Challenges Facing America’s Higher Education System

October 4-7, 2013
# Challenges Facing America’s Higher Education System

**October 4-7, 2013**

| Location          | Garden Court Hotel  
|                  | 520 Cowper Street  
|                  | Palo Alto, California 94301  
|                  | TEL: 650-322-9000 or 800-824-9028  

| Air Travel | The Aspen Institute provides airfare and makes ground transportation arrangements in Palo Alto. If you encounter cancellations or other air travel problems during travel, call Beth Goldberg, (508) 647-1224 during regular business hours and (617) 840-1631 after hours.  

| Internet Access | Internet access is available in your room and throughout the hotel at no additional cost.  

| Meals/Lodging | Accommodations at the hotel and all meals will be provided during the conference.  

| Ground Transportation | The Aspen Institute will provide all ground transportation in California. Upon arrival at the airport, representatives displaying Aspen Institute signs will meet you at baggage claim and direct you to ground transportation to the hotel.  

| Format/Schedule | Conference sessions will be roundtable, off-the-record discussions moderated by Executive Director Dan Glickman. Member and scholar seating is assigned at the conference sessions and for all participants at evening meals for more in-depth discussion during the course of the conference.  

| Participants | Participation is by invitation only. No congressional staff, lobbyists, or outside observers are permitted.  

| Photocopying | Participants who have materials to share should bring 40 copies.  

| Attire | Dress for the meetings and meals is business casual.  

| Climate | Daytime temperatures range in the high 70s.  

| Personal Expenses | At hotel check-in, you will be asked for a credit card to cover incidentals that are personal or non-conference related expenses. No expenses for entertainment or recreation will be paid by The Aspen Institute.  

| Contact | Carrie Rowell, Aspen Institute Congressional Program, office: (202) 736-5825; carrie.rowell@aspeninstitute.org; during travel, cell: 202-679-7748.  

Challenges Facing America’s Higher Education System: The Impact of Exploding Student Debt, Marketplace and Technological Innovations in an Era of Federal Constraint

October 4-7, 2013
Stanford University, Palo Alto, California

FRIDAY, OCTOBER 4

All participants arrive in Palo Alto

7:00-9:30 pm Working Dinner
Scholars and Members of Congress will explore topics covered in the conference. Seating is arranged to expose participants to a diverse range of views and provide opportunity for a meaningful exchange of ideas. Scholars and lawmakers are rotated daily.

SATURDAY, OCTOBER 5

7:00-8:15 am Breakfast

8:20 am Vans depart Garden Court Hotel for Stanford University

8:45 am Arrive at Paul Brest Hall

9:00 am Welcome and Framework of the Conference
Dan Glickman, Executive Director
Aspen Institute Congressional Program

9:15 am What Can Be Done at the Federal Level Regarding Financial Aid and Tax Policies to Lower the Cost of Higher Education and Student Debt?

Higher education is regarded largely as a state issue; and state policymaking is a critical leverage-point for raising completion rates, lowering costs, and creating structures that incentivize and sustain improvements in students’ outcomes and institutional productivity. But the federal government also invests billions of dollars in higher education—directly, through financial aid programs such as Pell grants and subsidized student loans, and indirectly through tax policy impacting both individuals and institutions.
• Is there a national consensus to support federal aid for higher education? Is financial assistance to students the most effective means of support?
• What are the major forms of federal investment in higher education, and what purposes do they serve?
• What are the federal government’s main interests in higher education and how are those reflected in current policy: Broad access? Economic competitiveness in a global marketplace? Innovation?
• How has the federal role in higher education changed, and where is it headed?

_Sandy Baum, The George Washington University Graduate School of Education_  
_Senior Fellow, Urban Institute_  
_Kristin Conklin, Founding Partner, HCM Strategies_  
_Formal Senior Advisor to Secretary of Education Margaret Spellings_

10:45 am Break  
11:00 am **What Changes in Both Community Colleges and Traditional Four-Year Universities Are Needed to Serve the 21st Century College Student?**

Less than one-third of the 18 million students enrolled in higher education experience the “traditional” college pathway of going straight from high school into a residential four-year college. Instead, the majority of U.S. postsecondary enrollment is comprised of students who are older, attend college part-time, and/or attend community colleges at some point during their progress toward a degree or certificate. Additionally, the racial/ethnic and socioeconomic demographics of higher education are changing rapidly—colleges serve increasingly large populations of students from groups historically underrepresented in higher education who still experience rates of achievement lower than white and higher-income peers.

• Is the structure of higher education aligned to meet the public purposes of higher education? If so, in what ways?  
• Who does the current system serve well and who does it serve poorly?  
• How and why does the _structure_ of higher education matter for students’ success?

_Sandy Shugart, President, Valencia College, Orlando_
The crossing of the $1 trillion student debt level nationally with 50 million Americans holding some kind of student loan was a staggering wake-up call for the nation, and some have even suggested that education debt is the next “bubble” with parallels to the housing crisis. For individuals and families, student loan burdens create a drag on earnings and a barrier to further economic integration and class mobility, including home ownership—particularly when the college degree earned (or not earned) may not always help students secure a stable, well-paying job. At the same time, college graduates on average still outperform non-graduates in stable employment, lifetime earnings, health insurance coverage, and other critical measures of social and economic success.

- Who is currently benefiting from higher education and who is not?
- Where are the “market failures” in higher education and why do they exist?
- Is higher education a public good or a private good, and what is the optimal amount of higher education for the nation?
- Should the federal government incentivize enrollment in certain forms of higher education over others or leave those decisions to the free market?

**Anthony Carnevale**, Director, Center for Education in the Workforce
Georgetown University

For years, the cost of attending college has been rising far faster than the overall rate of inflation, driven primarily by faculty and administrator salaries and, in the four-year sector, investments in high-priced residence halls, recreational facilities, and other student affairs “perks” that institutions perceive as necessary in order to rise in prestige-based rankings. Yet despite the rapid inflation of costs, the outcomes of higher education nationally have barely budged from 50% completion rates. In short, higher education has become more expensive but not more productive, and as a result the U.S. now falls short of other Organisation for Economic Co-operation and Development nations in graduation rates while students incur high levels of debt.
• What are the cost drivers in the current models of higher education? How do they differ by sector? Is the trend reversible?
• What are opportunities for savings and improvements in efficiency?
• What are the implications for quality of learning? Can teaching be made both more efficient and more effective?
• What is the federal role in sustaining existing models and fostering new ones? Are there examples of promising new models for increasing productivity and quality?

**Paul LeBlanc, President, Southern New Hampshire University**

7:00-9:30 pm  Working Dinner
Scholars and Members of Congress will explore topics covered in the conference. Seating is arranged to expose participants to a diverse range of views and provide opportunity for a meaningful exchange of ideas. Scholars and lawmakers are rotated daily.

**SUNDAY, OCTOBER 6**

7:00-8:15 am  Breakfast
8:20 am  Vans depart Garden Court Hotel for Stanford University
8:45 am  Arrive at Paul Brest Hall
9:00 am  **How is Technology Transforming Higher Education and What, if any, are the Federal Policy Implications?**

Massive Open Online Courses—MOOCs—have emerged in the past two years as a potentially powerful tool for providing higher education outside the walls of an institution. Many of the nation’s most prestigious institutions have been pioneers in this new mode of delivery, and online learning in general is increasingly being seen as a legitimate replacement for or supplement to seat-time in a classroom (i.e., counting toward a degree or certificate). Particularly in states like California, where demand for courses in community colleges far outstrips capacity, online learning is seen as the way to maintain access in the face of rising demand for higher education.

• What is the scope of MOOCs in higher education today? How many MOOCs are there, what subjects do they cover, and who takes them?
• Is online learning as effective as in-classroom learning?
• What is the potential that prestigious universities see in online learning, and what do they stand to gain from investing in it? What is the business model for MOOCs?
• Should the federal government treat MOOCs and other online learning formats as equal to traditional courses in terms of eligibility for aid and loans?
• Where does the accountability for learning in online formats reside—With the instructor? With the institution? With the provider?
• Is federal investment needed to incentivize the development of online learning as an efficient tool for access and equity?
• What information do students need in order to be wise consumers of online learning, and does the federal government have a role in providing that information (if so, where and how, and if not, could it)?

Andrew Ng, Co-Founder of Coursera
Computer Science Department, Stanford University

Candace Thille, Founding Director, Open Learning Initiative
Carnegie Mellon University

Graduate School of Education and Office of the Vice Provost for Online Learning
Stanford University

10:45 am   Break

11:00 am   What Are the Returns of Federal Investment in University Research?

In addition to the billions of dollars spent annually to directly support student access and success, the federal government invests billions of dollars in university research through various federal agencies. Research universities contribute immensely to the innovation and scientific advancement that helps the U.S. stay competitive in a global market. These grants also represent significant sources of revenue for the nation’s research universities and often lead to patents and other sources of revenue for individual faculty researchers and/or their institutions.

• How is the return-on-investment for federal research grants measured?
• What are the trends in federal investment in university research—has it increased or decreased over time? Shifted focus? What are the major areas of investment?
• How does the amount of public-good return compare to the amount of private-good return on the research developed with the support of federal grants?
• In what ways is federal investment in university research targeted to areas where private capital is less likely to exist, and in what ways (and why) is it duplicative of private investment?

Julia Lane, Senior Managing Economist
American Institute for Research
1:00-2:30 pm  Working Lunch

**How Do Current Policies Restrict the Recognition of Knowledge by Discrediting Transferability?**

**Are New Models of Accreditation Emerging?**

With the considerable changes in models of higher education delivery explored elsewhere in this forum, it is becoming increasingly critical that higher education capture learning achieved across different sectors and formats. Currently, barriers to transferring credits between institutions, sectors, or formats of learning are resulting in considerable inefficiencies for both federal and state governments and for students. At the same time, however, institutions have strong incentives to maintain control over the quality and content of the courses for which they ultimately award a credential.

- Is accreditation the best way for the federal government to assess quality? Are there alternative methods?
- Where in the current system is learning inadequately acknowledged, resulting in significant inefficiencies and redundancy?
- How and where are competency-based assessment and other forms of measuring out-of-classroom learning currently being used? Are these efforts effective?
- What are the policies that impede the transfer or recognition of prior learning, and where do they ‘reside’ (i.e., state, system, institution)?
- How do federal postsecondary programs in particular currently support or undermine the transfer of learning between sectors and institutions or the recognition of prior learning?

**Peter Smith, Senior Vice President, Kaplan Higher Education Corporation**

**Former Member of Congress**

3:00-4:00 pm  Individual Discussions

Meetings will be scheduled between Members of Congress and individual scholars to discuss education policy. Scholars to meet with Members of Congress include Andrew Ng, Candace Thille, Julia Lane, Peter Smith, and Stephen Joel Trachtenberg for in-depth discussion of ideas raised in the morning and luncheon sessions.
6:00-7:00 pm  Pre-Dinner Remarks  
**How Well Does the Business Model of Higher Education Serve Societal Needs and America’s Global Competitiveness?**  

For over 200 years, the U.S. has developed a higher education infrastructure that is the envy of the world. From top-flight research and educational institutions to open-access community colleges, over 4,000 colleges in the U.S. create enormous knowledge that fuels an innovative economy and democratic participation. At the same time, the system has not evolved in terms of its cost structure, driving tuition higher and creating substantial questions among the American public about the value of a college degree.

- What are the public benefits of higher education and what most deserves preservation in an era of rapid technological change?
- What new forms of innovation in the delivery of higher education can best protect the strength of U.S. higher education while improving the return on investment?
- What role should the federal government play in steering the market and structure of higher education toward the needs and opportunities of the 21st century and a new generation of students?

*Stephen Joel Trachtenberg, President Emeritus  
The George Washington University*

7:00-9:30 pm  Working Dinner

**MONDAY, OCTOBER 7**

All participants depart and return to their destinations
## Participants

### Members of Congress

<table>
<thead>
<tr>
<th>Name</th>
<th>House/Cabinet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jim Cooper</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>Susan Davis</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>Anna Eshoo</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>Raúl Grijalva</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>Tom Harkin</td>
<td>U.S. Senate</td>
</tr>
<tr>
<td>Heidi Heitkamp</td>
<td>U.S. Senate</td>
</tr>
<tr>
<td>Rush Holt</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>John Kline</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>Dan Lipinski</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>Zoe Lofgren</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>Jim McDermott</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>George Miller</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>David Price</td>
<td>U.S. House of Representatives</td>
</tr>
<tr>
<td>John Tierney</td>
<td>U.S. House of Representatives</td>
</tr>
</tbody>
</table>

### Scholars and Speakers

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy Baum</td>
<td>George Washington University</td>
</tr>
<tr>
<td>Anthony Carnevale</td>
<td>Georgetown University</td>
</tr>
<tr>
<td>Kristin Conklin</td>
<td>HCM Strategists</td>
</tr>
<tr>
<td>Karl Eikenberry</td>
<td>Stanford University</td>
</tr>
<tr>
<td>John Etchemendy</td>
<td>Stanford University</td>
</tr>
<tr>
<td>Julia Lane</td>
<td>American Institute for Research</td>
</tr>
<tr>
<td>Paul LeBlanc</td>
<td>Southern New Hampshire University</td>
</tr>
<tr>
<td>Andrew Ng</td>
<td>Stanford University</td>
</tr>
<tr>
<td>Sandy Shugart</td>
<td>Valencia College</td>
</tr>
<tr>
<td>Peter Smith</td>
<td>Kaplan Higher Education Corporation</td>
</tr>
<tr>
<td>Claude Steele</td>
<td>Stanford University</td>
</tr>
<tr>
<td>Candace Thille</td>
<td>Carnegie Mellon University</td>
</tr>
<tr>
<td>Stephen Trachtenberg</td>
<td>George Washington University</td>
</tr>
<tr>
<td>Josh Wyner</td>
<td>Aspen Institute College Excellence Program</td>
</tr>
</tbody>
</table>
## Foundation Representatives

<table>
<thead>
<tr>
<th>Name</th>
<th>Foundation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Gilligan</td>
<td>Henry Luce Foundation</td>
</tr>
<tr>
<td>Leah Hamilton</td>
<td>Carnegie Corporation of New York</td>
</tr>
<tr>
<td>Lindsay Hunsicker</td>
<td>Bill &amp; Melinda Gates Foundation</td>
</tr>
<tr>
<td>Michael McPherson</td>
<td>The Spencer Foundation</td>
</tr>
<tr>
<td>Victor Vuchic</td>
<td>The William and Flora Hewlett Foundation</td>
</tr>
</tbody>
</table>

## Aspen Institute Staff

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dan Glickman</td>
<td>Vice President, Aspen Institute</td>
</tr>
<tr>
<td>Bill Nell</td>
<td>Executive Director, Congressional Program</td>
</tr>
<tr>
<td>Carrie Rowell</td>
<td>Deputy Director, Congressional Program</td>
</tr>
<tr>
<td>Douglas Farrar</td>
<td>Conference Director, Congressional Program</td>
</tr>
<tr>
<td></td>
<td>Congressional Associate, Congressional Program</td>
</tr>
</tbody>
</table>
Alphabetical List of Every Participant

Sandy Baum
Tony Carnevale
Kristin and Brian Conklin
Jim and Martha Cooper
Susan Davis
Karl and Ching Eikenberry
Anna Eshoo
John Etchemendy
Michael Gilligan
Dan Glickman
Raúl and Mona Grijalva
Leah Hamilton
Tom and Ruth Harkin
Heidi Heitkamp
Rush Holt
Lindsay Hunsicker
John Kline
Julia Lane
Paul LeBlanc
Dan and Judy Lipinski
Zoe Lofgren and John Collins
Jim McDermott
Michael McPherson
George and Cynthia Miller
Andrew Ng
David and Lisa Price
Sandy Shugart
Peter Smith and Letitia Chambers
Claude Steele
Candace Thille
John and Patrice Tierney
Stephen Trachtenberg
Victor Vuchic
Josh Wyner
The federal government plays a central role in helping students with limited financial means pay for college. Pell Grants cover a significant portion of tuition for many recent high school graduates from low- and moderate-income families, as well as for many adults seeking to improve their labor market skills. Both federal tax credits and deductions and federal education loans support a much broader range of students. It is a good idea for members of Congress to take a step back before the Higher Education Act is reauthorized to ask whether these programs are working as effectively as they could for students and for taxpayers.

