



UNIVERSITY SYSTEM OF MARYLAND

Policy on Technology Fluency – Implementation Progress Report

September 2003

University of Maryland, Baltimore (1807)
University of Maryland, College Park (1856)
Bowie State University (1865)
Towson University (1866)
University of Maryland Eastern Shore (1886)
Frostburg State University (1898)
Coppin State College (1900)
Salisbury State University (1925)
University of Baltimore (1925)
University of Maryland Center for Environmental Science (1925)
University of Maryland University College (1947)
University of Maryland, Baltimore County (1966)
University of Maryland Biotechnology Institute (1985)

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EXECUTIVE SUMMARY

Introduction

In August and September 2003, USM's eleven degree-granting reported on their progress in implementing institutional technology fluency policies, which were presented to the Education Policy Committee in September 2002. The Executive Summary highlights selected strategies and initiatives undertaken by the campuses to implement their technology fluency policies.

Status of Institutional Policies on Technology Fluency

All eleven degree-granting institutions either have approved technology fluency policies or policies that are awaiting final approval.

Highlights of Strategies and Initiatives to Implement Technology Fluency Policies

As detailed in the institutional progress reports, numerous activities are underway to implement campus technology fluency policies. The National Research Council¹ postulated three areas of knowledge for achieving fluency with information technology: contemporary skills; foundational concepts; and intellectual capabilities. Selected strategies and initiatives in these areas include:

Contemporary Skills: The ability to use today's computer applications, enabling fluency in the application of information technology. In the present labor market, skills are an essential component of job readiness. Most importantly, skills provide a store of practical experience on which to build new competence.

Selected Individual Institutional Strategies and Initiatives:

- Making information technology an integral part of all aspects of University life
- Developing students' competencies by requiring them to complete computer science or information technology courses
- Assessing the proficiency of students' information technology skills
- Providing the necessary infrastructure and training to give students easy access to IT resources
- Conducting technology orientations for students, enabling them to effectively use institutional computing resources

¹ cf. "Being Fluent with Information Technology," National Research Council
<http://books.nap.edu/html/beingfluent/es.html>

- Implementing programs to enhance student access to computers and technology resources

Foundational concepts: The basic principles and ideas of computers, networks, and information that underpin the technology.

Selected Individual Institutional Strategies and Initiatives:

- Strengthening students' technological competencies through the design of courses and requirements in the General Education Program and major programs
- Incorporating 'capstone' technology courses as part of the academic requirements for certain disciplines
- Requiring proposals for new programs to address how the program will assure that graduates possess technological fluency
- Providing support for faculty to enhance the infusion of technology in teaching and learning activities

Intellectual capabilities: The ability to apply information technology in complex and sustained situations as well as to encapsulate higher-level thinking in the context of information technology.

Selected Individual Institutional Strategies and Initiatives:

- Fostering the use of information technology tools for research and course activities
- Encouraging students to work with a variety of applications to reinforce foundational principles

INSTITUTIONAL PROGRESS REPORTS

BOWIE STATE UNIVERSITY
REPORT ON THE IMPLEMENTATION OF THE
POLICY ON TECHNOLOGY FLUENCY

Bowie State University's statement on Technology Fluency has been approved as a policy by the Council of Deans and Office of Information Technology and is pending approval by the President's Cabinet. Nonetheless, in responding to the constant advances in technology, Bowie State University progressively endeavors to prepare and graduate students who are both technologically fluent and fully capable of keeping pace with the increasingly dynamic technology culture. This report highlights the University's progress in developing technologically fluent students.

Foundational study and practice begins in the General Education Program, where courses and requirements are designed for strengthening students' abilities in various areas, including computing. In addition to the various educational technologies found in the course experiences, students are required to take computer science courses. Here specific attention is given to students' developing competencies in computer literacy and fluency, as well as methods of analysis and problem-solving. Students continue to expand these competencies as they engage in faculty members' progressive use of technology in teaching and learning within major and elective courses.

All schools indicated increased activities in infusing technology into various teaching and learning experiences, as cited in the 2002-03 School Annual Reports to the Provost. Syllabi reflected more consistent integration of educational technology as major instructional tools, augmented by supplementary strategies for fluency development, as faculty continued development in the use of Blackboard and other educational tools for web-enhancing courses. Title III funds allowed the School of Education to establish a Student Technology and Curriculum Resource Center (TCRC), with the primary mission of integrating and incorporating the application of technology into the development of curriculum and delivery instructional models.

Off-campus centers in the School of Graduate Studies & Continuing Education have also infused technology through the utilization of Blackboard. Chat-room discussions are held between the faculty and classmates, which provide students with an understanding of the purpose of a computer and its role in a business environment, including the information processing cycle.

A distance education program is offered through two-way audio/video teleconferencing. Classroom interaction between students and faculty take place through state-of-the-art compressed video conferencing located at an off-campus site.

In support of the 2000 Maryland State Plan for Postsecondary Education, the University System of Maryland's strategic plan, its technology fluency policy, and in response to constituent needs, market demand, and emerging challenges, Bowie State University staff is heavily involved in: 1) Integrating the use of information technology throughout the campus; and 2) Providing and maintaining an infrastructure conducive to developing and producing technologically literate and fluent students and graduates. Specific details are

provided below.

Integrating the use of information technology throughout the campus

? Student Access to Appropriate Computer Technology:

- A Freshman Laptop Rollout Program was implemented in fall 2001 in which each freshman received a laptop for one-year, on loan, to assist with their academic work. In addition, via the Digital Divide Initiative, over 200 wireless-accessible laptops are being made available for check out, on loan, at the Library, to students at all levels who have a demonstrated financial need
- All students receive campus e-mail accounts, accessible via the web, anytime, from anywhere
- Students, via the OPAL system, are able to register on-line and review their grades
- Dormitories have been wired for access to the Internet and campus network
- A wireless prototype was implemented in Summer 2003 to allow Internet access via wireless devices from various hubs and open, general traffic locations across the main campus

? Faculty Access to and Use of Technology to Support Teaching

- The BlackBoard course management system was installed and deployed to assist faculty in putting course materials on-line, communicating with students, and integrating technology into teaching.
- All faculty members have workstations and receive campus e-mail accounts, accessible via the web, anytime and from anywhere.
- Summer Institutes and various scheduled workshops are conducted to develop/enhance technical skills of faculty.

? Campus-wide PeopleSoft Initiative

- PeopleSoft is an enterprise resource management software system to provide technology that supports a growing and changing campus, and provides web-based, self-service functionality for students, staff, and faculty. Over the past six months, Bowie State University has upgraded its Financials (Purchasing, Accounting, Asset Management) software from PeopleSoft version 7.5 to 8.4 and implemented Phase I of the PeopleSoft Human Resources/Payroll modules. The Student Administration module (includes Admissions, Financial Aid, Student Records and Accounts Management) and Phase II of Human Resources is currently being implemented.

Providing and maintaining an infrastructure conducive to developing and producing technologically literate and fluent students and graduates

? **Backbone and Security**

- Bowie State University has a gigabit, fiber backbone existing between each of the buildings on campus, providing an un-congested, fast link to each of the buildings and to the servers. This provides auto-sensing 10/100 mbps throughput to the network jacks and workstations. The underlying IT infrastructure has been upgraded to include a DS-3 Internet backbone and VPN authentication for remote access to the network; Security measures have been incorporated to include a firewall and a more structured VLAN.

? **Classrooms and Labs**

- All classrooms and laboratories are wired for access to the campus network. New academic buildings, including the Center for Learning and Technology, include/will include Smart Classrooms and latest technology.

? **Staffing**

- Additional IT professionals, technicians, and support staff have been hired and are being trained to use the tools necessary to provide "Help" services via phone, on-line, and in person as well as to develop documentation and to assist with report generation – the HelpDesk is being reorganized to allow more analysts and student support for the PeopleSoft Project and the BlackBoard system.

