more accurately. The team recommends implementation of a pilot measurement system for the Global Access project that includes:

- An in-depth review of the data collection approach and cost for each measure selected for implementation in the first year,
- A careful consideration of how data are to be analyzed and communicated to interested parties, and
- Establishment of a continuous review and improvement process to revise and update the performance measurement system as the Global Access project and the needs of those monitoring it change over time.

## **Performance Measures for the Global Access Project: Team Report and Recommendations**

### **I Global Access Performance Measurement Team: Appointment and Work Plan**

#### **A. Background**

The County Council's active interest in outcomes and performance measurement started several years ago. At the Council's request, the Office of Legislative Oversight (OLO), in cooperation with the National Academy of Public Administration (NAPA), produced a report in FY 96 that described a generic process for developing program outcome measures for major information technology projects. The report included illustrative performance measures for major technology projects, including the Montgomery County Public Schools' Global Access project and the County Government's 800 Megahertz Radio Systems project.

As a follow-up to the initial OLO/NAPA report, the Council asked the Office of Legislative Oversight to work with the Montgomery County Public Schools (MCPS) to further develop performance measures for the Global Access initiative. The purpose of this cooperative OLO/MCPS project was to bring together a group of stakeholders to develop a recommended performance measurement system to monitor and analyze costs, schedule, and performance over the life cycle of Global Access. The goal was to design a system that generates valid, accurate, and usable information in an understandable format. The OLO/MCPS project was also intended to serve as a model for how to use performance measurement results in Council and agency decision-making.

#### **B. Appointment of the Team**

In January 1996, the County Council approved Resolution 13-410, establishing the thirteen-member Global Access Performance Measurement Team and directing it to develop the recommended performance measures. The Board of Education and the County Council each appointed six team members and jointly appointed the team chair. The Office of Legislative Oversight and the Office of Global Access Technology jointly staffed the team.

Names of the 13 team members are listed in Appendices A and B. The appointed team included representatives from the Council staff, MCPS administration, and the Executive Branch, as well as parents, teachers, principals, and community members.

A steering committee for the project was established to provide input and guidance to the Global Access Performance Measurement Team during the project period. The steering committee was made up of the three Councilmembers who serve on the Council's Education Committee and the three Board of Education members who serve on the Board's Research and Evaluation Committee.



### **C. Team Schedule and Work Plan**

The Global Access Performance Measurement Team met regularly between February and December 1996. The team held 13 meetings of the group as a whole, plus subcommittee meetings and meetings with the steering committee.

The first four team meetings included a kick-off meeting with the steering committee, a four-hour training session conducted by the National Academy of Public Administration on how to develop performance measures, and a briefing by MCPS staff on the Global Access initiative. The team also developed and approved an action plan for the remainder of the project.

The team then spent one meeting identifying the mission and goals of Global Access, followed by three sessions of brainstorming potential performance measures. The brainstorming sessions produced more than 100 potential performance measures that the team organized into three categories: The Technology Itself, MCPS Staff Use, and Teaching and Learning (teacher/student use). A fourth category, Fiscal Indicators, was added later.

A professional facilitator led the team through the brainstorming process and continued to work with the team to refine the potential performance measures. Two consultants familiar with instructional technology and performance measurement also provided technical assistance. The two technical consultants helped the team edit, annotate, and add to the measures generated by the brainstorming sessions and subsequent worksessions. Subcommittees of team members met to review the consultants' work and to continue the revision and editing process. After the subcommittees completed their work, the full team reviewed and discussed the list of potential measures.

During this period, the team was briefed by the MCPS Department of Educational Accountability on its evaluation plan for Global Access and the relationship of this ongoing evaluation with the team's work. The team also discussed the content and format of its final report.

The challenge then became how to select the best potential performance measures. A rating exercise was developed to help team members prioritize measures for inclusion in their report. Team members selected and ordered their most preferred and least preferred measures. Values assigned to each choice were totaled, and the measures were listed in priority order. The final team meeting was spent discussing the results of the rating exercise and selecting the performance measures to recommend. During the final months of this team project, the report was drafted, reviewed, and edited.

## **II. What Is Performance Measurement?**

### **A. Introduction**

Performance measurement is a tool for assessing the progress of a program toward accomplishing its intended goals and for maintaining accountability. If developed and used effectively, a performance measurement system can be used to:

- Document performance strengths
- Alert officials to performance problems or deficiencies
- Formulate and justify budgets
- Inform stakeholders
- Improve decisionmaking

Performance measurement involves identifying program goals and objectives, developing relevant measures, collecting data, and then analyzing and using the data to change and improve a program.

A performance measurement system is made up of individual performance measures that answer the following questions:

- How many?
- How efficiently?
- Of what quality?
- To what effect?

Performance measures are data on inputs, processes, outputs, or outcomes of a program that identify program strengths and weaknesses and point to areas for potential improvement.

### **B. Developing Relevant Measures**

An effective performance measurement system identifies and addresses the needs and views of all of the program's stakeholders, including staff who will be held accountable for the measurement results. It can include new measures developed by the stakeholders, measures that already exist in the organization, and comparisons to measures used in other organizations.

A complete system includes performance measures from each of the following types:

- **Input measures** -- Measure the resources used in producing a product or service, e.g., dollars, time, people
- **Process measures** -- Measure the activities and tasks that create the capacity to deliver a product or service, e.g., educational methods
- **Output measures** -- Measure the specific products and services produced by a program for its customers, e.g., a new curriculum element
- **Outcome measures** -- Measure the results of a program or activity as compared with its original purpose, e.g., higher rates of college acceptance

A complete system should also include short range, intermediate, and long range measures that provide both quantitative and qualitative data. Measures of short term duration reflect more immediate progress on program implementation, while longer term measures capture the effectiveness of carrying out the program's mission. Quantitative measures produce data such as numbers, percentages, and ratios. Qualitative measures indicate quality and produce information such as an assessment or valuation of program performance.

A larger number of measures is not necessarily better. Criteria for selecting the best measures include the following (from Price Waterhouse, LLP, *Who Will Bell the Cat?*, 1993):

- **Objective linked** -- Directly related to clearly stated objectives for the program
- **Responsibility linked** -- Matched to specific organizational units that are responsible for, and capable of, taking action to improve performance
- **Organizationally acceptable** -- Valued by all levels in the organization, used as a management tool, and viewed as being "owned" by those accountable for performance
- **Comprehensive** -- Inclusive of all aspects of program performance, e.g., measuring quantity but no quality provides incentives to produce quickly but not well
- **Clear** -- Understandable to intended audiences
- **Credible** -- Based on accurate and reliable data sources and methods not open to manipulation or distortion
- **Cost effective** -- Acceptable in terms of cost to collect and process
- **Compatible** -- Integrated with existing information systems
- **Comparable with other data** -- Useful in making comparisons, e.g., performance can be compared from period to period, with peers, to targets
- **Easy to interpret** -- Presented graphically and accompanied by commentary

Once collected, performance measurement data can be analyzed in a variety of ways, including making comparisons with baseline measures, target measures, or benchmarks. A baseline measure is an original point or value against which successive performance measures are compared. A target measure is the ending point or the performance that is desired. The actual performance measures are compared to this target value. A benchmark compares the program being evaluated with similar programs or organizations. Benchmarking often connotes comparison against programs recognized as "best practices" in the field.

### **C. Implementing a Performance Measurement System**

Implementing a performance measurement system involves collecting and analyzing the data and reporting the results. The amount of data collected and the frequency of reporting vary from measure to measure. Those measures that draw on existing data will require less time and money to collect. Other measures, particularly measures of effectiveness, require more time and resources to collect and analyze.

Once collected, the data are integrated into management control processes, such as budget and planning. The information collected and the reports generated must be

tailored to different recipients' needs. For example, elected officials may need different information about a project than program managers. A strategy for providing information externally also must be developed.

