BRIEFING THE PRESIDENT:

WHAT THE NEXT PRESIDENT OF THE UNITED STATES NEEDS TO KNOW ABOUT THE INTERNET AND ITS TRANSFORMATIVE IMPACT ON SOCIETY

The Internet Policy Institute
Washington, D.C.

The Internet Policy Institute

The Internet Policy Institute (IPI) is the nation's first independent, nonprofit research and educational institute created exclusively to provide objective, high-quality analysis, research, education, and outreach on economic, social and policy issues affecting and affected by the global development and use of the Internet.

IPI is nonpartisan and does not lobby or otherwise actively advocate or represent the interests of businesses, associations, policy makers, individuals or others. A primary role for the Institute is as a forum for independent research, discussion, debate and consensus building.

Other IPI publications of interest:

America: On the Net (Washington, D.C., 2000)

http://www.internetpolicy.org

CONTENTS

8

BRIEFING THE PRESIDENT

The Internet and Education

Robert O. McClintock

THE INTERNET AND EDUCATION

By Robert O. McClintock,
Co-Director, Institute for Learning Technologies
Teachers College, Columbia University

In the late 19th century, compulsory elementary schooling for all took hold as a civic responsibility and entitlement. In the early 20th century, the public extended compulsory schooling into adolescence and provided opportunities for universal secondary education. In the second half of the 20th century, with the GI Bill and a succession of other measures, a widening sector of the population gained access to higher education. As an historic force in education, early in the 21st century the Internet is completing the democratization of education in a way that will make all educational opportunities open to all people at all times in all places.

As the Internet completes the universalizing of educational opportunity, serious issues of public policy arise – issues of resources, of incentives and empowerment, of control and regulation, of assessment and accountability. The following sections survey some of these issues.

Resources

Every major enhancement of educational opportunity has provided substantial personal and public benefit at increased cost. Since the mid-19th century, enhanced access to education through compulsory elementary and secondary schooling and broadened admittance to higher education significantly raised expenditures for education, public and private. Societies around the world have unanimously judged the benefits of these educational efforts to be worth their substantial expense.

There is no reason to expect the cost-benefit calculus with respect to digital technologies in education to be different. As it expands educational opportunity, the Internet will force increases in educational expenditures. But increased benefits to individuals, groups, organizations, and society at large will balance the expense.

Traditionally, universal education was a wish, barely approximated by opportunities for large groups and cohorts – for instance, children aged 6 to 12, who received schooling for part of the day for part of the year. In principle the Internet is greatly extending these historic achievements, making educational experience accessible, not just to large cohorts, but to everyone, not only for significant periods, but all the time at any place – 24 hours a day, seven days a week, that is, "24/7" in current jargon. Further, the education afforded to all is greatly enriched. Traditionally, universal opportunity concentrated on elementary education, which had a very limited content. In principle, the Internet now opens the full resources of

higher education – the libraries, laboratories, and expertise of the culture – to all people in unprecedented ways. It makes digital participation in the cultural resources of every discipline and profession possible for anyone at any time from any place.

But where will we get the resources to implement this added access? It is very difficult to estimate the costs, for the added access will change existing structures and add new ones. For 20 years, a demand for more technology for education has taken diverse forms. This demand continues and will grow as a recurring quest for new and increased expenditures, driven by the interaction of technical innovation, social need, and civic interest. Resources for open-ended innovation like this come from four main areas: individuals, philanthropy, government, and commerce. Let's consider in turn the contributions each can, and can't, make.

