

EDARPA: An Education Advanced Research Projects Agency A New Mechanism for Federal Support of Research on Learning and Education

Let me begin with three premises:

Premise 1: We have entered an age of knowledge, in which educated people and their ideas have become the keys to economic prosperity, national security, and social well-being. Furthermore, in such an age, education has become the key determinant of one's personal prosperity and quality of life.

Premise 2: It has become the responsibility of democratic societies to provide all of their citizens with the education and training they need, throughout their lives, whenever, wherever, and however they desire it, at high quality and at an affordable cost; that is, to create a *society of learning* in which life-long educational opportunities become not only available to but pervasive in the lives of all of our citizens.

Premise 3: Although the major investments in the learning infrastructure necessary to create and sustain a society of learning will come from the private sector and local government at the state and community level, leadership, research, and the development of a policy framework are the responsibility of the federal government.

Although education is clearly felt to be a priority in our society, the federal government has yet to make the commitment to research on this topic that has characterized other national priorities such as health care and military security. In FY2001, less than 1% of the federal R&D budget will be directed to research related to learning and education. Furthermore, most education research is generally viewed and supported within the constraints of existing perspectives, policies, programs. As a result, our existing research programs are simple unable to engage the interest and commitment of the most talented members of the national research establishment.

Since the development of our nation's intellectual capital is likely to become a dominant domestic issue in the decades ahead, it seems appropriate to consider not

only a substantial increase in the amount of research directed toward this priority, but as well efforts to engage a far broader segment of the research community capable of addressing more radical issues. For example, how would one explore different architectures or ecologies of learning environments, institutions, and enterprises for an age of knowledge? Here the goal would be to set aside the constraints imposed by existing educational structures (e.g., schools, colleges, workplace training), policies, and practices and begin with a clean slate to consider how one might meet the life-long educational needs of citizens in a global knowledge-driven society. How would one design learning experiences, resources, and institutions that exhibit the various characteristics suggested for learning institutions in the 21st Century: learner-centered, interactive and collaborative, asynchronous (any one, any time, any place) and ubiquitous (every one, every time, every place), intelligent and adaptive, lifelong and evolutionary, diverse, and affordable?

Of particular interest here is the redesign of the national learning infrastructure that provides technical knowledge and skills (science, math, technology) and the learning skills necessary for a knowledge-driven society. There also needs to be consideration given to how to design a learning architecture that narrows the digital divide, with a particular concern given to providing educational opportunities to those who have been traditionally disadvantaged by our current educational systems.

Although the U.S. Department of Education has traditionally been given the responsibility for federal leadership and policy development in education, particularly at the K-12 level, it could be that the most appropriate federal agencies for providing national leadership in creating this “society of learning” might well be basic research agencies such as the National Science Foundation and the National Institutes of Health. This is suggested by several considerations: 1) Much of the knowledge most critical to our future will be based upon science, mathematics, and technology. 2) The NSF is unique among federal agencies in having both a charter and experience in the conduct of fundamental research concerning education at all levels. 3) The NSF and NIH are also unique in their ability to engage the entire research community in high-quality, merit-driven research directed at national priorities such as economic competitiveness and health care. In fact, much of the innovation in life-long learning will be based upon research and development already sponsored by NSF and NIH in fields such as information technology, cognitive science, and the social and behavioral sciences.

Today, however, such basic research agencies face some rather significant challenges in providing such leadership. There continues to be a debate at the highest levels about the priorities that the federal government should give its activities concerning human resource development. For example, should the priority ranking be *people > ideas > tools* as suggested by the premises above, or *ideas and tools > people* as proposed by many in the research community.

Second, much of the activity conducted by the federal government is highly fragmented and compartmentalized. Its research programs and funding patterns are still dominated by a chimney disciplinary structure (e.g., physical sciences vs. biological sciences vs. social sciences). Furthermore there continue to be numerous firewalls that exist between various levels of educational programs, e.g., K-12, undergraduate, graduate, and faculty development, workplace training, and lifelong learning.

Third, even in basic research agencies such as NSF and NIH there is difficulty in stimulating and supporting truly “out-of-the-box” thinking, unconstrained by traditional scholarly disciplines or existing educational structures. The peer review process generally works against break-the-mold research proposals that lie outside traditional disciplinary structures or paradigms. Particularly in the field of education, we need to find ways to stimulate more people to set aside the constraints imposed by the traditional education systems and think far more broadly and boldly about just what knowledge and skills citizens will need in a global knowledge-driven society, and then how to build learning resources that will address these needs throughout their lives.

An interesting model of stimulating high quality and innovative basic research to address a national priority is provided by the Defense Advanced Projects Research Agency of the Department of Defense. Through an unusually strategic and flexible funding model, DARPA has been able to engage some of the brightest minds in the scientific community in both basic and applied research related to defense priorities. One might imagine a similar effort aimed at focusing the capabilities of the American research establishment on what many believe to be our nation’s most compelling priority, the availability and quality of education for a knowledge-driven society.

While the current Interagency Education Research Initiative is an important start, the compelling nature of this nation’s human capital requires a far greater commitment to research in areas related to learning and the engagement of a research community far broader than that currently involved in such studies. Instead, suppose instead we were to consider an “ED-ARPA” structure, funded at a level comparable to DARPA, that would

identify the best people in areas related to education and fund them through highly flexible, sustained support designed to stimulate unusual creativity and innovation. Since the Department of Education has so little experience in managing merit-driven basic research activities and such limited credibility with the broader scientific community, other federal agencies such as the NSF and NIH might serve as partners or even a lead agencies to provide guidance and oversight, at least during the startup phase. To convince the research community that this is a serious effort and not simply channeling more money into the education establishment, it might even be useful to get the National Academies both to support the new research programs and perhaps even provide some leadership.

These are challenging issues, to be sure. But as just as the “space race” of the 1960s drove major investments in research and education, there are early signs that the “skills race” of the 21st Century may soon be recognized as a dominant domestic policy issue, thereby providing an opportunity to break free of existing constraints.