Successful implementation of a performance measurement system requires:

- Careful development of suitable performance measures
- Use of appropriate data collection techniques
- Timely reporting of performance information
- A link between the performance monitoring system and important decision-making processes
- Continuous revision and modification of the system
- Stakeholder support
- Adequate financial resources

Successful implementation of a performance measurement system also requires acknowledging the limits of performance measurement. The most often cited limits of performance measures are:

- Performance measures do not typically indicate cause and effect.
- Resources, sometimes significant, are needed to develop and maintain the performance measurement system.
- Possible misuse of negative findings is an unavoidable risk of performance reporting.

The parties involved also must recognize how difficult it is to develop and use a performance measurement system effectively. Implementing a performance measurement system requires a change in management culture from process/input orientation (how much is spent on programs) to outcomes/output (results from the money spent). In addition, managers can develop full blown performance measures but fail to integrate the resulting information into key management decisions of their agencies.

### **III. Recommended Performance Measures for Global Access**

The Global Access Performance Measurement Team recommends an initial set of 22 measures. The measures fall into four categories or key concepts that the team identified: (1) The Technology Itself, (2) MCPS Staff Use, (3) Teaching and Learning, and (4) Fiscal Indicators. The 22 recommendations represent four measure types: Input, process, output, and outcome. They include progress and effectiveness measures of short range (1-2 years), intermediate (3-5 years), and long range (ongoing) duration. Each measure includes an estimated cost of data collection developed by MCPS staff. Estimated costs are categorized by range defined as low (<\$10,000), medium (\$10,000-\$50,000), and high (>\$50,000).

Descriptions for the 22 recommended measures, grouped by category, follow in this chapter. Each description consists of eight components:

- Measure number
- Category
- Abbreviated title
- Precise statement of the measure
- Description of data collection sources
- Examples of possible data presentation modes
- Relevant comments on the intent or implementation of the criteria
- Estimated costs of collection

For some measures, data collection options with varying estimated costs are offered. Immediately following this page at the front of the 22 descriptions is a chart that presents summary information on the measure, category, type, duration, and estimated cost range. In Appendix C is a chart that presents the measures in the team's rank order.

Chapter IV describes the team's recommendations for implementing a first-year pilot of measures selected from the 22 presented for consideration and for ongoing expansion, review, and revision of the performance measurement system.

## Recommended Performance Measures for the Global Access Project

<b>CATEGORY 1: THE TECHNOLOGY ITSELF</b>			
<b>Measure</b>	<b>Type</b>	<b>Duration</b> Short = 1 to 2 yrs. Inter. = 3 to 5 yrs. Long = ongoing	<b>Est. Cost</b> Low = < \$10,000 Med. = \$10-50,000 High = > \$50,000
1. <b>Student Use of Networked Computers</b> - Percentage of students in Global Access schools using networked computers in classrooms and/or the media center during a marking period	Process	Long Range	Low, Medium, or High
2. <b>Percent of Computers on the WAN</b> - Annual percentage of networkable computers in Global Access schools that have both local area network (LAN) and wide area network (WAN) connection, allowing a user to access resources on a school fileserver and to communicate over the MCPS e-mail system	Input	Intermediate	Low
3. <b>Workstation Downtime</b> - Number of hours of workstation downtime during the school day because of hardware/software malfunction (e.g., hard drive damage or software conflicts) and number of hours of fileserver downtime in Global Access schools per year	Process	Long Range	Low
4. <b>Teaching Areas with Networked Computer</b> - Percentage of teaching areas (classrooms, media center, labs, and other areas accessible to students) in Global Access schools that have at least one networked computer workstation with printing capability	Output	Short Range	Low
5. <b>Ratio of Students to Workstation</b> - Annual percentage of schools in which the ratio of the number of students to the number of networked (building wide LAN and WAN connections) computer workstations in teaching areas (classrooms, media center, labs, and other areas accessible to students) is no more than 15:1	Output	Intermediate	Low

**CATEGORY 2: MCPS STAFF USE**

Measure	Type	Duration	Est. Cost
		Short = 1 to 2 yrs. Inter. = 3 to 5 yrs. Long = ongoing	Low = < \$10,000 Med. = \$10-50,000 High = > \$50,000
6. <b>Staff Use of Online Administrative Functions</b> - Annual percentage of school building staff (administrators, classroom teachers, media specialists, office staff, and other school-based personnel) who are performing on-line administrative functions appropriate to their job requirements (e.g., attendance, interim reports, purchase orders, warehouse requisitions, payroll, query financial transactions, query evaluation and selection database)	Process	Long Range	Low
7. <b>Staff Participation in Technology Training</b> - Reported hours and types of technology training activities (in-service workshops, outside courses, individual mentoring, online training) that each MCPS staff member participates in annually	Input	Intermediate	Medium to High
8. <b>Teacher Satisfaction with Available Technology</b> - Percentage of teachers in Global Access schools satisfied with MCPS-supported software, hardware, network services, and curriculum-related instructional materials	Outcome	Long Range	Low
9. <b>Staff Satisfaction with Training Activities</b> - Percentage of staff by job classification (administrators, teachers, and categories of supporting services) satisfied with the types, availability, and adequacy of MCPS-provided technology training activities	Outcome	Long Range	Low
10. <b>Staff Meeting Technology Competencies</b> - Percentage of staff (administrators, teachers, media specialists, and categories of supporting services) meeting established technology competencies for the job classification	Outcome	Long Range	High
11. <b>Teacher Use of Information Resources about Technology</b> - Number and types of resources that teachers in Global Access schools use to gain information about technology in teaching and learning	Process	Intermediate	Low

### CATEGORY 3: TEACHING AND LEARNING

Measure	Type	Duration Short = 1 to 2 yrs. Inter. = 3 to 5 yrs. Long = ongoing	Est. Cost Low = < \$10,000 Med. = \$10-50,000 High = > \$50,000
12. <b>Curricular Demands for Technology Use</b> - Number and location of curricular demands for technology use included in secondary course guides, elementary curriculum guides, and instructional processes/strategies that are used across content areas	Output	Long Range	Medium to High
13. <b>Teacher Use of Instructional Strategies</b> - Daily percentage of teacher time spent using each of the following instructional strategies: Lecture; demonstration and modeling; interactive whole group activities such as simulations, discussions, electronic field trips, and video conferencing; small group work; one-to-one support; and students working independently on assignments	Outcome	Long Range	Low or High
14. <b>Growth in Quality of Student Work</b> - Percentage of secondary students using Global Access technology tools whose work over a year's time shows growth in the depth and complexity of research and the fluency of information presentation	Outcome	Long Range	Medium to High
15. <b>Information Resources Available to Students</b> - Number and names of information resources (stand-alone CD-ROMs and networked reference tools) that students can access and use because of Global Access-installed hardware, software, and networking	Output	Short Range	Low
16. <b>Availability of Networked Computers to Students Outside Class</b> - Number of hours before and after the scheduled school day and during lunch periods that networked computers are available in each Global Access school for students to use for word processing, on-line communication, Internet research, and other electronic research	Process	Intermediate	Low
17. <b>Graduates' Report on Relevancy of Skills</b> - Percentage of Global Access high school graduates who report that they learned technology skills relevant to the modern day workplace and college/university	Outcome	Long Range	Medium to High
18. <b>Active Learning and Computer Use/Non-Use</b> - Of the time scheduled daily for a class/subject, percentage of time that students are engaged in active learning when computers are in use compared with percentage of time that students are engaged in active learning when computers are not in use	Outcome	Long Range	High



