

UNITED STATES OF AMERICA

+ + + + +

DEPARTMENT OF COMMERCE

TECHNOLOGY ADMINISTRATION

+ + + + +

SUMMIT ON THE USE OF ADVANCED TECHNOLOGIES IN
EDUCATION AND TRAINING

+ + + + +

BREAKOUT SESSION
GROUP 2: POLICY AND INNOVATION ISSUES

+ + + + +

FRIDAY, SEPTEMBER 27, 2002

+ + + + +

The session came to order at 11:00 a.m. in room 4830 of the Department of Commerce, 14th Street and Constitution Ave, N.W., Washington, D.C., Bruce P. Mehlman, Assistant Secretary for Technology Policy, presiding.

PRESENT:

Bruce P. Mehlman U.S. Department of Commerce
Gary Bachula Internet2

1 P-R-O-C-E-E-D-I-N-G-S

2 (11:18 a.m.)

3 MODERATOR MEHLMAN: My name is Bruce Mehlman, and
4 I am with Commerce Department. Present, this is my panelist,
5 colleague, and friend, Gary Bachula with Commerce Department
6 past. Gary was the deputy under secretary and was acting under
7 secretary for a while in that stretch as well and the current
8 assistant secretary for technology policy.

9 Thank you for joining our panel and not the
10 other. We will try to make it worth your while, maybe faster
11 access to the food or better lunch or something.

12 By the way, a key and a cell phone were found at
13 the guard's desk in the tunnel. If anybody here is missing a
14 key and a cell phone, they are probably yours.

15 What I thought would be useful to do, Gary has
16 got some introductory ideas and remarks. I've got about 60
17 questions I would like to ask. The goal here to have it be as
18 interactive as possible.

19 My goal is to speak as little as possible, -- we
20 are transcribing this -- to have as many folks who were selected
21 for what you know and where you come from to offer thoughts as
22 possible. I am going to try to take as good notes as I can

1 here.

2 The goal is to identify policy barriers other
3 than the R&D issues that are being talked down the hall, to
4 identify policy solutions if we have got them. That would even
5 be better than just a big list of barriers.

6 I am going to try to track what I hear. And this
7 may or may not be operative. I have got a lot of paper if it is
8 not. I've got right now a chart that has "Technology, Content,
9 and People" across the top, "K-12," "Post-secondary," the
10 "Government B Team," the "Government A Team," and "Industry"
11 along the bottom.

12 I think DARPA, the Defense Department, and NSA,
13 and guys like that are the A team, with no lack of love or
14 disrespect to our colleagues at Commerce, our ability to get
15 resources and our ability to get other things that may be
16 necessary are often second to those who are defending our
17 homeland or protecting our national security, as they should be.

18 But that leads to when you ask, can government do something,
19 particularly in using technology.

20 There are some folks, like NSA, who can do it,
21 who do do it, and who are phenomenal. And there are folks like
22 Commerce. We are doing our best here.

1 Gary, do you want to offer some opening thoughts,
2 maybe some ideas on how to begin the discussion, but, folks, you
3 feel free to take it where you think best taken to make sure we
4 are identifying government non-policy barriers and policy
5 solutions to them?

6 MR. BACHULA: Sure. Thank you. Let me again
7 just thank Secretary Mehlman for the opportunity to return and
8 revisit my old haunts and to participate in this conference.
9 This is an exciting one.

10 I currently work for an organization called
11 Internet2, which are 200 research universities as well as some
12 corporate partners and some affiliates, including some
13 government laboratories, working in partnership to sort of do
14 advanced internet development. I might get in a few plugs on
15 some of what we are doing as we go.

16 As we all know, the research that is probably
17 being discussed down the hall will probably come back with a lot
18 of good ideas about areas to talk about and a request for money.

19 That is the easy part in many ways. It is the
20 easy part because we know that from research proof of concept or
21 even development of a prototype to the actual sort of
22 commercialization of a product, whether it is a new automotive

1 product, a miracle drug, or an educational technology, there are
2 a lot of steps in between.

3 Those steps involve investors. Those steps
4 involve scalability. In some cases, it's manufacturability.
5 There are regulatory barriers. There are tax issues. There are
6 people and organizational issues.

7 So very often a really great research project
8 doesn't end up affecting every day life because you haven't been
9 able to go through all of those other steps.

10 We are talking in this session about how we get
11 from here to there. We know there is going to be good research
12 going on on both technologies. There is also going to be good
13 research going on on how kids learn and content.

14 The question is, how do you get to this vision?
15 How do you actually translate that? I think it is tough. In
16 education, there have been thousands and thousands of little
17 experiments in which we have learned something in a very small,
18 contained world. It is very, very hard to scale it up to
19 national systemic change, very, very hard to sort of move an
20 idea from an individual project that works even to one that
21 changes all the classrooms.

22 I see in the visions in this document some common

1 things. One is that individuals in this future world are
2 connected to some very sophisticated computing resources and
3 databases. Obviously with some very high bandwidth network
4 pipes and a bunch of wireless kinds of network technologies, all
5 kinds of unique new tools, like tablet PCs and wireless
6 headphones and all kinds of neat tools that speak to their
7 computers, lots of software in between all of that. And there
8 are huge numbers of issues in the technology area, I think,
9 including standardization.

10 These are all made by different people.
11 Different people make the PC tablets, who make the network
12 routers, who make the wireless devices, who write the software
13 for interactive educational media. How do we make sure that
14 they are all going to work together?

15 Secondly, the content. What is it that we are
16 teaching, and where is that content? We heard earlier in the
17 morning about how economies of scale probably say that you want
18 to put a lot of investment into putting some really high-quality
19 content, including maybe some very immersive simulations and so
20 on, and then use that over and over again, use that for millions
21 of students in classrooms. Create it once, use it a million
22 times. That sort of implies a national repository somewhere, a

1 central place.

2 What does that mean in terms of the investment to
3 create it, the ownership of it, copyright kinds of issues,
4 public or protected? What does it mean in terms of the
5 transmission and protection that way, digital rights management?

6 How does that transform the system? What does it mean in terms
7 of state standards? What does it mean in terms of the local
8 rules that govern schools today, the school boards that
9 determine what's the content that my children in this particular
10 area can use? How do we have to change the systems?

11 So that leads me to the third category. We have
12 got, first, technology; then content. Third are the people in
13 the organizations in which all of this gets used.

14 How do you change the culture? How do you change
15 the culture in the classroom, the school board, the state
16 education district, the Department of Education downtown here to
17 accommodate these new visions because these new visions really
18 are, you know, learner-oriented? The walls break down. It's
19 24/7. As much learning takes place at home as in a classroom.

20 You deal perhaps more with knowledge and other
21 students perhaps than you do with a teacher, although a teacher
22 clearly has a role as a guide and a mentor. There are going to

1 be classrooms. So you really have those sort of organizational
2 and management change issues and a lot of questions there.

3 So I think that Bruce talked about the different
4 players in this process, from K-12 to higher ed. to government
5 and industry. I think that we have sort of categories of how do
6 you integrate the technology delivery systems, where do you get
7 the content, and how do you manage that, and then how do you
8 change the people, how do you change the organizational
9 structures in which this has to work.

10 That is about as much as we really would hope to
11 say here because we really want now to hear from all of you.
12 The idea really is what are the barriers and issues that affect
13 these various categories. And then, even better yet, what are
14 the solutions?

15 We would ask that you the first time you speak,
16 at least, identify yourself in terms of name and organization,
17 maybe say a word or two as to why you are here, and then get
18 into your discussions.

19 MODERATOR MEHLMAN: I would amend that only to
20 suggest that since we are having this all transcribed for our
21 colleagues in the other session, as they are having theirs
22 transcribed for us, maybe every time you speak. Unless this guy

1 has an awesome seating chart, which I can't believe he does, if
2 every time folks speak, they could try to emulate my level of
3 volume and repeat who they are, it would be most helpful, I
4 think, for those who follow later.

5 MS. HOUSE: My name is Jenny House. I am with a
6 company called Classroom Connect. One of the primary things
7 that we work with is training teachers online.

8 Gary, one of the things you are working with is
9 Internet2, but the interesting thing is we are wiring all of the
10 schools. And, yet, what we have learned is the teacher training
11 takes place at 10:00 o'clock at night, after their children go
12 to bed or on Saturdays.

13 The access to the content has really been at
14 those times. We aren't thinking of how we get Internet2 to the
15 homes. And that is something that as a government effort is
16 something that we are very concerned about because we really
17 feel, not just the teachers -- you know, I think the same
18 pertains to the students, but this is a big one of how do we get
19 that pipeline available to them?

20 MR. BACHULA: As you know, there is a national
21 debate about broadband delivery right now. I think the White
22 House is going to have a study coming out soon or the PCAS group

1 is going to have one.

2 MODERATOR MEHLMAN: Recommendations.

3 MR. BACHULA: Or some recommendations. I would
4 certainly say that if the federal government had a role in the
5 broadband area anywhere, it would be in delivery of educational
6 material to kids. But if you think about that, you are right.
7 It becomes 24/7. And so it can't just be to a classroom
8 building. It's got to be to their homes.

9 So the federal government perhaps has no
10 particular interest in making sure that Warner Brothers and
11 Disney gets their entertainment material to you. That will
12 happen in its own way and so on. I think in the educational
13 area, there is a role.

14 MODERATOR MEHLMAN: Can I ask a question, a quick
15 follow-up? Do teachers get credit? Does it help teachers get
16 their job done? A question, some teachers I know, with whom I
17 have spoken about this, have raised is, how do we get technology
18 to help them get their jobs done? What they find, one of the
19 reasons they start doing this at 10:00 or 11:00 o'clock is not
20 just that they have their own lives and families, but it's also
21 they've got to grade their papers. They've got to do their
22 lessons plans.

1 And training, let alone training to use
2 technology, is not something that helps them advance their
3 career with respect to tenure, with respect to the school. It
4 is something they want to learn because they believe it is right
5 for their students, but it is not prioritized in their own
6 world, nor is it currently being deployed to help them get their
7 first, second, and third jobs done.

8 Do you have an opinion there?

9 MS. HOUSE: Well, it's interesting because a lot
10 of the infrastructure issues that were raised this morning
11 pertain to the same thing. If they can get to the student
12 records through the privacy issues and if that has all been
13 mitigated, if they can have access to that at night, yet, they
14 can do the grades; they can enter the grades; they could look at
15 the multimedia projects that the children have presented and the
16 papers and work on those; and, again, input, provide feedback to
17 the students online; as well as do all of the district records
18 because the paperwork that teachers have to do is almost
19 insurmountable, especially with a lot of the new legislation and
20 the accountability issues.