What are the goals of federal student aid?

While the states are primarily responsible for providing higher education in the U.S., the federal government has appropriately become deeply involved in diminishing the financial barriers facing students of limited financial means. The federal government has responsibility for assuring that individuals have the opportunity to invest in themselves and their futures and for creating the necessary conditions for a healthy and growing economy. The states fund public universities directly and the federal government has for decades helped individual students to pay the prices charged.

Federal student aid policies have been very successful at increasing access to postsecondary education, but concern is growing that the rapid rise in tuition is thwarting federal efforts to keep college within reach. The focus on students who are struggling with education debt is fueling this concern. And questions about whether what colleges offer students are worth the price increase the skepticism about current policies. But the evidence indicates that the policies are effective and that the vast majority of students reap sizeable benefits from their postsecondary educations, with a high rate of return on their investments. Still, there is of course room for improvement.

How can the Pell Grant program be improved?

The Pell Grant program is the foundation of the federal government’s support for college students. It now funds over 9 million students per year. Some students receive the maximum grant (now $5,645), but the average grant is under $4,000 because only students who have no expected contribution from their families or their own resources and who are enrolled full-time receive the maximum. While parents’ finances are considered for 40 percent of recipients, 60 percent are independent students, with eligibility based only on their own resources or those of their spouses. Half of the...
recipients are age 24 or older and 25 percent are over the age of 30.

Over its 40 years, the Pell Grant program has transformed the lives of many students. Expenditures have increased dramatically in recent years because of a combination of rapid increases in enrollment, the decline in employment and incomes, and changes to the Pell rules.

Most of the discussion about Pell Grant legislation focuses on the maximum grant. Advocates for students want a higher average. Policy makers concerned about federal spending think the maximum is too high. It is time to change our focus to the structure of the program and to consider whether its design could be improved to make it more successfully meet its goals.

**The application process and eligibility determination should be simpler.** These principles apply to the entire financial aid system, not just to Pell Grants. There is compelling evidence that the current complexity discourages some of the students who need it most from participating. The complexity is also expensive.

Students fill out a complicated application form, the FAFSA (Free Application for Federal Student Aid) every year. There are ways to make this process much simpler. One promising approach would rely on data available from the IRS. Eligibility could be determined once, lasting for the length of the student’s program. It would be possible to determine Pell eligibility for all young people when they turn 17. They would receive notification, based on their parents’ tax filings, of the Pell Grants they will receive if they enroll in college. This eligibility would last until they turn 24 and become “independent.” Students and parents would not have complicated forms to fill out. They would know well in advance how much financial aid they would receive. And the expensive and complicated process of verifying the accuracy of the information reported on FAFSA forms would no longer be necessary.

For older students, eligibility could also be determined once, lasting for the life of the chosen program. They would trigger the award determination process by filling out a simple form and authorizing the use of their tax data to determine eligibility.

**Pell dollars should be supplemented with improved information and guidance for students to improve success rates.** Attention is turning from the problem of assuring access to college to the more challenging problem of improving the success rates of students who enroll. The Pell Grant program cannot solve this problem, but it can help.

There are many different post-secondary opportunities available. Choosing among them is not easy, particularly for students who do not have parents or other adults with the knowledge and experience to help them choose wisely. Improving high school guidance programs and developing personalized information systems and prompts for high school seniors could go a long way towards helping them make better decisions.

The challenge is greater for older students. Under the current system, with the Pell Grant program the largest source of federal funding for job training, students are given a voucher and told to use it in whatever way they see fit. If independent students received some disinterested counseling before they enrolled, they would likely choose programs in which they have a better
chance of succeeding and that promise better job opportunities if they do succeed. Institutions have a strong incentive to enroll students and are not so likely to advise them that they would be better off going elsewhere or deferring postsecondary education. The federal government should protect its investment in Pell Grants by supporting improved student decision-making processes.

Just providing information, by creating websites and publishing debt levels and graduation rates, is not enough. Aside from the facts that we lack adequate data and that it is difficult to create metrics appropriate for all students, students don’t seek out the relevant information. They think they will succeed where others have failed. They need personalized advice. Spending $500 on advice for every student seeking job training would likely be a better investment than a $100 or $200 per year increase in the Pell Grant they receive.

**Are there appropriate incentives built into the program?** The Pell Grant program was designed to give people money to help them overcome financial barriers. It is time to add consideration of how the funding structure can provide incentives for timely completion of degrees and certificates.

To be considered full-time for Pell purposes, students have to enroll in 12 credits per semester. If they do this, it will take them 5 semesters to earn a 60 credit associate degree and 5 years to earn a bachelor’s degree. If they enroll over the summer to make up the extra credits to graduate “on time” they will not get Pell support. We could solve this problem easily.

We could for example, revise the system so that students would receive more Pell funding if they enroll for more credits. Whether they enroll for these credits over two terms or three during an academic year, they would then receive the appropriate funding. Students who enroll for 12 credits now get more funding than those who enroll for 9. But those who enroll for the 15 credits necessary for on-time graduation do not get any more than those who enroll for only 12. Moreover, students who take 5 years to earn 120 credits now receive 5 full Pell Grants—25% more than those who earn the same credits over 4 years.

**What about the crushing student debt?**

Pervasive reports of a student debt crisis make reasoned conversations about the appropriate role for borrowing in financing higher education difficult. Education is an investment. Students benefit in many ways and the benefits last a lifetime. One of the benefits is higher earnings, and these higher earnings make it possible for college-educated individuals to repay their debts at the same time that they enjoy a higher standard of living than they likely would have had without a college education.

As more and more students enroll in college, more borrow and the amount of student loan debt outstanding increases. That is not a startling fact. Our focus should be on the circumstances of individual students. Are students borrowing more than they can reasonably expect to repay? Does this cause undue hardship either to them or to the taxpayers left holding the bag if they do not repay?

About 2% of students who enroll in college borrow as much as $50,000 for undergraduate study. Two-thirds borrow less than $10,000. Instead of panicking about debt, we should think carefully about how to finance this important investment, how to distribute the risk involved in that invest-
ment, and why the minority of students who get in way over their heads find themselves in this situation.

The federal Income-Based Repayment (IBR) plan, which prevents former students from having to make payments exceeding a reasonable amount of their incomes, is a very big step in the right direction. But it can and should be improved.

- As it stands, graduate and professional students can borrow up the cost of attendance each year and then have much of their debt forgiven through IBR. These relatively high-income borrowers are not the intended target for these federal subsidies and this issue should be addressed.
- Students whose incomes do not support even the interest accruing on their loans will see their debts balloon over time. They are unlikely ever to repay this exploding debt, so limiting the extent to which unpaid interest is capitalized would probably not have serious cost implications.
- A relatively small number of students participate in IBR. They don’t know about it. They don’t understand it. They face bureaucratic hurdles to enrolling. Other nations have made this the standard way of repaying education debt, an option the U.S. could pursue by making IBR the default option.

While there are certainly student debt problems that should be remedied, the problem is sometimes greatly exaggerated. The weak economy, with too many people unemployed or underemployed, has made entry into the labor force difficult for many young people. The unemployment problem is much worse among people who didn’t go to college than among those who did, but college goers who borrow heavily may still have repayment problems, particularly if they have nonfederal loans. Moreover, some students borrow to enroll in programs that hold little promise for them. Students need better protection against over-borrowing.

**What about rising college prices?**

The federal government’s student aid policies don’t explain rising college prices and changes in those policies are unlikely to have a significant impact on reducing the rate of increase in those prices. A major part of the explanation for the recent rapid rise in tuition levels at public colleges and universities is the failure of state appropriations to keep up with rising enrollments and in recent years, even to keep up with inflation without factoring in the growing size of the student body.

It is not possible to go into a detailed discussion of the causes of rising college prices here. But it is important to note that it is not the sticker prices that affect student access to college, so much as the net prices they pay after taking grant aid into consideration. In addition to the contribution of federal student aid to keeping this net price down, four-year colleges, particularly those in the private nonprofit sector, have been increasing their discounts. In many cases, rises in the sticker price don’t correspond to any increase in net revenues for the institutions—or in the net amount of tuition that students pay.

It is true that federal aid is chasing a moving target in trying to keep up with the published tuition prices of colleges and universities. It is totally appropriate for the federal government to consider stronger incentives for states and institutions to moderate increases in both the cost of producing education and in the prices charged to students. But the rapid rise in the sticker
price of public higher education does not correspond to a similarly rapid rise in the cost of producing that education. The reality is that per-student revenues and expenditures have risen very slowly at most public four-year universities in recent years and have actually failed to keep up with inflation at community colleges. Overall, most of the growth in tuition revenues just compensates for declining states appropriations.

Students and parents are filling in the gaps left by state governments. But the federal government has picked up much of the slack, increasing its assistance through grant aid and tax benefits. In other words, a key issue is state funding. Focusing on colleges and universities themselves rather than on the states that have historically provided the foundation for their funding obscures the real story.

Of course, private colleges don’t have the same issue with state budgets. Tuition at private colleges is much higher than tuition at public colleges but has been rising more slowly in recent years. It has also risen more slowly over the most recent decade than over either of the two preceding decades.

A Potential Role for the Federal Government

It’s not plausible that the federal government would directly set the prices of America’s colleges and universities. But it does have some tools for exerting influence. Linking federal funding for a state’s public institutions to the level of state support for those institutions, perhaps through some form of maintenance of effort provisions, might be effective. The federal government might consider awarding some of its subsidies directly to institutions in a policy designed to encourage both the successful education of low- and moderate-income students and tuition and/or student aid policies that keep the net prices these students pay from rising too rapidly. Adjusting the aid awarded to individual students based on the institutions in which they enroll would not be a sound approach, as it would punish students for circumstances out of their control.

The Fundamental Concerns

There is more we can do to help students make better choices. We can bar institutions that don’t effectively educate students from receiving federal student aid. We can provide better and more effective advice for students making difficult decisions. And we can build incentives for timely completion into student aid programs. The federal government is well positioned to invest in research on ways, including technological innovation, to reduce higher education costs without reducing quality. But we probably cannot construct metrics to rate each institution on all of the important dimensions of educating students.

It pays to step back for a moment and ask why we are concerned about college prices and student debt. The real goals relate more broadly to equity and efficiency. Everyone who can benefit should have access to quality higher education so they can improve their own lives and contribute to a strong economy.

Largely because of the aid the federal government provides, along with additional support from state governments, from employers and other private sources, and from institutions themselves, on average full-time students at public four-year colleges pay only about $3,000 a year of the $8,700 average tuition themselves. They cover these charges, as well as their living costs,
through a combination of help from parents, earnings while in school, savings, and student loans.

There are real problems that need to be addressed in order to assure that the United States continues to have an outstanding higher education system offering a wide variety of opportunities to young people from all backgrounds, as well as to older adults seeking to improve their labor market outcomes. But much of the public discussion exaggerates some of the problems, while deflecting attention from the real issues.

College is expensive. Expensive is not the same thing as unaffordable. The reality is that two-thirds of high school graduates enroll immediately in a postsecondary institution. Those who choose community colleges face tuition charges averaging about $3,100 per year if they enroll full-time. Few of them pay that full price because of the availability of grant aid. A very small number of students enroll in highly selective private colleges with prices tags over $50,000—including room and board. The very few institutions in this category get more than their share of attention because of the character of their clientele. Most of these schools give large discounts to the low- and moderate-income students who succeed in enrolling. In any case these institutions are not the ones on which the federal government should be focusing its concern.

Making college affordable does not mean eliminating the need for students to rely on debt. Most long-term investments are debt-financed. But the selection of postsecondary education paths is complicated and involves considerable uncertainty. Students make this decision with limited information, and while better data would help, no amount of information about how many students have graduated or how much they have borrowed will eliminate this uncertainty. We should assure that federal student aid programs are designed with this reality in mind and focus on loan programs that insure students against unaffordable repayment burdens after they leave school, in addition to grant programs that help them get into and through school.
In July 2012, HCM convened a small group of financial aid, tax and higher education policy experts. The technical panel was charged with examining the overall financial aid system and developing innovative policy ideas that respond to the fiscal, economic and demographic realities the nation faces today. This brief summarizes the results of their collaboration.

WHY DOES THIS MATTER?

The nation’s financial aid system was built for a different age. In 1965, when the first significant federal financial aid program began, 23 percent of Americans had a college degree. This attainment level was sufficient to support a vibrant middle class. That economy and those times are no more.

Today, the economy places a premium on postsecondary credentials and the skills these degrees represent. By 2018, 45 percent of all jobs will require some type of college degree, including certificates. Unfortunately, nearly half of all students start college but fail to earn any credential within 6 years; the outcomes are much worse for African Americans and Hispanics.

The financial aid system – its collective $226 billion in investment – needs to be seen as part of the solution for a nation that needs many more skilled graduates, a stronger middle class and greater opportunity.