- **Individuals.** For universal, "24/7" educational access to become a reality for American students, every U.S. home needs full connectivity to the Internet. Also, many of our society's cultural assets – textbooks, research papers, speeches and novels, not to mention images of great architecture and performing and fine art – need to be made available in a digital format. As people buy home computers and Internet appliances they equip themselves to participate in the expansion of educational access. As more and more homes and individuals go online, they not only consume culture, they begin increasingly to contribute to it. All this greatly lowers the per capita costs of broadened educational participation. Numerous scholars, professionals, and individuals in the interested public openly contribute much Internet content and create communities of critical exchange, all of which are significant elements of the Internet as an educational force. Overall, individual commitments are necessary, but not sufficient, in generating the resources for the educational use of the Internet. As a necessary strategy in raising resources, voluntary action by individuals provides a significant base of effort. Were it to be the sufficient strategy, however, reliance on individual actions would exacerbate inequalities of educational opportunity by speeding those with many resources ahead while leaving lagging those with few.
- **Philanthropy.** Philanthropic funds are playing a major role advancing the educational power of the Internet, most notably in helping to generate educational content for it, in creating resources adapted to populations with special needs and interests, and in helping to mobilize expertise needed to implement the effort. The World Wide Web exists because scholars at research labs and universities were able to design and implement powerful solutions to their problems of intellectual communication. Advanced information and communication technologies have become essential to the conduct of research and scholarship. Many of the philanthropic endowments and foundation grants driving the

advancement of learning in our culture generate, as a secondary consequence, the digital content enabling the Internet to become the locus of ubiquitous educational opportunity. The role of philanthropy in developing the educational uses of the Internet is particularly important in higher education, which will increasingly become the provider of content for the entire structure of education, not only for specialized, advanced subjects. Philanthropy is unlikely, however, to provide a ubiquitous infrastructure for accessing all the content it helps to create.

- **Government.** It is not clear whether public sources can generate the additional funds needed to implement the educational uses of the Internet and digital technologies, especially the needed infrastructure. In the nation's schools, the average number of students per computer has been steadily decreasing, but that average masks extreme divergence between schools, and even within schools. Accidents of wealth, community interest, and leadership hustle are a few of the factors accounting for the divergent actualities within the average. Local governments are still expanding their commitment to increasing educational opportunity through the Internet. At the local level, for example, reasonably affluent communities frequently succeed in passing bond issues to equip schools and classrooms well. In some places, the Internet also makes it possible to alter the politics of local educational funding by developing technology plans that serve a broad spectrum of community needs -- schools, local hospitals, community and senior centers, local government, and small businesses. On the other hand, however, in many communities -- especially large urban school systems -- the local ability to increase available funds is limited and the backlog of unmet demand for school construction and maintenance precludes generating much by way of technology expenditures.

  A few state governments have moderated local differences by building a consensus for special initiatives with technology. These are valuable, but at the state level, like the local, such initiatives may rely excessively on bond issues, as if expenditure for technology is a once-in-a-while matter akin to putting a new roof on the school. One time for all initiatives can set states up for long-term failure, for sound use of technology in education requires a new kind of substantial, on-going educational expenditure. Historically, schools in the United States have functioned as extremely stable institutions, with capital plants designed to last indefinitely and heavy annual staff expenditures. In fact, the budget of a school in 2000 differs little from the budget of a school in 1900. That's because most school budgets include virtually no internal investment for rationalizing and improving the schools' ways of doing business. This has to change. To realize the educational benefits of the Internet, schools need to restructure their budgets. They need to invest substantial resources in upgrading continuously their basic ways of doing business. To

make full use of the Internet, schools need to develop an annual capital budget for continuously upgraded production tools and expanded training support.

Mobilizing the resources to restructure educational budgets will not be easy. Schools cannot simply cut expenditures on plant or teachers and staff substantially, using the savings for new types of expenditure. The show must go on. Localities and states must inject expanding expenditures for equipment and content and lots of staff development into the existing mix. Over time, the new expenditures will have effects, not on the size of the old expenditures, but on the character of the educational operations that they support. Change requires added capital and support. Teachers want and deserve higher salaries; the public presses for reductions in class size, a longer school year, and higher learning standards; old buildings need refurbishing and new ones must be built – in short, traditional expenditures tend to grow. Yet localities and states have limited taxing powers. Change likewise requires assured capital and support. Implementing the Internet requires pedagogical vision. If the most dynamic educators must devote inordinate effort to raising continuing funding and struggling to sustain innovative efforts, they will become mired in minutiae and loose their sense of vision. Liable to the flux of fashion and funding, localities and states have great difficulty sustaining long-term innovation.