**CATEGORY 4: FISCAL INDICATORS**

Measure	Type	Duration Short = 1 to 2 yrs. Inter. = 3 to 5 yrs. Long = ongoing	Est. Cost Low = < \$10,000 Med. = \$10-50,000 High = > \$50,000
19. <b>Ratio of Students to Teachers</b> - Annual ratio of the number of students to classroom and other school-based teachers	Outcome	Long Range	Low
20. <b>Expenditure of Media Center Funds</b> - Annual percentage of media center funds spent on software (includes CD-ROMs and any recurring subscription charges), online charges/subscriptions, traditional journal subscriptions, and other paper-based research tools	Input	Short Range	Low
21. <b>Ratio of Training Dollars to Infrastructure Dollars</b> - Ratio of dollars spent on training (salaries, stipends, substitutes, materials, consultants, conferences/outside workshops) to dollars spent on infrastructure (hardware, software, networks) in a Global Access school during the first two years	Input	Intermediate	Low
22. <b>Change in Administrative Overhead Costs</b> - Percentage and/or actual change in administrative overhead costs over time	Outcome	Long Range	High

**Number:** 1

**Category:** The Technology Itself

**Title:** Student Use of Networked Computers

**Measure:** Percentage of students in Global Access schools using networked computers in classrooms and/or the media center during a marking period

**Data Sources:** Student surveys conducted by the Department of Educational Accountability currently ask students to report use. Self-reported student logs at each workstation or in each student's notebook could be used to collect data more frequently. Online electronic logging would be the best method of collecting complete data on usage.

**Data Presentation:** For the first year, aggregated data for Global Access schools would be presented in tables and reported by school level (elementary, middle, and high school) and by year of Global Access implementation (first, second, third, fourth year in the project). Subsequent years' data showing change over time would be shown in graph format.

**Comments on Criteria:** This process measure is intended to provide a measure of overall equipment use by students. Data entered consistently by each student user in a log in his/her notebook or at each workstation would provide a more accurate measure of equipment use than data collected by the Department of Educational Accountability survey. The most accurate method of collecting these data would be to log student use electronically.

**Costs of Collection:** Cost for collecting data by survey is low (<\$10,000) because the data can be gathered by modifying existing self-reported student surveys of technology use. Cost for using logs would be medium (\$10,000-50,000). Staff would have to be hired/assigned to prepare the logs, distribute them to students or maintain them at each machine, ensure that students fill them out, collect the data periodically, and compile it. Cost for electronically logging student use would be high (several hundred thousand dollars). Each student would be required to have a unique logon. Elementary networks are not configured this way at present. In addition, contractual help and staff time would be required to design a tracking system, upgrade file servers to hold the data and handle the increased traffic, and refine the data collected into meaningful form.

**Number:** 2

**Category:** The Technology Itself

**Title:** Percent of Computers on the WAN

**Measure:** Annual percentage of networkable computers in Global Access schools that have both local area network (LAN) and wide area network (WAN) connection, allowing a user to access resources on a school fileserver and to communicate over the MCPS e-mail system

**Data Sources:** User support specialists assigned to each Global Access school would provide these data. Secondary school-based user support specialists and elementary specialists who work in four or five schools would collect and report these data for each site on an electronic bi-monthly report form that would be designed for this and other measures.

**Data Presentation:** Data aggregated for schools with the same number of years in the Global Access project would be presented on a graph showing the number of networkable computers and the number of those connected to and operating on the LAN and WAN at a given point in time.

**Comments on Criteria:** This input measure is intended as a measure of equipment configuration and installation. All networkable computers in Global Access schools should have the necessary network card and software configured for connection to the LAN and WAN. The target for fully capable retro-fitted Global Access schools, usually reached sometime during their second year, is 100% of the workstations attached to the LAN and WAN. New and modernized Global Access schools, because the LAN is installed before the school opens/reopens, usually reach 100% during the first year.

Ideally, once a Global Access school reaches 100%, that percentage should not vary unless the school chooses to maintain some computers off the network for special projects such as multimedia development. In such a case, the computers would be fully capable of network connection whenever desired by staff. This measure is also influenced positively systemwide by the fact that all schools will have WAN connection for media center and office computers by the end of the 1996-97 school year.

**Costs of Collection:** Cost is low when measured in terms of user support specialist time rather than additional dollars. Data collection, however, would displace other work. Start-up cost includes development of report forms, electronic collection procedures, and data presentation.

**Number:** 3

**Category:** The Technology Itself

**Title:** Workstation Downtime

**Measure:** Number of hours of workstation downtime during the school day because of hardware/software malfunction (eg., hard drive damage or software conflicts) and number of hours of fileserver downtime in Global Access schools per year

**Data Sources:** User support specialists assigned to each Global Access school would provide these data. Secondary school-based user support specialists would maintain and report these data for each site on an electronic bi-monthly report form that would be designed for this and other measures. Elementary specialists who work in four or five schools would work with Help Desk and LAN and Systems Maintenance reports to collect these data for each site.

**Data Presentation:** Aggregated data would be presented in a graph showing total number of networked workstations, number of those experiencing downtime during the year, and total amount of school-day downtime for the year. Data would be reported by school level (elementary, middle, and high schools).

**Comments on Criteria:** This is a measure of infrastructure reliability combined with maintenance response time and parts availability. While equipment is still under warranty, vendor service is a factor in downtime. As the number of Global Access computers increases over time, the number of maintenance technicians and the MCPS parts inventory are downtime factors unless they also increase proportionally. Total downtime could be expected to increase as equipment ages.

**Costs of Collection:** Cost is measured in terms of user support specialist time rather than additional dollars and is therefore relatively low. Ongoing data collection would displace other technical work. Start-up cost includes development of report forms, electronic collection procedures, and data presentation.

**Number:** 4

**Category:** The Technology Itself

**Title:** Teaching Areas with Networked Computer

**Measure:** Percentage of teaching areas (classrooms, media center, labs, and other areas accessible to students) in Global Access schools that have at least one networked computer workstation with printing capability

**Data Sources:** User support specialists assigned to each Global Access school would provide these data. Secondary school-based user support specialists and elementary specialists who work in four or five schools would collect and report these data for each site on an electronic bi-monthly report form that would be designed for this and other measures. Total number of teaching stations for each school would be obtained from records maintained by the Department of Educational Facilities Planning and Capital Programming.

**Data Presentation:** Aggregated data would be presented in a graph and reported by school level (elementary, middle, and high school).

**Comments on Criteria:** This output measure is a measure of equipment resources and availability for student and teacher use. Every teaching area in a Global Access school should have one or more networked computer workstations with access to a networked printer and/or to a printer attached to the workstation. The target is 100% and should be reached during a school's second Global Access year. Once reached, the percentage should decrease only if additional teaching areas are added to the building and computers have not yet been purchased and installed. To maintain the percentage at 100%, workstations at the end of their useful life cycle will have to be replaced.

**Costs of Collection:** Cost is low. Cost is measured in terms of user support specialist time rather than additional dollars, and this data collection activity should require a minimal amount of time. Start-up cost includes development of report forms, electronic collection procedures, and data presentation.

**Number:** 5

**Category:** The Technology Itself

**Title:** Ratio of Students to Workstation

**Measure:** Annual percentage of schools in which the ratio of the number of students to the number of networked (buildingwide LAN and WAN connections) computer workstations in teaching areas (classrooms, media center, labs, and other areas accessible to students) is no more than 15:1

**Data Sources:** School equipment inventories maintained by the user support specialist or media specialist would provide data for the number of networked computer workstations in teaching areas. School enrollment data would be obtained from records maintained on the MCPS central server/mainframe.

**Data Presentation:** For the first year, data would be presented in narrative and table format. In following years, data showing change over time would be shown in graph format.

**Comments on Criteria:** This output measure, when calculated for all schools, provides the annual change or growth in the percentage of schools with a 15:1 or better ratio of students to fully capable networked student workstations. The baseline would be set by the first administration of the measure and, because initial ordering and installation of equipment takes up to two years, should represent the number of Global Access schools in the project for two or more years. The annual target is a percentage of schools equal to or better than (resulting from federally funded activities such as Challenge Grant projects) the total of Global Access schools in their third or higher year. The long-range target is 100% when all schools are fully networked Global Access sites.