? **Training**

- Workshops are scheduled on a regular basis, along with those offered by the Center for Excellence in Teaching and Learning, to provide training for staff and faculty in Blackboard, the Microsoft Office suite (Word, Excel, PowerPoint, and Access) as well as e-mail (Outlook), PC troubleshooting, and webpage development. IT staff are involved in PeopleSoft and other technical training to upgrade their skills in order to fully support the clientele.

COPPIN STATE COLLEGE
REPORT ON THE IMPLEMENTATION OF THE
TECHNOLOGY FLUENCY POLICY

September 2003

Coppin State College adopted its *Technology Fluency Policy* on August 28, 2003. There have been no modifications to the policy since adoption. As described below, Coppin State College has implemented several strategies related to its technology fluency policy:

- **Coppin State College has created an immersive, technology-rich environment, requiring students to use technology in both their academic activities as well as their campus related business transactions.**

Students are exposed to different models of using technology in their classrooms by their faculty; students are also encouraged to use technology to present their academic work. Students are asked to use several simulation software packages for their class work in different disciplines such as Mathematics, Biology, Chemistry, Computer Science, History, Geography, and Nursing. In addition, 2600 students used Coppin's Web registration to complete their course registration activities. Coppin State College is implementing the PeopleSoft student system to further enhance the students' exposure to different models of technology usage in the business world. Also, with the recent roll out of the PeopleSoft Human Resource Management System, work-study students as well as employees at Coppin State College are using the Web Timesheet application to enter their work hours.

- **Coppin State College has developed new policies and continues to emphasize current policies to encourage faculty to integrate technology into the curriculum.**

The current merit policy rewards faculty for integrating technology in their teaching and learning activities. In addition, a parameter to measure technology implementation in the curriculum was added to the program review document.

- **Coppin State College has developed and implemented policies to insure that students acquire the necessary IT competencies.**

The College devised a technology fluency course for all first-year students. In addition, Coppin State College has added a technology fluency requirement for graduation.

A majority of Coppin State College's academic departments (75%) have aligned their curricula to incorporate the National Research Council's three areas of knowledge for achieving fluency with information technology: contemporary skills; foundational concepts; and intellectual capabilities. Many of those requirements are covered as well in the technology fluency course. Further, the curriculum committee at the

College adopted a technology fluency statement that is being added to all course syllabi.

- **Coppin State College has strengthened support and training for faculty in the use of technology for teaching and learning**

Coppin State College provides on-going training opportunities for faculty; the College has also established mechanisms for faculty to collaborate and to share and be knowledgeable about faculty experiences within the institution as well other sister institutions in the System. In addition, Coppin State College is an active participant, through the system-wide Information Technology Coordinating Council, in system-wide instructional technology educational events.

Faculty members at the College are provided better technical support. Further, Coppin State College, through grants funding, offered its faculty a competitive mini-grant during the summer to foster the integration of technology in the curriculum.

- **Coppin State College has made progress and developed processes to assure students access to technology.**

Coppin State College successfully implemented a Student Laptop Ownership program, increased its open computer labs, and provided more computerized classrooms as well smart classrooms. These activities improved the students to computers ratio from 26:1, four years ago, to 6:1.

- **Coppin State College has instituted assessment processes to evaluate progress in achieving technological fluency**

Student progress is assessed as part of the technology fluency course; departmental progress is assessed through the program review process. The campus produces an annual technology fluency assessment report and overall progress is evaluated by the Information Resource Management committee.

FROSTBURG STATE UNIVERSITY
Policy on Student Information Technology Fluency:
A Progress Report

This report summarizes the University's *Policy on Student Information Technology Fluency* (August 2002) and discusses the University's progress in implementing the following key action items of the policy:

- Developing alternative methods through which undergraduate students can acquire and demonstrate proficiency in the use of basic information technology skills
- Promoting student fluency in discipline-based information technology
- Ensuring student access to information technology
- Revising and updating the University's Information Technology Plan
- Establishing administrative structures and procedures to help students meet the University's information technology standards. (A discussion of these structures and procedures are included in various sections of the report.)

I. POLICY ON STUDENT INFORMATION TECHNOLOGY FLUENCY

Frostburg State University's *Policy on Student Information Technology Fluency* requires that all students develop and demonstrate fluency in information technology. The policy establishes alternative methods for undergraduate students to acquire and show basic proficiency in the use of information technology. It also requires that Periodic Program Reviews, prepared by academic programs every five years, discuss how students acquire technology fluency in program-based competencies and report on assessment measures that are in place to evaluate student information technology skills. Under the policy, all proposals for new academic programs must also address how they intend to ensure that their future graduates will gain appropriate program-based competencies. Additionally, the policy commits the University to providing students with access to an on-campus 24/7 computer laboratory (as part of its larger effort to provide state-of-the-art information technology to members of the University community); revising and updating its technology planning document, *Strategic Directions in Information Technology*; and developing and instituting appropriate administrative structures and procedures to ensure that students meet the information technology standards established by the University.

II. DEVELOPING ALTERNATIVE METHODS FOR STUDENTS TO ACQUIRE AND DEMONSTRATE BASIC INFORMATION TECHNOLOGY SKILLS

A. Identifying Basic Student Skills

The Provost's Student Technology Fluency Advisory Group (hereafter, the Advisory Group) has tentatively identified ten basic skills that Frostburg State University students

should acquire as part of their undergraduate education (*Basic Student Information Technology Skills*, March 2003). These skills, which are listed below, are based on recommendations of the National Research Council as presented to the University System of Maryland Board of Regents.

1. ***Using appropriate terminology to discuss basic concepts:*** The student can demonstrate an understanding of basic computing terms and acronyms. The student can explain an advertisement for a computer and common peripheral equipment.
2. ***Using basic operating system features:*** The student can demonstrate a basic understanding and use of the features and utilities of an operating system. The student can install new software, delete unwanted software, invoke applications, and understand the reasons for different file formats. The student can demonstrate the ability to save files to a personal folder or disk, copy files from one location to another, and print files. The student can demonstrate an awareness of the variety of operating system and hardware platforms.
3. ***Using e-mail:*** The student can use email effectively and appropriately to receive and send messages and documents (e.g., managing a personal mailbox, creating an address book, adding attachments, observing e-mail etiquette).
4. ***Using the Internet to find information and resources:*** The student can efficiently use browsers, search engines, and online scholarly databases to locate information from a variety of Web-based resources. The student can evaluate this information and document its sources, and can participate in "chat rooms" and other "real-time" electronic communication.
5. ***Using word processing to create a text document:*** The student can manipulate text to create a variety of document formats, create tables and charts to show a comparison of data, use a spelling and grammar checker, and insert images and other items into a text document.
6. ***Using information appropriately:*** The student can understand and discuss the social, ethical, legal, and political consequences of information technology.
7. ***Using instructional materials:*** The student can use online help files and understand printed instructional materials. The student can use a tutorial to understand essential models and ideas underlying new hardware and software.
8. ***Using a spreadsheet to model simple processes or financial tables:*** The student can acquire the necessary skills to modify cells in a spreadsheet file, use formulas appropriately, create various graphs from a spreadsheet program to represent data, and design appropriate print formats for a spreadsheet.
9. ***Using a database system to set up and access useful information:*** The student can construct and manipulate a flat data file, search the data file for specific information using keywords search patterns, upload and download files from the data file, and format the data for printing.
10. ***Using presentation software:*** The student can use general-purpose presentation software and can incorporate multimedia into presentations (e.g., audio and video clips).

B. Implementation Procedures

The Advisory Group has developed draft implementation procedures that establish alternative methods for students to acquire and/or demonstrate proficiency in the basic information technology skills identified above (*Implementation Procedures*, March 2003). Under these draft procedures, students can elect to demonstrate proficiency by passing the *Student Test of Basic Information Technology Skills*, currently under active development by the University (see below). Students who do not initially pass this test must successfully retake the examination after completion of appropriate online tutorials. Alternatively, students who fail to pass the skills test may elect to complete an appropriate computer science or information technology course where the final examination assesses the basic information technology skills identified by the University.

