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Research Universities: The Next Five Years

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Nothing we historians like more than talking about the future. No one can prove us wrong. By the time they can, everyone will have forgotten what we said. The other thing we historians like is the opportunity to project the past, which we think we know, into the unknowable future. So with a half century or so of engagement with this activity we call American higher education, I come to you with a five-year crystal ball.

Although it will compromise the grand vision of my comments, we should probably recognize three clarifying, and to most of us, self-evident, truths.

First, there is no such thing as “higher education.” There are many colleges, universities, community colleges, technical schools, for-profit institutions, virtual universities, and other post-secondary enterprises, all claiming membership in “higher education.” Almost all generalizations about “higher education” are, as a result, partly wrong, applying at best to one or another of the various niches within this large domain.

Second, there is no such thing as a “college student.” These are individuals of widely varying characteristics. Some are men, some women; some black, some white; some international, some domestic; some younger than 24, some older; some rich, some poor; some academically prepared, some unprepared; some graduate, some undergraduate; and some pursuing no degree at all. Almost all generalizations about “students” are also, as a result, partly wrong, describing at best some students, of some type, in some place, and at some time.

Third, there is no such thing as “free” or low cost post-secondary undergraduate or graduate education. The costs are always there. The discussion is about who pays. It is cheap to the student if the parent pays, or if the state pays, or if the federal government pays, or if a college or university donor pays. Biology courses are free online when someone else pays the instructor, pays for the

computer infrastructure, and paid in the past for the research that developed the knowledge taught.

In all of the rhetorical excess on college costs, there lurks a romantic belief that knowledge wants to be free. Knowledge may sometimes be free for the taker, but it has never been created for free. The argument about college costs is an argument about who pays and what the money buys, not about whether knowledge wants to be free.

All who suffer the key educational buzz words of the past five years often hear that we are in a period of “disruption,” that we may well be at a “tipping point,” and that the confluence of “dramatic changes” and “creative destruction” will surely require American universities to “reimagine” the post-secondary world. Some see the “game changers” coming from cheap distributed technology. Others blame the turmoil on an unsustainable financial model for colleges and universities.

Our commentators worry that the economy does not need college graduates, and that not enough Americans have college degrees. They decry the decline of standards, and they demand that everyone who enters should leave with a certificate or a degree. They want our graduates to earn high salaries, and they insist that colleges and universities train more and better primary and secondary school teachers. They want our research institutions to enhance American competitiveness by discovering new knowledge in basic research, and they want university researchers to focus on local economic development.

The good news is that this agenda of often contradictory concerns is so confused and poorly focused, so impractical or misguided, that almost none of it provides a useful basis for change. It will lead to much government mischief in the form of political programs demanding expensive, usually simple-minded, and ineffective solutions to the wrong problems. These may help reelect their proponents, even as they fail to produce real results. As the noise rises and falls in the daily press, post-secondary education will continue its permanently changing adaptation that has and will continue to allow it to meet real challenges. Yet the responses will reflect not a simple notion of reform or change but rather the sensible and widely differing requirements posed by individual circumstances and in response to greatly variable audiences.

The Primary Products of Colleges and Universities

We can understand this confused conversation better if we recognize that the domain of post-secondary education and especially the four-year/graduate college and university institutions simultaneously deliver quite different products.

One of these is obvious and for many, it may appear as the only product: The Content. This is the information, knowledge, and skills taught through a four-year, graduate, or professional degree program such as chemistry, history, English, math, psychology, kinesiology, or theater arts. We have reasonably standardized definitions of what these categories of content include. Periodically we argue about whether this or that element of content should become part of a field, but these are practical arguments by professionals, accreditors, or faculty members of the respective academic guilds.

Chemistry 101 is pretty much the same everywhere. American history from 1865 to the present covers the same ground everywhere. We define this more or less universal content through textbooks, syllabuses, and accreditation. The definitions vary surprisingly little from college to college, university to university because these building blocks of knowledge feed a national system that expects level one of a discipline to teach content that prepares students for level two. Chemistry 101 at my college should be sufficient preparation for chemistry 201 at yours. A chemistry major at my college should leave prepared for the graduate program in chemistry at your university.

Although we can fuss about quality control and grade inflation and other similar concerns, we all know that the battle is often not about the content because mostly we agree on the content. Content changes in response to real changes in knowledge. We do not invent an alternative chemistry 101 that uses different chemicals unknown to other providers of chemistry 101. If a new chemical appears, everyone connects this advance in knowledge into their chemistry 101. So change in content comes as the range and depth of knowledge requires. Math 101 for 15,000 students in a MOOC session and Math 101 for 15 students in an Amherst College class have mostly the same content.