This measure should be re-evaluated after the first time it is used to determine whether or not the 15:1 ratio, a figure used in the algorithm that determines allocation of funds for peripherals and student workstations beyond the minimum of one workstation in every teaching stations, is a useful figure.

**Costs of Collection:** Cost is relatively low because these data exist in individual schools and a procedure for gathering them can be established.

**Number:** 6

**Category:** MCPS Staff Use

**Title:** Staff Use of Online Administrative Functions

**Measure:** Annual percentage of school building staff (administrators, classroom teachers, media specialists, office staff, and other school-based personnel) who are performing online administrative functions appropriate to their job requirements (eg., attendance, interim reports, purchase orders, warehouse requisitions, payroll, query financial transactions, query evaluation and selection database)

**Data Sources:** Annual self-reported staff/teacher surveys conducted by the Department of Educational Accountability would be modified for this measure. Data available from other school districts and private industry would be collected and used for comparisons.

**Data Presentation:** For the first year, aggregated school system data would be presented by job classification in tables. In following years, data showing change over time would be shown in graph format.

**Comments on Criteria:** This process measure, when calculated for all schools, provides the annual change or growth in the percentage of staff performing online administrative functions. The baseline would be set by the first administration of the measure. The short-range annual target is a percentage representing media specialists in all schools with Research and Learning Hubs, office staff and administrators in all schools with School-based Monitoring System networks, and all classroom teachers in that year's secondary Global Access schools. The long-range target is 100% when all schools are fully networked Global Access sites and online systems for elementary classroom teachers have been developed and implemented.

**Costs of Collection:** Cost is relatively low because most of these data can be gathered by modifying and validating existing staff/teacher surveys of technology use.

**Number:** 7

**Category:** MCPS Staff Use

**Title:** Staff Participation in Technology Training

**Measure:** Reported hours and types of technology training activities (in-service workshops, outside courses, individual mentoring, online training) that each MCPS staff member participates in annually

**Data Sources:** Staff self-reporting, in-service participant lists, and college/university course-completion/grade reports are sources for these data. Procedures would be established, forms developed, and staff assigned to collect and maintain these data as a permanent record on the official MCPS personnel database. An alternative is an annual self-reported survey of a random sampling of staff.

It would be possible to benchmark levels and hours of training by different job classifications. For example, user support specialists' training experiences could be compared with network administrators in the private sector.

**Data Presentation:** Data would be presented in chart format by job classification and type of training and would be reported by Global Access schools, non-Global Access schools, and central and field offices.

**Comments on Criteria:** This measure is an input measure of the time staff spend annually in learning how to use technology effectively. A major task to implement this measure would be to define the categories of training (eg., what constitutes mentoring?) and determine procedures for collecting the data. The reality is that time reported for Global Access schools will be much higher than that of non-Global Access schools because of project expectations and resources. In addition, the amount of time would be expected to decrease over the years in a Global Access school as staff members become adept technology users.

**Costs of Collection:** Cost is medium to high. Start-up procedures for permanent recordkeeping would be very expensive. The personnel database would require modification. Initial data collection from individual employees and data input would be time and labor intensive. Ongoing collection would require staff assigned to manage the process and input data.

An alternative low-cost method would be an annual self-reported survey of a random sampling of MCPS staff. The current Department of Educational Accountability survey of Global Access and non-Global Access teachers could be expanded to include these data and other staff in addition to teachers.



**Number:** 8

**Category:** MCPS Staff Use

**Title:** Teacher Satisfaction with Available Technology

**Measure:** Percentage of teachers in Global Access schools satisfied with MCPS-supported software, hardware, network services, and curriculum-related instructional materials

**Data Sources:** Annual teacher surveys conducted by the Department of Educational Accountability would be modified to include this measure. Focus groups would be conducted to gather feedback and suggestions. Data available from other school districts with similar technology infrastructure and support would be used for comparisons.

**Data Presentation:** Data would be presented in narrative and chart form by school level (elementary, middle, and high school).

**Comments on Criteria:** This outcome measure is a straightforward measure of teacher satisfaction with the material resources that have been provided to allow and help them to teach with technology. Satisfaction would be measured in terms of MCPS-provided software including both productivity and instructional types, MCPS-provided hardware including both capability and availability factors, educational resources available over MCPS-supported networks, and MCPS-provided instructional support materials.

Survey questions would use a scale of "Strongly Disagree," "Disagree," "Agree," and "Strongly Agree." Satisfaction would be defined as "Agree" and "Strongly Agree."

**Costs of Collection:** Cost is low because most of these data can be gathered by modifying existing teacher surveys of technology use. The estimated cost of three focus groups, one for each school level, consisting of eight to ten teachers and meeting three times a year, is about \$4,000 for substitutes. This cost could be lowered with fewer focus group meetings.

**Number:** 9

**Category:** MCPS Staff Use

**Title:** Staff Satisfaction with Training Activities

**Measure:** Percentage of staff by job classification (administrators, teachers, and categories of supporting services) satisfied with the types, availability, and adequacy of MCPS-provided technology training activities

**Data Sources:** Annual staff/teacher surveys conducted by the Department of Educational Accountability would be modified for this measure. Data available from other school districts and private industry would be used for comparisons.

**Data Presentation:** Data would be presented in chart form by job classification and would be reported by Global Access schools, non-Global Access schools, and central and field offices.

**Comments on Criteria:** This outcome measure is a straightforward measure of staff satisfaction with resources provided to help them learn how to use technology effectively. Satisfaction is literally the percent of staff rating MCPS training favorably. The training measured here is tied strictly to formally recognized MCPS training provided by MCPS units responsible for these services, including Office of Global Access teams (Instructional Technology Support Team and Applications Development and Implementation Team), School Improvement Training Unit, Systemwide Training Unit, and curriculum coordinators in the Office of Instruction and Program Development.

The target in non-Global Access schools is 100% of media specialists in schools with Research and Learning Hubs and 100% of office staff and administrators in schools with School-based Monitoring System networks. The target for staff beginning to implement new administrative applications such as the Special Education Information System is 100%. The target in first and second year Global Access schools is 100%. The expectation is that staff satisfaction in Global Access schools will be considerably higher than that in non-Global Access schools because of project resources.

**Costs of Collection:** Cost is low because training satisfaction questions could be added to the current Department of Educational Accountability survey workload.

**Number:** 10

**Category:** MCPS Staff Use

**Title:** Staff Meeting Technology Competencies

**Measure:** Percentage of staff (administrators, teachers, media specialists, and categories of supporting services) meeting established technology competencies for the job classification

**Data Sources:** Staff self-reporting on an annual survey conducted by the Department of Educational Accountability could provide useful initial data. Ongoing long-term data collection would need to be incorporated into personnel hiring/evaluation procedures and recordkeeping, with data maintained in a central database and available for retrieval at any time.

**Data Presentation:** The first year's aggregated school system data would be presented by job classification in table format. In following years, data showing change over time would be shown in graph format.

**Comments on Criteria:** This measure is an expansion and refinement of the measure (#6) that looks at staff performing online administrative functions. Technology skills, both generic and specific, are being incorporated into job qualifications gradually as required by administrative and instructional applications and made possible by the presence of appropriate equipment and training. Formal technology competencies have not yet been set for every job classification and subcategory (eg., competencies for teachers at different grade levels and subject areas would differ).

Once competency standards have been established, this measure, when calculated for all staff, provides the annual change or growth in the percentage of staff meeting job technology competencies. A short-range annual target is all media specialists in schools with Research and Learning Hubs and all office staff and administrators in schools with School-based Instructional Monitoring System networks. A target in Global Access schools after two years is 75% of staff, after three years 95%. The long-range target is 100% of all staff when all schools and offices are fully supported Global Access sites. Competency standards will need to change over time with the technology, and staff turnover will affect the percentage of staff meeting established competencies.