C. Recent Work and Anticipated Timelines

Work to develop the University's *Student Test of Basic Information Technology Skills* progressed throughout 2003. In the fall of 2002, a self-evaluation technology fluency survey was administered to all freshman students. Drawing on this survey and other information, a pilot test was constructed using the SAM Challenge Assessment Software, which is currently under development by Thomson Course Technologies of Boston, Massachusetts. The pilot test was administered to 920 registering freshmen during the University's Summer Planning Conference in June. Results from the pilot test will help the University to gain a fuller understanding of the information technology competency level of entering freshmen. They will also greatly assist the Advisory Group this fall as it works to refine the *Student Test of Basic Information Technology Skills*.

The work of the Advisory Group, including the *Student Test of Basic Information Technology Skills*, the *Implementation Procedures* that govern its administration, and a timeline for requiring students to acquire and demonstrate proficiency in basic information technology, will be submitted to the Provost no later than November of 2003 for review and appropriate action. Implementation of FSU's *Policy on Student Information Technology Fluency* must be accomplished in conjunction with the Provost's Undergraduate Education Initiative, a two-year review and study of the undergraduate experience at the University.

III. PROMOTING STUDENT FLUENCY IN DISCIPLINED-BASED INFORMATION TECHNOLOGY FLUENCY

The Student Information Technology Fluency policy stipulates that academic programs report in their required Periodic Programs Review (PPR) how their students acquire disciplined-based information technology skills. During 2001-2002 PPR reporting cycle, eight academic programs made this discussion an important part of their self-studies. During the 2002-2003 reporting cycle, ten academic programs successfully described their present efforts and future plans in this area. For both reporting cycles, outside evaluators favorably assessed each program's strategy for helping students gain necessary technology skills. Follow-up meetings involving the associate provost and dean are also

planned with all programs that have completed a PPR during the first and subsequent reporting cycles to discuss their ongoing efforts to meet the technology needs of their students. Finally, the University's Academic Affairs Committee will continue to require that all new academic programs specifically address how they intend to ensure that their graduates will acquire appropriate discipline-related competencies.

IV. ENSURING STUDENT ACCESS TO INFORMATION TECHNOLOGY

The Student Information Technology Fluency policy reaffirms the institution's commitment to provide students, faculty, and staff with ready access to state-of-the-art information technology. As part of this commitment, the University opened a new 24x7 student computer laboratory on campus and a new PC facility at the Hagerstown Center in the spring of 2003. In addition, seven student computer laboratories on the main campus have been updated with new computers for the fall 2003 semester. The University has also recently built four new smart classrooms and agreed to open an on-campus Educational Testing Service (ETS) computer-based facility to administer ETS student examinations (PRAXIS, GRE, GMAT, and TOEFL). In addition, the University has doubled off-campus student dial-up capacity to its computer network and established a centralized Help Desk to provide technical support to students, faculty, and staff. Beginning this fall, the University will provide students and faculty with digital storage through the Internet and the University's computer network and will update its course-management platform for online and web-enhanced courses (level-6 Blackboard).

V. REVISING AND UPDATING THE UNIVERSITY'S TECHNOLOGY PLANNING

The Student Information Technology Fluency policy references the University's well-established commitment to information technology planning. The University's first comprehensive information technology plan, *Strategic Directions in Information Technology*, was completed in January of 1998. In May of 2000, the University adopted a follow-up plan, *Strategic Directions in Information Technology, Phase II*, in May of 2000.

A third edition of the University's information technology plan, *Strategic Directions in Information Technology, Phase III*, will be ready for campus review in September of 2003. This edition incorporates ongoing objectives from the University's first two technology plans, identifies new challenges, and makes important recommendations that are commensurate with and fully supportive of the information technology access standards and student fluency policies of the University System of Maryland Board of Regents.

In the spring of 2003, the University also reorganized its information technology services to better meet the needs of students, faculty, and staff. From this reorganization, a new Information Technology Department and Center for Instructional Technologies were created, and the principal group for institutional technology planning, the Technology Advisory Group, was restructured. This new administrative structure will improve the delivery of technology services to the main campus and the Hagerstown Center, provide students and faculty members with additional opportunities to take advantage of new

instructional technologies, and ensure effective faculty and staff input into information technology planning at the University.

Institution Strategies Addressing Technological Fluency of Graduates

Salisbury University

August 2003

Salisbury University (SU) is committed to assuring that all its graduates have technological fluency competencies appropriate to their major, interests, and goals. Institutional strategies for addressing the technological fluency of our students and graduates include integration of technology and appropriate competencies within both the General Education and major programs, maintaining a technologically immersive campus environment, and providing extensive and supportive opportunities for faculty to develop and enhance their own technological competencies.

Integration of Technology in Curriculum and Learning Experiences

- In August 2000, Salisbury University faculty endorsed sets of “Program Principles” and “Learning Goals” for SU’s General Education Program. The second of six primary General Education principles affirms that a Salisbury University graduate is able to demonstrate the use of multiple strategies, resources, and technologies for inquiry and problem solving. Included among the more prescriptive student learning goals are skills necessary for productive membership in contemporary society; one of those skills is the “ability to use libraries, computer applications, and emerging technologies.” Ongoing review and assessment of all academic programs provides the mechanism to monitor student progress toward the learning goals.
- Effective fall 2000, all periodic reviews of academic programs must include a discussion on the integration of technology in the programs’ curriculum and learning experiences. In each program, discipline-specific definitions of technology fluency are expressed in terms of student learning outcomes. Since the technology fluency principal is program-directed, the demands to demonstrate contemporary skills and foundational concepts vary by academic program. All students graduate with the technological skills appropriate to their field, broader technology skills to exploit in a wider market, and the intellectual preparation to respond to or shape complex environments or conditions.
- All proposals for new programs must address how the program will assure that graduates possess technological fluency.

Maintaining a Technologically Immersive Campus Environment

- Salisbury University provides a “port for every pillow” in all residence halls.
- All off-campus students and faculty have dial-up access to campus server and World Wide Web. All faculty offices and computer labs are on the campus network. All affiliated student residential housing complexes have access to the campus network.

- The majority of our general purpose classrooms are SMART (computer, VCR, projection system, Internet and cable TV access) with broad Faculty participation in the integration of technology into classroom pedagogy.
- Students have been offered significant discounts on Microsoft software for over five years. This practice has added value to computer ownership and provided students with the tools they need in most academic areas.

Providing Faculty Development and Support

- Salisbury University maintains a Teaching and Learning Network (TLN) to support the enhancement and development of quality teaching and learning at SU.
- The TLN offers consultation and design assistance to faculty “on demand.” The TLN offers frequent workshops on topics such as WebCT, PowerPoint, and Instructional Design throughout each semester and during summer and winter terms.
- The TLN’s Verizon Studio is a state-of-the-art multimedia design and development facility.
- Almost all faculty members have Web pages. Many of those faculty members are using e-mail, Internet applications and resources, computer software and assignments, PowerPoint presentations, and other technology to improve the teaching and learning process.
- The University Academic Assessment Committee directs the faculty and the academic programs in the assessment of student learning. This committee provides guidance to all faculty regarding program-based and general education outcomes, including outcomes specific to information literacy and information technology.

TOWSON UNIVERSITY
Report on Implementation of
Institutional Policy on Technology Fluency

Towson University adopted an interim Student Technology Fluency Policy in August 2002.

The policy was reviewed and approved by the Instructional Technology Committee of the University Senate and the Presidents' Staff in May 2002 and August 2002 respectively. The interim policy has not been modified since the initial reviews in 2002.