21 So it is the infrastructure available to the
22 teachers 24/7. And there get a lot of the issues that you

1 talked about, Gary. The privacy issue has come up, the security
2 issues, et cetera, et cetera. So none of these sit by
3 themselves. And, Bruce, it is very important for teachers to
4 have that after school.

5 MR. BYER: My name is David Byer with Apple. We
6 just had a couple of points on what Jenny was saying. And that
7 is there is also this culture where there are few incentives for
8 teachers via their organizations to go back to continuing
9 education.

10 There is a great interest, but if you compared
11 the business activity to the education sector, as Bill was
12 pointing out, corporations will pay to send their employees back
13 for the training to be as productive to that organization as can
14 be. In education, the expectation is that teacher, that
15 educator will pay for their own continuing professional
16 development. So you also have that.

17 If schools were able to produce greater
18 incentives with alternative learning structures, via online at
19 10:00 o'clock at night, or other ways or in real-time classroom
20 situations. Then you may also begin to address these issues on
21 the best way to do it.

22 MR. BACHULA: Just a quick comment on that

1 because we have made that statement and I fully agree with it
2 for 10 or 15 years now. But think about ten years ago. Almost
3 every teacher in this world now knows how to use e-mail. They
4 probably have some idea of how to use instant messaging. And
5 they have probably done their own Web searches. And they
6 probably have figured out how to use and pull in a document in
7 that way.

8 They didn't learn that through formal training.
9 They learned that because they were immersed in this in every
10 part of their life and because the stuff got easy enough to use
11 for all of us.

12 When it gets easy enough to use for all of us,
13 like I-Photo, you just plug it in, right? I mean, it works.
14 You then don't need a formal training program. If you have to
15 have a training program to use the technology, it is going to be
16 forever.

17 MR. BYER: It's not that type of a training
18 program. It is more the applicability of the stuff that is
19 coming over the transient. How to make I-Photo is something
20 that is educational. What was most compelling this morning when
21 we watched the video with that movie, the video presentation,
22 that John provided, the charts that were also provided as part

1 of the DARWARS, things that help make learning in life different
2 from learning experiences.

3 We know that that stuff is out there because
4 technology now is there and can deliver different modalities of
5 learning. The question becomes, how do we figure out what is
6 most advantageous technologically that is going to help increase
7 test scores or productivity in the corporate sector and then get
8 on top of those and then figure out the requisite training
9 without this expectation you've got to do it on your own, you've
10 got to go figure it out on your own.

11 So coming back to the governmental role and the
12 institutional roles, what would be the appropriate way to feed
13 the ability for us to get on top of understanding
14 technologically these technologies.

15 MS. SCHULL: My name is Diantha Schull. I'm
16 President of Libraries for the Future.

17 This conversation reminds me of a conference that
18 we ran at the Wiggs-Barrett Center two years ago, the name of
19 which was How New Technologies are Transforming Children's
20 Library Services. At the end of it, our primary recommendation
21 was that the conference should have been how librarians can
22 inform the development of new technologies.

1 Listening this morning as well, there seems to be
2 this profound need to have a better pipeline between
3 practitioners and the developers of new technologies or
4 technologies at any level, whether the practitioners be
5 librarians, community technology centers, teachers of all sorts,
6 as well as parents and children.

7 I just read on the was in the morning on the red
8 eye from Arizona quite an interesting report from Canada that
9 talks about teenagers and their perceptions of technologies in
10 schools. It was totally negative. They're quite cynical about
11 the lack of infrastructure; the lack of interesting core
12 available content; and, above all, the lack of the competency of
13 their teachers. So I think that remains for children as well.

14 MODERATOR MEHLMAN: Will that last be a permanent
15 barrier? I mean, I was the guy who programmed the VCR for my
16 parents, and I expect my kids will do the wireless security at
17 my house. Are teachers always going to be behind the curve.

18 MS. SCHULL: It's a matter of will. The British
19 government decided to do a major install base to librarians.
20 They may even have to do this on the national curve for learning
21 to teachers.

22 They looked at this as essentially a military

1 effort. They looked at least at retraining postal workers and
2 lottery workers. That's what this has to do to deal with that
3 as well as the profound change to education in schools and
4 librarianships and for putting those together in an
5 interdisciplinary umbrella that happens to understand brain
6 development. A whole different interdisciplinary approach has
7 to be developed between the community and educators.

8 MS. MALYN-SMITH: I would like to follow up on
9 that. Joyce Malyn-Smith from EDC in Newton, Massachusetts.

10 I think that there is some action that we can
11 take right now in even thinking through this issue, and that is
12 to talk about what is that window, what is that implementation
13 window, that we are aiming at and think carefully about who will
14 be the players in that window.

15 We can't look at the static picture of what
16 education is today, who are the teachers, who are the
17 administrators because when these technologies come on board,
18 for example, if we are aiming at 2020, we will have a new list
19 of characters that will have new skills, interests, and
20 abilities.

21 For example, it is our 15-year-olds today, those
22 same cynical people. My son, by the way, said the same thing.

1 He is 17 and a power user of technology. When he read through
2 this, he said, "This will never happen because they don't have
3 people like us helping to make it happen our age with that frame
4 of mind. And there is not enough money being put into schools
5 to do this. So it's a good idea, but the reality is tenuous."
6 So I began looking at it.

7 But the thing is the 15 and 17-year-olds who will
8 be the veteran teachers in 2020, the ones who are 15 and 17 now.

9 It will be our seventh graders now who will most likely become
10 the community college instructors who will be training the
11 technicians to maintain the programs, which is to maintain the
12 infrastructure, which is another real weakness.

13 In schools, the infrastructure can be there, but
14 keeping it working is a real challenge. It will be our current
15 second and third graders who are the new teachers in 2020. And
16 it will be our second and third graders who will probably be our
17 new technicians maintaining the system.

18 So the question is, what changes are we making
19 now in our systems to make sure that these people have the
20 skills and knowledge and abilities to make that happen? We
21 can't focus only on what is in place now. So many of our
22 educators are at a age where they are retiring.

1 MS. CAMPBELL: I'm Laura Campbell, and I am with
2 the Library of Congress.

3 For, oh, more than a decade, we have been trying
4 to build a digital library. The library is the world's largest
5 repository of knowledge and information. So we sort of thought
6 it was our responsibilities to put some of the science online
7 given the enabling technology.

8 Through that process over the last several years,
9 we put millions of items online. We intended this high-quality
10 educational content to be geared towards the K-12 program. In
11 the end, it turns out that is much more lifelong learners as
12 well.

13 In order to get teachers to use this material, we
14 have had to mount a lot of byline help for access to the
15 content, how to navigate through it. As several of you
16 mentioned, teachers don't have a lot of time.

17 So I think that you can't just expect that
18 training teachers is going to be easy without access to
19 high-quality content and vice versa. Of course, I come at the
20 issues and barriers from the content side. That's where I live.

21 I think one of the great issues is a broad vision
22 for access to high-quality content, for the integration of

1 content, for policy issues that address how are we going to deal
2 with rights-protected access.

3 Maybe we need to think about, as you mentioned,
4 the national repository of content. Maybe it's a national
5 utility that addresses such things as copyright clearance
6 supports access to an integrated body of content that will in 20
7 years be alongside those teachers that are now in third and
8 fourth grade.

9 MR. GROSSMAN: Larry Grossman from the Digital
10 Promise Project, which is a project sponsored by a number of
11 major foundations to develop the public interest and public
12 service uses of these new technologies. We have found them
13 certainly as being reinforced here.

14 What you have so effectively done is a
15 recognition of the need for some major vision, for a major
16 initiative to deal with the problems, not just for K-12 and via
17 learning but worker training, all of the things that have been
18 mentioned.

19 We have an opportunity now to really think big.
20 I would love to see coming out of this a recommendation that the
21 administration, that this federal government adopt as a major
22 priority to do for education what the National Science

1 Foundation is doing for science, what DARPA is doing for the
2 military, what NIH is doing for health.

3 We spend \$800 billion on education in this
4 country, and we spend practically very little, pitifully little,
5 on research and learning, on teaching, on training as well, on
6 the content development and the opportunity to use these new
7 technologies for such a national repository.

8 I think we need a major initiative here on the
9 level of the GI bill of the Twentieth Century and the Land Grant
10 Colleges Act in the Nineteenth Century and the development of
11 public education through the Northwest Ordinance in the century
12 before that for the Twenty-First Century.

13 It would be good if we could start thinking in
14 much bigger terms to deal with all of these issues that have
15 been developed with seed money to do the research and modeling
16 that everybody has been calling for here.

17 MR. BACHULA: Larry, your proposal I remember, I
18 think, involves also using the proceeds from the sale of
19 Spectrum. Isn't that correct?

20 MR. GROSSMAN: That's right.

21 MR. BACHULA: Department of Commerce has
22 something to do with Spectrum here, right?

1 MR. GROSSMAN: The precedent has been the public
2 spectrum is the counterpart to the public land that was used to
3 support education in the previous century. But, regardless,
4 when I get at where the funds come from, that's inappropriate.
5 The point is to take all of these issues and approach them from
6 kind of a large perspective and a visionary perspective, as you
7 have heard, and make it part of the national priorities.

8 MR. KRUEGER: This is Keith Krueger from the
9 Consortium for School Networking.

10 Actually, I want to sort of follow up on what
11 Larry was just saying. I think that from a policy perspective,
12 the most important thing is in terms of sort of doing a quantum
13 leap in terms of the amount that we are putting in research and
14 development.

15 The fact is we had lots of reports, PCAST, PITAC,
16 CEO forum, Web-based commission, all of which have pointed out
17 the fact that we are woefully under-funding our R&D agenda.

18 It seems to me if you look at what happens with
19 the area of NIH, for 20 years, there were incremental increases
20 in NIH. What happened was the schools of education and medical
21 societies and the pharmaceutical industry got together on a very
22 clear agenda, which was over five years to double NIH. They

1 already had large billion-dollar budgets.

2 We are not anywhere on that spectrum. We need I
3 think to have not only a general goal of increasing R&D but
4 specific tangible yearly significant increases. And also we
5 need to look at how that information disseminates to
6 practitioners because right now the vast majority of what is
7 done is not connected. It's irrelevant. And it never reaches
8 the folks who make decisions at K-12.

9 MR. WILSON: I'm John Wilson with the National
10 Education Association.

11 There is a lot to be said about how we treat
12 professional development within the teaching ranks. We are
13 advocating policies, I think a policy of advocating more time.

14 Most of the teachers get around this sort of
15 thing. So there really is very little time built in to do
16 professional development. I think that the days when teaching
17 is a part-time employment should be over and that we need it to
18 be an 11-month or 12-month full-time job, so to speak, because
19 for every amount of time we spent on quality professional
20 development, we improve student achievement, and in the area of
21 technology even more so.