In size and scope, student financial aid is more important than ever. Nearly half of all undergraduates receive a Pell grant. Revenues from Pell grants pay almost $.20 on every $1.00 received by a college or university in this country, ranging from 43 percent at 2-year public colleges to 7 percent at 4-year private colleges. If current trends continue with public colleges in several states, the percentage share that federal financial aid pays of total operating costs soon will exceed what states pay.

It is time to modernize the financial aid system and align it with today’s economic and fiscal realities. The level of aid matters, but so does its design and delivery, according to research. Known barriers in how financial aid dollars are distributed hinder innovation and the expansion of more cost-effective approaches to a quality postsecondary education. A new survey of engaged voters confirms Americans are ready for reform and open to conversations about ways financial aid can serve more students, better.
A SIMPLER, MORE EFFECTIVE FEDERAL AID SYSTEM: One Grant, One Loan, One Tax Benefit

**FIRST**, simplify financial aid with a single federal grant program and a single loan program accessed by means of a simpler application. A new grant program would consolidate federal support into a grant designed to provide an open financial door to higher education and focus on applicants with genuine need. A simplified loan program, with universal income-based repayment, would be available for middle-income students who do not qualify for grants, as well as to supplement grant resources for low-income recipients.

For most students, application data for both the grant and loan program would be directly imported from federal income tax data, simplifying the process, making the total financial aid package and terms of repayment more transparent, and reducing opportunity for error or fraud.

**SECOND**, simplify federal tax benefits for higher education. The single grant and loan program, as proposed, provides generous but better-targeted financial benefits to all students. Making these changes reduces significantly the need for the current tax benefits for college tuition and fees. Further, there is little evidence that tax credits and deductions have significantly affected higher education outcomes, but their effectiveness could improve if they were better targeted, better timed and better integrated into financial aid policy. A single Lifetime Learning Credit, available for education and including training that happens outside of a formal program (for example, an assessment for credit for prior learning or proficiency in a Massive Open Online Course, or MOOC), replaces the existing credits and deductions.

**ONE GRANT PROGRAM**
- Make the enduring commitment to affordable access with a simpler needs analysis and application process for all federal financial aid.
  - Simplify the FAFSA, replacing much of the interface with a pre-filled interface so low-income students can qualify for the aid they need.
  - Offer a simple look-up table based on income and family size so students can plan early and choose wisely.
  - Eliminate federal campus-based aid.

**ONE LOAN PROGRAM**
- Streamline the loan programs and reduce the complexity in loan terms and repayment rates.
  - Create common annual and aggregate loan limits for undergraduates and for graduates. Help mitigate price insensitivity by setting these levels at a midpoint between current levels for dependent and independent students.
  - Use a market-based interest rate.
  - Eliminate the subsidized loan program, which pays interest that accrues during school, and move that subsidy to a reformed income-contingent loan repayment that all students participate in.

**ONE TAX BENEFIT**
- Consolidate all household-based tuition and fee tax credits and deductions into one Lifetime Learning Credit.
  - Make any tax benefits permanent to better serve students and families.
THIRD, promote shared responsibility for completion. For students, this means making smart choices about schools to attend and upgrading the definition of satisfactory academic progress—or what is required to receive and keep a maximum award. Promoting intensive enrollment for all students improves the odds of completion and focuses the size and scope of the federal aid investment in structured and accelerated pathways that can work better for students who juggle work, family and other commitments while attending school.

FOURTH, spend a portion of the federal aid budget on demonstration programs that spur innovation and experimentation.

This could include pilot programs such as: 1) a "Pell-ready Grant Demonstration" in which students with family incomes within 250 percent of the poverty level who need remediation would receive a flat award, for use at either traditional or nontraditional providers, with incentives to both the student and institution for timely completion; 2) a "Competency-based Demonstration" that would support students and institutions pursuing competency-based (as opposed to seat-time- or credit-hour-based) models of higher education; 3) a "Performance Contract Demonstration" that would maintain federal needs analysis and a guaranteed federal student award, but give institutions discretion over how to allocate their federal aid dollars in exchange for successfully graduating higher numbers of low-income students.

A set of balanced metrics can be used to create stronger eligibility criteria for institutions receiving federal aid. An "Institutional Effectiveness Index" can integrate measures of access and equity, loan repayment and risk-adjusted completion rates. Institutions would not need to perform strongly on all components of the index to have a passing score. In fact, it would be unlikely that they could do well on all. But they also could not get by with weak performance in all or most components.

---

INCENTIVES FOR ON-TIME COMPLETION

- Limit the number of credits borrowers can accumulate before aid eligibility ends.
- Provide incentives for students to make progress toward completion within 100 percent of the time.
  - Increase the number of credits a student must take per semester or year to qualify for the maximum, full-time award.
  - Projected 10-Year Net Savings: $39 billion

OR

- Give students a $7,000 maximum grant if they complete at least 27 credit hours in a 12-month academic year.
  - Projected 10-Year Net Cost: $86 billion

- Work to define a set of metrics that can be phased in over time to help determine institutional eligibility for federal financial aid. A sample Institutional Effectiveness Index could include:
  - a measure of access and equity
  - loan repayment; and
  - input-adjusted completion rate
- Eliminate Parent PLUS and Grad PLUS loans, which have no time or borrowing limit.
The time for policymakers to consider fundamental improvements to the federal financial aid program is now. Forty-nine percent of engaged voters believe the higher education system needs major changes or a complete overhaul. When presented with arguments for and against providing financial aid based on completion, 73 percent of engaged voters surveyed believed this was a good idea. At the same time, statutory provisions that offer important benefits to borrowers and taxpayers will expire this year or shortly thereafter. Most of the program authorities provided by the Higher Education Act expire within two years. Policymakers must not let this opportunity pass.

Our knowledge of how financial aid works and how it affects higher education outcomes is imperfect, and the system as it stands has largely evolved based on politics, ideology and available budgets rather than evidence. The solutions we have outlined work from what imperfect information we have, while remaining open to continued improvement as our understanding advances. For that advance to occur, we support improvements in descriptive data collection about aid recipients and their results, as well as expanded experimentation with a portion of the federal aid budget to increase the knowledge base that policymakers can draw upon in future reforms.

**The Broad Reach of Federal Financial Aid**

<table>
<thead>
<tr>
<th>Pell Recipients</th>
<th>1973-1974</th>
<th>176,000</th>
<th>2011-2012</th>
<th>9.4 million</th>
</tr>
</thead>
</table>

47% of undergraduates receive financial aid.

- **$174 billion** Federal Aid
- **$9.9 billion** State Grants
- **$42 billion** Institutional Aid
- **$11 billion** Private and Employer
The new College Score Card can help students, colleges and the public make better, informed decisions. It can be improved if all institutions receiving federal financial aid collect and publicly report for all students:

- enrollment data, including full-time and various measures of part-time and transfer;
- tuition prices and other costs of attendance;
- completion and graduation data, including student mobility-adjusted persistence rates, graduation rates that consider institutional mission, and time to degree by field of study; and
- financial aid data from state, institutional and third-party sources.
HCM STRATEGISTS' EXPERT TECHNICAL PANEL

Dr. Steven E. Brooks, North Carolina State Education Assistance Authority
Kevin Carey, New America Foundation
Kristin Conklin, HCM Strategists (chair)
Jason Delisle, Federal Education Budget Project, New America Foundation
Dr. Tom Kane, Harvard University
Andrew Kelly, American Enterprise Institute
Daniel Madzelen, retired, U.S. Department of Education, Office of Postsecondary Education
Dr. Kim Rueben, The Urban Institute and the Urban-Brookings Tax Policy Center

The work of this Technical Panel was supported by a grant from the Bill & Melinda Gates Foundation to HCM Strategists (HCM) and the analysis, advice and management of Lauren Davies, Terrell Halaska, Dr. Kim Hunter-Reed and Dr. Nate Johnson.

1 This assumes current take up rates, we eliminate campus based aid programs and it includes closing the current $44 billion current projected shortfall. Our simplified formula saves $37 billion even if we assume full take-up rate of eligible students.

2 The technical panel proposes eliminating the AOTC and moving savings into an expanded grant program. For example, the savings from consolidating the tax credits could be used to expand the size of the maximum grant to $7,000. If a tax credit aimed at undergraduate education is deemed essential, it should be non-refundable and be structured more like the Hope credit, which was replaced by the AOTC.

3 This assumes using existing FAFSA aid system and that ¼ of students taking 12 credits will increase their course load. The savings are higher and more targeted to lower income students if the simplified application is used.

4 This assumes using existing FAFSA aid system and that ¼ of students taking 12 credits will increase their course load. If the simplified application is used, the expanded grant will save about $42 billion. Alternatively, it would cost $11 billion if eligibility is expanded to 250% of poverty rate.


6 Higher Education Opportunity Act of 2008 authorizes the programs for five years (P.L. 110-315).

7 Some programs authorized through HEA can continue to receive funds and operate one additional year after authorities expire through the authorities provided in the General Education Provisions Act. 20 USC 1226a (P.L. 112-123)

HCM Strategists, founded in 2008, works with clients to align, advocate for, and advance public policies that improve our nation's education and health.

1156 15th Street, NW, Suite 850, Washington, DC 20005
HOW CAN FINANCIAL AID HELP MORE STUDENTS SUCCEED?

- Extra money to help you get ready for college
- Confidence that the college you choose to use your aid at has met certain minimal standards
- Clear reports with the information you need to make decisions about where to go to college
- Loans you can repay based on your income after graduation, which are forgiven after 25 years if not paid off
- An instant notification of the grants and loans you can expect
- A simple tax credit to reimburse you for individual courses you may need in your career
- Automatic eligibility for financial aid if you receive other kinds of federal support like free and reduced price lunch
- A financial aid application that pre-loads data for you
- More money for enrolling in enough classes to graduate on-time

Aligns with the call to action of American Dream 2.0
Details on how these options can help more students succeed at Doing Better for More Students
### Table 1: Pell Grant Options, Default Take-up

Pell Grant Recipients (millions) and Value of Grants (billions of dollars), 2013-2022

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Pell Grant (Billions)</strong></td>
<td>1.73</td>
<td>1.74</td>
<td>1.75</td>
<td>1.76</td>
<td>1.77</td>
<td>1.78</td>
<td>1.79</td>
<td>1.80</td>
<td>1.81</td>
<td>1.82</td>
<td>1.83</td>
<td>17.04</td>
</tr>
<tr>
<td><strong>Cost of Campus-Based Aid (Billions)</strong></td>
<td>2.54</td>
<td>2.56</td>
<td>2.58</td>
<td>2.60</td>
<td>2.62</td>
<td>2.64</td>
<td>2.66</td>
<td>2.68</td>
<td>2.70</td>
<td>2.72</td>
<td>2.74</td>
<td>25.75</td>
</tr>
</tbody>
</table>

#### Option 1: Current Law

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 2: Simplified Application Process with $5,550 Pell Maximum

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 3: With $5,550 Pell Maximum

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 4: With $6,550 Pell Maximum, with Increased Full-Time

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 5: With $7,000 Pell Maximum

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 6: With $10,000 Pell Maximum, with Increased Full-Time

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 7: With $5,550 Pell Maximum

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 8: With $5,550 Pell Maximum, with Increased Full-Time

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 9: With $1,000 Pell Maximum

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 10: With $7,000 Pell Maximum, with Increased Full-Time

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

#### Option 11: With $7,000 Pell Maximum plus dual 25% of poverty, with Increased Full-Time

| Revenue (millions) | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 17.04 |
| Cost of Grants (millions) | 2.54 | 2.56 | 2.58 | 2.60 | 2.62 | 2.64 | 2.66 | 2.68 | 2.70 | 2.72 | 2.74 | 25.75 |

## Table 2:

### Distribution of Current Law Pell Grant and Alternative Proposals by Size of Adjusted Gross Income, Tax Year 2015: Assuming Baseline Take-up Behavioral Responses, All Undergraduate Students

### Assuming Baseline Take-up Behavioral Responses, All Undergraduate Students

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average per Recipient</td>
<td>Total Cost (in thousands)</td>
<td>Average per Recipient</td>
<td>Total Cost (in thousands)</td>
<td>Average per Recipient</td>
<td>Total Cost (in thousands)</td>
</tr>
<tr>
<td>$0 or less</td>
<td>$3,875</td>
<td>$1,829,317</td>
<td>$4,029</td>
<td>$1,848,814</td>
<td>$4,367</td>
<td>$1,874,170</td>
</tr>
<tr>
<td>&gt; $0 and &lt;= $5K</td>
<td>$3,979</td>
<td>$3,844</td>
<td>$4,199</td>
<td>$3,865</td>
<td>$4,557</td>
<td>$3,904</td>
</tr>
<tr>
<td>5K-10K</td>
<td>$3,957</td>
<td>$3,834</td>
<td>$4,195</td>
<td>$3,869</td>
<td>$4,557</td>
<td>$4,545</td>
</tr>
<tr>
<td>10K-15K</td>
<td>$4,028</td>
<td>$3,904</td>
<td>$4,265</td>
<td>$3,973</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
<tr>
<td>15K-20K</td>
<td>$4,037</td>
<td>$3,918</td>
<td>$4,285</td>
<td>$3,990</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
<tr>
<td>20K-25K</td>
<td>$4,050</td>
<td>$3,936</td>
<td>$4,305</td>
<td>$4,008</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
<tr>
<td>25K-30K</td>
<td>$4,074</td>
<td>$3,955</td>
<td>$4,326</td>
<td>$4,023</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
<tr>
<td>30K-40K</td>
<td>$4,121</td>
<td>$3,989</td>
<td>$4,365</td>
<td>$4,056</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
<tr>
<td>40K-50K</td>
<td>$4,161</td>
<td>$4,029</td>
<td>$4,406</td>
<td>$4,087</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
<tr>
<td>50K-75K</td>
<td>$4,207</td>
<td>$4,074</td>
<td>$4,443</td>
<td>$4,118</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
<tr>
<td>75K-100K</td>
<td>$4,241</td>
<td>$4,121</td>
<td>$4,481</td>
<td>$4,149</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
<tr>
<td>100K-200K</td>
<td>$4,272</td>
<td>$4,156</td>
<td>$4,519</td>
<td>$4,180</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
<tr>
<td>200K+</td>
<td>$4,306</td>
<td>$4,191</td>
<td>$4,558</td>
<td>$4,213</td>
<td>$4,626</td>
<td>$4,626</td>
</tr>
</tbody>
</table>

### Notes for Pell Distribution and Revenue Tables:

1. Preliminary estimates. The simulations apply the alternative proposals to current-law Pell grant.
2. Adjusted Gross Income refers to income of the students’ tax units in 2015, in 2012 dollars.
Table 3:
Cost Estimates for Higher Education Loan Reforms (in $ Billions)
(+): savings, (-): cost in outlays, by fiscal year