Towson's technology fluency policy addresses the areas outlined in the National Research Council's document: "Being Fluent with Information Technology," as integrated components of each discipline and a critical outcome of a comprehensive university education. Towson students acquire *contemporary skills* through a range of experiences according to individual needs and curriculum objectives. Through the range of General Education courses, the major programs and the resources available for self-study, consultation and assistance, students acquire, develop or update the skills required to use current computer applications and develop fluency in the application of information technology. Development of basic knowledge and skill set supports the students' ability to adapt to changing requirements and build new competencies as necessary.

The understanding of the *foundational concepts* of technology fluency and information literacy also is an important outcome of this integrated approach. Key concepts, basic principles of computers, networks, and information design and organization are incorporated appropriately in each level of experience.

The *intellectual capabilities* that allow students to apply information technology to complex situations and stimulate higher-level thinking about information technology also are integrated into the comprehensive approach Towson has taken toward IT fluency, particularly in the *Using Information Effectively* Gen. Ed. courses required of all Towson graduates.

Regarding specific initiatives outlined in the Towson policy, the following are indicative of the progress of implementation.

- **General Education Requirement.** The University requires that all students, whether first-time or transfer, complete the general education requirement, Category I.B- Using Information Effectively (UIE). This category requirement addresses the following goals for information literacy and technology fluency: 1) gathering information from print, human and electronic resources, 2) critically evaluating information in print and electronic formats, and 3) using it effectively in writing and speaking, including electronic presentations. During the past academic year, 3,513 students enrolled in the 27 UIE courses offered through academic departments in all colleges. Within the area of gathering and using information, the Library and the Student Computing Services Center work with students so they learn to design a

good research plan, to effectively navigate, evaluate, and use information found on the Internet and the Web, and to create appropriate presentations or polished papers from the information obtained.

- **Requirements of the Major.** Each academic department defines the requirements for its majors and the information technology capabilities specific to the discipline. These requirements are incorporated in individual courses or defined in broader concepts, such as the College of Education's 'PT³ Standards', based on Maryland Teacher Technology Standards, or the College of Business and Economics' 'Cornerstone/ Capstone' courses. Courses in the majors also provide additional emphasis on and development of information technology capabilities, through the use of higher level technology software and equipment, including email discussion, course Web sites, electronic collaborative projects and presentations, and spreadsheets. More specific examples:
 - a. **Business Administration.** CBEC301 'Business Cornerstone' offers a major emphasis on communication and presentation skills including the use of PowerPoint. ECON205 'Business Statistics' and ECON306 'Business Statistics II' provide a firm grounding in Excel and SPSS. MNGT 337 'Information Technology' includes additional experience with the Internet, FrontPage, Excel and Access. FIN331 'Principles of Finance Management' requires the use of financial functions and formula in Excel, and a number of other courses have content- specific technology components.
 - b. **Elementary Education.** All students are required to complete a two-course sequence, ISTC201 and ISTC 301, designed to fulfill the MSDE's Maryland Teacher Technology Standards. The standards are specific and keyed to identifiable and outcomes, and indicators. The indicators range from the use of electronic resources to find information, to the use of software to analyze data related to student and school performance.
 - c. **Music.** In addition to basic communications and information management applications incorporated in the General Education curriculum, the undergraduate music curriculum ensures technological fluency of majors through required courses: MUSC100, 102, 133, 134, 135, 335 and 405. All students develop skills in web interaction, generating sound files, sequencing, sampling, recording and editing, digital sound, synthesis, synchronization of music to film and video, MIDI applications and configurations, computer aided instruction and computer music notation. MUSC 405 includes web design generation of audio and graphic files for Internet applications.
 - d. **Mathematics.** All math majors are required to take COSC236 'Introduction to Computer Science', which includes programming with high-level, structured programming languages. In addition, the major programs integrate technology fluency by requiring students to use technology tools common to the discipline. All pre-Calculus courses require use of graphing calculators. Calculus and higher-level courses involve the use of Mathematica, and all

Statistics courses use MiniTab. Both software packages are taught in course laboratory sessions. Elementary and Secondary Math Education majors are required to use LOGO and Geometry Sketch Pad, and the TI92 with Geometrix. Performance with math technology tools, as well as in PowerPoint, word processing and communication tools are assessed in the context of course assignments.

- e. Nursing. Nursing majors are expected to develop fluency in all basic technology skills for communication and information management, including word-processing, PowerPoint, email and research via the Internet. Specific technology solutions for the discipline are incorporated in courses such as NURS345 'Technology and Therapeutic Interventions' and NURS347 'Health Assessment Across the Lifespan' including the use of computer simulation for clinical skills development, the use of technology assisted diagnostic techniques (blood glucose monitoring), as well as exposure to the technology tools commonly found in modern hospitals. Additional technology issues related to health care administration and clinical problem solving are explored in the 'Nursing Practice I – VIII' sequence (NURS 351, 353, 355, 451, 453, 455 and 459). A new project this academic year will permit nursing majors to develop skill with computerized bedside charting to create and maintain clinical records.
- f. Political Science. All Political Science majors are required to take POSC301 'Political Research' I which includes statistics and associated computer applications (SPSS and MicroCase), and basic online tools for legislative and legal research (Thomas, Lexus/Nexus. oye.com etc.). In POSC459 'Simulation & Games in POSC', students learn computer applications for linear programming (LINDO) to do strategic analysis of decision making using game theory. In POSC307 'Contemporary International Relations' students learn Internet communications to participate in a semester long simulation of foreign policy. POSC422 'Law On Line' teaches students to use online legal research tools and Internet collaboration tools to conduct research on line with students from other universities.
- **Independent Study Resources and Tutoring.** In addition to and in support of specific information technology requirements incorporated in UIE courses and the major programs, the University provides resources and support services to facilitate students' directed or independent development of basic competencies and skills.
 - a. The Student Computing Services Center (SCSC) directly supports student technology orientation, skills assessment, and skill development in computer software and campus computing resources. The Center offers an online skills inventory for students to determine their skill level and identify needed remediation; computer-based tutorials or hands-on workshops to alleviate deficiencies; and workshops on word processing, presentation and spreadsheet software, Web searching and publishing, the use of Blackboard courseware, and electronic mail. During AY 2003-2044 SSC conducted 204 classes at faculty request for UIEs and other courses, and provided 122 individual student or small

group consults. Tracking data on the use of online tutorials or other resources is not available.

- b. Computing and Network Services, through its Help Center and web site, provides telephone, e-mail, print, and online support for the following: using e-mail, creating web pages, connecting to the University's free dial-up Internet service, using standard Office productivity software, using the BlackBoard online courseware, transferring and backing up files, ensuring safe computing practices such as the use of anti-virus software, hardware and purchasing recommendations, and answering other IT related questions. During the fall and spring semesters, the Help Center handles approximately 75 - 175 different student requests per business day. The Help Center and CANS Lab are available for all students during day, night and weekend hours.
 - c. The Cook Library reference librarians provide course-related, general, and individual instruction for students on how to use the Internet and web browsers and how to evaluate information located online. This includes instruction in how to use the online TU and USM catalog, online databases, online journals, online tutorials, Internet search engines, and Internet resources. In AY 2002-03 library faculty taught 425 Using information Effectively sessions. There has been a steady increase in the number of UIE sessions over the past few years - 391 sessions in 2001-02 and 373 sessions in 2000-01.
- **Ongoing Assessment Tools.** The University has made some strides in this area:
 - a. The Library and TU's Director of Assessment developed an assessment tool for the Category I.B - 'Using Information Effectively' courses. The tool was pilot tested in the spring 2003 semester, and will be implemented fully for the coming academic year. A rating scale and rubrics to guide faculty assessment of IT literacy assignment in the UIE course was design to include specific items related to the use of IT to communicate, manage and process information and the use of IT for problem solving.
 - b. Approximately one-third of all TU academic programs are assessing IT fluency goals as a regular part of program assessment. New guidelines were established in June 2002 for the 2002-2003 Academic Program Review report. The guidelines cite the need to analyze 'the technological skills that students develop in the program'. Emphasis on this component will be an important feature of future reviews.
 - c. SCSC, Library and CANS are gathering statistics on the use and effectiveness of resources and services in support of student information technology fluency. The data and feedback responses will provide direction in the acquisition, revision or development of new or revised tutorials, workshops and online resources for independent or directed use by students.
 - d. All academic program reviews shall address the basic requirements for technology fluency, and all new program proposals will be required to incorporate specific plans for contributing toward the University goals for information technology fluency.