22 I think there are very few states left, if any,

1 -- there may be some just teachers within some states -- who
2 aren't required to renew their license.

3 One of the trends that we are seeing is that some
4 states are requiring a percentage of that renewal to be in the
5 area of technology. Carolina is a good example of that.

6 Quite frankly, we don't oppose that. We know
7 that technology and education work hand in hand. The more we
8 use technology, the more we can move in the areas to achieve it.

9 We are very supportive of doing that. But I think that is at
10 least one area. That is a policy to advocate to do that.

11 And then I will have to say we are so inefficient
12 in business applications in public schools. Having said that,
13 if we can show we can save money, -- sometimes time is money --
14 then maybe, I guess, to accelerate the way we do business
15 applications -- so much of a teacher's time is taken away from
16 instruction. That, too, causes lack of student achievement,
17 just the amount of time that teachers have to spend on other
18 things. I think the business community in the area of
19 technology could be so much more helpful than that.

20 The last thing I will say is funding. We never
21 dedicate. The funding of education, quite frankly, to do what
22 everyone wants us to do is not enough and the demands that are

1 not now funding these. But we also never say that, you know,
2 like Missouri said, a percentage of your money has to be spent
3 on professional development. I thought that was good policy
4 because it highlighted it. And maybe we should have a policy
5 that says a percentage of your education funding should be spent
6 in technology.

7 MODERATOR MEHLMAN: If I could ask you one
8 follow-up? Do you think NEA and other teacher organizations
9 would be supportive of adding into the decision-making for which
10 teachers get promoted and which teachers get paid more,
11 something that reflects some of this work done in using and
12 bettering understanding of technology? You want folks on time
13 so that if I am a teacher, I am more likely to get a higher
14 salary or promoted faster because of the work that I have done
15 on my own on technology.

16 MR. WILSON: I think that in a compensation plan,
17 once you have reached a phase-out that reflects the profession
18 of teaching, then you have an opportunity to differentiate with
19 paying for skills and knowledge.

20 I think that technology skills could be rewarded.
21 The problem with compensation in public schools is that there
22 are very few places where the base salary but there are some

1 places where the base salary is pretty good. And so our goal is
2 to raise the base salary, then to start differentiating based on
3 skills and knowledge.

4 MR. COOPER: I'm Trey Cooper from the Boeing
5 Company in St. Louis. I work in the training systems and
6 services organization. My responsibility is grading the course
7 where we used to train the folks who use our products and also
8 some of the internal training that we use.

9 I will kind of shift gears a little bit. Beyond
10 having kids and grandkids currently in the public school system,
11 that is my involvement with folks.

12 From a corporate standpoint, one of the hard
13 lessons that we have learned over the years in dealing with
14 multimedia education -- and I will call it multimedia education
15 because ten years ago, 15 years ago, we would create what was
16 then and now has become kind of a euphemism called CBT. And it
17 was black screen, green letters, sit at a terminal, turn a page,
18 and you might have some stick figures. A lot of the training we
19 got for the airplanes, both on maintenance and the operator side
20 came in that form.

21 The information today is still valuable
22 information. However, the technology has changed such that that

1 training is not now useable on modern PCs and it's not what our
2 customers expect to see. So in many classrooms, we have Pentium
3 IV devices sitting here on the screen on the students' desks,
4 and we have an old Wycat sitting with a screen on the student's
5 desk. In order for them to get the full spectrum of training,
6 they are going back and forth between the two.

7 So I guess, setting that as a stage, one of the
8 things we need to be, I think, mindful of is that what we do
9 today, technology is going to change so drastically in the next
10 ten years or 15 years we have to be concerned about legacy, of
11 course, the legacy aspects of what we do.

12 And so from a policy standpoint, if we could
13 influence the policy-makers to work with the suppliers of
14 products that we use to create that training to ensure that it
15 has a life span beyond two or three years so that it will play,
16 what I do today will play, in five years because the data will
17 still be good in many cases.

18 In that regard, I think there are a couple of
19 industry organizations out there that have done some remarkable
20 work in that area. The one that I think is outstanding right
21 now is the Advanced Distributed Learning CoLab, one located here
22 in Washington, one at the University of Wisconsin, and one at

1 Orlando. Those guys are doing dynamite work in terms of
2 developing the definitions and sequencing a lot of these learner
3 models and that type of thing.

4 The aviation industry's computer-based training
5 committee, the relay multimedia training committee, IMS have all
6 been and are currently doing an awful lot of in-depth work in
7 terms of looking at design issues and how the instructional
8 design process needs to be rethought a little bit, including
9 into a Web-based training aspect and all of those things. There
10 is a lot of good data out there that I think a lot of people
11 just aren't aware of. We are aware of it because we deal with
12 it daily and sit on the committees.

13 MS. MURPHY: Anne Murphy.

14 I want to go back to your original question,
15 which is to set up what the barriers are and what the solutions
16 might be. I think in listening to a number of the talks this
17 morning, there is a commonality going through them that I think
18 stated what they are.

19 One, you have just mentioned strategic alliances.
20 Probably there are initiatives going on in various government
21 components now from Department of Commerce to OE to NSF that
22 aren't as interrelated as they might be.

1 There are initiatives at IMOS they are working to
2 established. There is some sort of bargaining at the federal
3 level, which all needs to be integrated with what is going on in
4 industry and also needs to be integrated with the user.

5 So when you talk about strategic alliances, you
6 are talking about inter and intra-government, inter and
7 intra-industry, inter and intra-users. But that is the number
8 one thing that came up.

9 The other thing that came up today was
10 interaction policies and how they all fit. So you may have
11 copyright policies that need to be looked at. You have privacy
12 issues that need to be looked at, security issues that need to
13 be looked at.

14 And then another issue that came up was standards
15 and the open network that was going on with the standards work,
16 platforms to different things that were being developed.
17 Someone needs to be looking at that from each of the directives.

18 Training and teacher implementation was another
19 big issue that has been certainly addressed that we talk about
20 here. National archives with materials was another big thing
21 that came up. How do you do that on a national level? How do
22 you interact with standards?

1 Then we talked about the equipment and the
2 integration of that, that integration and the content that is
3 into the national archive, and, again, the people.

4 So those seems to be the continuing barriers.
5 The one solution that came up this morning, which several people
6 mentioned, was a well-funded national initiative that might have
7 those tasks, those integrating tasks, as part of what they need
8 to do.

9 MR. DODDS: I'm Phil Dodds, the chief architect
10 for the DOD's ADL initiative. Thank you for being so kind. I
11 will parenthetically saying Boeing has been terrific in
12 supporting these efforts.

13 We have worked for the last four or five years
14 with other organizations, trying to work out the technical
15 standards thing and to get over the hump.

16 I think we are really approaching the plateau.
17 We are not there, but we are really close. We are almost done.

18 I need to take a moment. Building onto what you said, I have a
19 new hobbyhorse.

20 I have been dabbling in this field for about 25
21 years or so. I remember the Wycat systems and the green screen
22 CBTs. I have watched exactly the phenomenon you have talked

1 about, how content is developed. Stuff that is good is
2 developed and then goes obsolete. That is why I spent the last
3 five years working on the standards in the internet space.

4 Well, I am beginning to get a little bit of hope
5 that in the internet space, stuff does seem to have a life and
6 could work, but now what we are staring at is some of the same
7 problems we ran into in the CD-ROM days and multimedia days. I
8 also ran the Interactive Multimedia Association.

9 So I was always puzzled. Why do we have to keep
10 re-creating really effective good content? Well, it used to be,
11 well, it is because technology evolves and you've got to rewrite
12 it and re-create it for the new platform. And, by the way, you
13 have to do that every 18 months.

14 How on earth are you going to build a library
15 when every few months your content will no longer work? Well,
16 as I say, I am beginning to think that that problem may be
17 within the reach of being sold.

18 The thing that hasn't been attacked is the
19 development of really good, really engaging techniques for
20 building content that is known to be educationally effective.
21 This technology change has masked an art of building really
22 effective content. It has also masked the ability to go find it

1 and run.

2 We've got to quit talking about, well, we are
3 just going to use technology. We've got to quit talking about,
4 well, content has a static chunk of stuff that you just look at.

5 We have already heard that page-turning really isn't very
6 interesting. We have to know how to build engaging content.

7 So I think, as a matter of policy, there ought to
8 be a very sharp focus on the content side of the equation, not
9 the technology and wires and uses itself, number one.

10 Number two, as a matter of policy, we should go
11 develop in multiple disciplines and areas really good exemplars
12 and get them widely available so people can really get excited
13 and see what the potential is. Otherwise we are going to stay
14 on this silly treadmill that has been going on for 25 years
15 building more shovel-ware that, oh, God, it is really boring.

16 I have seen within DOD, within the multimedia
17 industry examples of really high-quality work. The research has
18 been discussed on intelligent tutoring and on advanced adaptive
19 processes to learning. Show the stuff can work. But, instead,
20 we keep talking about it and say, golly, gee, it's not the
21 content.

22 MODERATOR MEHLMAN: Back row.

1 MR. ETTLIE: John Ettlief. I'm the research
2 professor and director of the technology management center at
3 Rochester Institute of Technology.

4 Going back to the private sector, we are in the
5 midst of a study right now of use of the internet in
6 collaborative engineering in companies that are in the midst of
7 trying to reinvent the new product development process.

8 We just collected our first round of data. I had
9 some of my research assistants run some frequencies before I
10 came down. One of the questions that we asked in this first
11 round, in the auto industry, we got 62 responses back from the
12 auto industry. And they are primarily companies for the leading
13 edge of these technologies, which haven't stabilized yet.

14 We asked them the kinds of challenges and
15 barriers that they are encountering in trying to proffer these
16 new technologies into their new product development process.
17 Well, training and retraining are tied for sixth as an issue.

18 I think we are a long way away from having
19 informed policy decisions without a clear understanding of what
20 the context is, at least the private sector, of how companies
21 are dealing with these abstract remedies.

22 And the private sector does also spend billions

1 and billions and billions of dollars on hardware and software.
2 I would rather not be quoted on this, but our rough estimate is
3 that about 25 percent of that investment goes into the toilet.

4 MODERATOR MEHLMAN: Can I ask you a question
5 directly about that?

6 MR. ETTLIE: Research is still needed to
7 understand this process.

8 Sure. Go ahead.

9 MODERATOR MEHLMAN: A question I have that I
10 think is really important that you seem to be going right at is,
11 are there measures for the impacts of these technologies
12 anywhere? I mean, education, I'm fairly confident there are
13 not. It may have been you who used the phrase, great phrase,
14 "quantifying the cost of ignorance."

15 It seems that if we can identify, if it were
16 safety training, once we started Web-based or high tech-based
17 training, if that reduced the incidences of wash, you can
18 quantify dollar-wise those.

