Disclaimer

These slides were presented at the President's Information Technology Advisory Committee's (PITAC) November 4, 1998 meeting by the chairs of its six panels. The panels were asked to suggest revisions to the PITAC's Interim Report. The information in these slides will be taken into consideration as the PITAC drafts its final report.

SEW PANEL FINDINGS AND RECOMMENDATIONS

IT has the potential of transforming society, for better or for worse, in many very fundamental respects

We need to make sure that:

a) the transformations are beneficial,

b) there will actually be a workforce that is capable of bringing about these transformations, and

c) the benefits are uniformly accessible to all citizens, regardless of gender, ethnic origin, age, physical ability, and geographic location

TO DO SO, WE WILL NEED

a) a significant increase in the level of funding for research into SEW issues, in order to identify and understand the nature of the possible transformations, and

b) significant investment in the development and implementation of the necessary educational and socio-economic programs, and

c) significant investment in the deployment of the infrastructure in a manner that insures equitable access to all sectors of society.

We have added expertise to the panel through the addition of 4 members:

- George Campbell Jr., Ph.D.
  President & CEO
  NACME, Inc.
- Diane Martin, Ph.D.
  Department of Electrical Engineering and Computer Science
  The George Washington University
- Michael S. Teitelbaum, Ph.D.
  Program Director
  Sloan Foundation
- Donna Hoffman, Ph.D.
  Professor at Vanderbilt University/ Co-Director of Project 2000

PITAC members:

- John Miller, Chair
- Ching-Chih Chen
- Sherri Fuller
- Andy Viterbi

The final report will reflect the work we've done in several respects:

- We will refine the list of findings and recommendations to those that we judge to be central and essential to the task of the committee, and incorporate them into the report

- We also hope to refine the Executive Summary and Vision sections to reflect more accurately the importance of these societal issues within the context of the rationale for the proposed initiatives

FINDINGS

These break down into 4 basic categories:

1) Equity of Access issues: Race, gender, age, physical ability, and geographic isolation.
2) Education
3) Workforce issues
4) Other socio-economic

RECOMMENDATIONS

These can be broken down with regard to several different spectra:

- Immediate ←→ longer term
- Endorsement of plans for the expansion of existing programs ←→ expansion of current programs we feel to be under-funded ←→ initiation of new programs
- Research ←→ deployment

The investments should be made across agencies, and must be strongly and effectively organized across the agencies

Funding will be balanced between single PI grants and Center grants

EQUITY ISSUES

The Internet may provide equal opportunity and democratic communication, but only for those with

a) access

b) the basic knowledge to take advantage of that access

FINDINGS

There is a race gap on the Internet, in two important respects:

- Usage of IT in day-to-day life, and as a resource and tool during public education.
- Engagement in IT careers
- The consequences to US society of a persistent racial divide on the Internet may be severe. If a significant segment of our society is not provided with equal access to the Internet, employment opportunities and income differences among whites and minorities may be exacerbated, with further negative consequences for the nation's cities.
- Citizens with physical disabilities do not have equitable access to IT-based services and resources. Similar statistics currently apply to older citizens.
- There is a severe geographic penalty for access to IT services and resources

RECOMMENDATIONS

- Support research focussed on equity of access issues, including (among others) the following focus areas:
  - What are the implications of unequal access to technology in the nation's schools and communities? How can we improve access to the Internet to the poorest members of our society?
  - What are the best ways to ensure a technologically literate nation? How do we guarantee Internet access for all members of society?
  - What are the factors influencing the adoption of the Internet as a communication and commercial medium?

HOW?

- Establish an Enabling Technology Center research component that will conduct and disseminate population projectable, representative studies of Internet access and usage a minimum of twice a year. The results should be made freely available to everyone in the global Internet community, for the purposes of informing research, business decision making and public policy.

- PITAC strongly endorses a new initiative being planned within NSF concerning a RESEARCH FOCUS ON UNIVERSAL ACCESS, to be conducted jointly by the Human-Computer Interaction and Knowledge and Cognitive Systems programs within the Information and Intelligent Systems Division. The research initiative is aimed at empowering people with disabilities to be able to participate fully in the emerging information society, and will benefit the nation as a whole by advancing computer technology in the area of novel man-machine interfaces.

HOW? (CON'T)

- Enhance programs to create access points in libraries, community centers and other nontraditional access places where individuals may access the Internet, and advertise/encourage/train use at these locations.

- Develop and aggressively pursue programs that encourage home computer ownership and the adoption of inexpensive devices that enable Internet access through the television and other low-cost "appliances."