Submitted 8/15/03 Provost's Office

UNIVERSITY OF BALTIMORE

Progress Report on Implementing the Policy on Information Technology August 15, 2003

University of Baltimore continues to build on the technology fluency standards set in response to the USM Board of Regents' Resolution on Technology Fluency. A general commitment to require information technology fluency of all UB students was adopted in spring 2000. By fall 2000, each of UB's three schools, Law, Business and Liberal Arts had adopted specific IT fluency standards relevant to its students. The Business and Liberal Arts schools officially adopted a common set of standards February 2001.

- **Contemporary skills:** Two required undergraduate courses that contribute to University of Baltimore students' "store of practical experience" of skills essential to job readiness, are Ideas in Writing (IDIS 300) and Ethical Issues in Business and Society (IDIS 302).

Ideas in Writing has been designed with technology fluency and its implications for society in mind. Topics covered include: the limitations of information technology, the assumptions built into technology, and the significance of policy issues such as privacy, encryption, copyright, and intellectual property. Students are expected to submit at least one paper electronically to demonstrate their knowledge of sending e-mail attachments.

Ethical Issues in Business and Society includes a component on computer ethics. Additionally, faculty are expected to include e-mail as a means of communication and are encouraged to establish web boards and use them as a forum for discussion.

- **Foundational concepts:** Both the Merrick School of Business and the Gordon College of Liberal Arts require their students to have successfully completed a basic course in computer technology, Introduction to Microcomputers (COSC 100), or its equivalent at the community college. This course introduces students to the hardware components of a microcomputer and to the operating system, the underpinning of the technology. Students are also taught the fundamentals of using e-mail and a browser. Though the COSC 100 course is offered each semester, records indicate that fewer and fewer students require it as they have already mastered those skills before coming to UB. The Merrick School is in fact witnessing progressively more of its applicants already having a second or third course emphasizing technology.
- **Intellectual capabilities:** Development of intellectual capabilities most likely occurs within major courses, with certain academic programs requiring extensive further education in the use of information tools.

Each academic program within the Gordon College of Liberal Arts has developed (or is in process of developing) a set of computer fluency goals for its majors that takes into account the more advanced requirements for successful employment in that discipline. These goals and requirements have been enumerated in the Program Review documents. Most academic programs are in the process of creating measurements of the attainment of these goals, usually through the capstone courses and/or final projects required for graduation.

The Merrick School of Business provides for development of intellectual capabilities within the specialization component of the degree. Students in Computer Information Systems, for example, practice application of networking, e-commerce, and database skills in a generic context allowing them to master multiple versions of commercially available products. Accounting students develop background knowledge of conducting the accounting function in a computerized environment. Finance students learn analytical tools and how to find up-to-the-second-quotes on equities and currencies as part of their coursework. Management students become accustomed to issues of workplace privacy and understand the implications of numerous managerial e-tools for workers and firms.

The Merrick School also requires Management Information Systems (INSS 300) of every student. INSS 300 provides a fundamental understanding of important general business management technology issues. Students are taught how to project their expertise and skills more effectively. The course also emphasizes a broad understanding of computer networks, the use of the Internet and associated e-commerce ideas and the use of enterprise planning systems in organizations.

Law School students are explicitly taught computer-assisted research and electronic communication skills in Legal Analysis, Research and Writing. First-year law students are also required to take classes in Westlaw and Lexis, the most used databases for legal research. These classes are provided free of charge. Students are introduced to other legal research resources on the World Wide Web as well. The Law School feels its graduates are well equipped to meet the technology challenges in the workplace today. It will be investing further in litigation support hardware and presentation software to meet the needs of future litigators.

UB has recently contracted to further expand and enhance our online offerings. Currently, there is a web component to nearly every course in the Merrick School and to many courses in the Gordon College and the School of Law, with courses routinely offered entirely online. By December 2004 students will be able to earn their entire business degree online. The Gordon College is in the process of providing the M.S. in Public Administration online. In the recent 2003 Student Satisfaction Survey 15% of respondents (both graduate and undergraduate) reported that they had taken an online course. At least 80% of those respondents reported they were satisfied or very satisfied

with the quality of interaction with the professor and other students, with the quality of instruction, and/or with the cost effectiveness of the courses.

The University's future efforts to assure IT fluency will greatly depend upon available funding. Funding for new initiatives is currently limited to student technology fee revenue. UB has asked its Information Management Advisory Committee to review proposals for new initiatives and to make recommendations for allocating that source of revenue. The FY03 recommendations are now being implemented and include such projects as: replacing / upgrading computers in student labs, including a new lab in the Office of Disability Support Services; replacing nonfunctioning / outdated mobile classroom technology; upgrading smart classrooms; purchasing program specific software; purchasing new hardware and upgrades to the Law Library and law clinics.

The University of Baltimore recognizes the importance of technology in today's society and continues to take steps to enhance our students' exposure to the world of information. A technology fluency statement is included in each program review and every new program proposal.

**IMPLEMENTATION PROGRESS
INSTITUTIONAL POLICY ON TECHNOLOGY FLUENCY
UNIVERSITY OF MARYLAND, BALTIMORE**

Institutional Policy

The policy of the University of Maryland Baltimore (UMB) remains as approved by the President on April 30, 2002 (attached). As a campus we remain committed to developing graduates with the requisite skills to use state-of-the-art information technology and to adapt to developing technology in settings ranging from research laboratories to professional practice settings.

Implementation Progress

Surveys of incoming students indicate that about 90% of UMB's students own their own computer. Two of our schools require the purchase of a specific computer as part of the required tools for completion of their curricula. Each school, the Health Sciences/Human Services Library (HS/HSL), and the Thurgood Marshall Law Library provide computers for students to use. UMB was the first campus to secure Microsoft licenses for all students under the MEEC agreement and our students have taken extensive advantage of these software offerings. Progress in implementing technology fluency in areas recommended by the National Research Council and mandated in UMB's Policy on Technology Fluency follow.

Contemporary Skills and Foundational Concepts

School based technology orientations exist for all students in appropriate forms. Before fall classes begin, students learn to use school resources for file sharing, instructional technology, streaming media and web servers. Trusted Internet sources for discipline based searching are included. The HS/HSL and the Law Library teach search techniques using library resources. The Center for Information Technology Services (CITS) provides information on student e-mail, Acceptable Use of Information Technology Resources and Network policies, and how to access the campus' Assistance and Service Center Help Desk. CITS-School collaboration introduces students to the ethical requirements of the Health Information Privacy and Portability Act (HIPAA) and how it applies to their use of electronic data.

Each student is provided an e-mail account and is instructed in the use of the **Student UseR Friendly System (SURFS)**. All students have an official mailbox on this system where all campus based information is provided for their use. By logging on to the secure portion of SURFS, students are able to obtain grades, class schedules, register for classes, add/drop, and change personal information. Soon student course/instructor evaluations will be added to the menu of items on SURFS.

Spreadsheet, presentation software, and statistical analysis packages are licensed by the campus in order to provide students with contemporary tools to generate, analyze, and present data in preparation for professional careers. Database software is also licensed by the campus and instruction is provided in how to design and implement research and/or clinical databases. Each school offers rotations through various

professional “clinical” disciplines. Although each school’s curriculum is different and the rotation could be to actual health related clinics or social services offices or legal “store front” operations, a means of managing and remotely accessing information is a component of nearly every rotation.

Intellectual Capabilities

Every school has incorporated electronic media into their curriculum. Agreement on Blackboard as an instructional technology standard has allowed the creation of a central resource for system support and a school-based e-Learning Steering committee which plans further dissemination of this technology into curricula of the schools.