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsidized Stafford eliminated (new loans)</td>
<td>4.000</td>
<td>6.100</td>
<td>6.200</td>
<td>5.800</td>
<td>4.600</td>
<td>4.000</td>
<td>3.800</td>
<td>3.300</td>
<td>3.000</td>
<td>2.900</td>
<td>11.400</td>
<td>16.400</td>
</tr>
<tr>
<td>Unsubsidized Stafford loan limit for dependent undergraduates increased (fair-value)</td>
<td>0.624</td>
<td>0.368</td>
<td>-0.688</td>
<td>-1.226</td>
<td>-1.681</td>
<td>-2.203</td>
<td>-2.487</td>
<td>-2.224</td>
<td>-2.675</td>
<td>-3.159</td>
<td>-3.087</td>
<td>-16.785</td>
</tr>
<tr>
<td>Unsubsidized Stafford limit for independent undergrads conformed to limit for dependents (fair value)</td>
<td>-0.191</td>
<td>-0.107</td>
<td>-0.144</td>
<td>0.507</td>
<td>0.631</td>
<td>0.781</td>
<td>0.872</td>
<td>0.948</td>
<td>0.990</td>
<td>0.761</td>
<td>5.548</td>
<td></td>
</tr>
<tr>
<td>Grad PLUS loans eliminated (fair-value)</td>
<td>-3.150</td>
<td>-1.723</td>
<td>-1.069</td>
<td>-0.327</td>
<td>0.454</td>
<td>0.944</td>
<td>1.326</td>
<td>1.463</td>
<td>1.580</td>
<td>1.658</td>
<td>-4.864</td>
<td>2.082</td>
</tr>
<tr>
<td>Graduate Stafford loan limit increased to $30,000</td>
<td>0.303</td>
<td>0.050</td>
<td>-0.448</td>
<td>-0.922</td>
<td>-1.273</td>
<td>-1.612</td>
<td>-1.865</td>
<td>-2.045</td>
<td>-2.006</td>
<td>-2.048</td>
<td>-2.300</td>
<td>-1.939</td>
</tr>
<tr>
<td>Parent PLUS loans eliminated (fair-value)</td>
<td>-2.978</td>
<td>-2.427</td>
<td>-1.796</td>
<td>-1.131</td>
<td>-0.580</td>
<td>-0.181</td>
<td>0.087</td>
<td>0.121</td>
<td>0.125</td>
<td>0.129</td>
<td>-0.084</td>
<td>-0.877</td>
</tr>
</tbody>
</table>

Note: All budgetary effects are estimated relative to current law as of December 19th, 2012. Source: New America Foundation
### Table 4:
#### Education Tax Options
Impact on Tax Revenue (billions of current dollars), 2013-2022

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsidized Stafford eliminated (new loans)</td>
<td>$-3.000</td>
<td>$3.100</td>
<td>$3.350</td>
<td>$3.000</td>
<td>$3.650</td>
<td>$4.100</td>
<td>$4.400</td>
<td>$4.800</td>
<td>$5.300</td>
<td>$5.900</td>
<td>$16.900</td>
<td>$41.400</td>
</tr>
<tr>
<td>Unsubsidized Stafford loan limit for dependent undergraduates increased (fair-value)</td>
<td>$0.524</td>
<td>$0.066</td>
<td>$0.099</td>
<td>$1.229</td>
<td>$2.031</td>
<td>$2.203</td>
<td>$2.487</td>
<td>$2.564</td>
<td>$2.675</td>
<td>$2.759</td>
<td>$3.957</td>
<td>$15.766</td>
</tr>
<tr>
<td>Unsubsidized Stafford limit for independent undergrads conformed to limit for dependents (fair value)</td>
<td>$-0.141</td>
<td>$0.017</td>
<td>$0.148</td>
<td>$0.307</td>
<td>$0.358</td>
<td>$0.622</td>
<td>$0.818</td>
<td>$0.850</td>
<td>$0.890</td>
<td>$0.767</td>
<td>$5.946</td>
<td></td>
</tr>
<tr>
<td>Grad PLUS loans eliminated (fair-value)</td>
<td>$-2.150</td>
<td>$-1.712</td>
<td>$-1.063</td>
<td>$-0.327</td>
<td>$0.151</td>
<td>$0.244</td>
<td>$1.552</td>
<td>$1.403</td>
<td>$1.561</td>
<td>$1.653</td>
<td>$-4.954</td>
<td>$2.052</td>
</tr>
<tr>
<td>Graduate Stafford loan limit increased to $30,000</td>
<td>$0.593</td>
<td>$0.050</td>
<td>$0.448</td>
<td>$0.922</td>
<td>$1.373</td>
<td>$1.452</td>
<td>$1.906</td>
<td>$1.945</td>
<td>$2.005</td>
<td>$2.069</td>
<td>$2.300</td>
<td>$11.839</td>
</tr>
<tr>
<td>Parent PLUS loans eliminated (fair-value)</td>
<td>$-2.972</td>
<td>$-2.412</td>
<td>$1.793</td>
<td>$1.151</td>
<td>$0.501</td>
<td>$0.087</td>
<td>$0.121</td>
<td>$0.125</td>
<td>$0.120</td>
<td>$0.624</td>
<td>$3.572</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Urban-Brookings Tax Policy Center Microsimulation Model (version 0412-3ED).

(1) Fiscal years. Estimates assume a microdynamic behavioral response. Revenue amounts reported are TPC estimates and may differ from official revenue estimates from the Joint Committee on Taxation.
Twenty-First Century Colleges for Twenty-First Century Students

Sanford C. Shugart, Ph.D.
President, Valencia College

What must both 2 and 4 year colleges do to serve 21st century students?

This paper will address the topic with a focus on undergraduate education through three questions:

1. Who are these 21st century students?
2. What are the challenges our colleges and universities face in serving them?
3. Where will we find solutions to these challenges?

Who are our 21st Century students?

Some 19 million undergraduates are enrolled in several thousand undergraduate colleges and universities in the U.S.: just over 7 million in public four-year universities; almost 6.5 million in public two-year colleges; more than 3.5 million in independent colleges and universities; and 1.3 million in for-profit colleges. They are a diverse group and the demography is shifting steadily toward more diversity, especially in the community college sector. Most of these students, and all who will follow them, are “digital natives,” with a different set of experiences and capabilities for engaging sources of information and entertainment. Their approach to pursuing college, once called “non-traditional,” has become the norm. Most students work, many at more than one job. The great majority no longer lives on campus nor attends full-time. Many have complex family obligations to meet while studying. Conversely, the percentage that pursues college “traditionally,” that is attending on campus, out-of-town, full-time, and with only limited work obligations, is now only about 15% of the total undergraduate population. While only 20 percent of four-year college students are “first generation,” they comprise half or more of the enrollment in community colleges. And these students face special challenges in preparing for and sustaining momentum in college.

Students continue to adjust their plans and their majors over time, increasingly trending toward more career-oriented pathways over the last 30 years. More than a third of all degrees conferred are in business and health professions, and while education, liberal arts, and social sciences are still the top five majors, none of them comprises even 10 percent of the degrees awarded. STEM (science, technology, engineering, and mathematics) fields, despite much cheerleading on their behalf in recent years, together amount to only 11 percent of all undergraduate degrees. (At the doctoral level, however, they comprise about 40 percent of degrees awarded.)

What are our challenges?

Four mission critical challenges (as opposed to resource and other instrumental challenges) beset our undergraduate education systems. They are the challenges of college readiness, college completion, college students with purpose, and making the promise
of opportunity through college real.

**College Readiness.** Despite decades of reform in the public education sector, one outcome has been remarkably stable—the low percentage of students who graduate high school who are college-ready. A good measure of this is the readiness of incoming community college students (the sector where students are welcomed whether they have the full complement of college-level competencies or not). At most community colleges, fewer than a third of the students are college ready in reading, writing, and mathematics at the point of admission, and half have serious deficiencies in these skills. These numbers have scarcely changed in two decades. They suggest an enduring disconnection between the curriculum and expectations of secondary education and that of post-secondary. This mismatch leads to exaggerated and unsustainable levels of failure and attrition among the two-thirds of students who are not ready, who graduate from community colleges at about half the rate of college-ready students.

Much has been written and discussed over the success and failure rates of developmental or remedial students in college, but this problem will not be substantially solved until we double the percentage of students coming to our open-door institutions with the skills to begin college immediately and successfully.

**College Completion.** Concerns about completion rates, especially at non-selective and open-door institutions, have dominated much of the public discourse on higher education in recent years and led to a host of reforms. These reforms have been leveraged by major foundations that have recognized that America’s inclusive system of higher education possesses the power to impact the cycle of intergenerational poverty and restore the hope of a growing middle-class, if only the system produced many more completers with credentials of economic value, ranging from technical diplomas and industry certifications to associate and bachelor degrees. The essential first step forward in this work has been a commitment to evidence-based practice, from the classroom to the boardroom. The discipline of assessment and measurement, holding all of our practices up to the challenge of the results we are actually achieving, has bred many success strategies that are well tested and are being brought to scale in institutions across the country, but they will take time. This work is very promising, but is hampered by the relative difficulty of assembling data across institutions and producing analytics that are meaningful to their diverse missions. More importantly, these strategies alone, within the institutional and sector silos where we commonly work, will fail to address some of the core challenges.

While colleges provide much more productive learning environments for students—more effective models of remediation, intensive advising, structured program pathways, deep learning support systems and technologies, etc.—it is important to remember that the most important person to care about completion is...the student. Here the work becomes much more difficult for two reasons.

First, the students are immensely diverse, creating challenges for solutions at scale—what works for some manifestly doesn’t work for others. But our larger institution and systems are broadly based on a factory model of undergraduate education where scale and productivity trump personalization. Further, to accommodate the diversity of students, the curriculum has grown
less focused and structured, requiring them to navigate what one writer has aptly called a “shapeless river,” leading to an unfocused program of study, failure to timely complete major prerequisites, accumulation of excess credit hours, exhaustion of financial aid before completion of the credential, and other problems.

Second, while institutions tend to assume students pursue their educations in a linear fashion (as they did fifty years ago), the students no longer experience our education systems in this way. Their experience often crosses (even violates) the boundaries of institution and program. They swirl among more than one, creating degree pathways the colleges themselves never designed. Even those who follow a more linear path will require more than one institution to reach the goal of graduation. Nationally, for example, 45 percent of all students who earn a bachelor’s degree begin their educations at a community college. In the larger states, that percentage is much greater (65% in California, 78% in Texas.) So students need to treat our institutions not as stand-alone entities, but as part of a larger ecosystem of higher education through which they can navigate to their education and employment goals. These same institutions, however, often have uncoordinated, even conflicting expectations and policies, creating obstacles rather than pathways for students. Again, transfer offers a useful example.

Recently, a large community college in a major urban area was pilloried in public for having a low Associate of Arts graduation rate. Yet, a review of all of the senior institutions to which local students might transfer in the region revealed that not a single one required or even advised that a student complete the A.A. degree prior to transferring. In fact, most strongly encouraged students to take as few courses as possible at the community college prior to transferring. (This in spite of solid evidence that students who transfer after earning the A.A. degree fare much better than those who transfer only with some accumulated credit.) That same community college’s transfer and graduation rate was ten times higher than just the graduation rate. The students were following the pathway we, inadvertently, created for them.

By contrast, there are now several large-scale models of transfer consortia (northern Virginia, central Florida) where completion of the associate’s degree is highly incented prior to transfer, resulting in dramatically higher graduation rates at the community college, higher success rates at the baccalaureate level, and serious cost savings to both the state and the student. And, just to complete the story, the college in the example above has catalyzed the creation of such a consortium in its region.

Just as importantly as the transfer function is the need to understand all of the postsecondary technical and workforce programs as part of a larger ecosystem of employers, economic development agencies, local government leadership, and others. For them to succeed at putting people into jobs with a future, they need to be deeply partnered with employers and others on the design, support, and delivery of programs with real opportunity for completers, and with real work experience much more tightly woven into the learning program.

College Students with Purpose. This issue strikes at two related challenges. The first is aligning student aspirations and program selection to real opportunities and
needs in the community. As mentioned earlier, the challenge to grow STEM majors is still largely unmet, yielding just one example of the looseness of the coupling between student decisions about their educations and the needs of our society. Just as serious are concerns about the future of highly-skilled workers in manufacturing, metal-working, and advanced trades of all types. Further, while the recession and slow recovery have masked the larger reality, an essential medium- to long-term challenge for our economy is the certainty of deep, pervasive shortages of highly-skilled workers driven by simple demographics with the aging and retirement of the boomers. Given this, it is hard not to reach the conclusion that we are over-producing massage therapists and chefs and under-producing engineering technologists and software engineers.

The other challenge connects this issue of purpose with those described above (readiness and completion). After years of inquiry into the success patterns of our students, it is quite clear that one of the strongest predictors of their performance is a sense of purpose. Students who know clearly what they are in college to accomplish have a much higher success rate, whatever their background. Most, however, lack this clarity. And our colleges and universities have not undertaken to design and scale curricular pathways that intentionally move students toward clarifying purpose and translating that purpose into a plan for their education. To even suggest such a model rattles traditional academia, since these curricular experiences would necessarily be competing for a place in the curriculum with more traditional disciplines.

Opportunity and Equity. This has been a constant challenge to the promise of American higher education for some 50 years. In recent times, however, it has moved from just a question of who gets into a given institution to a much more robust concern with equity in educational outcomes. The question, in fact, isn’t just who gets to be a freshman, but who gets access to the professions, to societal leadership, to real economic opportunity because, in part, of their excellence in higher education. The persistence of wide gaps in academic performance of groups from different ethnicities and socioeconomic status continues to trouble all of higher education. But there is reason to hope. A number of institutions have taken on the challenge to close gaps in achievement and shown remarkable success.

Important to this issue is to recognize that even the best efforts of the selective and higher cost institutions cannot solve this problem. They simply don’t have the scale. Again, however, the “ecosystem” of higher education could, if consortia of colleges and universities set out together to do so. Historically black colleges and universities (HBCUs), Hispanic Serving Institutions (HSIs), community colleges, and many for-profit colleges have models of engagement with these underrepresented students that are getting exceptional results. By connecting them more powerfully to baccalaureate and professional schools more tightly, providing guaranteed pathways for these students and reducing risk and cost for them, the goal of diversifying the professions may not seem so remote. But this is precisely where traditional financial aid models fall short. For example, the amount of aid provided by states for incoming college freshmen dwarfs what is available to transfer students, though transfer scholarships would leverage a real increase in the diversity of baccalaureate graduates.
Where will we find solutions?