19 MR. ETTLIE: Yes. We have some of those
20 measures. And we are working with other people networking with
21 other people. Just in the auto industry alone, for example, the
22 automotive industry action group and, in general, product

1 development management association both have in process
2 benchmarking studies on exactly this issue.

3 It turns out that what most people at the
4 directorate level at companies are interested in, especially in
5 the first year, is not the ultimate outcomes. We all know what
6 we are trying to do. We are trying to avoid these huge warranty
7 costs of recalls, billions of dollars in safety issues.

8 What they are interested in is the metrics that
9 predict these outcomes before you get there. They're the in
10 process things. That's one of the issues that we are focusing
11 on in this project.

12 I am saying it is very complex. I am saying we
13 are in a free policy mode when it comes to this. I would not
14 leave any great policy conclusions from the kinds of things we
15 know we don't understand.

16 MR. WIGGENHORN: Bill Wiggenghorn from Cigna, but
17 in my previous life, I worked with engineers.

18 I would like to go back to your data. If it is
19 only a 25 percent throw-away, that is terrific. We looked at
20 the same thing in the '80s. When we didn't invest in education
21 of a person with the new tool, which always got funded, they
22 only used 20 percent of the features. So it was an 80 percent

1 throw-away. So the cost of ignorance was very high.

2 When we looked at software engineers, in
3 particular, those are the university throw them into a job,
4 1,200 lines of code; if you educated them, 3,500 lines of code;
5 if you used the state-of-the-art knowledge reuse system, 8,000
6 lines of code. At 8,000, you don't have to move everything
7 because the cost to the employee is not a big issue. But you
8 have to shift your investment.

9 So I guess as a policy, if we could have a policy
10 that gives us education credits, as we get R&D credits, that
11 would be very helpful because if I can get credits to buy a
12 piece of equipment, I don't get any credit to train them. So we
13 don't train them, number one.

14 Two is to look at the interaction of policies and
15 see, are they really moving us forward or backward. Part of
16 that is on your graph, Bruce, K-12 through continuing education,
17 making it easier for those of us in different components to
18 figure out how to work together. That's easy to say and hard to
19 do.

20 The third one, however, I think when you talk
21 about R&D is to figure out R&D all the way through the
22 implementation. We used to run camps, online camps, for

1 children, study patterns, et cetera. We did a lot of other
2 things with different groups.

3 One of the things that became very clear was that
4 when you worked with teachers, they had a dollar a year of
5 variable expense money. This was the physics instructors. It's
6 a dollar now. We are not geniuses. We know how to sell
7 something at a dollar and make money.

8 We had the use of technology between rural
9 schools and urban schools down to 50 cents a day, and it was not
10 affordable. So I guess before we fund more R&D to do all of
11 these wondrous things is to take it all the way through until I
12 reach the back person, whether it be the kindergarten student,
13 the industrialist, et cetera. That to me is just very important
14 because that is where it seems to fall apart.

15 It is kind of like figuring out how to teach
16 engineers to develop products for the second world, not third,
17 second world, and make money.

18 I always contend it's all right except for the
19 world we own, how do you assign bill props for the wealthiest,
20 just not the poor, and make money.

21 Our experience in trying to get this technology
22 transferred is the poor. The statistic used today was 4,000 or

1 so and for continuing education. That is true for engineers and
2 software.

3 Nurses, \$200, 200, fully loaded. Now, I think
4 they are probably more important than some of this software.
5 You think about it when you get the call, 200 bucks.

6 How do you get it down to 200 for 20 CE,
7 continuing education, units? So per hour, that's really got to
8 be cheap. That's what I was trying to draw the point this
9 morning. It's \$10 versus \$1,150. But the people have the money
10 per capita.

11 So to me, from an R&D, it's to push it down to
12 you get it to ten because if it is still 1,100, a certain part
13 of the population gets it, but a lot of them can't. And that's
14 where over the last 30 years we're trying to drive this. We
15 just found it difficult.

16 The last one is this cooperation between those
17 who have and those who don't. You get an industry. We have a
18 lot of resources. They're only used so many hours a day. We
19 tried for years to say, "Why don't we just turn them over in the
20 evening to the local school districts?" except they don't need
21 new computer labs. They can use ours.

22 But then you look in policies and regulatory

1 affairs and God forbid whatever else that you don't. And you
2 lock them up. You don't have it for your community asset. You
3 lock it from the community because you can be sued. So then you
4 raise taxes to buy the same thing, which is going to be used
5 eight hours a day next door.

6 So part of it is just figuring out some of these
7 things that, regrettably, are just built on trust, rather than
8 legislation.

9 MODERATOR MEHLMAN: Would you say that last point
10 goes to people, too? In other words, there are some really
11 smart, engaging folks in the corporate and industry, especially
12 the high tech sector, who would be great at helping to teach
13 technology. Are they able to bring their energy and expertise
14 into the student environment?

15 MR. WIGGENHORN: Yes. We tried that, too, in
16 some areas. It depends on union and all of that. My favorite
17 example is a guy with two Ph.D.'s who retired and funding to
18 teach chemistry. All of the courses he had to take to learn how
19 to be a teacher had been dead. And, yet, the person teaching it
20 had no degree in chemistry but had been certified. I know those
21 things are starting to change, but the end part of it is taking
22 that resource.

1 The other thing is that the greatest users of
2 technology I think are those like under 20 and now becoming over
3 age 60. And the thing that they have is time. A 60-year-old
4 has the money to fund the 15-year-old, and the 15-year-old has
5 the knowledge to counsel the 60-year-old. Really, it's only the
6 poor people still working who have no time.

7 (Laughter.)

8 MR. WIGGENHORN: And so you begin to think of who
9 you would bring back to the workforce. You would bring back the
10 60-year-old because they are now actually technically more
11 competent than some of the people who are there who are now
12 funding for their education. Two, they have maturity. Three,
13 they can think. I mean, there is a whole series. So, as I age,
14 I think, "Gosh, I'm just going to hit my prime. This is going
15 to be terrific." But there is this change.

16 Now, from a design point of view, technology has
17 to be for the kid who can see little bits but for the
18 six-year-old who needs it about this size. Yet, there is a lot
19 of commonality there.

20 So, again, I think from R&D, it is to look at the
21 total asset bases as people, figure out how to tap into it. We
22 are using what we are announcing, adjunct faculty. We go into

1 the community. We find people who have certain knowledge. We
2 teach them to teach. We turn our employees over to them. We
3 are now teaching them to use technology to facilitate the
4 learning process.

5 You can be sitting in Pensacola, but you can be
6 teaching our students all over the United States. And you have
7 no specific knowledge of our industry, but you can teach them to
8 use that technology.

9 So what we do is look for people who were
10 laid-off in downsizing, who are very competent, and re-tool.
11 Again, I think you can do that across the spectrum.

12 MODERATOR MEHLMAN: Let me make a quick
13 administrative announcement. Lunch is out there. What has been
14 recommended by Carol Ann, whom you do not disagree with, is that
15 we keep the discussion going. People who are interested in
16 grabbing food roll. And maybe add a little bit of clarity, we
17 will try to call on one person ahead.

18 So how about you go next and you go second? And
19 if somebody really wants to be called on but also is starting to
20 get really hungry, you're not going to be the next or the
21 on-deck person. So maybe it is a good time to grab food. We
22 have one gentleman smart enough to have already grabbed food.

1 Is it good?

2 PARTICIPANT: It's good.

3 MODERATOR MEHLMAN: Good. So we have an
4 endorsement, no less.

5 MS. McCAIN: Thanks. I am Mary McCain. I am
6 part of a technology policy consultant group called Tech Ridge
7 21 and also do work with other organizations, including Cigna,
8 in the interest of full disclosure.

9 I would like to extend some of what Bill and
10 others have been saying recently. I have been doing in this
11 arena for about 40 years starting something called information
12 on technology in adult learning, which is focused on
13 work-related learning that I direct. I imagine a lot of people
14 in this room are a part of that.

15 Since then, I have been continuing in this area
16 looking at technology in learning to low-skilled adults,
17 technology in learning in K-12 and post-secondary and continuing
18 and employees.

19 I say all of that because what always strikes me
20 and happened here today is you read about and you learn about
21 and you see demonstrated these really remarkable kinds of not
22 just technologies themselves but environments in which different

1 kinds of technologies are used, so-called immersive kinds of
2 things that one of the speakers this morning said.

3 All of that comes crashing in to all of the
4 systems we have. I have been doing public policy now for about
5 15 years, and I think public policy is great. So I am all
6 supporting all of the policies that we have been promoting for
7 years. I think we should continue to provide them.

8 We need more funding for K-12, for
9 post-secondary, for incumbent worker training, for low-skilled
10 adults. Yes, we do. We need teacher training. We need all of
11 that. But I would like to put in a plea that connects somewhat
12 to what Bill is saying about R&D at the implementation phase,
13 that we don't just look towards how we support doing this in the
14 institutions that we have now because a lot of the kinds of
15 technologies that we see let people learn in environments that
16 are not attached necessarily to the institutions that exist
17 today.

18 We almost never focus on doing R&D and to what
19 those kinds of environments might be. Yet, federal agencies and
20 state departments and other groups fund a lot of pilot projects
21 that do that.

22 One, they disappear. They're not collected

1 anywhere. And, two, they don't get into the policy thing
2 because they are not part of the institutional matrix. They
3 don't have lobbyists. They don't have like me and others. They
4 don't have that.

5 And I just would like to put in a plea to add
6 that to the policy recommendation that the R&D be extended to
7 looking at the kinds of environments that people -- they learn
8 at home. They learn in libraries. They learn in the shopping
9 mall. They learn on their instant messaging.

10 MODERATOR MEHLMAN: Great. Thank you. You and
11 then you.

12 MS. MADDOCKS: Hi, I'm Peg Maddocks from Cisco
13 Systems in the internet learning solutions group. We are
14 responsible for providing content for our customers for a
15 certification course. We are a very conditional ILT but also
16 solving the learning problems for Cisco.

17 What we have learned is there is sort of a
18 missing piece that I am not hearing here. I actually have ten
19 years of experience in public education as well. So I kind of
20 see a bridge. There is a system of technology, and then there
21 is the content that we talked about. They have to be glued
22 together.

1 At Cisco, we have a brilliant guy. He is an
2 architect. He knows IT, and he knows learning structures. One
3 of the things we are struggling with right now -- and I know
4 folks who have the same problem -- is the structure of the
5 content. Phil and Trey kind of alluded to it, but I want to
6 amplify it because you have to kind of stop.

7 If you really want to leverage content across
8 different venues and audiences, you have to identify pedagogical
9 structures that the learner will experience. It is not going to
10 be all random. Then you have to identify standards for the
11 content and the meditative framework and all of the other stuff
12 that goes in between that. I as a training person did not know
13 anything about all of this and have been educated about it.