The progress in this area is vast and varied. Anecdotal information follows the same pattern. The UMB School of Nursing offers an entire degree program on line for a BS/RN degree. Students access course materials, instructor led discussions, office hours, collaborative assignments, administrative information, library and other resource materials, and tests on line without ever having to visit the campus. Medical students regularly access the Visible Human project to supplement their studies. Medical students can also download lectures in streaming media formats for study in off hours. Every course taught in the Law School contains an electronic component.

In summary, the University of Maryland Baltimore accepts technologically talented students and leverages these skills to increase their ability to perform in the dynamic and technologically challenging professional fields for which we prepare our students.

UNIVERSITY OF MARYLAND, BALTIMORE COUNTY

Institutional Policy on Technology Fluency Report on Implementation Progress

1. *What is the effective date of adoption of UMBC's institutional policy on technology fluency? Has the language in the February 2002 interim policy been modified?*

UMBC's policy on Technology Fluency was developed in February 2002 as an interim policy. Since then, no modifications have been made to the interim policy's text as it serves the university's objectives very well. The Faculty Senate will consider adoption of the interim policy as a final policy during the 2003-2004 academic year.

2. *Please report on the progress in implementing the institutional technology fluency policy in the areas recommended by the National Research Council: Contemporary Skills, Foundation Concepts, Intellectual Capabilities. As appropriate, please include comments on implementation progress regarding the initiatives outlined in UMBC's technology fluency policy.*

In preparing our previous report, UMBC surveyed the faculty to identify barriers that departments face in providing discipline-specific technology skills. The most commonly reported barriers to requiring discipline-specific IT skills of students are: training and support needed for faculty development; need for additional computer lab space and equipment for students; need for institutional support for discipline-specific specialized software programs; and advancements needed in classroom wiring and equipment for technology-enhanced teaching and learning.

To address these barriers UMBC undertook a number of major campus projects that will have a significant impact on further enhancing its technology infrastructure. Such projects include:

- a. UMBC's Faculty Development Office, Library, and Office of Information Technology (OIT) have run a series of workshops and colloquiums on using technology effectively in the classroom. In the summer of 2002, UMBC funded a small number of department proposals for curriculum reform in Dance, History, Education, and Modern Languages and Linguistics. The result of this work is that during AY02-03 we saw the usage in our course management system increase by 25% over the prior year. Approximately half the courses in the humanities and social sciences are now using our course management system.
- b. During the AY02-03 period, UMBC upgraded 3 existing computer labs and created two new discipline specific labs: one for Visual Arts to

support animation and graphics and one computer lab to support interdisciplinary courses associated with bioinformatics. In addition, with the opening of the IT/Engineering building, UMBC will add seven new computer labs that will be used to support Computer Science, Computer Engineering, Information Systems, and Imaging and Digital Arts.

- c. Budget cuts have limited UMBC's progress on discipline-specific software. We did add discipline specific software for Music and Language instruction. A major enhancement was the new LIMS system that provided better integration of electronic databases into the catalog. Very good progress was achieved in a number of departments in infusing technology throughout the curriculum. In the English department, all sections of its Composition class (English 100) are technologically enhanced. Also, the department has made a commitment that all of its faculty will make use of technology in their classes. Additional departments that have significantly enhanced their courses with technology include Modern Languages and Linguistics and History
- d. UMBC added six new mobile project carts in AY02-03. Each cart provides a data projector and laptop for instructors to use. This increase allowed UMBC to keep up with growing demand. One major initiative during this period was to implement a new facilities scheduling software system. This new system, Resource/25, will allow UMBC to associate classroom attributes such as technology with specific classrooms and then schedule classes based on what attributes are needed. A second major initiative was to design and equip smart classrooms in the new IT/E and Public Policy buildings. These two buildings will provide nine new technology equipped classrooms and three technology-equipped lecture halls in academic year 2003-2004.

In a survey of all academic departments performed by the Provost Office in 2002, a question was asked concerning the expectation of technology fluency for the graduates of the departments. All departments indicated that students were expected to graduate with at least basic technology skills, including knowledge of word processing, use of e-mail, use of the internet, and use of spreadsheets and/or databases. Many departments indicated expectations beyond the basic level, including the use of discipline specific software, the use of presentation software such as PowerPoint, and the skills to design a website.

To promote student ownership of computers, UMBC expanded the wireless access system on campus and developed special pricing promotions with Apple and Dell for new students. Students at UMBC can now be found connecting with their wireless laptops from one of four buildings on campus.

In order to assess the level of technology fluency of its students, UMBC is now including questions on IT fluency in the biennial survey of UMBC bachelor's degree recipients, one year after graduation. This survey is carried out by the Office of Institutional Research and included the IT fluency question for the first time in the survey of bachelor's degree recipients in FY 2001. Another survey of all the bachelor's degree recipients in FY 2003 will be carried out in the spring/summer of 2004.

UNIVERSITY OF MARYLAND, COLLEGE PARK
Institutional Policy on Technology Fluency
August 15, 2003

1. The University of Maryland's Policy on Technology Fluency has not changed from that described in our submission of May 1, 2002. As indicated in the University's May, 2000 Strategic Plan, we remain committed to "systematically integrating the use of information technology into our instructional programs so that all faculty and students can fully exploit new technology as an essential tool for teaching and learning." Despite serious financial challenges, we have continued to make progress in implementing the strategies meant to move us towards that goal. Some highlights are indicated below. We are also pleased to be participating in a national assessment program, to be implemented in fall 2003, that will enable us to better measure the level of information fluency of our entering students and to gauge their progress over time.

2. Last year's submission described three strategies for ensuring technology fluency for our students. The first two (A. and B. below) are meant to ensure that all students master the basic skills of information technology and, through continuing experience in many contexts, develop a real understanding of the workings of networks and of the nature of information and its relation to mere data. The third strategy relates to the development of those advanced skills that enable creative use of information technology in real world disciplines. Progress in the past year relative to these strategies includes the following:

A. Providing the infrastructure and training required to give students easy access to the information technology tools and resources they need:

Infrastructure

- Funding from Student Technology Fees supported upgrades in the centrally supported student computing laboratories. A total of 135 new computers will be in place by September 1, 2003.
- Approximately 11,000 students had activated Internet connections in their residence halls during spring 2003. This represents close to 100% of all resident students.
- Wireless services increased from 190 installed access points to 270 (giving an increase in coverage area by 40%). Additional network management for all wireless access points and hardware to improve roaming and security were added. There are now approximately 1,500 registered users of our wireless network.
- We are implementing a new e-mail system that offers faster, more reliable service, virus scanning, and a Web-based interface. Approximately 4000 new students have already received accounts on this system; returning students may also elect to use it. The system is also being rolled out to faculty and staff users.
- Two new buildings opened in fall 2003, adding another 15 Technology classrooms. We now have a total of 78 Technology classrooms with another 6 being added this summer. In addition, 22 existing technology classrooms were upgraded with newer technology

- In January the Libraries, in collaboration with other USM institutions, implemented a new integrated library system that includes more powerful searching capability and many other user-empowerment features.

Training

- Sixty-five Short Courses, training for University staff, were offered to 627 participants in addition to 6 special request classes to 107 participants. Advanced level classes that were added this past year included WebDAV training and Introduction to Cold Fusion.
- The Office of Information Technology offered 85 classes to 782 students in the Peer Training program. To address the changing needs of the students, courses in more advanced applications were substituted for introductory ones no longer in demand. Thirty-two special request classes (Peer Training courses taught during a class period) were conducted in Excel, HTML, Unix and Dreamweaver for 411 students. Of course, the great majority of "peer" training is on an informal one to one basis.
- The Institute for Instructional Technology offered 38 classes to 426 faculty participants. In this case as well, advanced applications replaced previously offered introductory ones.
- A new speakers' series entitled "Teaching, Learning, Technology?" was launched. Co-sponsored by the Office of Information Technology and the Libraries, this series seeks to engage the University community in discussions around the issues of integrating technology into the teaching and learning process.
- In 2002-03, library staff conducted nearly 1,000 classes, reaching about 18,000 students. Nearly all of the sessions emphasized use of electronic information resources (online catalog, journal databases, e-journals, electronic reference tools and other) and were conducted in the three McKeldin Library laboratories.