**Costs of Collection:** Cost is high for start-up development of specific technology competencies and their approval as part of the qualifications/evaluation system for every MCPS job classification and subcategories within a classification, as well as for modification of the personnel database. Cost for an interim self-reported survey would be low based on modifying existing staff/teacher surveys of technology use.

**Number:** 11

**Category:** MCPS Staff Use

**Title:** Teacher Use of Information Resources about Technology

**Measure:** Number and types of resources that teachers in Global Access schools use to gain information about technology in teaching and learning

**Data Sources:** Annual teacher surveys conducted by the Department of Educational Accountability would be modified to include this measure.

**Data Presentation:** Data would be presented in narrative and chart format.

**Comments on Criteria:** This process measure looks at the resources teachers use in learning how to teach with technology. As an input measure, it provides a picture of the variety of material and human resources that are made available to teachers through the Global Access initiative.

**Costs of Collection:** Cost is low because these data can be gathered by modifying existing teacher surveys of technology use. Current teacher survey requests data on use and usefulness of specific categories of resources providing information about computers.

**Number:** 12

**Category:** Teaching and Learning

**Title:** Curricular Demands for Technology Use

**Measure:** Number and location of curricular demands for technology use included in secondary course guides, elementary curriculum guides, and instructional processes/strategies that are used across content areas

**Data Sources:** Course and curriculum guides would be examined and technology uses would be tallied. Curriculum coordinators, program directors, and a sampling of teachers and students would be surveyed to identify expectations of generic technology tool use across the disciplines. Present surveys used by the Department of Educational Accountability and the Maryland State Department of Education could be used in developing surveys for this purpose. Sample lesson plans could be collected from teachers and examined for technology use.

**Data Presentation:** Data would be presented in narrative as well as table and graph formats. Data would be reported by discipline and by teacher, student, and curriculum staff or document source.

**Comments on Criteria:** This output measure looks at teaching and learning activities that include school system, teacher, and/or student expectations for technology use and measures the extent of these expectations. Historically, curriculum and course guide documents are revised completely about every eight to ten years. Some are presently in process of revision, and others are scheduled to be revised during the next few years. Instructional processes/strategies that are used across content areas and involve technology tools include such activities as conducting research, organizing and storing information, taking measurements/collecting data, analyzing and interpreting data, communicating through writing or graphic presentations, communicating through multimedia productions, and solving problems using appropriate tools.

**Costs of Collection:** Cost is medium to high. There are 1323 secondary courses and about 42 elementary course strands that would need to be examined at an estimated contractual cost of \$25 per secondary document and \$50 per elementary document for a total of \$35,175. Costs could be lowered by examining curricula only when they are revised or new, but only 10-15 courses met that criteria and were examined for technology integration this past school year. The cost of developing, printing, scanning, and analyzing the required surveys is estimated at \$10,000. Collection and examination of lesson plans would be about \$10,000.

**Number:** 13

**Category:** Teaching and Learning

**Title:** Teacher Use of Instructional Strategies

**Measure:** Daily percentage of teacher time spent using each of the following instructional strategies: Lecture; demonstration and modeling; interactive whole group activities such as simulations, discussions, electronic field trips, and video conferencing; small group work; one-to-one support; and students working independently on assignments

**Data Sources:** Classroom observations and/or self-reported data in teacher surveys would be used for this measure. The most accurate source would be observations over time of a sample of randomly selected teachers in Global Access schools at each level (elementary, middle, and high school) and in the project for one, two, three, or more years. Trained observers would observe the classrooms of these teachers for a class period over two to three consecutive days during three different observation time periods, one announced, two unannounced. Lesson plans could be collected and strategies could be tallied.

**Data Presentation:** First year data would be presented in narrative and table format and reported by school level and by number of years in the Global Access project. Subsequent years' data showing change over time would be shown in graph format.

**Comments on Criteria:** This outcome measure looks at results of the Global Access program and related training activities designed to change the way teachers teach and students learn by moving from a teacher-centered classroom (predominately lecture or other teacher-directive activities) to a more student-centered classroom (predominately interactive group or individual student project-based activities). Technology enables this reform by putting interactive information and communication tools directly in the hands of students.

**Costs of Collection:** Cost is low if only surveys are used to collect data. Cost is high if observations are used. The current Department of Educational Accountability teacher survey could be modified to include items related to this measure at little cost. Cost of observations would vary from \$90,000 to \$450,000 depending on a sample size of 300 to 500 teachers and from six to nine observations of each teacher. The estimated cost per 45 minute observation, including training and analysis time, is \$50 to \$100. Collection and examination of lesson plans would be about \$10,000.

**Number:** 14

**Category:** Teaching and Learning

**Title:** Growth in Quality of Student Work

**Measure:** Percentage of secondary students using Global Access technology tools whose work over a year's time shows growth in the depth and complexity of research and the fluency of information presentation

**Data Sources:** Work of randomly selected students in Global Access secondary schools would be collected and maintained in the guidance office. Students would be identified by the beginning of the school year. Representative work would be collected in English, mathematics, social studies, science, and an elective. For each student, one work sample would be collected each marking period from each of the five areas.

**Data Presentation:** Data would be presented in narrative, table, and graph formats.

**Comments on Criteria:** This outcome measure looks at the results of Global Access technology resources and staff training in terms of student growth. The measure follows the team intent to measure the impact of the Global Access initiative on student learning, combining two similar original measures: "Number of in-depth, articulate, attractive, and complex research projects conducted by students that involve the use of technology" and "Number of students who are more fluent in presenting information and problems dynamically." The modified measure provides a means of showing growth in student work.

Criteria for selection of the work samples and rubrics for scoring the samples would be developed by a staff team selected by the offices of Instruction and Program Development and Global Access Technology. During the summer following the collection of work samples, staff would be hired and trained in using the scoring rubrics and would score the work. Each piece would be scored by two people unless there were a two-point difference in scores, in which case a third scorer would rate the work.

**Costs of Collection:** Cost is medium to high. If a minimum sample of 400 students were used, the estimated cost is \$66,300 based on 442 days of work at \$150 each. The 442 days include one day of scoring per student plus training and development time. In addition, school staff would spend time selecting and maintaining the student work, and central office staff would be assigned to organize and manage this effort. Costs could be lowered by collecting data in fewer than five academic areas.

**Number:** 15

**Category:** Teaching and Learning

**Title:** Information Resources Available to Students

**Measure:** Number and names of information resources (stand-alone CD-ROMs and networked reference tools) that students can access and use because of Global Access-installed hardware, software, and networking

**Data Sources:** Student menus on networked computers in Global Access media centers and classrooms would be examined and recorded.

**Data Presentation:** Typical data would be listed for each school level (elementary, middle, and high school) and by year in Global Access.

**Comments on Criteria:** This output measure looks at the local information resources available to students because of the Global Access project and local school decisions. When Research and Learning Hubs were first installed in media centers over the last two-and-a-half years, a standard set of information resources was provided to each school. Secondary schools were given some choices in this standard configuration. Over the years, each school then adds to or modifies this collection according to school needs and available resources. This same process is followed when newly constructed schools enter Global Access. In a Global Access school, most media center information resources can be accessed also in classrooms. This measure does not attempt to count or name the multitude of curriculum-related World Wide Web information resources available to students over the wide area network and Internet connection.

**Costs of Collection:** Cost is low. Initial lists for secondary schools and the first set of elementary schools were included in the November 14, 1995, update on Global Access technology to the Board of Education. Data collection would displace other staff assignments.