National programs can help provide capital and support that is both added and assured – up to a point. For instance, the federal government has stepped in over the past decade to help schools serving less advantaged students acquire Internet connectivity and classroom technology through targeted programs. Provisions in the 1996 Telecommunications Act, for example, extended universal service concepts to include high-speed connectivity to schools and libraries in lower income communities (this is the so-called E-rate program). This program has greatly advanced the pace at which the Internet is coming into effective use throughout elementary and secondary education. Combined with other programs in the Department of Commerce, the National Science Foundation, and the Department of Education, the E-rate program has also made possible a good deal of pedagogical experimentation with the Internet in classrooms.

But the role of the federal government in the elementary and secondary schools is too limited, relative to that of the states and localities, for federal programs to help across the board in restructuring school budgets to sustain continuous internal innovation. It is even less suited to underwriting the implementation of educational access through the Internet as a ubiquitous, "24/7" opportunity for all. Ubiquitous, "24/7"activity reaches into the confines of the private, everyday life of each person. The American

ethos, one of limited government and a bill of rights protecting the autonomy of speech and assembly and much else from official reach, is very likely to resist the centralization of universal educational experience.

- **Commerce.** Aside from the commercial provision of limited training programs, education in the United States has been almost entirely non-commercial. However, these days there are many signs that the broadening of access to education through the Internet will bring much more commercial activity into education at all levels. Individuals, philanthropy, and government may not be able to do the whole job. Fully universalizing educational opportunity may require further resources, at a substantial scale.

For better and for worse, commerce is the great, untapped means for generating resources in education. Already, initial efforts to develop the Internet in education through commercial initiatives are underway. First, non-commercial educational organizations – such as universities, libraries, and museums – are developing commercial initiatives to pursue their traditional missions with new media. Second, non-educational commercial organizations – such as publishers, new media start-ups, and large technology firms – are developing educational initiatives in pursuit of potentially profitable new business. Both types of initiative are likely to expand dynamically over coming decades and to intertwine, together and with non-commercial educators, in ways that are difficult to anticipate. Relatively soon, say by 2020 or so, these efforts at commercial education and at educational commerce are likely to have become a significant element in the provision of education opportunity in all developed societies.

Substantial commercialization of education carries risks of historic loss, however, along with potential benefits. Modern educational systems have engaged in what Francis Bacon, the renaissance theorist of applied science, called the "advancement of learning," entailing both the creation and dissemination of knowledge. Modern educational systems have also served, well but imperfectly, to encourage criticism and to protect dissent. The danger of increasing commercialization in education is that it is not clear whether the pursuit of new knowledge or the enunciation of critical dissent have intrinsic value in the world of commerce. As the structure of education becomes increasingly commercial, policymakers may need to develop new ways to ensure that the emerging educational structures preserve and enhance the capacity to generate new knowledge and to bring criticism to bear on the exercise of power. Otherwise, Internet-based education may turn ironic, becoming a deadening tool of orthodoxy, rather than a vital means of education for the public.

Of all the issues likely to arise from the interaction of the Internet with education, the role of commercial activity in the expansion of educational opportunity is likely to become the most deeply controversial. It is beginning to drive a wedge of basic disagreement into a broad, existing consensus about the range of activities appropriate in institutions of higher

education and about the presence of profit-driven action in the elementary and secondary classroom.

Incentives and Empowerments

As the Internet expands access to education, who does what, when, why, and how will also change. Expanded access to education does not simply mean that people will do exactly what they did before, only doing it longer and in more locations. Opportunities and pressures will both invite and push students, teachers, parents, academics, and the public to develop new pedagogical behaviors. With respect to these changes, policymakers need to consider potential patterns of empowerment and possible incentives to help key groups adapt.