14 What we had to do at Cisco was stop and identify
15 a couple of learning models that we wanted to put to experience.

16 We had the Clarkson model. We had a lot of arguments about it,
17 whether it was the right thing or not, but we did it and then we
18 applied it.

19 I think another thing we heard several times this
20 morning was carrying the solution all the way through. So you
21 understand all the problems with implementing this. If you do
22 that, you will back up with all the variety of exciting things

1 we read about in the *2020 Visions*. There are a lot of exciting
2 things in there. You have to start kind of simple and create a
3 few solutions in that system or we are never going to implement
4 it.

5 I have had an education 25 years, too, and I have
6 seen this system in 1973. I don't know if anybody remembers
7 that. Nothing ever gets implemented because the standards
8 aren't there to create the context. You have to think about the
9 context side.

10 The other I think exciting thing about being here
11 today that is kind of in the forefront of my mind is for years
12 we talked about adult learning being different from teaching
13 kids. Schools always are about giving our knowledge and
14 information, not necessarily related to jobs, not to tasks.

15 But now I think with problem-solving training,
16 the approach you heard this morning, I think we actually can
17 create learning structures and experiences that are both good
18 for adults and for kids.

19 I have a 13-year-old who is on the Web a lot. He
20 has learned a lot of exciting ways to learn through his games
21 that are not what he does in school, but school education could
22 be like that.

1 MODERATOR MEHLMAN: A quick follow-up on one of
2 your points. Then I promised you would go next. With respect
3 to the standards and inter-operability questions, is there any
4 reason why education content creates different or more complex
5 standards problems than all of the other digital content, which
6 are already creating massive challenges for those who try to
7 create inter-operability in standards?

8 MS. MADDOCKS: No, not necessarily, if we can
9 stick to some, as I said, pedagogical models. So how are we
10 going to deliver this content? I think that is what hasn't been
11 agreed to. Starting with that with the sequencing, it is very
12 exciting. There are lots of theories of structural design out
13 there. We just have to pick something and go with it.

14 MODERATOR MEHLMAN: Right. You next and then on
15 the back row.

16 MR. BOHANNON: On the Stevens issue, education
17 has done something. Actually, there are some unique issues.

18 MODERATOR MEHLMAN: This is Mark Bohannon.

19 MR. BOHANNON: I am Mark Bohannon with the
20 Software and Information Industry Association.

21 Every sector has its own aspect of standards.
22 And I think there are two big ones in education. The reason why

1 I say this is that we have a very large standard in education
2 program called the school framework project, whose goal is to
3 make sure that there are across different platforms because we
4 do not assume one platform for delivery of content to schools.

5 How do you come up with industry consensus about
6 what the unique elements are, including identifiers, elements of
7 security, elements of education, so that educators in school
8 systems can know the content they are getting relied on?

9 It's been a multi-year process. It has involved
10 a diverse set of players in the industry. It is on our Web
11 site. We will now begin certifying, actually, the end of this
12 year some of the initial efforts to do this.

13 We think there are some unique issues because of
14 the complexity of the market. And it does require I think
15 industry-led but government as a partner in thinking through
16 some of these issues so that there is competence both at the
17 industry level, the buyer level, and ultimately the teacher and
18 consumer level, but there is more information about all of that.

19 MODERATOR MEHLMAN: Sir?

20 MR. CHERRY: I'm Schroeder Cherry, deputy
21 director for museums at Institute of Museum and Library
22 Services.

1 What I would like to see is the presence of those
2 organizations that fall outside of the school system that are
3 still engaged with education. Museums specifically are
4 institutions that consider themselves treasure houses of the
5 nation's treasures, but they are just chipping away at
6 technology.

7 There are barriers for museums. That includes
8 training, but it also includes economics. Those museums that
9 can afford to get engaged in technology right now are primarily
10 using technology for Web sites. And they're finding that they
11 are very engaged in terms of reaching larger populations that
12 can't come to their physical sites.

13 So in this policy, I would just like to make a
14 plea for the inclusion of other types of organizations that are
15 engaged with education.

16 MODERATOR MEHLMAN: Virtual field trips.

17 MR. CHERRY: Installation of collections, living
18 and nonliving collections.

19 MS. MOONEY: I would like to go back to what I
20 think Larry Grossman said about his recommendation that we set
21 up some separate organization, all of the NIH, to deal with this
22 issue.

1 The reason that is, the time is now. I disagree
2 with my colleague here. The time is now. It needs to be
3 separate because we see the technology as coming like a freight
4 train. And it will continue to come, whether there is
5 commercial interest.

6 The educational institutions do change this. It
7 is not an accident or an anomaly that they are totally
8 resistant. Anyone who works in the university, there is no
9 mechanism for adaption in universities. Everything that is
10 supposed to be there is going to be there.

11 The one thing on the research side, in covering
12 education on the research side, there has been some good
13 research in managing radical innovation. We don't know a lot
14 about it, but we know a little bit about it.

15 I would say this institution should start off
16 with the idea that this is not incremental improvement. This is
17 radical innovation. What is required for radical innovation is
18 quite different than what is required for incremental
19 improvement.

20 I think the incremental improvement should
21 proceed, but the challenge is radical innovation, which you have
22 to have champions. You have to have cross-disciplinary people,

1 which universities and schools cannot do at all.

2 So that notion of taking research that we have in
3 radical innovation and applying it to how are we going to get
4 these atrophied institutions right down to the local school
5 board and all the way up to the top universities to implement
6 these technologies in productive ways, rather than simply add on
7 to organizations, to what they have been doing all along so
8 nothing gets disrupted.

9 I didn't quite catch your name over here who said
10 you will need new structures to do this. I think you will have
11 to recognize the possibility that you will have to bypass
12 existing structures and come up with new structures as one
13 possibility.

14 MR. ETTLIE: Marta, identify yourself before you
15 leave here.

16 MS. MOONEY: Oh, I'm sorry. Marta Mooney with
17 Fordham University.

18 MODERATOR MEHLMAN: I want to go to you and you,
19 although a man with food on his lap who is vehemently waving his
20 hand has to have an immediately responsive point, I assume.

21 MR. COOPER: Just in response, I think it's a
22 matter of --

1 MODERATOR MEHLMAN: You are from Boeing again?

2 MR. COOPER: Boeing, right. I think it is a
3 matter of not always sharing what technology is out there and
4 available. For example, in the government, does DOD share with
5 the Department of Education what is being done at the Air Force
6 research lab in the area of imbedded simulation? I think it is
7 not just getting the technology there but helping people
8 understand what technology has been developed so that it can be
9 shared.

10 MR. MACEDONIA: Michael Macedonia. I'll speak
11 for my constituency, the U.S. Army. We spend a billion dollars
12 a year on simulation training devices. Add on top of that
13 distance learning.

14 And then we train 80,000 people a year that come
15 into the Army, 18-year-olds out of high school. So we compete
16 with colleges and all that sort of stuff, key university online.
17 We do all this sort of stuff.

18 And we're getting in the K-12 business. We
19 actually have a program called the Cyber Mission, which will get
20 unrolled here very soon because we have a concern about the fact
21 that we need soldiers who have an interest in science and math.

22 Most people look at the movies and say, "Soldiers, all they

1 care and worry about is carrying rifles and things like that,"
2 but now they carry a bunch of computers.

3 I think from a policy standpoint, you have to be
4 asking yourself, "What is the urgency?" Frankly, from our
5 standpoint, it has always been urgent. The need for education
6 and training has always been urgent.

7 As Ralph pointed out, we have proved it over and
8 over again. It is better to train people in simulators or in
9 the classroom than it is to train in blood. That's the choice.

10 Train for blood. The first wave gets killed, and the guys have
11 learned to do better. Essentially it is we're not into this
12 sort of dual winning. We don't want to go through that dual
13 winning process ever again.

14 The fact is from the standpoint of a national
15 policy, I would say the urgency would be on the national defense
16 side and homeland defense, just like, for example, we have a
17 national highway system today because Dwight Eisenhower said you
18 need to put in highways because we have a national defense
19 requirement to evacuate people out of cities in time of crisis.

20 And John F. Kennedy used that same angle when he
21 was President when he said we have to get science into the
22 classroom because of Sputnik. I think from the standpoint of

1 this, if there is an urgency, the urgency will probably have to
2 come from the national defense side.

3 You look at NIH. Why does NIH get more money
4 every day? Because it is a bunch of congressmen who are worried
5 about dying of cancer and heart diseases. That's the urgency.
6 Okay? Okay?

7 The same thing. Why did DARPA get two billion
8 dollars a year? Because there is an urgency with respect to
9 supporting the national defense, et cetera. I don't think you
10 are going to find that sort of urgency in general overall
11 because we had this low-grade photo called the U.S. educational
12 system because the expectation is the price of K-12 will be
13 fixed by industry. Industry will spend the dollars. They will
14 adapt those people to their specific needs and put their
15 investment dollars.

16 Unless you come in through another perspective,
17 which is we want to get into national policy, it has to do with
18 what is the urgency. Well, we have a homeland defense
19 requirement. We have to train EMTs. We have to train nurses.

20 You don't want it to be the first person on the
21 scene who is trying to resuscitate you to have gotten a
22 five-hour class and never touched a human subject.

1 MODERATOR MEHLMAN: A quick follow-up for you,
2 and then I promised I would go to you next.

3 As we heard from Ralph and DARWARs, -- maybe we
4 should call them CHARWARs just for Ralph -- DOD seems to be a
5 cutting-edge leader. Is there any reason to hope or to believe
6 that DOD and the virtual simulation environments they create
7 might be able or willing to share some of those environments
8 with teacher colleges, for example, just like we would like an
9 Air Force pilot before he goes into real plane-to-plane combat
10 to have flown 1,000 virtual missions?

11 If teaching colleges could or teacher preparation
12 activities could allow teachers to have 100 hours of virtual
13 classroom time with everything from troublemakers to stragglings
14 students to other things, it might help them both better do
15 their job as teachers and better feel like I see how I have
16 lived, how a virtual and immersive environment can help me
17 learn. So I see how it can help students learn, too.

18 MR. MACEDONIA: I think there is a lot of
19 interest in that. In fact, we're planning two videotapes, in
20 fact, in collaboration with Sony. So I think there are a lot of
21 possibilities there. The Cyber Mission is a Web-based video
22 game, essentially teaches science and math. So I think there is

1 a lot of potential there.

2 I think where the real potential is is in
3 developing an industry that is supportive of education. The
4 fact is we will fund a lot of companies.

5 A lot of companies now in the education business
6 started off getting grants from DOD, SBIRs, et cetera. And I
7 think one of the things to do in terms of the investment is to
8 be able to feed that.