**Number:** 16

**Category:** Teaching and Learning

**Title:** Availability of Networked Computers to Students Outside Class

**Measure:** Number of hours before and after the scheduled school day and during lunch periods that networked computers are available in each Global Access school for students to use for word processing, online communication, Internet research, and other electronic research

**Data Sources:** User support specialists assigned to each Global Access school would collect these data from classroom teachers. Media specialists would be asked to report hours for Research and Learning Hub computers. Secondary school-based user support specialists and elementary specialists who work in four or five schools would collect and report these data for each site on an electronic bi-monthly report form that would be designed for this and other measures. A possible alternative method of data collection would be modification of annual self-reported staff/teacher and student surveys conducted by the Department of Educational Accountability.

**Data Presentation:** Data would be presented in narrative and chart form and would be reported for each Global Access school.

**Comments on Criteria:** In this process measure, the definition of equipment available for student use includes the presence of staff supervision (teachers or support staff) of equipment locations, including media centers, labs, and classrooms. If surveys are used, questions related to this measure would be developed and included on the staff surveys. Data of this nature are already collected on student surveys; the wording would be modified to reflect time variables of before and after school and the lunch period.

**Costs of Collection:** Cost is low. Cost is measured in terms of user support specialist and media specialist time rather than additional dollars. Data collection, however, would displace technical and other school support. Start-up cost includes development of report forms, electronic collection procedures, and data presentation.

Cost of alternative survey collection is low because these data can be gathered by modifying existing staff/teacher and student surveys of technology use. Present survey of randomly selected teachers only would have to be expanded to include school-based instructional support staff in Global Access schools who work with students and provide availability to computers. The increase in printing and processing costs is estimated at \$8,000.

**Number:** 17

**Category:** Teaching and Learning

**Title:** Graduates' Report on Relevancy of Skills

**Measure:** Percentage of Global Access high school graduates who report that they learned technology skills relevant to the modern day workplace and college/university

**Data Sources:** The Department of Educational Accountability would develop and conduct surveys of a class of Global Access high school graduates two, four, and six years after graduation and would conduct five or six focus group sessions each year after graduation.

**Data Presentation:** Aggregated school system data for the selected graduating class would be presented in chart form every two years. Focus group findings would be presented in narrative form annually.

**Comments on Criteria:** At present the Department of Educational Accountability conducts an annual survey of high school seniors, but there are no MCPS follow-up efforts on graduates because of cost and low response rate to such surveys conducted in the past. (Every four years MCPS distributes a Maryland Department of Education-conducted survey of graduates one-year out of school.) To provide validity for this outcome measure, the graduating class selected would need to be one with three years of full Global Access involvement, not including the first two years schools are in the project. The initial two years are focused on infrastructure installation and staff training. The first group of four Global Access high schools meeting this requirement will graduate seniors in 1999. Five more schools will meet the requirement in 2000 and another five in 2001. From the selected graduating class, it would be necessary to follow a minimum of 600 to 800 students to allow survey results to be generalized to an entire systemwide graduating class.

**Costs of Collection:** Cost is medium to high depending on the scope of the survey and the number of focus groups. The estimated cost for developing and conducting an annual countywide survey of one year's graduating class is \$50,000 based on graduate follow-up surveys once conducted by the Department of Educational Accountability. If only graduates of selected schools were surveyed, printing, postage, and processing costs would decrease. A representative (college and non-college) random sample would include cost of tracking down nonrespondents. A typical focus group would cost up to \$2,000.

**Number:** 18

**Category:** Teaching and Learning

**Title:** Active Learning and Computer Use/Nonuse

**Measure:** Of the time scheduled daily for a class/subject, percentage of time that students are engaged in active learning when computers are in use compared with percentage of time that students are engaged in active learning when computers are not in use

**Data Sources:** Classroom observations and measures of time on task would be used to collect data for this measure. Sample lesson plans could be collected from teachers and examined for student activities.

**Data Presentation:** First year data would be presented in narrative and table format and reported by school level (elementary, middle, and high school) and by number of years in the Global Access project. Subsequent year's data showing change over time would be shown in graph format.

**Comments on Criteria:** This outcome measure looks at results of the Global Access program and related staff training activities designed to change the way teachers teach and students learn by moving from a teacher-centered classroom (predominately lectures) to a student-centered (predominately interactive group or individual student activities) classroom. Technology helps make this reform possible by putting interactive information and communication tools directly in the hands of students.

This measure is similar in intent to measure number 13 but looks at change from the perspective of student, rather than teacher, activity and provides a way of measuring the influence of computer use. The original committee wording ("Number of hours of engaged academic learning resulting from the use of computers in classrooms, labs, or hubs") has been modified to make the measure even more meaningful.

**Costs of Collection:** Cost is high with observations of two-hours length estimated at \$60 per observation for a total of \$120,000. To collect adequate data for this measure, it would be necessary to follow a minimum of 400 students and observe each at least five times during a marking period. Cost includes hiring and training observers, designing observation instruments, collecting data, and analyzing data.

**Number:** 19

**Category:** Fiscal Indicators

**Title:** Ratio of Students to Teacher

**Measure:** Annual ratio of the number of students to classroom and other school-based teachers

**Data Sources:** These data are published regularly as part of the budgetary and accountability process.

**Data Presentation:** The Department of Educational Accountability reports data for this measure in the document *Schools at a Glance* that is published annually.

**Comments on Criteria:** These data are maintained and reported by the school system. The team recognizes that changing the present student/teacher ratio is not an objective of the Global Access program and that this measure is affected by many variables such as special programs, educational load, and budget. Nevertheless, this measure is recommended so that data can be tracked over time to observe what is happening and see if any patterns emerge.

**Costs of Collection:** There would be no additional cost for this measure.

**Number:** 20

**Category:** Fiscal Indicators

**Title:** Expenditure of Media Center Funds

**Measure:** Annual percentage of media center funds spent on software (includes CD-ROMs and any recurring subscription charges), online charges/subscriptions, traditional journal subscriptions, and other paper-based research tools

**Data Sources:** Media specialists would be asked to report total figures for these four categories of expenditures annually. Total funds allocated to each school's media center would be obtained from the Office of the Deputy Superintendent of Schools. Data also could be obtained from the three-year projected annual buying plan developed by media specialists.

The first year, data would be collected from non-Global Access schools to create a pre-Global Access baseline for comparison. For the first and following years, data would be collected from Global Access schools.

**Data Presentation:** For the first year this measure is administered, data would be presented in chart form for each category of expenditures and reported by school level and Global Access/non-Global Access schools. Data from Global Access schools would be reported by first, second, or more years in the project. Non-Global Access school data would be used as a baseline for comparison. Data from following years would be reported in graph format to show change over time.

**Comments on Criteria:** This input measure would show the amount of allocated media center funds spent to support technology-based and paper-based research materials and resources, figures based partially on Global Access project expectations. As an ongoing measure, it should show change in how media funds are spent. During the first two Global Access years, a school agrees to spend 80% (Year 1) and 60% (Year 2) of its total media center funds to support educational technology. Expenditures in following years will vary depending on school needs and decisions, as well as on resources available for purchase. For the foreseeable future, software and online resources are expected to complement, not totally replace, paper-based research tools.

**Costs of Collection:** Cost is low. These data are not collected now. Collection procedures would need to be established, and media specialists would need to keep records based on category definitions.

**Number:** 21

**Category:** Fiscal Indicators

**Title:** Ratio of Training Dollars to Infrastructure Dollars

**Measure:** Ratio of dollars spent on training (salaries, stipends, substitutes, materials, consultants, conferences/outside workshops) to dollars spent on infrastructure (hardware, software, networks) in a Global Access school during the first two years

**Data Sources:** Central office and school-level spreadsheets and databases used to develop and monitor Global Access and school-level budgets and data from salary accounts for central office-based trainers would be used for this measure. Data available from other school systems and expert sources, such as educational consultants and university staff that collect, analyze, and report educational technology data, could be used for comparison.