- **Students.** As the Internet expands access to education, it transfers a tremendous amount of educational initiative and control to students. First, the Internet expands when and where students can find educational opportunities; what students could get previously only in classrooms they can now find at any time at any place. Second, the Internet greatly increases the range of educational resources that students can use at will. In principle, the entire culture of humankind is online, open for use by any student, as he or she should see fit. The problem is that the operative rationale of modern education rests on principles of compulsion, from the idea of compulsory schooling to reliance on the lesson and assignments, tests and grades. In contrast, the Internet gives students of all ages, abilities, and interests an astounding range of choices. Where choices abound, compulsion may cease to work. Educational authorities may need to reexamine fundamentally the assumptions they make about motivation in designing programs for students.
- **Teachers.** As the Internet expands educational access, teachers face an immediate task. They must learn how to incorporate advanced technologies into the work of the school. Then, they must also learn how to adapt the work of the school to a learning environment in which the traditional monopoly of the school on educational opportunity disappears.

  To enable them to cope with the first task, teachers and other professionals in the educational system are calling for increased professional development. It would be a mistake for policymakers to think that relatively simple training programs will satisfy this call. Schools are highly tuned institutions, with well-defined programs of activity and familiar, set roles for everyone working within them. There is little room for experimentation and adaptation in most schools' day-to-day routines. Patterns of practice that capitalize fully on the educational potentialities of the Internet are very different from standard school practice, however. Standard professional development will not sustain a full transition from normal practice to an alternative pedagogy. The Internet and the technical

environment constantly develop and change. This continual change makes teachers' standard professional development expectations all wrong. Most teachers have come to expect that if they acquire a new skill or technique once well, they can use it, over and over again, this year and next, throughout their career. In contrast, computer technology requires dynamic principles of practice in which the agenda of work, the tools for it, and even the criteria of success and failure, constantly evolve and change. This means that teachers' professional development will have to become ubiquitous, constant, and available just in time and on-demand – just like the technology they are increasingly being called upon to use.

Adapting the work of the school to an environment in which the school is just one of many distinct educational opportunities will also require longer-term efforts which may diverge sharply from currently popular policy initiatives. Here teachers may have to reconcile sharply divergent visions about what they should try to accomplish.

In most school districts around the country, current policies promulgating clear learning standards and mandating high-stakes testing aim to fine-tune the performance of existing schools. These policies do not necessarily perfect the program of the school for its usefulness in a world of expanded educational access. To prepare students to meet the standards and to perform well on high-stakes tests, many teachers feel they must restrict students' choices and authoritatively focus class attention on preparing for the tests. To prepare students to make the most of a wide range of autonomous choices, operative both in school and out, however, many teachers believe they should function instead as guides and mentors, helping students build their ability to sustain their own inquiry and learning. How the school and the teacher within it should function in a world of expanded educational access and choice is not clear. It will be important for policymakers to keep this issue uppermost in their minds, however, when developing new rules and regulations for education in the Information Age. As educators we will need to expand substantially the research on learning and teaching to provide a basis of knowledge for deciding such questions.

- **Parents.** Technology-expanded educational opportunity confronts parents with some new challenges. One expression of parental recognition that educational access is broadening is the home schooling movement. Some home schooling is driven by distaste for the values (or lack of them) that some parents feel is pervasive in schools. This sector of the home-schooling movement is generally not Internet-friendly. A growing component of the home-schooling movement, however, reflects the judgment by parents that their children could expend their pedagogical effort more productively by working at home, largely on the Internet. It is very likely that home schooling by such parents will not lead to "de-schooling" in any general sense, for there are many reasons parents and the public

may choose to send children to schools, even though many other means of education are available to them. Many parents who themselves feel dissatisfied with their own educational efforts and opportunities may feel poorly qualified to guide their children's educational activities outside of schools. Even where access is equal, a "digital divide" in educational achievement may develop between children in homes where parents can help their children exploit expanded opportunities and children in homes where parents may not be so able. In fact, I foresee a substantial intergenerational need emerging. As expanded educational access to the Internet becomes an actuality, whole families, children and adults together, will need shared learning centers to make full use of their complicated opportunities for a fuller education.