9 The other thing is sort of the leverage between
10 assets. For example, when we talk about internet2, we spend an
11 enormous sum on Dent. What is the relationship? Probably zip.

12 It's the defense network over there, and it's the internet2
13 network over here. From a policy standpoint, what is the
14 leverage that we are getting out of DOD assets and resources in
15 combination with existing educational mixes.

16 Frankly, that is one of the reasons why
17 universities have done so well. Look at the DOD investment in
18 universities. I mean, basically outside of NIH, DARPA funds
19 more programs than anything else at universities.

20 MODERATOR MEHLMAN: I promised you and then
21 Larry. What a great statement on globalization in technology.
22 The United States Department of Defense is funding high tech

1 gaming with a Japanese company. Don't tell those protestors.

2 MR. MACEDONIA: Singapore is a partner, too.

3 MS. SCHULL: Listening to this, it seems to me we
4 do have a real chance here to be both opportunistic and
5 coordinated in a constructive sense across sectors and across
6 levels of education.

7 There is a real opportunity here for the first
8 time to move from the sort of technology development, content
9 development, institutional change, and practitioner issues,
10 which are addressed so boldly and, in fact, so exceptionally
11 well, but a tiny little amount of excellence.

12 We need to have some kind of coordinated seed
13 change agenda and an institution behind that to move that agenda
14 out and, indeed, provide the fuel and the justification.

15 The beauty of this room is that we have cultural
16 heritage, we have libraries, we have informal learning, we have
17 senior learning. We even have this kind of civic abatement to
18 re-tool and resubmit policies to work with older people and work
19 with younger people. So I think it is a very special moment.

20 I would also like to just get to discussing
21 school-based education. We are all excited about and talking
22 about informal learning and recognizing learning. Back at the

1 campus at Stanford, learning is happening everywhere. But then
2 we talk about school-based learning.

3 You said could DOD work with classrooms. It's
4 not about the classroom anymore. It's about immersive
5 educational communities. And we have to figure out ways to
6 enrich those communities and also with some equality.

7 I was out at Little River Reservation yesterday
8 in Arizona to the gates computer workstations. That's all they
9 had in a square mile, and they were not working. So we have
10 these regards that we can't dismissed, even though we are
11 excited.

12 And the third thing I will say is that just in
13 this room, you have heard about all sorts of research that is
14 going on. And we didn't know that. We have to think about
15 right away how the public-private sector and non-public sector
16 can begin to share research.

17 I can give you a list of what is being done in
18 our libraries and with school cooperation. I'm sure that many
19 people would like that but don't know it exists.

20 So shared research has got to be one of the
21 topics for this seed change agenda.

22 MR. GROSSMAN: Diantha just made my point that I

1 was going to make, but I think it is worth emphasizing. What we
2 have heard as a common theme is this integration coordination
3 effort.

4 The only thing I would amend is that classroom is
5 also still an essential and central focus. It's in addition to
6 all of those things. On a policy basis, going back to your
7 original challenge to us, it seems to me what makes NSF and NIH
8 and DARPA so effective is that they cross the boundaries between
9 the public sector and the private sector, between companies and
10 hospitals and pharmaceutical companies and private investigators
11 and so on.

12 We need some restructuring on the federal
13 government side, it seems to me. To be able to do what
14 everybody is pleading for, namely to bring everybody, not just
15 the educational world, I mean, it's fascinating that it is the
16 Commerce Department that is leading the charge on this.

17 But we have the libraries and the museums and the
18 universities and the schools and the private sector and the
19 Department of Defense all doing work that is essential in this
20 field, and nobody is talking to each other on it.

21 We need some government organizations --

22 MODERATOR MEHLMAN: Until today.

1 MR. GROSSMAN: -- that can cross those boundary
2 lines the way NSF and NIH and DARPA do in their own areas for
3 education in its broadest sense.

4 MR. WALEY: Dan Waley, wearing a hat under the
5 National Science Foundation today but most recently with a
6 company called getthere.com, which builds Web sites for airlines
7 and corporate systems like Cisco.

8 I think when I listen to a lot of the discussion,
9 especially centered around the K-12 area, where I think maybe
10 the most important kind of fundamental educational issues are,
11 and as you get into the post-secondary, you are right where
12 people want to be there to learn and are kind of driving our own
13 education, it seems one of the interesting things, reading
14 Phillip's introduction talking about the brain bench company
15 that is offering \$20 in competency evaluations, I wonder if
16 there is a future whereby the K-12 area could be, instead of
17 kind of a mandatory attendance in a classroom, over a period of
18 time, you might work a scenario or a future where kids are
19 simply evaluated based on what they do learn.

20 Wherever they might learn and however they might
21 get there, I think that if you want to, instead of funding
22 technology initiatives or putting policies in place, remove

1 barriers for our wonderful entrepreneurial country to simply
2 jump to the charge to build this stuff on their own volition,
3 you can create an environment whereby people are simply
4 evaluated based on what they learn, instead of kind of attending
5 classrooms instant messaging each other all day long for X
6 number of years in the public school system, that it might
7 create a much more categorical and rich combination of business
8 and so forth that we would have in the learning process on its
9 own, instead of if we mandated a couple of schools.

10 MR. BYER: David Byer with Apple. I want to make
11 a comment based upon an experience I was involved in with
12 something called the Web-Based Education Commission, which we
13 started a couple of runs ago.

14 We questioned every year sort of experts from all
15 different walks of educational life as well as members of
16 Congress, went around the country addressing these issues,
17 really taking on. The over-arching goal was how we are going to
18 get on top of this thing, which really was a euphemism for sets
19 of technologies and learning. We looked, just like you are,
20 across constituencies, business, K through adult learning and
21 lifelong learning.

22 In the end, we came up with a set of

1 recommendations that may serve to help you as a help and
2 infectual framework that you are seeking. We identified seven
3 top priorities that, in effect, we have to deal with
4 simultaneously in some kind of national effort, whether there is
5 a lead organization as you described, or, as I think we really
6 preferred, we were able to impart on the constituency that would
7 be most effective by policy changes to take hold. And we will
8 run and determine what the changes are.

9 We looked at broadband as a top, broadband
10 access, advanced technology and access, along with the requisite
11 professional development that matches in with the content. That
12 also takes a look at the small amount of research that we're
13 doing and what type of research is necessary to bring that
14 around and the regulatory reforms that are necessary, not just
15 governing case regulatory reforms but cultural and institutional
16 based reforms to make it happen as well as financing.

17 And there is a report. We can make the report
18 available. Almost better than the report is we had five public
19 hearings where we had over 100 witnesses plus collected another
20 300 online testimonies. We characterized who against what sets
21 of issues.

22 So as I am listening to all of the different

1 strains of conversations here, they're in a lot of different
2 areas. I am thinking back to myself there are resources
3 available where a lot of that is already characterized,
4 catalogued, and organized that I think would be very helpful to
5 your effort.

6 It also still points to what the commission
7 concluded, which is to establish an e-learning agenda and ride
8 that high on the political and policy-oriented agendas of the
9 different constituencies that you have on your matrix from K-12,
10 post-secondary, to adult, to government, to business, to the
11 nonprofit, as well as the media. It all can be done. There is
12 a rich amount of array of resources available.

13 So it's more of a statement. And I apologize,
14 but I think it is relevant to the very heart of where you guys
15 are going.

16 MR. BACHULA: I would commend that report to
17 anyone who hasn't seen it. It's excellent.

18 MS. HOUSE: One of the things, I think if we look
19 historically at what has caused different seed changes in terms
20 of the whole area of commerce and one as recently as the
21 internet, is the R&D tax credits that come into play.

22 I think a lot of the companies, especially as the

1 economy is right now, for us to really invest in new areas, such
2 as content for the broadband or things like that, we have to
3 make sure that there is a critical mass that can buy the
4 product.

5 The only other way to incent companies to really
6 invest in the types of things that we are talking about today --
7 we're not talking about an evolution; we are talking about a
8 revolution to really change this environment -- is to look at
9 the R&D tax credits and to be creative in ways that they are
10 done so that maybe they are based on substantive public-private
11 partnerships, so that we really are using the research that has
12 been done or conducting the kind of research that needs to be
13 done and scalable and looking -- I love the way that somebody
14 was talking about the whole change, that it's not just
15 developing the product but how that is going to be implemented
16 all the way through to the cost of the sale.

17 MS. BILLINGS: Karen Billings, SIIA.

18 In the interest, then, of implementing it fully,
19 companies that are getting the R&D tax credits, it seems to me
20 that we need another GI bill for teachers who want to continue
21 their education and professional development and also those
22 other professions that might want to go into teaching.

1 MODERATOR MEHLMAN: May I ask you a follow-up,
2 please, on your PowerPoint, investors' view of the industry?
3 And we know that for K-12 and I think post-secondary it's too
4 risky because of government regulations.

5 Now, you didn't say because of material funding
6 levels. You said of regulations. I was curious. You didn't
7 elaborate at the time what you had in mind.

8 MS. BILLINGS: One that is hitting them directly
9 that seems to come up on them pretty fast and we all talk about
10 at times is the necessity for scientifically based research.
11 They are using school districts for saying that we are going to
12 buy software. They have to show us scientifically based
13 research to show that it works.

14 Publishers are now getting purchase orders that
15 say, "We'll buy your products but only if, if and only if, you
16 can attack the scientifically based research. Don't show us a
17 product without the data."

18 MS. HOUSE: And the model that they are
19 advocating can tack on up to a million dollars in terms of
20 increased development costs. So that's where.

21 MS. BILLINGS: And the publishers have started to
22 go into schools trying to get product evaluation to

1 scientifically based research studies done. They will get
2 sometimes a few people interested in it, but it is being stopped
3 at a lot of the schoolroom levels because nobody wants to be in
4 the control group.

5 MS. HOUSE: Right.

6 MS. BILLINGS: They end up with equity issues
7 because certain groups cannot get access to the intervention and
8 these kids do. Well, parents and school board members don't
9 like that a lot, but that's what the publishers are getting us
10 to do. It is not a real feasible study to take place in the
11 traditional classrooms, but that's what they think they are
12 getting us to do, a lot of confusion.

13 MS. HOUSE: I wonder how long it took before I
14 was asked about that.

15 MODERATOR MEHLMAN: You heard me circling.

16 MR. BYER: So one of the issues becomes in the
17 standards movement, you have got another set of regulatory issue
18 where if you are in a rural school district and you realize that
19 there is a demand for teaching for some kid to learn in German,
20 that course is offered two states away.

21 So you come up with this distance learning
22 vehicle and beam it over. Everybody is happy except how do you

1 deal with the transfer of credits, the assessment of, "Well,
2 that may be good in your statement, but it's not good in our
3 state"?

4 So as you now have 15 different state sets of
5 requirements, they don't necessarily match. The impediment is
6 how do you get the online stuff to work in a climate like that?