B. Making information technology an integral part of all aspects of University life:

Many Business Services are moving entirely to an online environment. For example:

- During the 2002-2003 academic year all financial aid recipients were sent an email notification directing them to the financial aid website to see their award letters. No paper award letters are mailed unless the student requests it. The financial aid web page receives approximately 112,000 hits per month from individuals accessing their awards or looking for financial aid information.
- In the coming year email will become the medium for all official academic communications with students. More and more information concerning a student's academic record and progress towards a degree will be made available through secure web sites.
- Faculty members are now required to assign grades through the University of Maryland's Electronic Grading (UMEG) system. Paper grades are no longer accepted.
- Students have had the option of using either the phone or the Internet for all registration services. Now they are required to use the online registration system.

- All staff members must complete their bi-weekly timesheets online.
- 49% of all applications for admission are now submitted electronically.

Online Library Reference Services are exploding in use.

- During the academic year 2002-2003, the Libraries responded to nearly 2,500 reference questions remotely via chat or e-mail services.
- In January 2003, the Libraries began participating in Maryland *AskUsNow*, a statewide cooperative chat service to provide virtual reference support to Maryland citizens. By participating in this service, our faculty, staff, and students now have access to reference assistance via the World Wide Web 24 hours a day, 7 days a week.
- During the 2002-2003 academic year, library users performed 4,029,053 searches in online databases and electronic journals. The Libraries license or subscribe to close to 300 databases and 3,938 electronic journals. In a recent survey of electronic journal use, 51% of university faculty respondents and 68% of student respondents said that they use library-owned electronic journals.

Instructional Development

- WebCT, the centrally-supported course management system, now serves 13,000 unique students with most students enrolled in more than one course using online resources (21,100 seats were active in spring 2003). In the fall 2002 and spring 2003 academic year, 693 WebCT course sections were used in support of academic courses.
- Students in the Professional Writing Program all use online information resources for their research, as well as learn to write for the Web.
- We continue to hold annual conferences on Teaching With Technology, and now offer prizes for innovative developments in this area.

C. Ensuring that program curricula provide up-to-date training in the technology skills required for each major discipline:

This strategy amounts to ensuring that the content of courses in our major programs reflects the latest thinking in the corresponding discipline. We have always been committed to this goal, and we rely on the quality and commitment of our faculty to achieve it. This is reinforced to a certain extent by the requirements of accrediting agencies and the judgments of academic peers during program reviews. We know that our faculty members are conversant with the skills required in their disciplines, as they need to be so in order to succeed in their scholarly work. We are confident that training in appropriate technology skills is being provided throughout the curriculum.

Our 2002 submission discussed a method for assessing the effectiveness of this advanced training. This consisted of developing an inventory of the particular skills required in each discipline and an inventory of courses that provided training in or that required substantial use of these skills. Unfortunately, the resources that might have been

devoted to this project were devoted instead to the challenge of continuing to offer high quality academic programs in the face of disastrous budget cuts.

3. In addition to the specific emphasis on technology fluency in institutional policies, there are many external forces that converge to lead to the same result. Information technology is pervasive in the community, and it is a rare student entering the institution who is not highly conversant with Internet browsing, electronic mail, and word processing, at the very least. Indeed, many have a sophisticated knowledge of other applications, both legitimate and otherwise. Reasons of both economy and efficiency have caused the university, in concert with most other private and governmental institutions, to move to electronic transaction processing and information technology based client interactions. Interest in the efficacy and efficiency of the educational process has led to burgeoning use of online resources and interaction in academic courses. The pervasiveness of the use of information technology in the scholarly disciplines has ensured that faculty of all ages, certainly in this research institution, are also highly skilled in the use of this technology.

Five years ago the Regents properly became concerned that the institutions ensure the technology fluency of their students. It is widely recognized that change is very rapid in this arena. What was required has been largely achieved, and there is no turning back. It is time to declare victory and move on to other battles.

UNIVERSITY OF MARYLAND EASTERN SHORE

Institutional Policy on Technology Fluency Template for the Board of Regents' report on implementation progress

1. What is the effective date of adoption of UMES' institutional policy on technology fluency? Has this policy been modified since adoption?

The UMES Policy on Technology Fluency was adopted in May 2003. Modification was done for clarity rather than change in substance.

2. Please report on the progress in implementing the institutional technology fluency policy in the areas recommended by the National Research Council²:
- **Contemporary skills:** The ability to use today's computer applications, enabling fluency in the application of information technology. In the present labor market, skills are an essential component of job readiness. Most importantly, skills provide a store of practical experience on which to build new competence.

The ability to use today's computer applications is now introduced at the onset. With the introduction of people-soft, both faculty and students' alike are introduced to the online advisement and registration systems. This initiation is taken further in the classroom courses both as general education requirement as well as a means of providing practical experience to build new competence levels.

- **Foundational concepts:** The basic principles and ideas of computers, networks, and information that underpin the technology.

Students (except those, who receive a full spectrum of IT exposure as part of their core curriculum) are encouraged to take the BUED 212 Computer Concepts/Applications I course or its equivalent from the Mathematics and Computer Science department to learn use of personal computers in word processing, use of spread sheets, database applications, and presentation development.

- **Intellectual capabilities:** The ability to apply information technology in complex and sustained situations as well as to encapsulate higher-level thinking in the context of information technology.

² cf. "Being Fluent with Information Technology," National Research Council
<http://books.nap.edu/html/beingfluent/es.html>

As appropriate, please include comments on implementation progress regarding the objectives for achieving technology fluency outlined in UMES' policy:

- ❖ Immersing students in an information-technology-rich environment

The use of personal computers is integrated in most classrooms environment. This was made possible by the "wired classroom" initiative allowing PC-based presentation material, and internet access to be displayed in the classroom.

- ❖ Reviewing current policies to encourage faculty to integrate technology into the curriculum

Technology is integrated to the maximum extent practical. Also, as part of the integration of Writing Across the Curriculum, students are required to word process at least one term paper a semester in courses taken, as well as requiring presentation of their work to the class using PC-based presentation software. The review of current policies is, however, departmental based to better address needs.

- ❖ Recognizing faculty efforts to integrate technology into the curriculum

There is little progress across UMES on this component. While the administration recognizes the importance of this component, current financial state within the UM system have delayed the introduction of a coherent strategy to address this need.

- ❖ Modifying academic program review documents to reflect the degree of integration of technology into the program

This is ongoing with respect to programs that come up for review on departmental basis. It is also emphasized that faculty document their revised course materials to reflect the program review changes.

- ❖ Requiring new faculty hires to be technologically fluent

This has been incorporated in the hiring practices of the University.

3. Other comments

While the University has made some progress, there will be further meetings to evaluate the extent to which the University is able to measure the level of success it has attained thus far.

UNIVERSITY OF MARYLAND UNIVERSITY COLLEGE

Report to the University System of Maryland on Implementation of the Institutional Technology Fluency Plan – August, 2003

Progress to Date: In accordance with the plan submitted to the USM last May UMUC's School of Undergraduate Studies (SUS) has instituted a cross-curricular initiative focusing on technology fluency and the following related activities: definition and list of student competencies; faculty materials for integration of technology fluency; curricular realignment; initial sample assessments; and development of tools for detailed assessment.