- **Academics.** Expanded access to education has great significance for scholarship and research. Traditionally, these fields have been out of reach for most people for research libraries and laboratories have historically been far too costly for everyone and anyone to enter, should they so wish. In universalizing educational opportunity, the Internet brings these tools to any home and any classroom, for anyone to consult. Through the Internet academics and professionals can begin to develop new audiences -- even, more radically, to broaden the community of peers. Some critics will say that lay people have no interest in the academics' work and that it is too demanding and confusing for ordinary folk. But the great challenge to self-governance in the 21st century inheres in the fact that all peoples have profound interests in the resolution of very complex and difficult problems, from science to economics to subtle questions of cultural value. Global warming, the global economy, peacekeeping, sustainable development – all these are complex matters in which all people have a substantial interest. Self-governance requires people to participate in making decisions about such matters. With the Internet, people all over the world increasingly have both the means to deliberate on such issues and full access to the sources of knowledge relevant to them.

  Another crucial point involves the integrity of knowledge and expression. Historically, formal peer review in science, and the free clash of opinion and criticism in culture and public life, tended to ensure such integrity. By enabling a much wider sector to communicate ideas at will, the Internet creates a significant challenge to academics, who now face an enlarged critical task. As the world of the Web proliferates, the responsibility to ensure the quality of information and ideas becomes evermore difficult. The Internet makes the validation of content more difficult while involving more and more people in the active exchange of ideas. Peer review will involve broader criteria and a wider base of participation. The impetus may grow to de-emphasize intellectual validation as the basis for funding research and inquiry. In its place, funding may increasingly follow politically legislated mandates,

based on the play of interests, not the discipline of reason, and the fashions of the marketplace and public opinion may compromise the quality of knowledge and culture. The Internet poses a most difficult challenge: to preserve the research principles with which academics and scientists have created a reasonably progressive science and culture, while including everyone as participants in the work.

- **The Public.** Interests and needs drive public participation in the educational opportunities enabled by the Internet. It is a mistake to assume that relative to education, the public is a homogeneous mass. The Internet has spread in spontaneous ways as diverse individuals and groups have perceived that it offers them interesting, meaningful possibilities. End users exert a great deal of control with respect to the shape and content of the Internet. As a result, the Internet is likely to develop a very interesting structure to its content. Points of entry are likely to be very diverse; the aggregate uses that people engage in may nevertheless be highly shared and comprehensive. This structure may provide a way beyond the rather divisive debates that dominated the 80s and 90s about multiculturalism and the canon.

  Conflicts over multiculturalism and the canon have been difficult to solve because traditionally the structure of educational opportunity has been so limited – the point of entry and the aggregate were essentially the same. In such a situation, people confronted either-or choices. If there were to be multiple points of engagement, the whole that each engaged would be different from others – there would be diversity with no unity. If there was to be a common canon, the entry point for engagement with it would be the same for all – there would be unity with no diversity. The extension of educational opportunity that the Internet offers provides the opportunity for an education that fully achieves unity in diversity. The structure of cultural content that the Internet enables is one in which each person is free to take their unique path into and through a common, shared aggregate of resources. This structure differs fundamentally from the structure of curricular debates in education up until the present time. It will take time to realize the possibilities inherent in this new structure in a double sense – it will take time to actualize the possibilities, and even more it will take time to become fully aware what they are.