7 So that is another example.

8 MODERATOR MEHLMAN: Telemedicine in state
9 licensure had the same challenge. Spell that correctly.

10 MR. BOHANNON: Except there there is probably
11 more specificity now than there is in kinds of basic things.

12 MR. WILSON: John Wilson, NEA.

13 The other side of this is that with the
14 technology money that we have, you go in to all of the schools
15 across the country and see the waste of things that people have
16 purchased and that were not useable.

17 So I think that we have to -- we all thought that
18 scientific based research was just to make money and call it
19 research.

20 MR. BOHANNON: Exactly.

21 MR. WILSON: I thought that was an interesting
22 point.

1 I think that we have to be able to cause within
2 the public school system some enlightenment in how we use
3 technology and the standards and the curriculums and the
4 professional development or, else, it's going to be like -- I
5 started teaching in the '60s. I taught special ed., where they
6 didn't provide any money for materials.

7 I could go into warehouses and see so much
8 machinery that was purchased with the original ESEA Title I
9 money. I said, of all things, if we start to infuse from the
10 federal government additional resources, let's not 30 years
11 later be able to go and see all of these things that we have all
12 been wanting to use.

13 So I think that is a great issue for schools and
14 businesses and more.

15 MODERATOR MEHLMAN: Do you think there's adequate
16 flexibility in the education system to allow and encourage
17 experiments? One thing that a woman in the back row -- I got
18 your name, I apologize -- mentioned that I think is a great
19 challenge here is having change management, let alone radical
20 change management, in big, often ossified organizations.

21 One way around that, albeit it hurts from the
22 industry perspective of getting to scale, but one way around

1 that, is having and allowing experiments so that different
2 teachers in different locations can try things that other
3 teachers aren't necessarily required to try or encouraged to
4 try, but you let 1,000 flowers bloom. Now I'm on the record
5 quoting Chairman Mao. That's not good.

6 Do you have a thought on that?

7 MR. WILSON: Well, two thoughts. I think that,
8 first of all, that's what we have charter schools, that they
9 would be a place where you could do visionary kinds of things
10 and new things. In most cases, they're the same old, same old.

11 There's this repetition of what we are doing and
12 manipulation of student assignment and those kinds of things.
13 So that was unfortunate that we didn't really stick to the
14 charter schools that have been lighthouses for public schools.

15 The other is that there are a lot of it really
16 takes the school administration. And if you have school
17 administration that is open and inviting, good things will
18 happen. There are examples, but there are a lot of examples. I
19 think a strong school administrator really does have a lot more
20 flexibility than sometimes they say they do.

21 MS. MADDOCKS: I would like to reenforce that.

22 Peg Maddocks.

1 Title IV-C back in the '70s, where we would have
2 innovation, funding for innovation, projects, but one of the
3 requirements was that you had to go back to the system, so you
4 had a billed system for disseminating. You had to evaluate and
5 disseminate and you had to provide them back to other school
6 districts for learning documented. That was pretty powerful.

7 The difference was the administration. So I
8 think that is a really important point. Both with corporations
9 and with education, it really is the leadership's belief in this
10 solution that is going to make it work.

11 MR. MACEDONIA: I sort of took issue with some of
12 the research stuff that went on this morning about we need to
13 figure out what works and stuff like that. Frankly, at DOD, we
14 have more or less figured that out, how to make people trained
15 to learn.

16 I think that the issue, and I think it is shared
17 with industry, is how we do it effectively and the most
18 inexpensive way possible because surgeons get all the great
19 training in the world, but there is just a few of them. We've
20 got to train in DOD 30,000 medics. They don't get very good
21 training.

22 So I think the issue is not really so much how do

1 we get to that, figuring out how we get -- let's put it this
2 way. We use that all the time.

3 Let 1,000 flowers grow. And then somebody with a
4 lawn mower comes by and cuts them all down. They're all
5 duplicated. We're reinventing the same crap all over again.

6 And we are experimenting with our kids. I see
7 experimenting with our kids. I see that in our school
8 districts. And the fact is that the things that survive and
9 grow are trees. They're hard to mow down, but you have to take
10 care of them and you have to tend them in your garden very
11 carefully.

12 The thing is there should be some national
13 initiatives, specific projects, but when you start throwing
14 money around in the 1,000 flowers, we have been doing that for
15 50 years in education.

16 You have got to figure out what are you really
17 trying to achieve. I think cost factor is one of the big
18 things. They say what we have got to do is we go off into
19 another pedagogical attempt to figure out how we can stuff more
20 information into kids' heads or in adults' heads. I think we
21 know how to do that. The problem is how to do it so that
22 they're not burned out after 10:00 o'clock at night.

1 It's a big problem in the military. We have gone
2 whole hog, all out, on distance learning, but now we are getting
3 the complaint back, "Our people are working 12 hours a day. And
4 you want them to go get a degree at night? There's just not
5 enough time in the day to do."

6 MODERATOR MEHLMAN: Well, the one difference that
7 probably ought to be observed and use the right language, the
8 military knows how to make people learn. With respect to kids,
9 it's often the question of how to get them to want to learn on
10 their own.

11 MR. MACEDONIA: No. They leave the military when
12 they get tired of it. That is a big problem for us.

13 MODERATOR MEHLMAN: That is a challenge for you
14 guys, but with kids, I do think there is some level of
15 difference. You have a good self-selection. If you join the
16 military, you probably more than do a lot of the stuff.

17 You know, schools have a problem with school
18 uniforms for debatable reasons why, but I think that a lot of
19 the lessons definitely do apply. I think that some of the
20 research that was discussed this morning is important and
21 valuable because I don't think there is all that much known
22 about how using some of the newer digital technologies learning

1 can be made sufficient sticky to have kids want to do it and
2 excited to do it on their own and, therefore, pursuing it as an
3 independent passion.

4 MR. MACEDONIA: Don't assume that technology is a
5 substitute for good parenting.

6 MODERATOR MEHLMAN: Right. Ma'am?

7 MS. MALYN-SMITH: Yes. I'm Joyce Malyn-Smith
8 from EDC.

9 I am very interested in seeing how the talk
10 around the table can be translated into some concrete steps that
11 will help us all move forward. I would like to suggest that we
12 have learned a lot today, and we are in the process of learning
13 more.

14 We have learned what a picture of the industry
15 is. We have shared that. We have learned about the research
16 and the projects that are out there that we want to know more
17 about, we wanted to share. We were identifying the issues and
18 barriers.

19 Every time a small group like this meets and
20 takes a step forward, we are leaving millions of people behind
21 and creating a wider and wider gap of understanding between
22 where they are and where groups like this are.

1 What can be done after these kinds of events that
2 can help bring everybody conceptually in an understanding way
3 along the path so that eventually we catch up together.

4 Might we, for example, create a set of
5 cross-agency activities, like Webcasts, where we invite people
6 from industry and we invite educators to participate and say,
7 "Here is what the technology looks like 20 years out" and help
8 people share that understanding? Here is what the issues are.
9 Here is what these are. Help us think these forward.

10 Those kinds of steps will help reduce that gap so
11 that by the time the technology is created and out there cheap
12 enough to get into schools, there will be people there who not
13 only are able to use it but know what to do with is.

14 MODERATOR MEHLMAN: Back row.

15 MR. ETTLIE: Yes. I wanted to go over an earlier
16 point, but I will also say something about that, too, which I
17 found interesting.

18 To reinforce one comment and a counter example to
19 another in higher ed. You would think that the doctrine of
20 academic freedom was given the instructor in the classroom,
21 college classroom, to provide education, tremendous amount of
22 incentive to invest in expensive technology.

1 But, in fact, if you look at the data, for
2 example, on distance education, faculty members are just as
3 overworked as their pupils, their graduate students or their
4 undergraduate students, because administrations, then, will use
5 that technology lever to increase their workload without any
6 increase in compensation.

7 Now, with respect to next steps -- I certainly am
8 interested in hearing that conversation this afternoon -- there
9 certainly is evidence in our data that suggests that we do have
10 equivalent of a turtle curve going through the world here. That
11 is, you have a few leaders who have no incentive at all to share
12 with the huge shell that's following this turtle.

13 Economists might say that that is a failure of
14 heart. Maybe we could take it in that direction to view the
15 economic analysis to investigate those kinds of things.

16 I am not so sure that you can defeat that basic
17 principle. You may just have to operate within those
18 constraints and do the best you can given the fact that some of
19 those are hard constraints and you move forward with that in
20 mind. That is, you make policy decisions where you do have an
21 informed and accurate database and then do research on the other
22 parts but certainly emphasize both.

1 MR. BACHULA: Let me ask a question to the
2 library people on the content, discuss this here. Intellectual
3 property copyright was mentioned earlier. We have the software
4 industry represented here. They have views on copyright.

5 There is a raging debate, as you know, in
6 Washington right now. Right now the debate is sort of described
7 as between Hollywood and others, those that make computers and
8 then the kids that manage to use those computers in creative
9 ways, who apparently are very soon going to be arrested and put
10 in jail. So much for peer to peer that was talked about this
11 morning.

12 My question is what is the view from the library
13 community or the museum community or ideas about a big digital
14 content national archive? Are we only going to have free and
15 open source material in that or are we going to have copyrighted
16 material? And, if so, how are we going to solve that problem?

17 PARTICIPANT: I think we could look at the
18 American Memory example.

19 MS. CAMPBELL: The American Memory program is a
20 public-private partnership where we raise \$60 million to put
21 over 5 million items of great historical and educational
22 significance online by the turn of the century. And even though

1 you would have thought much of that material was in the public
2 domain, it was not.

3 We hired an attorney and some paralegals. And we
4 got tons of rights clearance to make that material available.
5 And we also were at the helm of the U.S. Copyright Office.

6 Obviously this country is built on protecting the
7 rights of creators. That is incredibly important to our economy
8 and our accomplishments. That needs to carry forward in the
9 future.

10 There are ways, creative ways, to think about
11 clearing rights so you can have access, that you can provide the
12 revenue stream and the incentives for both educational purposes
13 and well as the content distributors and the rights holders.

14 I think that ought to be part of the discussion
15 when you are talking about something at a national level that is
16 a public good that enhances our educational output.

17 Future generations in order to be functioning
18 citizens in the future are going to need to be
19 information-literate. That is going to have a whole lot to do
20 with your understanding of content, culture, and other worlds.
21 That is why we need to be dependent on us being able to break
22 down some barriers about access to high-quality information.