Collaboration. We need to think differently about our immensely diverse higher education systems. This diversity, just like biological diversity, is a strength, but only if productively connected to the larger ecosystem. Creating ways for students to navigate intelligently and without penalty across institutional boundaries will greatly increase the productivity of the system. Policymakers may want to consider performance incentives that indicate this kind of collaboration. They may want to require institutions to go beyond articulation of credit to clear delineation of educational pathways.

Data and Metrics. Good information is the coin of the realm for all reform efforts. While the protection of private information is essential, it is time to work past this as a technical concern and commit to a national student unit-record database that allows for accurate assessment of student progress throughout the system. Only when the data are federated will the real power of analytics be available to higher education for improving learning and success. Further, the current practice and discussion of institutional performance measures is crude and noisy. What is needed is a nuanced system of measures that relates performance to mission, thus tuning performance measures in a way that challenges institutions to genuine excellence that is always defined in terms of mission. And as mentioned above, some of these measures should focus on the ecosystem outcomes, not just individual institutions.

Alignment for Readiness. It is time to demand that a high school diploma assures that a student is college and/or career ready. It remains to be seen whether the “Common Core” will accomplish this. A beginning could be to align the assessment system that will accompany the Common Core to college and career competency. But deeper work than this is needed, especially in the area of quantitative reasoning and mathematics.

Financial Aid. The federal financial aid system has underwritten opportunity for countless students and contributed greatly to diversity. However, it is hopelessly out of date with the way students really need to attend to their postsecondary learning. It fails to reward success and academic momentum and it curtails flexibility and innovation with byzantine bureaucracy and rules that prohibit the use of demonstrably successful models of learning, such as competency-based models and mastery-based models with flexible time to completion. It is time for an overhaul with an eye to what works for student learning and success.

Conclusion

The cauldron of reform is boiling at every level of higher education and many colleges are demonstrating that we can achieve dramatically improved results with a more diverse and challenged student population, even with constrained resources. And that, of course, is all we have to do.
There are two major discussions emerging from higher education. The first is the dual challenge of increasing completion rates while reducing the cost of instruction. The second is about the impact of technology on higher education, a topic brought to the fore in the past two years by the Massive Open Online Course (MOOC) phenomenon. The question of how technology is (or should be) transforming higher education sits at the intersection of these two discussions.

American higher education today faces multiple challenges that are at once immense and vexing. Global demand exceeds capacity. The achievement gap between rich and poor is widening. Institutions of higher education are seeing an increasing variability in the student population's background knowledge, relevant skills and future goals. Tuition and fees are outstripping inflation at an alarming rate. Students who are most in need of a degree have unacceptably low completion rates. The nation needs graduates who have developed the knowledge needed not only to be employed but also to be reasonably informed citizens participating in a democracy. It is tempting to hope, given the public attention and scale of MOOCs, that they offer the solutions to these complex challenges.

Aside from the media hype, there are two reasons that MOOCs have garnered public attention over the past two years. The first is that faculty and administrators at prestigious universities have offered, for free, access to knowledge, in the form of online courses, that was previously only available to very few individuals. The second is the surprising response to that offer—millions of people around the world have shown the interest, motivation and ability to participate in these courses.

MOOCs clearly meet an unmet need for millions of learners; however, MOOCs have been most successful with people who are already well educated. MOOCs work well for learners who have the foundation knowledge required to follow a university level course and who already view themselves as competent learners. One of the strengths of the U.S. higher education system is the diversity of the eco-system—the range of institutions that differ in target student population, program goals and pedagogical approach. If MOOCs, in their current form, are seen as a way to provide more cost-effective access by replacing more labor intensive forms of instruction, there is a risk that such access will widen rather than narrow the attainment gap.

There are, at least, three additional positive opportunities in the MOOC phenomenon that could, if reshaped appropriately, help address the dual challenge of cost and attainment.

The first is that MOOCs have rekindled an interest in teaching. Many faculty, who have created MOOCs, have been excited to reach thousands of students and
have been equally excited to learn how to make the course and their teaching better.

The second opportunity is being able to disaggregate the traditional instructional format into a set of activities, some of which can be enacted by a computer. Educational technology can provide more benefits than simple convenience and broad access to materials. Computer simulations allow students to explore complex ideas and phenomena at different scales of size and time. Students can experiment with the processes of chemical reactions, experiment with equilibrium at the molecular level, rotate crystalline structures, build and test the strength of bridges or intervene in complex eco-systems or population dynamics. The networking power of technology has also been leveraged to provide learners with access to a much wider pool of expertise.

The third opportunity is to collect meaningful data to improve the instructional environment and the basic understanding of human learning. People in all segments of the education system are becoming acutely aware of the need to make data-driven decisions at every level. The data that are needed to support such decision-making are collected, stored and analyzed in multiple repositories and at multiple levels of granularity. Forming data-based recommendations on program design, course design or a specific learning intervention given an individual’s context, demographics, behavior patterns and knowledge states will require discovering and analyzing patterns across all levels of data.

As the rush to go online continues, many discussions of MOOCs and other educational technology grow into debates about the value of online learning compared to traditional face-to-face instruction. Not surprisingly, the literature supporting that debate reports conflicting results, largely because “Is online education as good as (or better than) traditional education?” is the wrong research question. The right research question is “How can the technology be used most effectively to support and accelerate efforts to dramatically increase student learning, progress and completion?”

The technical questions that have been raised by the MOOC phenomenon have centered largely around the scaling of delivery, the certification of knowledge, authenticating the identity of the user, and business models—business models for the MOOC providers and the implications for the business model of the traditional colleges and universities.

As MOOCs have focused attention on these questions, other educational technology projects, such as the Open Learning Initiative (OLI), have been exploring a different set of questions regarding higher education and technology. OLI and other projects have been investigating how to use learning theory and technology to design effective instructional environments. In collaboration with multiple community colleges, liberal arts colleges, regional colleges and research universities, the OLI has also explored how to blend multiple resources such as computers, human experts and networks of peers to provide effective instruction.

Using intelligent tutoring systems, virtual laboratories, simulations, and frequent opportunities for assessment and feedback, the OLI teams built courses that were intended to support the kind of dynamic, flexible, and responsive instruction that fosters learning. The OLI course development process engaged faculty from multiple institutions, students, learning science researchers, human-computer interaction ex-
experts, and software engineers in the collective development, delivery, evaluation and continuous improvement of learning environments. This approach required a switch from a purely individual, intuitive approach to an evidence-based collaborative approach for course development, delivery, assessment and research. An advantage to the team approach was that it yielded effective courses. One of the limits of the OLI environment was that it did not provide easy-to-use tools or structures that supported data-driven adaptation of the courses by individual faculty or institutions.

Learning is complex. To adapt, replicate and scale effective instruction, faculty need better theories of learning to inform both teaching practice and the design of educational technology. To develop better theories, learning researchers need more data from more students in more contexts. The synergistic relationship between OLI and the National Science Foundation (NSF) funded Pittsburgh Science of Learning Center (LearnLab) is an example of how traditional institutions of higher education can leverage the dual mission of research and teaching to create a virtuous cycle for continuous improvement in teaching and learning. OLI development teams used results from LearnLab research to drive the design of the educational technology, and the OLI technology collected the data that LearnLab researchers needed in order to articulate and refine theories of human learning.

The OLI courses include many activities that capitalize on the computer's ability to display simulations and to promote interaction. Many of the courses include virtual lab environments that encourage flexible and authentic exploration.

Perhaps the most salient feature of OLI course design is found in the intelligent and quasi-intelligent tutors embedded within the learning activities throughout the course. An intelligent tutor is a computer program whose design is based on cognitive principles and whose interaction with students is based on that of a good human tutor, that is, making comments when the student errs, answering questions about what to do next, and maintaining a low profile when the student is performing well. The tutored learning activities differ from traditional computer-aided instruction in that traditional instruction gives didactic feedback to students on their final answers, whereas the tutors provide context-specific feedback at each step in the process.

The assessments, interactive activities, and tutors in OLI courses were designed to provide support and feedback to students, but they had an additional purpose: they collected data. With the students' permission, the OLI system digitally recorded interaction-level detail of student learning actions in all courses and labs.

The data in the OLI system were collected at a fine grain size and semantically tagged in order to support research and improvement in instruction. The OLI system dynamically analyzed the student activity in real time against an underlying knowledge model. After each student action, the system immediately updated the model of that student's knowledge state. The data collected from all student actions were presented in different forms as feedback to different users of the system so that: 1) Learners could refine their performance; 2) instructors could make choices about how to use their class or contact time; 3) course and environment designers could refine in-
structural task design and learner-specific system adaptations; and 4) learning researchers could develop and refine explanatory models of student learning.

Such reports, and the data and analyses that feed them, enable adaptive management and radical improvement of the teaching and learning process. The student learning data collected by the OLI system, for example, were presented to an instructor for the students in his or her course via the Instructor Learning Dashboard. The Instructor Learning Dashboard presented the instructor with a real-time estimate of student learning for each learning objective in the course. The learning dashboard was quite effective in giving faculty insight into the knowledge state of their students. Building the knowledge models that drive the dashboard, designing the representation of data to provide actionable information to students and faculty, and designing the processes to support students and faculty to use the dashboards effectively all continue to be areas of ongoing research.

All networked online learning environments can collect massive amounts of student interaction data; however, the insights into student learning that can be gleaned from that data are limited by the type of interaction that is observable and by the semantic tagging of the data generated by the interaction. The current MOOC platforms and many traditional learning management systems collect click-stream data that can measure frequency and timing of student log-ins, correctness (or incorrectness) of student responses, and the chattiness of individual students.

While the data collected by most MOOCs and learning management systems may be used to predict which students are likely to complete the course, they do not explain if or how learning is occurring. Although vast amounts of student data are being collected in MOOCs, the data lack the finer grained task information and semantic tagging that are needed to provide insight into student reasoning, problem solving or learning.

The MOOCs have made progress on how to scale the delivery of some forms of instruction for some students, how to collect and mine massive amounts of data, and how to re-engage some faculty in the conversation of teaching and learning. The OLI project and other learning technology projects have made progress in how to leverage learning research to inform the design of educational technologies to serve a diversity of students; how to structure the collection and analysis of data to support improving instruction and refining learning theory; and how to engage faculty in transforming teaching and learning. The next phase of research and development in the use of technology in higher education can build on what has been learned from all of these approaches.

Ongoing research and adaptive management in designing learning environments is critical because the context is in flux. The subject knowledge that students are expected to master is growing, the number and complexity of skills that students are expected to develop is growing, the number of students who are expected to achieve a college degree is growing, the diversity in the student population is growing, the scientific understanding of how people learn is growing, and the technology and the way people are using technology is changing rapidly. Information technology can offer ways of creating, over time, a complex stream of data about how students think and
The United States higher education system is a complex system with a diversity of institutions, contexts, student populations and goals. The transformation of the nation's higher education system will be a multi-institutional, multi-year research and development process. Critical to that process is the collection, analysis and use of student learning data, both to enable ongoing basic and applied research in human learning and to support adaptive decision-making. An immediate action that the federal government could take is to facilitate the research and development of a digital infrastructure for collecting and managing student learning data for the public good, while ensuring student privacy.

---

1 OLI is the project that I founded and directed at Carnegie Mellon University. OLI was an open educational resources project that began in 2002 with a grant from The William and Flora Hewlett Foundation. Over its eleven-year history, the project received funding from multiple additional foundations including the Bill and Melinda Gates Foundation, The Kresge Foundation, The Lumina Foundation, and the Spencer Foundation.
Figure 1: Instructor’s Learning Dashboard from a module in the OLI Statistics course. Unlike reports from traditional course management systems, the Learning Dashboard presents instructors with a measure of student learning for each learning objective. The dashboard also provides more detailed information, such as the class’s learning of sub-objectives, learning for individual students, and the types of tasks with which the students are struggling the most.
"The central premise of Moneyball is that the collected wisdom of baseball insiders (including players, managers, coaches, scouts, and the front office) over the past century is subjective and often flawed. Statistics such as stolen bases, runs batted in, and batting average, typically used to gauge players, are relics of a 19th-century view of the game and the statistics that were available at the time. The book argues that the Oakland Athletics' front office took advantage of more analytical gauges of player performance to field a team that could compete successfully against richer competitors in Major League Baseball."

The United States is by no means the Oakland A's of R&D. This country spends more than any other, has more Nobel Laureates, and is the unquestioned global leader in science. But even while other countries are spending more on R&D, purse strings are tightening in the United States, and taxpayers want to know that their money is well spent. The core questions to be answered in managing science—or baseball—are: What are the returns? And how can we improve them?

Answers to the first question are patchy. Serious academic work suggests that the private returns to R&D investment in firms average around 20 to 30%, and the social returns are roughly twice that. Other work attributes much of productivity growth in the 1990s to investments in information technology, which were driven at least partly by investments in basic research. Using a broad brush, the American Association of Universities draws a dotted line between research grants and the invention of the Internet and the World Wide Web, MRI's, MP3 players, and Global Positioning Systems. But by and large, science investments are based on subjective decisions and, often, flawed data. A major reason is that there is no systematic answer to the very specific question of the link between federal R&D and economic growth. As Federal Reserve chairman Ben Bernanke has pointed out, scholars do not know much about how federal support for R&D affects economic activity. Indeed, as the cartoon would have it, after research is funded "a miracle occurs" and vignettes abound: the National Science Foundation (NSF) routinely cites funding to Larry Page and Sergey Brin to claim credit for Google; the Department of Defense (DOD) takes credit for developing the internet; the National Institutes of Health (NIH) makes much of the value added of the human genome project. Alas, these vignettes can strain credulity: the NIH website cites, for example, a report that claims a leverage ratio of as much as $176 for every dollar invested in the human genome project! Federal agencies can and should be much more explicit about the miracle next step after research since policymakers still don’t know whether or...
which research leads to economic growth. As the *Nature* writer, Colin MacIlwain has pointed out, the evidence for such connections is “patchy.”

The United States government must and can do better: you cannot manage what you cannot measure, whether it’s baseball or science. Understanding how returns are generated can offer new ways to increase returns. That requires looking at the three reasons why there is so little information on returns to federal research investments: an inappropriate conceptual framework, limited information on what is funded and with what results, and inadequate analysis. In turn, government can do three things to deepen understanding of the returns to R&D investments—and, hence, improve returns: better framework, better measurement, and better analysis.