Control and Regulation

The problems of control and regulation that are endemic to the Internet impinge upon its educational effectiveness. These problems arise in part because the Internet blends activities together – in particular, commerce, entertainment, and education – creating significant cross-interference. Problems of control and regulation also arise because the Internet greatly accentuates the tendency to disregard the structure of established

jurisdictions, something that is already evident in modern communications and transportation. Paradoxically, the characteristics of the Internet that make it such a powerful force for extending educational access also give rise to these problems. The more the Internet becomes the locus of education, the more pressing these issues will become. Consider two instances:

- **Freedom of speech.** In a world where anyone can communicate anything to anybody at any time, difficult issues of freedom of speech arise. Historically the First Amendment has protected autonomous speech in the United States from gratuitous suppression. The Internet, designed to support interactive communication through the rigors of atomic war, may make these guarantees of free speech redundant, while creating new problems. Thus, policymakers could find it increasingly important to establish expectations of discretion and to implement procedures enabling people to exercise effective tact and prudence in Internet exchanges that are intrinsically unfettered.

- **Copyrights and fair use.** As freedom of speech principles protect speakers or writers and their work against suppression, copyright protects the right to manufacture physical copies of intellectual work and to control the use of those copies. The copyright laws arose because, historically, copies took effort; they were costly to make and subject to progressive degradation, from one copy to the next. The right to make copies was an inherently limited right. Within the field of copyright, the traditions of fair use were developed to promote educational activity. "Fair use" is a more circumscribed, limited right under the copyright law to use parts of copyrighted works freely if they are intended strictly for instructional and scholarly purposes. Historically "fair use" served a valuable purpose because the technological limitations inherent in the physical processes of reproduction guaranteed that the loss to the value of copyrights through fair use would be marginal.

  These days, however, copies do not exist in the digital realm. Copies made on a copying machine degrade from one copy to the next. But there are no inherent limits on digital replicas – one replica is identical to the next and the creation of replicas requires neither significant cost nor effort. For all practical purposes, in the Internet world "fair use" defines an infinite subset of an infinite set, each identical with every other.

  This situation raises significant difficulties for the regulation of intellectual property in general, and for the facilitation of educational use in particular. In a world in which any copy can give rise to innumerable identical replicas of itself, creators must choose between preserving the source in strict secrecy or opening it to unlimited duplication. This choice is frequently played out in the software industry, where companies maintaining source code for their products in strict secrecy compete with similar products based

on open sources freely available to anyone. Unlike software source code, secrecy won't work for most domains of culture – science, art, literature, poetry, criticism, history, and the like. For these, the Internet is a ubiquitous means of electronic publishing, of making materials public. Selling copies or the right to use copies many break down as a means of generating revenue from such intellectual property. In its place, there will be greater need to generate revenue by attaching advertising to creative work or creating public support for the creation of works to be placed directly into the public domain.

Other problems of control and regulation triggered or accentuated by the power of the Internet to expand opportunities for education may become equally important. For instance, questions may develop about whether markets or whether public authorities should serve as the operative providers of important civic services. The Internet makes commercial enterprise an increasingly effective means for raising the resources needed to extend unlimited educational opportunities to everyone. The power of commerce to raise resources derives from its clarity of purpose. Take return on capital: if the return is good, capital resources will accrue to an enterprise. So long as investors believe the returns will be high, commerce can generate substantial means for the pursuit of public goals. What happens should the expected returns drop?

Likewise, questions may develop about whether key Internet domains should merge or remain distinct. New media marketers, for example, are touting the synthesis of entertainment and education under the heading "edutainment." Many will agree that education should be entertaining and learning fun. Many Americans also hold – or once did, at any rate – that entertainment should "elevate" and lift up the spirit. Yet the formula in entertainment today is to hold audiences by leaving their members unchanged, ready to return over and over again to repetitions of the same basic production. Education, in contrast, changes a person; the whole idea is to move from mastery of one thing to another, to develop, to grow, to mature. Can education and entertainment combine? Is "edutainment" really an oxymoron?

Finally, the any-time-anywhere learning that the Internet fosters does not necessarily respect established boundaries and jurisdictions. Distance learning bursts apart the standard structures for accreditation that the academic world has come to use. For example, the French have become almost comical in their efforts to establish regulations ensuring parity for French as a global language on the Internet. What, given the anytime-anywhere characteristics of the Internet, is the locus and cultural character of the education that it is making so accessible to each and all? Who will guarantee quality and relevance? Who will provide vision and exert leadership? Towards what ends?