1 So I think copyright goes to the heart of the
2 issue.

3 MR. BOHANNON: I'm Mark Bohannon with the
4 Software and Information Industry Association.

5 I just want to make one comment that I was going
6 to make before the discussion got out today that I do think is
7 relevant. I think one area where we have not focused on public
8 policy issues so far in the discussion but which I have this
9 opinion that I think it is going to be very relevant to our
10 colleagues down the hall when they traipse back in with their
11 research and development agenda is that I think that we are
12 really at a very preliminary stage of having a consensus or an
13 appropriate discussion about, teeing off on what Jenny said,
14 what really is the appropriate framework for looking at who
15 should be doing the research and development that gets us where
16 we are going.

17 As both of you know, there are models out in the
18 semiconductor industry, the composites, manufacturing, which
19 have used either the NSF basic applied model or the model of
20 basic recompetitive/competitive. I think that we are far from
21 understanding in this discussion what that really means. I say
22 that because every industry is unique.

1 As Karen pointed out, there are some particularly
2 unique aspects of this industry because of the inherently
3 symbiotic relationship between government and industry in
4 achieving public policy goals or adaptations.

5 Clearly we have in HR the public standards.
6 We've got urban as one of our major customers. Yet, we still
7 are expected to be producers of the content and the tools that
8 are needed.

9 So I say that that is a question that we really
10 have got to have further discussion about because I think it
11 will help not only filtering some of these other issues that we
12 talked about here but be a basis.

13 On intellectual property rights, I think we
14 really need to drill down in terms of the discussion about
15 content. What I will argue is that, in fact, we don't even know
16 what we're talking about, repositories of content. That's not
17 really the problem we focus on in education.

18 We work very closely with the Library of Congress
19 on the American Heritage memory project. We were put in an
20 incredibly awkward situation since we had to register with the
21 Office of Copyrights our works in order to get them protected,
22 together, and put them all up online. That obviously raised

1 very serious issues that we needed to address. Quite frankly,
2 it was a very successful outcome for this.

3 I think the unique question, particularly when
4 the government gets involved in these kinds of issues --
5 licensing issues are not any less simple, but I think they are
6 not as charged. To put it frankly, if we do not have in place
7 property protection for our products and services, they could be
8 out there. And we need to be very clear about that.

9 There were some issues that Karen highlighted in
10 her presentation. Structure of licensing, particularly at the
11 university level, is traumatically underway. If anything, we
12 are revolutionalized right now.

13 Many of our content providers are, in fact,
14 positively using creative networks. We do not see creative
15 networks as inherent alone, but we have got to figure out the
16 licensing and appropriate issues. I am not sure the compulsory
17 licensing or royalties is the right way to go by any measure.

18 At the K-12 level, there are even more
19 complicated issues since as a result of Supreme Court decisions,
20 we are unable to sue states, including localities, for damages
21 if they have hired and then resell products. Those are measures
22 we are debating on the Hill.

1 So I think the key is that we need effective
2 intellectual property protection and to have the current laws
3 effectuated effectively if there is going to be competence in
4 the services and products that are out there because if it's
5 not, we're going to have the government producing it all. I
6 don't think that part is at issue.

7 MS. TENNANT: Claudette Tennant, American Library
8 Association.

9 I just wanted to take a step back, I think, and
10 say that I think our country was founded on a balance between
11 the rights of creators and the people who come after them and
12 the ability to compound our efforts. That is all we have gotten
13 to be one of the most successful and progressive nations in the
14 world because we have been able to not steal from one another
15 but build on earlier advancements.

16 I think that as far as policy goes, the Teach
17 Act, I think it passed yesterday as an addition to the Commerce
18 state appropriations. I think that will be signed by our
19 President. I think that might take care of some of these policy
20 issues in the copyright education area.

21 Also, I think that one thing we can examine in a
22 policy environment is a way to indicate a willingness to share,

1 a willingness to have your work used in a collaborative way. We
2 have seen in the last 50 years copyright has become more and
3 more and more about locking things down. I think we just need
4 to look for ways of indicating that things can be shared.

5 Right now the assumption. You don't even have to
6 have the copyright stamp on your work. The assumption is that
7 it's locked down and you don't have permission. I think we need
8 to turn that around and look at opening it not for wholesale and
9 free-for-all need to protect the ability of people to make money
10 off of their ideas.

11 At the same time, we need to protect our nation's
12 ability to compound those ideas. That's one of the things that
13 has run true today. It has been sort of tickling around in my
14 head when we are talking about policy barriers.

15 This is something that has brought a great, huge
16 benefit to our country, the competitiveness in our education
17 system. I think that is one of the reason that we have one of
18 the best education systems in the world, because it is very
19 competitive in nature.

20 At the same time, that has been one of the
21 stumbling blocks that we have sort of tripped up to the edge of
22 over and over and over again today as we have talked about the

1 idea of nationwide this, nationwide that. We need those
2 nationwide collaborations. We were talking about failures in
3 markets, a market failure. And maybe this is one of the areas.

4 How do we maintain the competitive nature of our
5 education system and protect ourselves from the negative points
6 of that competitiveness, too?

7 MR. KRUEGER: Keith Krueger from COSN.

8 Following up on what Claudette was just saying, I
9 think that from a policy perspective, there is an opportunity
10 with the passage of the Teach Act to do some education of folks
11 at the K-12 level at least about what you can and what you can't
12 do and what is still in the gray area.

13 We have been doing a lot of work in this area
14 with sort of technology folks from the school district level.
15 And there is just tremendous confusion about what the law is,
16 but, of course, it has been very confusing. So there has been
17 an opportunity to do that, and I think it needs to be done in a
18 way that isn't sort of industry saying, "Don't do this" --

19 MS. TENNANT: Right.

20 MR. KRUEGER: -- but, rather, a positive
21 conversation, which reframes it and says, "There is a law, a new
22 law, and this is what it is. This is what it does" and really

1 help educators comply with the teaching.

2 MR. BOHANNON: A positive statement. Mark
3 Bohannon again.

4 Again, thank you for the news on the Teach Act.
5 I hope you are right. We felt it was a very positive discussion
6 with universities and other stakeholders. I was working on it.

7 So I was delighted to see the President pass it. I think the
8 strong support that it had in the Senate and the House suggest
9 that it is key.

10 While we were probably one of the first
11 associations to actually put together a program in the 1980s, we
12 have always fundamentally believed in the importance of
13 education, that there is a lot more that we can be doing as an
14 industry in collaboration with educators and universities. We
15 think the Teach Act can be a positive way to do that. I am very
16 delighted, pleased to see that happen.

17 I think that, you know, in the context of this
18 discussion, I think the issues that have been raised may be, in
19 fact, outside of this discussion. I think the focus, really,
20 has to be on how we are looking at the future of education
21 technology and its application for the schoolroom. There is not
22 a clear baseline, but there has to be effective intellectual

1 property protection.

2 The private sector is talking without having
3 confidence. And the risks that were talked about in terms of
4 current market and the market are even going to get worse.
5 Certainly, that's I think the message that needs to come out of
6 this.

7 Clearly, there are lots of complicated issues, as
8 Bruce is painfully aware, who is having a moment of deja vu all
9 over again because I felt this was a different forum than others
10 that have been held in this room.

11 MR. BACHULA: Or I thought you said different
12 things.

13 MR. BOHANNON: And the fact that you lost the
14 transfer to the first one.

15 I think if the private sector does not have
16 confidence that it can build its models on, this is an academic
17 discussion.

18 MR. WIGGENHORN: Bill Wiggenghorn from Cigna.

19 I won't speak to copyrights, but on patents, one
20 of the things we found is -- we were the second or third largest
21 producer of patents in the world of patents -- they don't get
22 used. Very few get used. So we warehoused them. It also

1 creates this competitiveness that starts in the schools of an
2 uninvented center. So a lot of knowledge was never used.

3 One of the things we thought about that I
4 sometimes think is that sometimes as an industry, we have to
5 look at things differently, like copyrights, like patents, et
6 cetera, is to say, "Is there a way to still protect but liberate
7 at the same time?" Then you can actually speed up knowledge
8 transfer, rather than warehousing it, until somebody has the
9 money to buy it. I guess to me the challenge to the software
10 community is beginning to address some of that.

11 The second thing is there are always trade-offs.
12 In Canada, they are doing an interesting thing in redesigning
13 their health care policy. Using a process across the country
14 that several government districts in California are also using
15 to begin to determine "What are the trade-offs I am willing to
16 make in order to get something else?"

17 So I was thinking of previous conversations here.
18 We talked about defense and health get funded. Well, I think
19 you have to really look at education and the other two.

20 You don't want dumb military and you don't want
21 dumb medical people, but you also don't want dumb citizens. And
22 so if we said, "All right," if we were to create kind of a new

1 education forum, what would it look like, but also what are the
2 trade-offs we are willing to make?

3 The Canadian system to me fascinates us, just
4 looking at how it's addressing, how they simply go to the
5 telephone directory, pick out names, bring them together, and
6 they videotape it across country. The result has been that
7 people across different socioeconomic groups, education, ethics,
8 et cetera, are willing to make very similar trade-offs to get
9 new things.

10 So some of the things that people thought were
11 just part of the original Canadian constitution, people say
12 maybe it's time to look at for a trade-off.

13 I just suggest that maybe after a couple of
14 hundred years, it is worth looking at. Maybe at the end of the
15 day you don't change it. If I go back to patents, look at
16 Motorola. It was time to change how you looked at a patent.

17 How we looked at it had to change the culture.
18 And if we couldn't make money out of it, somebody else could.
19 So how do you sell it to somebody else that liberated it? We
20 used to call it the liberation of ideas.

21 We think about the educational thing. Everything
22 has been done, but it is locked up, the same with the military.

1 I think in the military's case, it is basically industry's
2 fault. Twenty-some years, DOD and others have always invited us
3 in. We never went in and said, "What can we learn?" It is
4 very, very different. In simulation, et cetera, they were
5 always 20 years ahead.

6 So, again, it is trying to create some of those
7 forums, I think, also to make it easy for that transfer to
8 happen.

9 MS. TENNANT: I was going to say there is a
10 project just sort of out there -- I know Lawrence Leslie was one
11 of the founders of it -- called the Creative Rights. I can't
12 remember the people who were responsible for it right now.

13 The idea behind it being that these are works
14 that the writers, authors, creators would indicate certain
15 rights that they freely liberate -- I like that word -- so that
16 someone else can take it.

17 It's not necessarily just totally out there for
18 free. What I am trying to say, let's see. It's not that they
19 give up all of their rights to this, but they give up certain
20 rights and make it very plain what rights they have to
21 accomplish.

22 MODERATOR MEHLMAN: Maybe we take the next

1 fifteen minutes as a break. Okay if we take a break before the
2 1:30?

3 PARTICIPANT: Absolutely. It's a great idea.

4 MODERATOR MEHLMAN: Fantastic. Thanks to
5 everybody. This was an enjoyable discussion over lunch.

6 (Whereupon, at 1:08 p.m., the foregoing matter
7 was adjourned.)

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22