**Background.** Federal science agencies use an inappropriate unit of analysis to document the returns to research. This is not surprising: their mandate is to manage research. Their focus is the grant, and research administrators spend much time and energy trying to link research grants to research outputs. This is the wrong framework to use: documents don’t do science, people do science. Science is not a slot machine wherein funding generates results in nice tidy slices in three- to five-year time intervals. In fact, research ideas—the black box between research funding and results—are transmitted through networks in long, circuitous and often non-linear fashion, over quite long periods. So the right framework begins with identifying the right unit of analysis—people—and examining how research funding builds public and private networks. The evidence is clear that people and networks are the drivers of innovation: the vibrant growth of Silicon Valley, Boston, San Diego and the Research Triangle was driven by each region’s research institutions and the people within them. Thorough analysis increasingly points to the importance of intangible flows of knowledge, such as contacts at conferences, business networking, and student flows from the bench to the workplace.

Current federal data systems are not up to the task: when the American Recovery and Reinvestment Act (ARRA) was passed, agencies and universities spent hundreds of hours every quarter finding out how many people were supported by each award.

**Building a better framework.** Universities and agencies—recognizing the need for accountability—are starting to build people-centered data systems, largely inspired by the STAR METRICS’ project. The data show for the first time the building blocks of research at the *project level*: showing the people who do the work and the firms who supply the scientific equipment. The approach avoids manual, burdensome reporting, and uses existing data drawn from the human resource records and financial reports of universities. It provides detailed insights into the production of science (see Figures 1 and 2 for examples of the types of data that can be generated). But, as is often the case with voluntary activities, coverage is patchy: only about half the universities and no national labs have signed up for the endeavor. A large part of the reason is that the data systems are set up to manage research, not to respond to the increasing demands of stakeholders to document what is funded and why.

**Policy Implication:** A clear path exists to build much better information about the production of science. The approach has
been successfully implemented by over 100 universities, and is beginning to be emulated overseas. Keeping a voluntary, collaborative system is critical, but strong congressional support will help foster and expand the program.

Better Measurement: What is the Money Spent on, and with What Results?

Describing what is funded and the results of funding is a precondition to estimating rates of return.

Background on what research is done. There is quite limited information on what research is funded by the federal government. A report by the National Research Council laments:

Two surveys...provide some of the most significant data available to understand research and development (R&D) spending and policy in the United States. [B]udget officials at science agencies, Congress, and interest groups representing scientists, engineers, and high technology industries, among others, constantly cite the survey results—or studies based on those results—in making public policy arguments. However, the survey data are of insufficient quality and timeliness to support many of the demands put on them. [T]he information provided to SRS is often a rough estimate, frequently based on unexamined assumptions that originated years earlier.” (National Research Council 2010, p. 1, emphases added)

Individual agencies do little better: NSF (http://www.research.gov/) and the NIH (http://projectreporter.nih.gov/reporter.cfm) are very useful tools for capturing information about individual awards, but do not provide a good overview of the funding landscape.

Building better measurement. Federal agencies still use 20th century tools in the 21st century—they rely on people filling out forms to figure out what science is being done and with what results. Agencies can do better: they can use the same algorithms that Google uses to describe the landscape of so much written text and apply machine learning to describe science. One such approach—topic modeling—has been successfully used to describe scientific research portfolios in France and the United States. For every project that is funded, there is some written description of what is funded: science agencies could use machine learning to use the words scientists themselves use to describe their science and identify topics, just like Google uses the words in text documents to identify topics of interest for web search. The scientific topics can be used to better understand the extent to which a field of research is supported by then linking topics to awards, be used to identify gaps and trends, and inform the alignment of research priorities. Science agencies can and should build tools that can track the path from research grants to the growth of scientific networks to commercialization: tools that could make a valuable connection between basic research, applied research, technology development, and technology deployment.

Background on results. There is still very limited information about the results of research funding—few answers to questions like “What have we learned about NSF-funded research?” and “What is the economic impact of research funding?” One example of the government’s interest in finding out more, the E-Government Act of
2002 requires federal agencies documenting R&D investments to develop policies to better disseminate the results of research performed by federal agencies and federally funded research and development centers. Another example is when Congress asked how the Science of Science Innovation Policy program (SciSIP)—and STAR METRICS—was providing information about scientific knowledge (such as publications and citations), social outcomes (such as health and environment), economic growth (through patents, firm startups and other measures), and workforce outcomes (through student mobility and employment) [17]. As Rep. Daniel Lipinski, then chairman of the Research Subcommittee of the Science, Space and Technology Committee noted,

"While many of us would agree that science has had a positive impact on our lives, I think we actually know very little about how the process of innovation works. What kinds of research programs or institutional structures are most effective? How do investments in R&D translate to more jobs, improved health, and overall societal wellbeing? How should we balance investments in basic and applied research? With millions of Americans out of work, it becomes more critical than ever that we find answers to these questions."

**Building better measurement.**

Fortunately, it is now becoming possible to also use new computational technologies to capture information on research outputs. Because so much knowledge is transferred through personal communication, among the most important research products now are the training and placement of students and postdoctoral fellows: information on these pathways can now be routinely captured through such activities as STAR METRICS. In addition, research products are increasingly both digital and accessible via the Web, making it possible to obtain much relevant information via Web scraping and automated inference. All U.S. patents granted since 1976 are available in digital form. So are the metadata, and often the full text, for many research publications. Catalogs of other research products, such as datasets, are slowly emerging. Researcher Web pages and CVs, whether created manually or via automated systems like those developed by the VIVO project are also valuable sources of information. The ScienCV (a common federal scientific CV) project being developed by a federal interagency group can also be used to allow researchers to describe their scientific contributions. Eventually these data could be used to build innovation portals, like those developed by the Brazilian science agency.

The research community has already started to describe outputs by linking multiple outputs—such as the patent and patent-application database developed by the University of California-Berkeley researcher, Lee Fleming; publication data at universities and on the web; and dissertation data from public sources—to STAR METRICS data from 13 major universities and the California Institute of Technology, as a result of a collaboration initiated in March of this year. In addition, information on the activities of scientific teams (faculty, graduate students, postdoctoral students) subsequent to funding will be derived (of course, for statistical purposes only and confidentiality protected) by matches to Census Bureau records that provide summary information on starting salaries and career earnings, firm and industry placement, firm startups, and firm productivity growth.
**Policy Implication:** This work is potentially path-breaking because it directly links R&D funding (what is funded) to results. Demonstrated and strong congressional interest in building tools that demonstrate what is funded with what results, and in supporting large-scale, comprehensive statistical analysis of scientific, social and economic impact, will help science agencies know what to focus on in their interactions with Congress.

**Better Analysis: An Independent Analytical Community and Voice**

The science advisor to President Bush, Jack Marburger, pointed out the need for better analysis with his usual eloquence:

“The inevitable absence of policy discipline in U.S. federal government decision-making creates an imperative for some system of public education that fosters rational policy outcomes. The existence of an academic field of science of science policy is a necessary precondition for such a system. Policies can be formed and carried through rationally only when a sufficient number of men and women follow them in a deep, thoughtful, and open way. Science policy, in its broadest sense, has become so important that it deserves the enduring scrutiny from a profession of its own. This is the promise of the academic discipline of the science of science policy.”

Baseball has the venerated field of sabermetrics. The National Science Foundation’s equivalent is the Science of Science Innovation Policy program, which has provided support for the development of an analytical community. But baseball also established the Society for American Baseball Research (SABR), with a baseball databank and an army of enthusiasts. The same should be done for the analysis of federal R&D. An independent institution would bring together the world’s best researchers to conduct and catalyze path-breaking research on the links among investment in R&D and innovation, productivity, and economic growth. Researchers could make use of frontier computational and statistical approaches to combine (i) existing data from science funders on what has been funded, (ii) existing data from research organizations on who has been funded and other key inputs into the production of science, and (iii) new types of data on research results from wide-ranging online, administrative and statistical sources.

**Policy Implication:** Congress could charter an independent institution that would provide the United States with a strong impartial voice providing scientific evidence on the returns to research and development. Such an institution does not currently exist. Instead, science agencies are mandated to identify and fund the best science, universities have research and education missions, and others are seen as science advocates rather than as impartial experts. There are ample precedents beyond SABR. The National Bureau of Economic Research has become the national voice for unbiased scientific economic research, without policy recommendations. Similarly, the Peterson Institute provides nonpartisan, objective evidence on international economic policy.

**Summary**

Maintaining and expanding the United States lead in R&D requires building a better understanding of the returns to R&D investments. The U.S. science community has taken major steps forward in using 21st century approaches to create a better frame-
work, build better approaches to measurement and create a community to do better analysis. The results should be a new “Moneyball” approach to research funding: better results for less money and for happier taxpayers. Congress can ask federal agencies to adopt less burdensome, higher quality, approaches to reporting that uses the right unit of analysis—people not documents. It can insist that 21st century tools be developed, and high quality statistical analysis be commissioned to describe what science is funded and with what results. And it could charter an independent institution to provide impartial, evidence-based information about what works and what doesn’t—using the best scientists in the world to provide answers to the important questions of what are the returns to R&D, and how can we improve them.
This paper draws heavily on work with too many colleagues to count, including Erling Barth, Nosh Contractor, Ian Foster, Danny Goroff, Paul Jensen, John King, Jacques Mairesse, David Newman, Jason Owen-Smith, Rebecca Rosen, Joshua Rosenbloom, Lou Schwarz, Paula Stephan, and Bruce Weinberg.

1 http://en.wikipedia.org/wiki/Moneyball
4 http://www.flickr.com/photos/skepticalist/4372728626/
5 The AAU refers to the return on investment from NSF’s original grant to Google as bigger than the “ratio of the red dot to the white circle” www.aau.edu/WorkArea/DownloadAsset.aspx?id=11556
6 The Impact of Genomics on the U.S. Economy, Prepared by Battelle Technology Partnership Practice for United for Medical Research, June 2013
7 Science and Technology for America’s Reinvestment—Measuring the Effects of Research on Innovation, Competitiveness, and Science
8 See, for example, http://inca.preprod.disko.fr/#/map/projects login: projects / Projects2012
9 See http://rd-dashboards.nitrd.gov/
11 See for example http://rd-dashboards.nitrd.gov/
12 www.vivoweb.org
13 http://rbn.nih.gov/profile_project.htm
15 For more information, see http://rd-nih.gov/login?login=public&email=projects Username = starmetrics, Password = iC3mc26#
16 http://sites.nationalacademies.org/DBASSE/CNSTAT/CurrentProjects/DBASSE_072054
17 www.nber.org
18 http://www.iie.com/

For further reading

References


<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of Transactions</th>
<th>Expenditures in Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and Development in the Physical Sciences</td>
<td>38</td>
<td>$1,654</td>
</tr>
<tr>
<td>Analytical Laboratory Instrument Manufacuretes</td>
<td>49</td>
<td>$61,464</td>
</tr>
<tr>
<td>Semiconductor and Related Device Manufacuretes</td>
<td>73</td>
<td>$3,672</td>
</tr>
<tr>
<td>Electronic Computer Manufacuretes</td>
<td>49</td>
<td>$6,331</td>
</tr>
<tr>
<td>Electronic Magnetic Ferromagnets Product</td>
<td>8</td>
<td>$189</td>
</tr>
<tr>
<td>Biological Product (Except Diagnostic) Manufacuretes</td>
<td>73</td>
<td>$2,480</td>
</tr>
<tr>
<td>Pharmaceutical Preparation Manufacurete</td>
<td>12</td>
<td>$629</td>
</tr>
<tr>
<td>Testing Laboratories</td>
<td>100</td>
<td>$8,312</td>
</tr>
<tr>
<td>Commercial Banking</td>
<td>2</td>
<td>$4,616</td>
</tr>
<tr>
<td>Other Professional Equipment and Supplies</td>
<td>121</td>
<td>$3,386</td>
</tr>
</tbody>
</table>
Overview of U.S. Higher Education

Aspen Institute Congressional Program
October 4-7, 2013
Enrollment in U.S. higher education, 1870-2010

And timeline of significant federal investments in access


**Morrill Land-Grant Acts of 1862 & 1890**

**GI Bills of 1944 & 1952**

**Higher Education Act of 1965**

**Veterans Readjustment Act of 1966**

+ Amendments of 1972, established Pell Grant & Federal Student Loan programs

(Growth of community colleges)
Enrollment in U.S. higher education in 2011 by sector

Enrollment in 2-year vs. 4-year institutions (all institutions, public & private)
- 2-Year: 36%
- 4-Year: 64%

Enrollment in public vs. private institutions (all institutions, 2 & 4-year)
- Public: 72%
- Private for-profit: 9%
- Private non-profit: 19%

Average Published ("Sticker") Price and Net Price, by sector*
1990-91 through 2012-13

*Price includes tuition & fees plus room & board; net price is published price minus grant aid and tax benefits

SOURCE: The College Board, Annual Survey of Colleges; Trends in Student Aid 2012
Undergraduate Student Financial Aid by Source & Type, 2011-12
(in billions)

SOURCE: The College Board, Trends in Student Aid 2012
Total Undergraduate Student Financial Aid, by source (in millions)
1990-91 through 2010-11 (in 2011 dollars)

SOURCE: The College Board, Trends in Student Aid 2012
Undergraduate Financial Aid per Full-Time Equivalent Student
1996-97 through 2011-12 (in 2011 dollars)

FTE = Full-Time Equivalent student, a standardized measure of enrollment
based on normal full-time course load during an academic period

SOURCE: Trends in Student Aid website (trends.collegeboard.org), Tables 3A and 3B.
Federal Investments in University-Based Research & Development in FY 2011

<table>
<thead>
<tr>
<th>Federally funded higher education expenditures in FY 2011, by granting agency</th>
<th>(in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOD</td>
<td>4,831,041</td>
</tr>
<tr>
<td>DOE</td>
<td>1,868,521</td>
</tr>
<tr>
<td>HHS</td>
<td>22,988,091</td>
</tr>
<tr>
<td>NASA</td>
<td>1,430,307</td>
</tr>
<tr>
<td>NSF</td>
<td>5,133,663</td>
</tr>
<tr>
<td>USDA</td>
<td>1,006,322</td>
</tr>
<tr>
<td>Other</td>
<td>3,506,878</td>
</tr>
<tr>
<td>Total</td>
<td>$40,764,823</td>
</tr>
</tbody>
</table>

Public University Revenues in FY 2011, by source

Revenues of public universities in FY 2011

- State & Local appropriation: $129,080,485 (40%)
- Other revenues: $104,687,936 (32%)
- Tuition and fees: $60,240,671 (19%)
- Federal grants and contracts: $29,808,728 (9%)
- Includes federal financial aid (Pell, loans, etc.)