Assessment and Accountability

As best they can, policy makers need to account for results. Therefore, the most important question becomes: will the benefits of "24/7" educational opportunity for all people justify the costs? People, school systems and governments have committed the physical resources to make this opportunity available. They have empowered participants to adapt and change their ways of work to accommodate new ways of learning. They have coped with the strains engendered by historic change through sage strategies of control and regulation. Will they find the benefits worthy of the effort? This is the challenge of assessment and accountability.

Where changes are incremental, assessment can rely on linear assumptions – each input should have a proportionate output. The assessment of educational innovation usually takes this form. Currently the public, press, and policy makers alike pay avid attention, whether or not they like the results, to measuring comparative academic performance in key subjects at key stages of the scholastic structure by scores on high-stakes tests. These measures track the outcome of effort within a given educational system, and they are political realities that demand attention. They are not, however, measures that will suffice to account for the benefits of the Internet in education. The educational system as it exists cannot encompass the Internet if we continue to rely on outdated measures. In extending educational access to unprecedented levels, the Internet acts on the system, not within the system. It does not optimize; it transforms.

Transformative historical changes are much like changes of phase and they have significant latencies inherent in them. This creates two serious problems for effective assessment. First, standard measures may show no effects throughout a period of latency. Assessment programs using standard techniques to identify the effects of the Internet in education may deceptively indicate that expensive efforts have no effect, weakening the rationale for investment in the efforts. Second, with transformative physical phenomena, observers usually know nearly as much about the altered state as they do about the former condition, and hence they have a reasonably good idea about how to test for the post-latency relationship. With transformative historical phenomena, people do not simply observe the transformation; they undergo it. As they undergo it, they have no way of knowing exactly what the post-latency state will be like. Hence, it is intrinsically difficult to develop and introduce new, post-latency assessment measures.

But we must develop these measures. They are likely to involve indicators showing extreme diversity in the users of high-quality cultural resources on the Internet and the degree to which the collections of great libraries and museums are available and used at a distance. Pressure on formal educational programs to serve as gatekeepers and as sources of credentials

may diminish. People may report participation in intellectual and cultural activities to be intrinsic goals, rather than means towards extrinsic purposes in higher proportions than now they might report. Increasing difficulty in trying to apply the old measures in situations where traditionally they once worked well, as patterns of behavior now slip away from established expectations, might indicate that transformative changes were taking hold of educational practice. Many familiar strategies of assessment rest on the assumption that one can predict what a good student should know as the result of an educational experience. That assumption becomes dubious in an educational environment in which the Internet empowers students to interact with the whole culture. The very definition of accountability may change. Currently accountability aims at giving the public evidence that educational programs meet the purposes they are designed to serve. In a system in which each student can continuously select from and interact with the whole culture, assessment itself may become an operational resource, providing self-directing individuals with much more effective, immediate feedback, that helps them manage their work.

CONCLUSION

The Internet makes a process of social and educational democratization possible. With it, societies can extend meaningful educational opportunities to all people at all places at all times. Such an achievement, if fulfilled, will not be the work of technology; it will be a profoundly human, social achievement. As such, it will take time and sustained effort.

In education, it is especially difficult to concentrate on truly long-term policy – people rightly feel that the educational interests of children, here and now, must not get sacrificed in pursuit of improvements that will help children growing up in a far off future. When policy becomes too long-term, it unfairly sacrifices today for the betterment of tomorrow. We can view this problem differently, however.

Here and now, the most important idea, which can become real for everyone, is that education at its best is continually a work in progress. Existing schools impress people, especially the young, as fixed and stable givens, places of predictable routine. Education should not comprise a fixed program, good or bad, that people do to the young, the aspiring, the perplexed. Education is properly a shared, unfolding, open effort. Insofar as educational programs appear monolithic and unchanging, they are at their core miseducational, for they communicate a profound mistruth to their participants, that good education consists in fixed and bounded programs.