What they do not share, especially in the undergraduate domain, is the same context. Context is the second higher education product. If content is a generally well accepted constant, varying little from place to place, context is a primary battleground for institutional differentiation, especially at the undergraduate level. It is the context of learning that inflames our critics, sets our politicians thundering from the rostrum, and prompts our legislators to roll out easy solutions to complicated problems. Context is the defining attribute that separates the various sectors of American higher education.

When we talk about reforming colleges and universities to reduce cost or improve outcomes, we often talk mostly about context. When we say students should study online at their own pace, we expect a change in context not content. When we say colleges and universities are too expensive and waste money on

foolish activities, this too is talk about context. The class of fifteen thousand students conducted through a MOOC software platform is a shift of context from the regular classroom, not a shift in content.

In a utopian world we could all get our knowledge from the kind of automated device that appears now and again in sci-fi movies. Perhaps in your misspent hours you too watched the *Fifth Dimension* where the incomparable LeeLoo absorbed all of human knowledge from an automated device in the space of minutes. Even so, however, we would find that the context remains a separate and significant post-secondary product.

Context differentiates the many providers of similar educational content. Most everyone knows, from parents to students to legislators, that the context of the private, elite, liberal arts college—a Smith, a Williams, an Amherst, a Pomona—is dramatically different from the context of an open-admission community college’s transfer program. These contexts contain many different services and widely varying infrastructure that differentiate one type of institution from another. The differences respond to a marketplace for college services that speaks clearly, and responds to a public appetite for specific services delivered in specific ways. Although the critics may disparagingly call many services provided through the context “amenities,” these are actually context products our customers appear eager to acquire, even at additional cost.

Context vs. Content

The past five years of commotion, controversy, and critique--focused primarily on undergraduate education—have helped us see more clearly which activities fall into the domain of content and which into the realm of context. Then, viewed separately, the differential cost of these two elements become more easily visible. The regulatory enthusiasm of government bureaucrats and educational messiahs in search of cheap higher education will seek to control the public’s appetite for context and constrain its choices for acquiring content, but their success over the next five years will likely be limited, although the battle will be entertaining to watch, from afar.

The buzz of high tech visionaries might lead us to think that this is all new and different, but much of what we see in the post-secondary marketplace has been in process for quite some time. We have always had career training programs at community and technical colleges, we have always had job focused four-year undergraduate programs leading to careers in various branches of health care and business, and we have always had an argument about elitism, access, and completion within the post-secondary industry. We have had online programs for

many graduate level professions, especially the MBA but many health related professions as well, for years. As the job market has gradually shifted towards employment requiring ever more sophisticated skill sets for what previously had been satisfied by high school and on-the-job training, business and industry looked increasingly to the organized post-secondary industry to deliver the training that they once provided at their expense.

This trend became reinforced at the lower end of the marketplace as the generic high schools found it difficult to prepare students sufficiently for these jobs and the elite public and private high schools focused on preparation for selective college admission. The expansion of demand and opportunity for training programs and job-centric education led some to believe that the storied American college model based on the residential liberal arts college, often with a graduate and research university component, had lost its primacy within American higher education.

Fortunately this is not the case. What we have seen is a growth at the lower end of the educational spectrum as institutions create programs that fill the niche between insufficient high school job training and the higher tech job marketplace requirements. The number of people seeking this form of training has grown dramatically. Nonetheless, the demand for the traditional four-year college, whether in the liberal arts or the research university contexts, have not declined substantially, although the number of job-related programs at many less selective colleges and universities has grown and the opportunities for career advancement training have expanded.

All of this leaves us with an education landscape more complex and varied, with many definable niches and differentiated products. The ordinary taxonomy of high school, trade school, community college transfer programs, state colleges and universities, residential liberal arts colleges, and major state and private research universities, has splintered into multiple differentiated providers at the dividing lines between categories.

For-profit and online programs produce credentials and training that capture students who previously might not have needed any post-secondary education, serves students unsuited by circumstance or preparation for the standard institutions, or provides educational advancement for adults.

Public colleges and universities find themselves seeking new markets as revenue from states and tuition from traditional students no longer adequately supports the enterprise.

Small private liberal arts colleges, with minimally selective admissions, struggle to find audiences for their special high-touch, high-cost version of American education.