SUS has developed an operational definition, list of student competencies (based on the standards disseminated by the Board of Regents), and suggestions for faculty across the curriculum to use in integrating technology fluency into classroom activities. The SUS definition of fluency in technology corresponds to the BOR standards, and the curriculum and assessment efforts address all the key categories of those standards (skills, concepts, and intellectual capabilities). To ensure that students acquire the requisite competencies in the bachelor's degree, SUS first revised its General Education Requirements (GERs) for the "emerging issues" category. Effective fall 2003, only IFSM 201 (Introduction to Computer-Based Systems) may be used to satisfy the basic GER in information technology (first GER course), which is required of all non-computing majors. In 2002-03, this course was revised to align it more explicitly with BOR standards. Finally, SUS continues to require the course LIBS 150 (Information Literacy and Research Methods) for all undergraduate students; see section "Remaining Steps in the Implementation of the Plan" below.

UMUC's Graduate School (GS) continues to require all incoming students to take UCSP 610 (Library Skills for the Information Age), a self-paced online course designed to ensure that all new graduate students are able to use the many electronic databases and other Web-based resources available to them. In spring 2003 GS conducted a pilot study of a required foundational "first" course for the M.S. in Management degree program, similar to the course already required of students in the Master of Business Administration program. This pilot course had technology fluency (along with other competencies) and its assessment built into the curriculum. GS faculty are currently evaluating the results of the pilot.

Results of Initial Assessment: In 2003 UMUC conducted an initial sample assessment of student technology fluency at both the undergraduate and graduate levels. Qualified faculty reviewed selected courses (both online and, for some sections of graduate courses, "face-to-face" delivery) to determine the extent to which students displayed mastery of Basic Skills, Foundation Concepts (at the graduate level), and Intellectual Capabilities 1 through 3. The courses chosen are among those that tend to be taken early in a degree program. The goals of the sampling were to give academic decision makers a sense of the current technology fluency of UMUC students as a result of the implementation of the technology fluency plan to-date, and to provide baseline data to guide further

implementation of the plan. Results of the sampling are discussed in context below, followed by a description of the remaining steps in the implementation of the plan.

Basic (Contemporary) Skills

At the undergraduate level, 19 online sections of the course IFSM 201 (Introduction to Computer-Based Systems) from the fall 2002 and spring 2003 semesters were assessed. Six of the 19 sections originated from UMUC's Asian Division; the remaining 13 originated from the Adelphi, Maryland campus. Class activities and student assignments were reviewed to determine the proportion of students who completed the course successfully and who demonstrated mastery of Basic Skills 1 through 5. Results showed exceptional success in *electronic communication and collaboration* (Basic Skill #4), with 100% of students in all sections demonstrating that skill. The most variation was shown in *using the Internet to find relevant information and resources* (Basic Skill #3); although in most sections students showed high levels of competency, two sections in Asia did not include related class activity and levels in Adelphi ranged from 73% to 100%. The newly developed common syllabus for IFSM 201 will support greater consistency in this area and others where there were outlier sections. For Basic Skills #1 (*use of a word processor*), #2 (*preparation of image-based documents*), and #5 (*management of data with software tools*), the percentage of students demonstrating the required competency was well over 90%. Future assessments will refine the assessment questions and samples, include worldwide student populations now that requirements are consistent throughout UMUC, and assess the full range of the competencies.

At the graduate level faculty surveyed 7 sections (6 online and 1 "face-to-face") of the course CSMN 601 (Issues, Trends, & Strategies for Computer Systems Management), and 6 sections (4 online and 2 "face-to-face") of ITSM 670 (Information Technology) using the assessment instrument described above. An average of 90% of the students in the online courses demonstrated proficiency in the Basic Skills; the average was slightly over 72% for face-to-face students. This is consistent with UMUC's belief that the technology-rich environment of the online courses contributes to a higher overall level of technology fluency.

Intellectual Capabilities

For undergraduate IFSM 201 students, competency levels for Intellectual Capabilities #1 (*project development using technology*) and #2 (*navigation of information structures*) varied more and will have to be more fully assessed in later courses. However, more than two-thirds of students in the Asia sections and even higher proportions in Adelphi sections demonstrated these capabilities. More than 98% of undergraduates demonstrated the ability to *work remotely and asynchronously with others* (Intellectual Capability #3); this is not surprising given that UMUC's online delivery platform WebTycho is based on asynchronous communication.

At the graduate level 93.6% of online students showed proficiency in the first three Intellectual Capabilities. What was surprising, however, was that 100% of face-to-face

students sampled showed the same proficiency. While the population of face-to-face students in this sampling was small ($n=87$), we speculate that this result may be due to the fact that all graduate face-to-face courses are now “Web-enhanced”; each section has its own WebTycho classroom in which students are encouraged to communicate asynchronously, create group projects, conduct research, and so on.

Foundation Concepts

The Foundation Concepts were not assessed at the undergraduate level in this sampling. At the graduate level, students in CSMN 601 are expected to acquire a broad knowledge of information systems, networks, and ways in which information is managed digitally. The course introduces students to sound ethical behavior as practitioners of the information system business. They are also exposed to the legal ramifications of the application of information technology, as well as to social considerations such as the “digital divide” and access for disabled users. The sampling of 7 sections of CSMN 601 from the fall 2002 and spring 2003 terms showed that 90% of online students and 72% of face-to-face students demonstrated proficiency in these concepts.

Remaining Steps in the Implementation of the Plan: At the undergraduate level, future assessments in IFSM 201 are planned that will evaluate student competencies in more detail and address a fuller range of skills and abilities, including the concept competencies in the BOR list. Standard final exam questions, mapped against the BOR competencies, have been developed with worldwide faculty participation. These questions will be integrated into all IFSM 201 final exams, beginning with Adelphi sections in fall 2003. They will be scored in the computing department and returned for faculty to integrate into the overall grade. Initial results will be available in spring 2004.

Another required undergraduate course, LIBS 150 (Information Literacy and Research Methods), focuses on information literacy skills, with special emphasis on Internet research. Nine of the 12 BOR competencies are addressed in this course, and one – using the Internet to find relevant information and needed resources” – is one of the three major learning outcomes identified for the course. Pre- and post-tests mapped to course learning objectives were completed and tested in online sections in spring 2003. Automated analysis is under development. For sample data related to technology fluency, we reviewed results for 420 students on questions that test the ability to formulate an appropriate search statement using Boolean logic. Results showed more than three-quarters of the students demonstrating competency in this area. All the test questions are being analyzed further to determine question validity. With implementation in all sections when automation of the tests is complete, data analysis and implications for practice improvement will be clearer. Future assessments in LIBS 150 will further evaluate student ability to formulate search statements and identify appropriate Internet sites. Pre- and post-tests will be refined and repeated through fall 2003, with a review of aggregated data used to determine appropriate revisions in instruction and/or the tests.

In addition, academic departments will assess student fluency in technology beyond the initial courses, including courses used for the second computing GER (which varies by

academic major) and courses within academic disciplines, such as capstone and foundation courses for the academic majors. In 2003-04, English and history programs are focusing on required methodology courses using a graded research assignment to assess advanced and discipline-specific competency in information literacy and technological fluency. Grading criteria are being developed for use by faculty in cross-grading a selected sample for baseline assessment of rater reliability and student competency will be conducted. This model will be extended to other programs after testing.

At the graduate level, a review of UCSP 610 is underway. Preliminary results of the review indicate a need to revise the course in order to strengthen its technology fluency and information literacy standards. Further, a pre-/post-assessment similar to that of LIBS 150 will be developed and integrated into the course.

GS has developed a preliminary framework for a coordinated approach to the assessment of several critical knowledge areas (including technology fluency) felt to be necessary for graduates of all programs. Included within this approach will be plans from each academic department for incorporating discipline-specific technology fluency skills and course-based assessments into individual courses.

Conclusion: UMUC is making good progress in the implementation of its technology fluency plan. The preliminary sampling assessment suggests that the majority of UMUC students are indeed mastering the Basic Skills, Foundation Concepts, and Intellectual Capabilities of technology fluency. We anticipate no difficulty in completing the remaining steps of the implementation.