**Data Presentation:** Data would be aggregated by school level, as well as countywide, and presented in chart format and/or within a narrative.

**Comments on Criteria:** This input measure would help determine whether adequate resources are being expended on staff development activities when compared with data from other school systems and generally accepted goals for educational institutions. A recognized limitation of this measure is that the ratio of dollars spent captures only a partial cost of both training and infrastructure. For example, it does not consider the full value of time spent by school staff attending any training activities with no stipends and independently learning to use technology, nor does it consider staff costs in designing, purchasing, and installing the infrastructure for a school -- costs that are difficult to quantify.

**Costs of Collection:** Cost is low. Staff would have to be re-assigned to data collection and/or part-time help would be required.

**Number:** 22

**Category:** Fiscal Indicators

**Title:** Change in Administrative Overhead Costs

**Measure:** Percentage and/or actual change in administrative overhead costs over time

**Data Sources:** Expenditures in identified budget accounts would be measured for a specified period and compared with data available from other school systems

**Data Presentation:** Data would be described in a narrative and shown in table or graph format.

**Comments on Criteria:** A set of metrics would need to be developed for this outcome measure. Relevant administrative overhead costs at the county and school levels for this measure would need to be identified and a baseline would have to be set. Because technologies such as countywide e-mail put in place in all schools and offices during the first two-and-a-half years of Global Access already have changed administrative practices, setting a baseline might involve research into prior years' expenditures. This measure might need to be focused on specific areas in which technology already has reduced costs when adjusted for inflation or is expected to reduce costs, whether in staff positions or in materials such as paper and forms.

**Costs of Collection:** Start-up cost for developing a comprehensive measure is high. Consultants specializing in creating metrics would need to be hired to provide the school system with a specific set for this measure.

#### **IV. Implementing a Performance Measurement System**

The work of the stakeholders represented on the Global Access Performance Measurement Team is complete. Fully implementing a system to measure, monitor, and utilize performance results in the Global Access project is just beginning. The next steps in this collaborative process between the County Council and the Board of Education are to:

- Adopt an initial set of measures as a pilot
- Collect and report data
- Review initial measures
- Revise the performance measurement system

##### **A. Adopt an Initial Set of Measures as a Pilot**

All of the 22 measures presented in the previous chapter are not intended to be implemented at once. Some can be put readily into place using available data. Some are more appropriate for the early phases of the Global Access project; others rely on years of technology use to assess outcomes more accurately. Obviously the budget will guide some of the decisions on how and when certain recommended measures are employed.

The Global Access Performance Measurement Team attempted to identify a broad range of indicators that would comprehensively serve the project in terms of complexity, types of measures (process, input, output, and outcome), duration, and goals (the technology itself, MCPS staff use, teaching and learning, and fiscal indicators). Given the interests of the collaborating entities, budget, timing, appropriateness, and other considerations, choices will need to be made in terms of which indicators should be adopted for the first year of implementation.

MCPS staff operationalized the team's recommended measures by describing possible data collection approaches, cost estimates, and some possible analysis. A detailed review of these issues will need to be done for the measures selected for implementation in the first year. A rigorous plan for the pilot system will ensure clarification of methodologies and expectations and move the process to a more concrete stage.

The team recognized that the use of educational technology is about transforming teaching and learning and focused clearly on this aspect of the Global Access project. However, qualitative changes in teaching and learning are difficult to capture, and useful measures tend to be costly to implement as data collection involves observations of classroom activities and evaluations of student work samples.

Nevertheless, measures of teaching and learning should be included in the pilot and remain a focus of the performance measurement system over time. The team recommends that MCPS staff continues to compile examples from organizations that are measuring the performance of technology in schools, seek effective measures of the impact of Global Access on student learning, and investigate less costly data collection alternatives.



## **B. Collect and Report Data**

As part of clarifying expectations, the implementers of this system must consider how data are to be communicated to interested parties. It was recognized from the outset that a wide range of individuals and groups will be consumers of the information that comes from measuring the performance of the Global Access project. MCPS staff – both those managing the project and those teaching in project classrooms, – elected officials and policymakers, parents and students, and the general public have a vested interest in acquiring information from this assessment. System implementers must consider the types of analyses that will occur – aggregating and disaggregating data, establishing baselines and benchmarks, looking at trends over time, making comparisons -- and how they will respond to user needs.

Of equal importance is the recognition of how results are to be published. For a performance measurement system to accomplish its basic purpose of informing stakeholders, the data must be presented in a user friendly format and one that is responsive to the different perspectives and requirements of the various intended users. A performance measurement system will allow MCPS, not only to publish its accomplishments, but also to supply information that can be used to improve performance. This important facet of designing the system should not be overlooked.

## **C. Review Initial Measures**

Although the intention in developing this system is that measures be relatively stable over time, it is also inevitable that changes will need to be made. The piloting of indicators and techniques to collect data and the changing nature of the Global Access project itself as it expands and evolves both require that the system be revisited.

Built into the system should be a continuous review and improvement model that establishes checkpoints for looking at results, processes, data quality, and customer satisfaction and for fine tuning the indicators and considering modifications to the system. Additionally, it is anticipated that the number of measures will increase over time after feedback from the pilot period is considered. The team assumes that, as MCPS proficiency in collecting these performance data grows, other indicators from the proposed list will be desired by MCPS, the Council, or other stakeholders and the budget will be able to accommodate additions.

It is suggested that a subset of the original team or representatives with similar interests to the first team members be involved in the review process. The review should not go back to “square one” or be lengthy. This recommendation affirms the intent of those establishing the Global Access Performance Measurement Team that stakeholders should contribute actively to developing a system for monitoring performance for this and other programs and initiatives.

## **D. Revise the Performance Measurement System**

The review process presumably will result in some revision to the system, not just after the pilot phase, but year by year. In revisions of the performance measurement system, the standard should be: Is the system working to help managers and policymakers

improve performance and to assess the program's achievements toward established goals?

Specific questions to be answered as revisions are made are:

- Are the performance indicators useful?

The project and the needs of those monitoring it will change over time, and the system should reflect current concerns.

- Do the performance indicators meet acceptable standards for data quality?  
Besides the utility of the system, the data collection experience needs to be scrutinized for technical adequacy (validity and reliability), feasibility in terms of burden and cost, and the propriety of data collection and use.
- What changes are needed in the performance measurement system?

Although there is value in maintaining a core set of indicators each year for tracking over the project's life cycle, the above questions and changing perspectives of the system's users require a system that is responsive and dynamic.

The Global Access Performance Measurement Team recommends implementation of a pilot measurement system for the Global Access project and an openness to discuss, review, and refine the process as the project matures and all involved become more adept at using performance data.



## **Appendix**



Resolution: 13-410  
Introduced: January 30, 1996  
Adopted: January 30, 1996

COUNTY COUNCIL  
FOR MONTGOMERY COUNTY, MARYLAND

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By County Council

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Subject: Establishment of and Appointments to the Global Access Performance  
Measurement Team

Background

1. The Office of Legislative Oversight's (OLO) FY 96 Work Program includes a cooperative project with the Montgomery County Public Schools (MCPS) to develop performance measures for the Global Access Project. Both the process and product of this cooperative project are intended to model how to integrate an outcomes approach into Council and agency decision-making.
2. On December 4, 1995, the Education Committee held a worksession on jointly prepared OLO/MCPS staff recommendations concerning how to proceed on this cooperative project. As a result, the Committee recommends creating a Global Access Performance Measurement Team, consisting of six members appointed by the County Council, six members appointed by the Board of Education, and a Chair jointly appointed by the County Council and the Board of Education.
3. The Education Committee also recommends that three members of the Council and three members of the Board of Education serve as the Steering Committee for the project. The role of the Steering Committee will be to provide the Performance Measurement Team with input and guidance at regular intervals during the project period.

