NATIONAL DEFENSE EDUCATION AND INNOVATION INITIATIVE

Meeting America’s Economic and Security Challenges in the 21st Century

January 2006

ASSOCIATION OF AMERICAN UNIVERSITIES
The Association of American Universities (AAU), founded in 1900, is an association of 60 leading U.S. public and private research universities and two top Canadian universities. While AAU universities comprise only about 1.5 percent of all U.S. colleges and universities, they educate annually over one million (approximately nine percent) of the nation’s undergraduates and over 450,000 (approximately 20 percent) of the nation’s graduate and professional students.

AAU universities award just over one-half of all U.S. doctoral degrees and 55 percent of all Ph.D.s in sciences and engineering. AAU members perform nearly 60 percent of the university research funded by the federal government. The federal investment in research at AAU universities totaled nearly $13 billion in FY2002.

AAU provides a forum for the development and implementation of institutional and national policies promoting strong programs in university research and scholarship and undergraduate, graduate, and professional education. It supports its members’ advocacy of national policies in these areas.
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“[T]he inadequacies of our systems of research and education pose a greater threat to U.S. national security over the next quarter century than any potential conventional war that we might imagine.”

Introduction

The United States has exercised global leadership in economic and security matters for more than 50 years, and the American people have experienced extraordinary security and economic progress as a result.

But in this still-young century, the nation faces new challenges to both our security and our prosperity: the danger to our national and homeland security posed by terrorism, the increasing competitive pressure from the growing economies of Asia and elsewhere, and the threat to our economic and national security posed by dependence on Middle East oil. These challenges demand a dramatic, creative response.

Yet they come at a time when the continuous innovation that has been the hallmark of America’s economic success and military prowess is threatened at its very foundation. Serious problems in our educational system and a weakening federal commitment to research in the physical sciences and engineering are eroding the nation’s innovative edge, with increasingly evident and alarming results.

Nearly 50 years ago, faced with similar challenges following the launch of Sputnik by the Soviet Union, America responded by enacting the National Defense Education Act and by multiplying the nation’s investment in university-based research. The Association of American Universities (AAU) believes that today’s challenges demand a comparable response.

In that spirit, AAU calls on the Administration, Congress, and academia, with the help of the business sector, to implement a 21st Century National Defense Education and Innovation Initiative aimed at meeting the economic and security challenges we will face over the next half-century. Government and America’s universities and colleges should implement this initiative now, so that it can be fully in place by 2008 – the 50th anniversary of the National Defense Education Act (NDEA) of 1958.

The Initiative springs from a belief among AAU universities that the burden of meeting these challenges is not government’s alone and that research universities and higher education in general have key roles to play. It therefore calls for action and resources – and change – not only from government but also from the nation’s colleges and universities. It also reflects a strong belief that, if we take the right actions, America can maintain its global leadership and that we can ensure our national and economic security for the 21st Century.

This report is in three parts. The first highlights the most significant recommendations contained in the Initiative. The second is a narrative that lays out the challenges, historical background, and a broad description of the Initiative. The third section of the report provides a detailed list of recommendations.
“One thing is certain. Our competitors will not wait for us to come to our senses - they will continue to fuel the changes in education and infrastructure required to spark innovation.”

— Craig Barrett
CEO, Intel Corporation
Wall Street Journal
March 4, 2004

PART I
Key Recommendations for Universities and Colleges

Enhance Research and Innovation

- Strengthen the connections between campus-based research and undergraduate education.
- Establish interdisciplinary research and education initiatives that create new combinations of faculty, postdocs, and graduate and undergraduate students to address emerging national challenges.
- Provide top young scientists and engineers – postdoctoral fellows (postdocs) and junior faculty – with independent research opportunities and funding to encourage novel thinking and research.

Cultivate American Talent

- Identify and promote best practices and programs in undergraduate STEM (science, technology, engineering, and mathematics) and foreign language education, especially those that address college freshman attrition and under-representation of minorities and women in STEM fields.
- Continue reexamination of doctoral education, particularly in STEM and language disciplines, to develop ways to shorten time to degree, improve completion rates, and broaden the scope of Ph.D. education.
- Continue to establish and build on professional science masters programs that meet specific science and technical managerial workforce needs identified by the federal government, business, and industry.
- Provide more university research experiences for those training to be K-12 math and science teachers, and for current teachers.
- Create accelerated teacher certification programs for individuals with STEM, foreign language, or area studies expertise.
- Create and sustain stronger partnerships with school districts, state departments of education, and business that focus on training and retraining K-12 teachers to fill the current teacher skills and knowledge gaps in STEM and foreign language education.

Attract and Retain Foreign Talent

- Continue to work with Congress and the Administration to combat the misperception that international students, scholars, scientists, and engineers are no longer welcome in the U.S.
- Continue to work with the Departments of State and Homeland Security to improve the visa process so that bona fide international students, scholars, scientists, and engineers can enter the U.S. in a secure, timely, and efficient manner.