Human possibilities are unlimited. Educational activity should exemplify that truth. Educational institutions themselves should engage in an unending quest to reach beyond established achievements, not only at the cutting edge of research, but pervasively throughout their work. Educational

arrangements must communicate to all the boundlessness of possibility – here and now – by committing to a vision of continuous change that leads far beyond what anyone can reasonably expect to achieve in the finite future.

CONTRIBUTING AUTHORS

Ellen Alderman	Co-author, *The Right to Privacy* and *In Our Defense: The Bill of Rights In Action*
C. Michael Armstrong	Chairman and CEO, AT&T Corp.
James L. Barksdale	Partner, The Barksdale Group
Alan Blinder	Gordon S. Rentschler Memorial Professor of Economics and Co-Director of the Center for Economic Policy Studies, Princeton University
Vint Cerf	Senior Vice President of Internet Architecture and Technology, WorldCom
Scott Charney	Principal, PricewaterhouseCoopers
Stephen S. Cohen	Professor of Urban and Regional Planning, University of California at Berkeley and Co-Director, Berkeley Roundtable on the International Economy
J. Bradford DeLong	Professor of Economics, University of California at Berkeley, and Research Associate, National Bureau of Economic Research
Bill Gates	Chairman, Microsoft Corp.
Rep.Robert Goodlatte	Republican of Virginia
Mike Gravel	U.S. Senate 1969-81; President, Philadelphia Two Direct Democracy
Bob Kahn	President and CEO, Corporation for National Research Initiatives
Caroline Kennedy	Co-author, *The Right to Privacy* and *In Our Defense: The Bill of Rights In Action*
Robert E. Knowling, Jr.	President and CEO, Covad Communications Co.
Charles Kolb	President , The Committee for Economic Development
Sen. Patrick J. Leahy	Democrat of Vermont
Robert E. Litan	Vice President and Director of Economic Studies at the Brookings Institution
Robert M. McClintock	Co-Director, Institute for Learning Technologies, Teachers College, Columbia University
Alice M. Rivlin	Senior Fellow at the Brookings Institution and holder of the Johnson Family Chair in Urban and Metropolitan Studies
Elliot Schwartz	Vice President and Director of Economic Studies, The Committee for Economic Development
Hal Varian	Professor and Dean of the School of Information Management, University of California at Berkeley
Ernest James Wilson	Director, Center for International Development and Conflict Management, and Faculty Associate, School of Public Affairs, University of Maryland
John Zysman	Professor of Political Science, University of California at Berkeley, and Co-Director, Berkeley Roundtable on the International Economy

Briefing The President **Advisory Board**

Jonathan Sallet, Chairman

Marilyn Cade, Director, Internet E-Commerce, Federal Government Affairs, AT&T Corp.

Antoinette Cook Bush (Toni), Executive Vice President, BroadwaveUSA/Northpoint Technology Ltd.

Vinton G. Cerf, Senior Vice President of Internet Architecture and Technology, WorldCom

Robert E. Kahn, President and CEO, Corporation for National Research Initiatives

Harris N. Miller, President, Information Technology Association of America

Lloyd N. Morrisett, Chairman, Infonautics Corp.

Adam Clayton Powell III, Vice President, Technology and Programs, The Freedom Forum

Donald R. Riley, Associate Vice President and Chief Information Officer, University of Maryland

George Vradenburg, Senior Vice President for Global and Strategic Policy, America Online, Inc.

Ernest James Wilson, Director, Center for International Development and Conflict Management, Associate Professor, Government and Politics and Afro-American Studies, and Faculty Associate, School of Public Affairs, University of Maryland

John Zysman, Co-Director, Berkeley Roundtable on the International Economy, University of California at Berkeley

Graeme Browning, Editorial Director, Internet Policy Institute