Major research universities adapt their undergraduate programs to meet elite competition and continuously reorient their research and graduate programs to satisfy the demands of the marketplace for highly trained graduates and the exploit varying opportunities for research funding.

Within this scramble to serve the expanded need of business and industry for more technically trained employees, the core American higher education enterprise, and especially its research universities, remains just about as strong and operates just about as it always has.

Research Universities

We are very stable. Buffeted by the changes in the marketplace, we might imagine that the mainstream of American higher education from its liberal arts colleges to its world class research institutions is threatened with extinction, but for all the justice in some of our critics' laments, we are actually doing pretty well. We do not have enough money, but when in our history did we ever think we had enough money? We are criticized constantly for this and that, but in my long life in the academy we have always been criticized for many things, even as the emphasis on one complaint or another changes from time to time.

We, who represent the core selective college and research university enterprise are not at significant risk. Are we challenged to change and adapt? Of course, as we have been for the last century or more. Will we see more technology, will our students take courses online or enhance their programs with virtual tools? Of course they will, and we'll invent and design them. Will our research enterprise continue to compete in an increasingly research focused international world? Yes, even if we must refocus and reorient some of our activities. In the end, what matters is meeting the expectations of our many marketplaces.

Quality: For the core colleges and universities, those with more or less traditional curricula and selective undergraduate admissions, with graduate programs and research activities, the main event is actually quality. Although the marketplace wants things cheap, what it wants even more is quality. We know this because the parents of high quality students in the 18-24 year-old age group preferentially attempt to install their children in institutions that have the highest perceived quality they can afford. Graduates of these colleges seek out graduate and professional programs with high research reputations gained by offering the highest quality faculty and facilities available. Granting agencies support high

quality projects, and universities worldwide seek the highest performing research faculty and staff.

Throughout this category of core institutions, the primary theme, much disguised by institutional public relations efforts, is competition. Quality by definition is scarce. There are not enough first rank students for every undergraduate college, there are not enough superior faculty research performers for every research university, there is not enough money for every needed laboratory or facility, and there are not enough first class football players to stock every university's teams. Competition for these scarce elements of quality is intense, especially among America's research universities.

When we look into our research university crystal ball for the next five years we see mostly an intensification of the competition that has always defined the American research university. This competition includes everything from the undergraduate program with its required investment in content and its competitive investment in context, the expensive high profile sports programs that form part of almost every first rank research university, to the essential competition for research capable faculty.

We have talked some about the undergraduate competition, decomposed into its content and context, and I'll leave the conversation about intercollegiate sports to another time, to focus on the structure of American research university competition.

Within the extended scope of what passes for "higher education" in America, a relatively small number of institutions fall into a category we call Top American Research Universities. These institutions, numbering just over 160 out of about 2500 four-year degree granting institutions, compete for federal research grants and spend at least \$40 million per year from federal sources.

Together, these institutions represent over 90% of all university spending from federal research sources. Overall, of course, many other colleges and universities receive federal funds, since about 700 institutions report spending from federal sources. However, the top 160 institutions clearly dominate the competitive domain of American university research.

These universities are both private and public (more than twice as many public as private), and while almost all have undergraduate programs, those range from as small as 1,000 students to over 40,000. What unifies this category is their commitment to research competition. This commitment manifests itself in many ways, from the process of identifying, hiring, and retaining faculty to the investment in research facilities, support, and commercialization.

Research universities, while they have a strong commitment in most cases to undergraduate instruction, and regard their undergraduate programs as emblematic of their overall commitment to competitive high quality academic work, nonetheless divide their faculty effort into two primary activities: teaching and research. Other institutions, less focused on research competition, will normally assign their faculty twice the teaching responsibility carried by research university faculty. This places a significant requirement on the research university to see that they invest in faculty who can compete successfully in the research world.

The federally funded research expenditures of this group of 160 institutions range widely from \$40 million to near \$650 million near the top, reaching over a billion and half at the outlier institution of Johns Hopkins. Still, none of these institutions turns a profit on research. Observers, seeing the large sums involved in research, imagine that this is a profit-making business for the institution, but the big number for research expenditures disguises the even larger annual investment required to sustain nationally competitive research activities.

Funding Research

The basic structure of research funding consists of federal and other grants and contracts that pay less than the full cost of the funded research. If a project receives \$150K of funding, it will likely cost the university almost \$200K to produce the contracted research. Some of this cost reflects unfunded indirect costs for heat, light, general physical plant, generic computing requirements, and other similar overhead. Other unfunded items can include the cost of sustaining research related administrative staff, the university legal and other operational management related to research, salaries of research faculty or staff in between grants or only partially funded for their research effort, and the graduate education that forms an essential part of all research universities.