Action

The County Council for Montgomery County, Maryland approves the following resolution:

1. A Global Access Performance Measurement Team is established with the mission to develop a recommended performance measurement system that can be used to monitor and analyze costs, schedule, and performance over the life cycle of MCPS' Education Technology: Global Access Project. The goal is to design a performance measurement system that will generate valid, accurate, usable information in an understandable format to the stakeholders of the project.
2. The County Council approves the joint County Council/Board of Education appointment of Helene Jennings as Chair of the Performance Measurement Team:

Helene Jennings  
Queen Elizabeth Drive  
Olney, Maryland 20832

3. The County Council appoints the following individuals as members of Global Access Performance Measurement Team:

Glenn Orlin, Deputy Staff Director  
Montgomery County Council  
100 Maryland Ave.  
Rockville, MD 20850

Steven Goldstein  
8311 Wisconsin Ave., C-19  
Bethesda, MD 20814

Gordon Aoyagi, Senior Assistant CAO  
Montgomery County Government  
101 Monroe Street  
Rockville, MD 20850

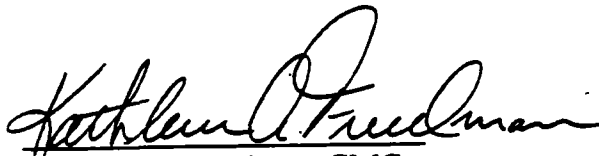
Stuart D. Milner  
12011 Smoketree Road  
Potomac, MD 20854

Lucie Ling Campbell  
11709 Beekman Place  
Potomac, MD 20854

Sharon H. Pugh  
14105-402 Castle Boulevard  
Silver Spring, MD 20904-4738

4. The County Council designates the three members of the Education Committee to serve on the Steering Committee for the project. The full Steering Committee will be the Council's Education Committee and the Board of Education's Research and Technology Committee. The Steering Committee will provide input and guidance to the Performance Measurement Team at regular intervals during the project period.
5. The Performance Measurement Team should provide an interim report to the County Council and Board of Education in April 1996, and a final report to the County Council and Board of Education by September 1996.

This is a correct copy of Council action.

A handwritten signature in cursive script, reading "Kathleen A. Freedman".

Kathleen A. Freedman, CMC  
Secretary of the Council

appres/global





ACTION

9.1

Resolution 28-96

Office of the Superintendent of Schools  
MONTGOMERY COUNTY PUBLIC SCHOOLS  
Rockville, Maryland

January 9, 1996

MEMORANDUM

To: Members of the Board of Education

From: Paul L. Vance, Superintendent of Schools *PLV.*

Subject: Task Force on Performance Assessment Measures  
for Global Access

WHEREAS, Montgomery County Public Schools and the Montgomery County Government's Office of Legislative Oversight for the Montgomery County Council will be working on a project to develop performance assessment measures for Global Access; and

WHEREAS, The plan calls for the establishment of a task force of 12 members, with six appointed by Montgomery County Public Schools and six by the County Council; now therefore be it

Resolved, That the following six persons represent Montgomery County Public Schools:

Ms. Carol Hyatt, MCCPTA Technology Committee Chair

Mr. Lee Meiners, principal, Cresthaven Elementary School

Ms. Susan Ragan, computer science teacher in the magnet program, Montgomery Blair High School

Dr. David Rodbard, director of computer technology at NIH; member of the Global Access Oversight Committee

Ms. Rosalva Rosas, assistant principal, Springbrook High School

Dr. Steven Seleznow, director, Office of School Administration; co-chair of the Global Access Oversight Committee.

PLV:JSV:bkw



## Recommended Global Access Performance Measures - Rank Order

<b>RANK</b>	<b>MEASURE</b>	<b>NUMBER IN DOCUMENT</b>	<b>CATEGORY</b>
1	Percentage of students in Global Access schools using networked computers in classrooms and/or the media center during a marking period	1	Technology Itself
2	Annual percentage of school building staff (administrators, classroom teachers, media specialists, office staff, and other school-based personnel) who are performing online administrative functions appropriate to their job requirements (eg., attendance, interim reports, purchase orders, warehouse requisitions, payroll, query financial transactions, query evaluation and selection database)	6	Staff Use
3	Reported hours and types of technology training activities (in-service workshops, outside courses, individual mentoring, online training) that each MCPS staff member participates in annually	7	Staff Use
4	Annual percentage of networkable computers in Global Access schools that have both local area network (LAN) and wide area network (WAN) connection, allowing a user to access resources on a school fileserver and to communicate over the MCPS e-mail system	2	Technology Itself
5	Number and location of curricular demands for technology use included in secondary course guides, elementary curriculum guides, and instructional processes/strategies that are used across content areas	12	Teaching & Learning
6	Annual ratio of the number of students to classroom and other school-based teachers	19	Fiscal Indicators
7	Percentage of teachers in Global Access schools satisfied with MCPS-supported software, hardware, network services, and curriculum-related instructional materials	8	Staff Use
8	Number of hours of workstation downtime during the school day because of hardware/software malfunction (eg., hard drive damage or software conflicts) and number of hours of fileserver downtime in Global Access schools per year	3	Technology Itself
9	Daily percentage of teacher time spent using each of the following instructional strategies: Lecture; demonstration and modeling; interactive whole group activities such as simulations, discussions, electronic field trips, and video conferencing; small group work; one-to-one support; and students working independently on assignments	13	Teaching & Learning
10	Percentage of secondary students using Global Access technology tools whose work over a year's time shows growth in the depth and complexity of research and the fluency of information presentation	14	Teaching & Learning

## Recommended Global Access Performance Measures - Rank Order

<b>RANK</b>	<b>MEASURE</b>	<b>NUMBER IN DOCUMENT</b>	<b>CATEGORY</b>
11	Number and names of information resources (stand-alone CD-ROMs and networked reference tools) that students can access and use because of Global Access-installed hardware, software, and networking	15	Teaching & Learning
12	Percentage of staff by job classification (administrators, teachers, and categories of supporting services) satisfied with the types, availability, and adequacy of MCPS-provided technology training activities	9	Staff Use
13	Percentage of teaching areas (classrooms, media center, labs, and other areas accessible to students) in Global Access schools that have at least one networked computer workstation with printing capability	4	Technology Itself
14	Annual percentage of media center funds spent on software (includes CD-ROMs and any recurring subscription charges), online charges/subscriptions, traditional journal subscriptions, and other paper-based research tools	20	Fiscal Indicators
15	Number of hours before and after the scheduled school day and during lunch periods that networked computers are available in each Global Access school for students to use for word processing, online communication, Internet research, and other electronic research	16	Teaching & Learning
16	Annual percentage of schools in which the ratio of the number of students to the number of networked (buildingwide LAN and WAN connections) computer workstations in teaching areas (classrooms, media center, labs, and other areas accessible to students) is no more than 15:1	5	Technology Itself
17	Percentage of Global Access high school graduates who report that they learned technology skills relevant to the modern day workplace and college/university	17	Teaching & Learning
18	Ratio of dollars spent on training (salaries, stipends, substitutes, materials, consultants, conferences/outside workshops) to dollars spent on infrastructure (hardware, software, networks) in a Global Access school during the first two years	21	Fiscal Indicators
19	Percentage of staff (administrators, teachers, media specialists, and categories of supporting services) meeting established technology competencies for the job classification	10	Staff Use
20	Of the time scheduled daily for a class/subject, percentage of time that students are engaged in active learning when computers are in use compared with percentage of time that students are engaged in active learning when computers are not in use	18	Teaching & Learning

## Recommended Global Access Performance Measures - Rank Order

RANK	MEASURE	NUMBER IN DOCUMENT	CATEGORY
21	Number and types of resources that teachers in Global Access schools use to gain information about technology in teaching and learning	11	Staff Use
22	Percentage and/or actual change in administrative overhead costs over time	22	Fiscal Indicators