Higher Education and Workforce Projections

Of the 55 million job openings between 2010 and 2020:

- 7 million (12%), Less than a high school diploma
- 13 million (24%), High school diploma
- 5 million (10%), Postsecondary vocational certificate*
- 10 million (18%), Some college, no degree
- 13 million (24%), Bachelor’s degree
- 6 million (11%), Master’s degree or higher
- 7 million (12%), Associate’s degree

Biographies

Sandy Baum is a research professor at the George Washington University Graduate School of Education and Human Development, a senior fellow at the Urban Institute, and professor emerita of economics at Skidmore College. She has co-authored the College Board’s annual publications Trends in Student Aid and Trends in College Pricing since 2002. She also co-authors Education Pays: The Benefits of Higher Education for Individuals and Society. Baum chaired the College Board’s Rethinking Student Aid study group, which issued comprehensive proposals for reform of the federal student aid system in 2008, and the Rethinking Pell Grants study group, which issued recommendations in April 2013. She is a member of the Board of the National Student Clearinghouse, a source for education verification and student educational outcomes research. Baum has a bachelor’s degree in sociology from Bryn Mawr College, where she is a member of the board of trustees, and a doctorate in economics from Columbia University.
Dr. Sandy Baum, Senior Associate, Institute for Higher Education Policy, 1825 K Street, N.W., Suite 720, Washington, DC 20006; 202-861-8223; sbaum@skidmore.edu

Anthony Carnevale is the director and research professor of the Georgetown University Center on Education and the Workforce. He previously served as vice-president for public leadership at the Educational Testing Service; director of human resource and employment studies at the Committee for Economic Development; and was founder and president of the Institute for Workplace Learning. Carnevale also served as director of political and government affairs at the American Federation of State County and Municipal Employees and as a senior staff member in both houses of the U.S. Congress. He has received appointments under Presidents Bush, Reagan and Clinton. Carnevale worked as a research economist with the Syracuse University Research Corporation. During that time, he co-authored the principal affidavit in Rodriguez v. San Antonio, a U.S. Supreme Court action to remedy unequal tax burdens and education benefits. This landmark case resulted in significant fiscal reforms. Carnevale has a bachelor’s degree from Colby College and a doctorate in public finance economics from the Maxwell School at Syracuse University.
Dr. Anthony Carnevale, Research Professor and Director, Georgetown University Center on Education and the Workforce, 3300 Whitehaven Street, NW, Suite 5000, Washington, DC, 20007; 202-687-4971; cew@georgetown.edu
Kristin Conklin is the founding partner of HCM Strategists, a policy and strategy firm that works with non-profit clients. Her work focuses on higher education policy and strategy development at the state and federal levels. Conklin served at the U.S. Department of Education as senior advisor to the Undersecretary of Education, where she helped develop an action plan that led to changes in the high school graduation rate regulation and the largest single-year increase in Pell Grants in more than thirty years. As program director in the education division of the National Governors Association, she supported the 2006 National Education Summit on High Schools and developed a $23.6 million grant initiative to support gubernatorial leadership for high school reform. She also directed the Washington, DC, office of the National Center for Public Policy and Higher Education, where she led the technical work behind a comparative fifty-state report card on higher education performance. A Pell Grant recipient and the first college graduate in her family, she has a bachelor’s degree from California Polytechnic State University and a master’s degree in public policy from Georgetown University. A wife and mother of two daughters, Conklin resides in McLean, Virginia. 

Kristin Conklin, Founding Partner, HCM Strategists, 1156 15th Street, NW, Suite 850, Washington, DC, 20005; 202-577-2222; kristin_conklin@hcmstrategists.com

Rep. Jim Cooper is serving his twelfth term representing Tennessee’s 5th district, which includes Nashville. He serves on the Armed Services and the Oversight and Government Reform committees. Cooper was an attorney before his election to Congress. He has a bachelor’s degree in history and economics from the University of North Carolina at Chapel Hill, earned a bachelor’s and master’s degree in politics and economics as a Rhodes Scholar at Oxford University, and a juris doctorate from Harvard Law School.


Martha Bryan Hays Cooper is married to Rep. Jim Cooper. A community activist and advocate for environmental issues and land preservation, she serves on the Tennessee Conservation Commission and is on the board of directors for the Greenways for Nashville. During her career, Cooper worked as a research assistant in the bird division for the Smithsonian Institution Museum of Natural History and later for the assistant secretary for external affairs at the Smithsonian Institution. She was also a researcher and field guide studying the birds of North America with the National Geographic Society, and worked at the World Wildlife Fund. Jim and Martha Cooper have three children. A native of Gulfport, Mississippi, Cooper has a bachelor’s degree in biology from Sweet Briar College and a master’s degree in zoology from Mississippi State University.
Rep. Susan Davis is serving her seventh term representing California’s 53rd district, which includes San Diego. She serves on the Education and the Workforce Committee and is ranking member of the Armed Services Subcommittee on Military Personnel. Before her election to Congress, Davis was a member of the California General Assembly, worked as a medical social worker, and served for nine years on the San Diego Unified Board of Education. She has a bachelor’s degree in sociology from the University of California at Berkeley and a master’s degree in social work from the University of North Carolina.

Rep. Susan Davis, U.S. House of Representatives, 1526 Longworth HOB, Washington, DC, 20515; 202-225-2040; cynthia.patton@mail.house.gov

Karl Eikenberry is the William J. Perry fellow in International Security at the Center for International Security and Cooperation and is a distinguished fellow with the Shorenstein Asia-Pacific Research Center at Stanford University. He is a member of the Commission on Humanities and Social Sciences established at the request of Congress. Eikenberry served as the U.S. Ambassador to Afghanistan from 2009 until 2011 and had a 35-year career in the United States Army, retiring with the rank of lieutenant general. He also served as Commander of the American-led Coalition forces from 2005–2007. He is a graduate of the U.S. Military Academy and has master’s degrees from Harvard and Stanford Universities and an advanced degree in Chinese history from Nanjing University. He is also the recipient of the George F. Kennan Award for Distinguished Public Service and Harvard University Graduate School of Arts and Sciences Centennial Medal.

Ambassador Karl Eikenberry, William J. Perry Fellow in International Security, Center for International Security and Cooperation, Stanford University, 616 Serra Street, Stanford, California, 94305; 650-723-9625; kweikenberry@stanford.edu

Rep. Anna Eshoo is serving her eleventh term representing California’s 18th district, which includes Palo Alto and Menlo Park. She serves on the Energy and Commerce Committee and is ranking member of the Subcommittee on Communications and Technology. Before her election to Congress, she served on the San Mateo County Board of Supervisors for 10 years. Eshoo has a degree in English literature from Canada College. She has two children.

John Etchemendy is the provost and a professor in the School of Humanities and Sciences at Stanford University. He was previously on the faculty at Princeton. Etchemendy is also a faculty member of the Symbolic Systems Program and a senior researcher at the Center for the Study of Language and Information. He is the author or co-author of seven books and numerous articles in logic, and has been co-editor of the *Journal of Symbolic Logic* and on the editorial board of several other journals. He has won a national award for leadership in the application of technology to teaching and learning, is on the academic advisory board for Coursera, and oversees Stanford's efforts in online education. Etchemendy is a member of the Western Association of Schools and Colleges regional accreditation commission. He has a bachelor's degree and master's in philosophy from the University of Nevada, Reno, and a doctorate in philosophy from Stanford.

Dr. John Etchemendy, Provost, Stanford University, Building 10, Stanford, California, 94305-2061; 650-724-4075; provost@stanford.edu

Michael Gilligan has served as president of the Henry Luce Foundation since 2003. From 1998-2004, he directed the foundation's theology program. The Luce Foundation includes grant-making programs that support higher education, American art, the environment, theology, women in science and engineering, and understanding Asia. Gilligan previously served in accrediting and leadership education at the Association of Theological Schools, as academic dean and professor of English at Pontifical College Josephinum, and as a teacher and administrator in the Catholic Diocese of Columbus, Ohio. Gilligan has a bachelor's degree from Duke University and a master's and doctorate in rhetoric and literature from the University of Virginia. He serves on the boards of the Council of Independent Colleges, the General Theological Seminary and the United Board for Christian Higher Education in Asia.

Dr. Michael Gilligan, President, Henry Luce Foundation, 51 Madison Avenue, 30th Floor, New York, New York, 10010; 212-489-7700; gilligan@hluce.org
Dan Glickman is vice president of The Aspen Institute and executive director of The Aspen Institute Congressional Program. He also serves as a senior fellow at the Bipartisan Policy Center where he is co-chair of its Democracy Project. Glickman served as U.S. Secretary of Agriculture in the Clinton Administration. He also represented the 4th Congressional district of Kansas for 18 years in the U.S. House of Representatives serving on the House Agriculture Committee and the House Judiciary Committee, and as chairman of the House Permanent Select Committee on Intelligence. Glickman is the former chairman of the Motion Picture Association of America, Inc. and former director of the Institute of Politics at Harvard University’s John F. Kennedy School of Government. Glickman has served as president of the Wichita, Kansas School Board; was a partner in the law firm of Sargent, Klenda and Glickman; and worked as a trial attorney at the U.S. Securities and Exchange Commission. He received his bachelor’s degree in history from the University of Michigan and his juris doctorate from George Washington University.

Dan Glickman, Vice President and Executive Director, Congressional Program, The Aspen Institute, One Dupont Circle, NW, Suite 700, Washington, DC, 20036; 202-736-5825; dan.glickman@aspeninstitute.org

Rep. Raúl M. Grijalva is serving his sixth term representing Arizona’s 3rd district, which includes Tucson. He is a member of the Committee on Education and the Workforce and is ranking member of the Natural Resources Committee’s Public Lands and Environmental Regulations Subcommittee. Before his election to Congress, Grijalva was director of the El Pueblo Neighborhood Center, chairman of the Tucson Unified School District Governing Board, a member of the Pima County Board of Supervisors, and assistant dean for Hispanic affairs at the University of Arizona. He has a bachelor’s degree in sociology from the University of Arizona.


Sen. Tom Harkin is serving his fifth term representing Iowa in the U.S. Senate. He is chairman of the Health, Education, Labor and Pensions Committee and is a member of the Appropriations, Small Business, and Agriculture committees. Before his election to the Senate, Harkin served as a U.S. Navy jet pilot from 1962-67, worked for a U.S. congressman, and as a Legal Aid attorney in Iowa. He served for 10 years in the U.S. House of Representatives. Harkin has a bachelor’s degree from Iowa State University and a juris doctorate from Catholic University Law School.

Sen. Tom Harkin, United States Senate, 731 Hart Building, Washington, DC, 20510; 202-224-3254; lindsay.jones@harkin.senate.gov
**Ruth Harkin** is married to Senator Tom Harkin. She served as the United Technologies Corporation senior vice president of international affairs and government relations and chair of UTC’s international representation arm from 1997-2005. Harkin has held senior positions with the Overseas Private Investment Corporation, the U.S. Department of Agriculture, and the Akin, Gump, Strauss, Hauer & Feld law firm. She is a member of the Iowa Board of Regents and previously served as the county attorney of Story County, Iowa. She has a juris doctorate degree from Catholic University Law School. The Harkins have two daughters and three grandchildren.

**Sen. Heidi Heitkamp** is serving her first term representing North Dakota in the U.S. Senate. She is a member of the Senate Agriculture, Indian Affairs, Banking, Small Business, and Homeland Security and Governmental Affairs committees. Before her election to the Senate, Heitkamp served as North Dakota’s attorney general and was a director of Dakota Gasification, a synfuels plant. She has a juris doctorate from Lewis and Clark College. Heitkamp and her husband have two children.

*Sen. Heidi Heitkamp, United States Senate, 502 Hart Building, Washington, DC, 20510; 202-224-2043; stacy_austad@heitkamp.senate.gov*

**Rep. Rush Holt** has represented New Jersey’s 12th district, including Princeton, Trenton and Plainfield, since 1999. He serves on the Committee on Education and the Workforce and the Committee on Natural Resources, where he is the ranking member on the Subcommittee on Energy and Mineral Resources. He has held positions as a teacher, Congressional Science Fellow, and arms control expert at the U.S. State Department. From 1989-1998 Holt was assistant director of the Princeton Plasma Physics Laboratory. He earned his bachelor’s degree in physics from Carleton College and his master’s and doctorate degrees in physics from New York University.

*Rep. Rush Holt, U.S. House of Representatives, 1214 Longworth HOB, Washington, DC, 20515; 202-225-5801; email: andrew.black@mail.house.gov*

**Lindsay Hunsicker** is a senior program officer on the Government Relations US, Canada and Asia-Pacific Team at the Bill & Melinda Gates Foundation. In this role she focuses on U.S. government relations around education issues that are aligned with the foundation’s U.S. programs, goals and strategies. Prior to joining the foundation, Hunsicker served as a senior education policy advisor on the U.S. Senate Health, Education, Labor and Pensions Committee for ranking member Mike Enzi. In her six-year tenure with the committee her portfolio focused on early childhood education and care and K-12 education issues. From 2001-2007 Hunsicker served as a senior legislative assistant for U.S. Senator John Ensign. She started her career on Capitol Hill in the office of U.S. Senator Gordon Smith. Hunsicker has a bachelor’s degree from the University of Washington.

*Lindsay Hunsicker, Senior Program Officer, Bill & Melinda Gates Foundation, 1300 Eye Street, NW, Suite 200, Washington, DC, 20005; 202-662-8157; Lindsay.Hunsicker@gatesfoundation.org*
Rep. John Kline is serving his sixth term representing Minnesota’s 2nd district, which is located south of the Twin Cities. He is chairman of the Education and the Workforce Committee and a member of the Armed Services Committee. Before his election to Congress, Kline was a 25-year veteran of the Marine Corps, where he retired in the rank of Colonel. He served as a senior military aide to Presidents Carter and Reagan with responsibility for carrying the “nuclear football,” which contained the nuclear launch codes. He also was a helicopter pilot in Vietnam and served as pilot of Marine One, the presidential helicopter. Kline has a bachelor's degree in biology from Rice University and a master’s degree in public administration from Shippensburg University. He is married and has two children and four grandchildren.

Julia Lane is a senior managing economist at the American Institutes of Research; professor of economics at BETA University of Strasbourg, CNRS; research associate at the Observatory of Science and Technology in Paris; and professor at the Melbourne Institute of Applied Economics and Social Research, University of Melbourne. She was formerly director of the National Science Foundation’s Science of Science and Innovation Policy program, senior vice president of the National Opinion Research Center at the University of Chicago, and senior research fellow at the U.S. Census Bureau. Lane has been working with a number of national governments to document the results of their science investments. Her work has been featured in Science and Nature, and she has testified on the topic to both the U.S. Congress and the European Parliament. Lane was a coeditor of the Handbook of Science of Science Policy.