GEOGRAPHIC ISSUES:

Short Term:

- Continuation of the NSF "Connections" grant Program
  - Suggest the consideration of funding connections to the backbone rather than of the backbone itself
  - Continuation of the EPSCoR program to supplement funds awarded through that NSF Connections program for universities in rural states
- Initiation of an EPSCoR program for upgrading hardware for connectivity
- Allocation of additional funds to support connectivity of EPSCoR universities
- Initiation and enhancement of programs to support the connectivity of non-research-intensive universities with large minority enrollments

GEOGRAPHIC ISSUES:

Intermediate Term (circa 5 years):

- A GigaPop in every state

These might seem to be a "deployment" issues rather than "research" issues. However, the more we learn about the rural connectivity problem, the more we realize how inextricably inter-linked the access issues are with broader SEW issues. Our intention is to articulate these recommendations, with an acknowledgement that the "gigaPop in every state" proposal will have to be dealt with independently from the other IT and SEW research problems we are discussing here. In other words, the cost of the deployment of the national infrastructure is NOT included in the $1 billion budget increase we are discussing, and may require a scheme for State/Federal partnership including some formula for matching funds.

EDUCATION ISSUES: FINDINGS

Endorsement of PCAST report

- Findings of that report dealt with issues of technological infrastructure, faculty development, application of new software and pedagogies, equitable access, budget, and need for more educational research

- However, that report dealt primarily with K-12 issues. Our recommendations do not stop at K-12 education, but have a strong focus at the undergrad, graduate, postgraduate and professional levels. Our future national strength rests with the development of a well-educated and highly skilled workforce at all these levels.

SPECIFIC RECOMMENDATIONS REGARDING MODES OF FUNDING

- Boost support for single and multiple PI grants through programs already in place
- Establish a dedicated ET Center focussed on Educational issues related to IT, and several more Educational components at other more tech-oriented ET Centers. The IT ET Center should serve as a coordination center for all of the other ET Center components. The Educational ET Center should host some Expeditions, though we expect that the funding levels required for this Education ET Center would not be nearly as great as those required for the tech-oriented Expedition Centers, considering that the expenditures for hardware development will not be nearly as great.
- Fund Traineeships at undergrad, grad and postdoctoral levels, at high scales. (talk more about that in Workforce section.)

WORKFORCE

- There is unequivocal data that there is a greater demand than supply for IT workers at many levels, including the highest levels, with the academic and industrial sectors
- There is recognition, as well, that the IT sector has experienced wide swings, booms and busts, which makes it especially difficult to assess the current situation

WORKFORCE (CONT'D)

Some evidence suggests, however, that there are large pools of potential IT personnel in the U.S. workforce at the lower-to-middle skill levels, but there *is a* "market failure" in accessing that pool.

The bottom line is that the workforce "stream" is not flowing effectively. There are bottlenecks, leaks, eddies, and potential tributaries that are correctly diverted. The system must be repaired and maintained. More details will be provided that enhance the material in the interim report, and present more concrete findings.

WORKFORCE: MINORITY ISSUES

- There is a participation gap for underrepresented minorities. African Americans, Latinos and American Indians constitute a fourth of the total U.S. workforce, 30 percent of the college-age population and a third of the birth rate.

- The declines among minorities have been attributed to three factors: (a) the ongoing failure of precollege education, particularly in the minority communities, (b) the growing difficulty of financing higher education for those in the poorest segment of the population and (c) the recent retraction of affirmative action policies at universities across the country, which have a more severe impact on admissions for selective disciplines, such as engineering, than on others.

RECOMMENDATIONS

- Support research on the demographics of the IT workforce
- Develop funding to support U.S. workforce development initiatives
- Undertake rigorous, systematic research efforts to identify specific barriers to computer and information technology careers for underrepresented groups
- Conduct or extend existing public awareness campaigns
- Fund academic traineeship programs to get more people into the workforce stream and keep them there
- Expand the participation of underrepresented minorities and women in computer and information technology careers

MODES OF FUNDING

- Research support: balance between an increase in support for single PI grants, multiple PI components at ET Centers
- Graduate traineeships in Computer Science, Computer Engineering, Information Technology, Information Science, and Computational Science
- In addition: identification, endorsement and dissemination of information about exemplars for University/Industry retraining programs

IT RESEARCH FINDINGS

- Privacy and security issues
- More research is needed regarding Social and Societal effects of IT (positive and negative)
- More research is needed regarding economic effects

RECOMMENDATIONS

It is imperative that the US establish procedures that protect its citizens' information privacy and security.

Establish a non-partisan, non-profit institute to evaluate and establish policies for the protection of individuals' information privacy on the the internet

Develop industry education programs that carry the message that protecting consumer privacy online will actually be good for business.

Expansion of research into the interaction of people with computers, networks, and databases for knowledge discovery.

Establish one or several Center components that will examine critically and forecast the impact of interactive networked technologies on society

ENABLING TECHNOLOGY/ENABLING CENTERS

- There should be an explicit requirement for a strong SEW research component associated with each Enabling Technology Center
  - a serious SEW component will be required for each IT enabling technology center
  - the SEW components are funded in a way that is clearly "incremental" to the funding required for the IT components, rather than “set aside”
  - probability of funding will be extremely low if an integrated proposal for BOTH components is not presented

ENABLING TECHNOLOGY/ENABLING CENTERS (CONT'D)

- The PACI Centers should consider the incorporation of strong SEW components to their portfolios, with incremental funding to be provided
- We recommend 2-3 SEW ET Centers. Centers should function as a "MetaCenter" to coordinate and publicize all SEW activity components at all of the other ETCs