Objectives of the Initiative
- Enhance America’s research capacity in order to sustain scientific and technical innovation.
- Cultivate American talent to enhance the nation’s math, science, engineering, and foreign language expertise.
- Continue to attract and retain the best and brightest international students, scientists, engineers, and scholars.
Key Recommendations for Government

Enhance Research and Innovation

♦ Increase federal investment in basic research supported by the NSF, NASA, and the Departments of Energy, Defense, Homeland Security, and Commerce by 10 percent annually for the next seven years placing particular emphasis upon growing federal support for the physical sciences and engineering. Grow investment thereafter to continue driving innovation.

♦ Sustain basic medical science funding at historical rates of growth to preserve the biomedical research capacity made possible by the recent doubling of the National Institutes of Health (NIH) budget.

♦ Strengthen federal support for research infrastructure by reinvigorating competitive facilities and equipment programs at NIH and the National Science Foundation (NSF), adequately funding the Department of Energy's 20-year facilities plan, and examining policy changes to strengthen federal support for scientific infrastructure at universities.

Cultivate American Talent

♦ Increase by 5,000 the number of graduate fellowships and traineeships supported by existing programs at federal science and education agencies, including NSF, NIH, National Aeronautics and Space Administration (NASA), and the Departments of Defense (DOD), Homeland Security (DHS), Energy (DOE), and Education.

♦ Create a graduate fellowship and traineeship program in the DOE Office of Science that supports 1,000 students annually and that generates talent to help achieve energy self-sufficiency and to enhance the nation's scientific enterprise.

♦ Expand the DOD National Defense Education Program, which provides scholarships and fellowships to students in critical fields of science, mathematics, and engineering in return for a commitment of national service after their studies.

♦ Increase federal need-based student aid, especially Pell Grants, to make college possible for the neediest students.

♦ Build on the Administration's National Security Language Initiative by expanding federal foreign language, area studies, and study abroad programs.

♦ Revive the NDEA K-12 teacher skills summer workshops to help teachers of math, science, and foreign languages improve their teaching skills and meet teaching standards.

♦ Improve education research and K-12 education by creating: 1) a competitively awarded extramural grant program in the Institute of Education Sciences at the Department of Education that funds high-quality research on K-12 education and 2) a new graduate fellowship program that supports 500 students per year pursuing Ph.D.s in math and science education.

♦ Establish a new mentoring and tutoring program in which college students earn a stipend for tutoring K-12 students in STEM and foreign language coursework.

Attract and Retain Foreign Talent

♦ Reform immigration policies to create clear pathways to permanent residency and U.S. citizenship for top international students who earn U.S. degrees, as well as outstanding scientists and engineers in the U.S. on exchange or work visas.

♦ Ensure that government policies and contracting practices do not discriminate against or curtail participation by international students and scientists in the conduct of unclassified fundamental research.
The Role of Business

The federal government and universities have a historic relationship in addressing national security and economic challenges through education and research. However, businesses and the business community also have critical roles to play in helping to strengthen our nation's education and research systems. They can contribute significantly by:

- Continuing their individual and collective efforts to educate the public and state and federal decision-makers about the challenges to American competitiveness and security and the need for this type of initiative;

- Identifying and communicating workforce education and training needs and helping to create opportunities to address those needs through partnerships with educational and philanthropic institutions, the federal government, and local and state governments; and

- Increasing participation in partnerships to address the education and research challenges facing our nation.
“... if trends in U.S. research and education continue, our nation will squander its economic leadership, and the result will be a lower standard of living for the American people. ... The good news is that America is able to meet these challenges from a position of economic strength.”

— Statement of National Summit on Competitiveness: Investing in Innovation, December 2005
Conclusion: A Uniquely American Response

AAU member universities are encouraged by other organizations and individuals who have come forward with ideas to meet the challenges facing our nation. The time to act is now. We as a nation must commit to specific solutions.

Orienting American society to the challenges that lie ahead will not be an easy task. It will take serious commitments of university resources and significant federal expenditures. However, as numerous business organizations have pointed out, these are investments that will produce reliable returns that benefit our society. For any of the major actors – universities, business, and government – to look to others to solve these problems without looking first to themselves is to invite failure. American society has never operated by command. Ours is a culture of self-initiative and problem solving. Our greatest successes have been the product of competitive effort accompanied by collaboration. In this way we have met great national challenges that were beyond the reach of any single individual or sector of society.

As an organization of research universities, AAU believes it must focus on its responsibilities to contribute to American competitiveness and security by doing better what only we can do, namely improve education and research. The recommendations AAU offers specifically outline the contributions universities can and should make. We believe that government and business also have important responsibilities. We stand prepared to do our part. We will work with the federal government, business, and the nonprofit sector to maintain and enhance America’s leadership position in the world.

It is our hope that this paper, along with the recent reports issued by a host of business, academic, and other organizations, will convince the Administration, Congress, and the American people that our national and economic security – indeed our global leadership – depend on education and innovation. Both of these objectives rely on a new national commitment in the form of a National Defense Education and Innovation Initiative for the 21st Century.