Paul LeBlanc is president of Southern New Hampshire University (SNHU). He previously served as president of Marlboro College in Vermont. SNHU is the largest provider of online higher education in New England, one of the five largest in the country, and the first to have a full competency-based degree program (untethered to the credit hour or classes) approved by a regional accreditor. In 2012 the university was ranked 12 on Fast Company magazine’s "World's Fifty Most Innovative Companies" list and was the only university included. LeBlanc won a New England Higher Education Excellence Award and was named by Forbes Magazine as one of its 15 “Classroom Revolutionaries” in 2012.
Rep. Dan Lipinski is serving his fifth term representing Illinois’ 3rd district, which includes parts of Chicago, southwest Cook County, and northeastern Will County. He is ranking member of the Science, Space and Technology Committee’s Research and Technology Subcommittee, and is a member of the Transportation and Infrastructure Committee. Before his election to Congress, Lipinski taught political science at the University of Tennessee and the University of Notre Dame, and worked in the House of Representatives and at the U.S. Department of Labor. He has bachelor’s degree in mechanical engineering from Northwestern University, a master’s degree in engineering-economic systems from Stanford University and a doctorate in political science from Duke University. Lipinski and his wife reside in Western Springs.


Rep. Zoe Lofgren is serving her tenth term representing California’s 19th district, which is based in San Jose, the “capital of silicon valley.” She serves on the Judiciary Committee; the Science, Space and Technology Committee; and the Committee on House Administration. Before her election to Congress, Lofgren worked for a Member of Congress, and was a partner at the San Jose firm Webber and Lofgren—where she practiced immigration law. She also served on the Santa Clara County Board of Supervisors and taught immigration law at the University of Santa Clara School of Law. Lofgren earned her bachelor’s degree in political science at Stanford University and her law degree at Santa Clara University. She and her husband have two children.


Michael McPherson is president of the Spencer Foundation. Prior to joining the foundation he served as president of Macalester College in St. Paul, Minnesota. He is an economist with a focus on the interplay between education and economics. McPherson spent the 22 years prior to his Macalester presidency as professor of economics, chairman of the Economics Department, and dean of faculty at Williams College in Williamstown, Massachusetts. He is co-author and editor of several books, including Crossing the Finish Line: Completing College at America’s Public Universities; College Access: Opportunity or Privilege?: Keeping College Affordable; Economic Analysis, Moral Philosophy, and Public Policy. McPherson was the founding co-editor of the journal Economics and Philosophy and has served as a trustee of the College Board, the American Council on Education and Wesleyan University. He was a fellow of the Institute for Advanced Study and a senior fellow at the Brookings Institution. He is a trustee of McNally Smith College of Music as well as president of the Board of Overseers of TIAA-CREF. He has a bachelor’s degree in mathematics, a master’s in economics, and a doctorate in economics, all from the University of Chicago.

Dr. Michael S. McPherson, President, The Spencer Foundation, 625 North Michigan Avenue, Suite 1600, Chicago, IL 60611; 312-274-6519; jklippenstein@spencer.org
Rep. George Miller is serving his twentieth term representing California’s newly formed 11th district, which includes Contra Costa County and the East Bay of San Francisco. He is ranking member on the House Education and the Workforce Committee. Before his election to Congress, Miller served on the staff of then State Senate Majority Leader George Moscone in Sacramento. He graduated from Diablo Valley Community College, San Francisco State University, and earned his law degree from the University of California, Davis.

Rep. George Miller, U.S. House of Representatives, 2205 Rayburn HOB, Washington, DC, 20515; 202-225-2095; katie.amundson@mail.house.gov

Cynthia Miller is married to Rep. George Miller. She is an advocate for improved health care with an emphasis on mental health services. Until recently, she served on the Contra Costa County Mental Health Commission since her appointment in 1985. Miller is also a member of the Medical Ethics Review Board at Contra Costa County Medical Center, and has provided hospice care for terminally ill AIDS patients. George and Cynthia Miller have two sons and six grandchildren.

Andrew Ng is a co-founder of Coursera, an education company that partners with the top universities and organizations in the world to offer high quality courses online for anyone to take, for free. A computer science faculty member at Stanford, he led the development of the university’s main MOOC (Massive Open Online Courses) platform, and also taught an online Machine Learning class that was offered to over 100,000 students, leading to the founding of Coursera. Ng’s goal is to give everyone in the world access to a high quality education, for free. With 63 university partners, nearly 400 courses, and more than 3.5 million students, Coursera is currently the largest MOOC platform in the world. Outside online education, Ng’s research work is in machine learning. He is also the director of the Stanford Artificial Intelligence Lab. He has a bachelor’s degree in computer science from Carnegie Mellon University, a master’s degree from the Massachusetts Institute of Technology and a doctorate from the University of California, Berkeley.

Andrew Ng, Stanford Artificial Intelligence Lab, Computer Science Department, Stanford University, Room 156 Gates Building, Stanford, California, 94305-9010; 650-725-2593; ang@cs.stanford.edu

Rep. David Price is serving his thirteenth term representing North Carolina’s 4th district, including Chapel Hill, Raleigh and Fayetteville. He serves on the Appropriations Committee and is ranking member of the Subcommittee on Homeland Security. Price is also the ranking member of the House Democracy Partnership, which he initiated to help strengthen parliaments in emerging democracies. Before his election to Congress, he was a professor of political science and public policy at Duke University. Price is the author of four books on Congress and the American political system. He has a bachelor’s degree from the University of North Carolina-Chapel Hill and a bachelor of divinity and doctorate in political science from Yale University.

Lisa Price is married to Rep. David Price. Her professional career includes casework with foster children and teenage unmarried mothers, and as an administrative assistant to two Chapel Hill mayors. Along with two friends, Price founded North Carolinians Against Gun Violence, the first statewide gun violence prevention organization in the state, where she served as executive director until 2008. She has a bachelor’s degree in English from Maryland’s Goucher College and a master’s degree from Boston University School of Social Work. Her volunteer activities have included the New Haven Board of Aldermen, Chapel Hill Public Library, public radio, animal welfare, and international visitors. The Prices live in Chapel Hill and have two children and two grandchildren.

Sanford “Sandy” Shugart has served since 2000 as the fourth president of Valencia College in greater Orlando, Florida. As the winner of the first Aspen Prize for Excellence, Valencia is one of the most celebrated community colleges in America. Serving some 70,000 students per year, Valencia is known for high rates of graduation, transfer, and job placement and has become something of a national laboratory for best practices in learning-centered education. Prior to Valencia, Shugart served as president of North Harris College and as vice president and chief academic officer of the North Carolina Community College System. He has a doctorate in teaching and learning from the University of North Carolina at Chapel Hill. In addition to his career in education, Shugart is a published poet and songwriter and author of Leadership in the Crucible of Work: Discovering the Interior Life of an Authentic Leader.

Dr. Sandy Shugart, President, Valencia College, Downtown Center - 401, MC: DTC-4, Orlando, Florida, 32802-3028; 407-582-3400; sshugart@valenciacollege.edu

Peter Smith is the senior vice president for academic strategies at Kaplan Higher Education Group, responsible for the development and implementation of major initiatives aimed at increasing academic quality. Among these are defining the “gold standard” for online and blended education; a reconceptualization of general education that integrates assessments within learning experiences, mining each more deeply while reducing time to degree; and an academic strategic initiative that will reposition the university for emerging markets. Smith was assistant director general for education at the United Nations Educational, Scientific, and Cultural Organization in Paris; founding president of California State University at Monterey Bay; dean of the Graduate School of Education and Human Development at George Washington University; a member of the U.S. House of Representatives; Lieutenant Governor of Vermont; founder and first president of the Community College of Vermont; and executive director of the National Commission on Responsibilities for Financing Post-Secondary Education in Washington, DC. He has a bachelor’s degree from Princeton University and a master’s in social studies and doctorate degree from the Harvard Graduate School of Education.

Dr. Peter Smith, Senior Vice President, Academic Strategies & Development, Kaplan Higher Education, 6301 Kaplan University Avenue, Fort Lauderdale, Florida, 33309; 954-515-4581; psmith3@kaplan.edu
**Letitia Chambers** is married to Peter Smith. She recently retired as the president and CEO of the Heard Museum in Phoenix, Arizona. She founded Chambers Associates, a public policy consulting firm based in Washington, DC; served as head of the system of higher education in the state of New Mexico; chaired the New Mexico Educational Trust Board; and was a board member of the New Mexico Student Loan and Guarantee Corp and a commissioner on the Western Interstate Commission on Higher Education. Chambers served as the U.S. Representative to the United Nations General Assembly in 1996, and as staff director of the Committee on Labor and Human Resources, (now known as the HELP Committee). Prior to that, she was a senior staff member on the Senate Budget Committee and staff director of the Senate Special Committee on Aging. Chambers held senior management positions in the New Mexico State Department of Education and the Oklahoma City Public Schools. She has a bachelor’s degree from the University of Oklahoma and a doctorate in education from Oklahoma State University.

*Dr. Letitia Chambers, 2022 Foothills Road, Santa Fe, New Mexico, 87505; 505-603-0297; Lchambers43@yahoo.com*

**Claude Steele** is dean of the School of Education at Stanford University. Previously, he served as the provost and professor of psychology at Columbia University and as a professor of social sciences at Stanford University. He was director of Stanford’s Center for Comparative Studies in Race and Ethnicity and director of the Center for Advanced Study in the Behavioral Sciences. Steele was elected to the National Academy of Sciences, the National Academy of Education, the American Academy of Arts and Sciences, and the American Philosophical Society. He is a member of the Board of the Social Science Research Council and of the John D. and Catherine T. MacArthur Foundation. Steele has received numerous fellowships and awards, including The American Psychological Association’s Senior Award for Distinguished Contributions to Psychology in the Public Interest and the Distinguished Scientific Contribution Award. He has a bachelor’s degree from Hiram College and a doctorate in psychology from Ohio State University.

*Dr. Claude Steele, I. James Quillen Dean, Stanford Graduate School of Education, 485 Lasuen Mall, Stanford, California, 94305-3009; 650-725-9090; gsedean@gse.stanford.edu*
Candace Thille is an assistant professor at Stanford University’s Graduate School of Education and a research fellow in the Office of the Vice Provost for Online Learning. She is the founding director of the Open Learning Initiative at Carnegie Mellon University. Her focus is in applying the results from research in the science of learning to the design and evaluation of open web-based learning environments. Thille serves as a redesign scholar for the National Center for Academic Transformation; as a fellow of the International Society for Design and Development in Education; on the technical advisory committee for the Association of American Universities STEM initiative; and on the Global Executive Advisory board for Hewlett Packard’s Catalyst Initiative. She served on a U.S. Department of Education working group, co-authoring the National Education Technology Plan, and on the working group of the President’s Council of Advisors on Science and Technology that produced the Engage to Excel report. She has a bachelor’s degree from the University of California, Berkeley, a master’s degree from Carnegie Mellon University, and a doctorate from the University of Pennsylvania.

Dr. Candace Thille, Graduate School of Education, Stanford University, 485 Lasuen Mall, Stanford, California, 94305-3096; 650-723-9132; cthille@stanford.edu

Rep. John Tierney is serving his ninth term representing Massachusetts’ 6th district, including Salem, Lynn and Peabody. He serves on the Oversight and Government Reform Committee as ranking member of the National Security Subcommittee. Tierney also serves on the Committee on Education and has previously been appointed to the Permanent Select Committee on Intelligence. Before his election to Congress, he was a partner in the law firm of Tierney, Kalis and Lucas for over 20 years. Tierney has a bachelor’s degree from Salem State College and a juris doctorate degree from Suffolk University. He and his wife, Patrice, live in Salem.

Stephen Joel Trachtenberg is president emeritus and university professor of public service at The George Washington University. He served as president of the university for nearly two decades. Previously he was president of the University of Hartford, and vice president for academic services and dean of the College of Liberal Arts at Boston University. He was a special assistant to the U.S. Education Commissioner, Department of Health, Education and Welfare, an attorney with the U.S. Atomic Energy Commission, and a legislative aide to former Indiana Congressman John Brademas. Trachtenberg has written five books including Big Man on Campus: A University President Speaks Out on Higher Education and A Letter to the President of the United States on Higher Education. He was a consulting editor to The Journal of Education and The Presidency and chaired the Southeastern Universities Research Association. Trachtenberg serves on the board of the International Association of University Presidents and chairs the Rhodes Scholarships Selection Committee for Maryland and the District of Columbia. A native of Brooklyn, New York, Trachtenberg has a bachelor's degree from Columbia University, a master's in public administration from Harvard University and a juris doctor from Yale University. Trachtenberg and his wife, Francine Zorn Trachtenberg, have two sons.

Dr. Stephen Joel Trachtenberg, President Emeritus and University Professor of Public Service, The George Washington University, 805 21st Street, NW, Suite 600, Washington, DC, 20052; 202-994-9820; trachtenberg@gwu.edu

Victor Vuchic is a program officer in the Education Program at The William and Flora Hewlett Foundation, focusing on technology-based grants in the area of Open Educational Resources. For eight years before joining the foundation, he worked as an e-business management consultant for both start-ups and large-scale companies in Silicon Valley. His work has been in domains such as wireless, online retail, music and rich media, high tech, and content management. Vuchic’s skills are focused on user-centric business analysis, which includes helping companies refocus their strategies and operations around end users' needs. He has a bachelor’s degree in systems science engineering focused on telecommunications from the University of Pennsylvania and a master’s degree in education in the Learning, Design & Technology Program at Stanford University. Vuchic also attended the Berklee College of Music during his undergraduate years.

Victor Vuchic, Program Officer, Education Program, The William and Flora Hewlett Foundation, 2121 Sand Hill Road, Menlo Park, California, 94025; 650-234-4500; vvuchic@hewlett.org
Joshua Wyner is the executive director of the Aspen Institute College Excellence Program, which aims to strengthen practice and develop leadership that substantially improve college student success. Started in early 2011, the program’s first two initiatives are the Aspen Prize for Community College Excellence, which strives to reward and shine a spotlight on community colleges that deliver exceptional student results and stimulate replication of successful campus practices, and the New College Leadership Project, which works to strengthen efforts to recruit and train college presidents who are capable of substantially improving student success. Wyner was executive vice president of the Jack Kent Cooke Foundation and was founding executive director of the DC Appleseed Center. He was an organizer and policy analyst with Citizen Action, a program evaluator at the U.S. Government Accountability Office, and an attorney with Beveridge & Diamond. Wyner has a bachelor’s degree from Vassar College, a master’s in public administration from the Maxwell School at Syracuse University, and is a cum laude graduate of New York University School of Law.

Dr. Joshua Wyner, Executive Director, Aspen Institute College Excellence Program, One Dupont Circle, NW, Suite 700, Washington, DC, 20036; 202-736-2286; josh.wyner@aspeninstitute.org