Universities subsidize these research costs from endowment, tuition and fees of undergraduates, and state and other government subsidies. As the public funding for undergraduate education declines, public universities in particular find it harder to sustain both their quality undergraduate program context, which is one of their defining characteristics, and their highly competitive research program, which is the most significant symbol of their academic distinction. In some cases, the commercialization of university research into products and services generates dollars that support the research enterprise, although these rarely prove sufficient to fill the funding gap. In universities with competitive medical centers or allied health programs, the fees from clinical services provided by the faculty and staff can create a surplus for reinvestment back into the research enterprise.

In any case, the last five years have clearly indicated that America's university research enterprise has a financial challenge as the funding landscape for all of the post-secondary industry continues to change. Tuition and fees at private universities have now risen to a level that is probably as high as it is possible to sustain, and in most private institutions, the actual net yield on tuition is significantly less than the sticker price with discount rates reaching close to 40%. Private research universities have nonetheless continued to demonstrate considerable success raising gifts for facilities and other critical elements for research and instruction.

In public universities, the challenge of funding is similar, but the structure of public university finance is much different. While tuition and fees are relatively low compared to the private sector, in many states the political resistance to tuition and fee increases inhibits institutions from capturing the market value of their quality undergraduate programs. Some respond by increasing their out-of-state populations, although this too has a politically sensitive limit. The states' commitment to university research has also weakened in many places, with a shift in emphasis towards local economic development programs. While these are surely valuable and appropriate activities for tax supported universities, they often do not create nationally competitive research results. Worse yet, political pressure can often persuade universities to carry out local research and development activities without receiving adequate compensation for the direct or indirect costs of the activity.

Ranking the Competition

The overall research competitiveness of public universities may have declined some in the past five years, and may well decline more in the next. Nonetheless, those public and private research universities in the top category appear to have sufficiently diversified income sources to sustain their performance.

The next five years will likely show more change within the second and third tiers within the top American research universities group. If we imagine a first tier of the top 50 institutions (defined by their federal research expenditures), a second tier of 50, and a third tier with the remaining 60 institutions we can anticipate what is likely to happen in these sections of the marketplace.

As indicated, the top 50 will likely remain the top 50, although there may be some reordering as a few decline a little and others immediately below them take their place. The structure of research competition in the US however is remarkably stable, in spite of university presidential rhetoric claiming that this or that institution will vault into the top ten within some short period. Relatively few

institutions move up or down many places in the federal expenditure ranking over a five-year time span. The investment required to compete is large, and most universities already spend as much as they can on research competition. Absent large new sources of funds or dramatic reorganizations of institutional priorities, they cannot afford to move up in the competition.

The distance between the top group of 50 institutions, and especially the top 25, and the rest of the marketplace will likely grow greater over the next five years as the challenges of subsidizing research competition strain all but the most financially secure universities. Size and scale are major advantages in this competition, and the bigger an institution's research establishment the better it will compete and the wider its base for the support of the many unfunded activities associated with research work. A university with a major investment in the biological sciences with many faculty, extensive facilities, much specialized equipment and staff, and a strong administrative infrastructure can launch new projects at a far lower marginal cost than an institution with a small biological sciences program, however stellar its faculty.

By the end of the next five years, we can perhaps also imagine that some of the institutions in the bottom group of 60 will fall out of the institutional competition as we have defined it. The difficulty of sustaining a competitive position in research, especially in the high cost sciences, may well prove impossible for institutions with smaller research portfolios.

Institution vs. Program Ranking

One of the characteristics of the American research university competition that may shift over the next five years will likely include the methods we use to evaluate and rank university research. Traditionally in America, we have used various measures based on NSF data related to research funding. Some like to use a measure of grants received each year while others, like our Top American Research Universities project, prefer annual spending. While grants awarded is a measure of faculty competitiveness today, the annual research spending is a measure of the work actually done by the faculty each year. The spending figure is, as a result, often a more stable and more accurate reflection of institutional research work, although often the awards data make better public relations announcements.

Both, however, are input measures. They measure how much we expect or actually spend from external funds on research but they do not measure the research accomplished. Absent good, reliable, and consistent data on results, we have all relied on NSF spending and awards information because it is reasonably

accurate and less susceptible to institutional exaggeration than other forms of research reporting. Every university announces to its alumni, friends, and trustees that it is doing exceptionally well in research and offers one data point or another to demonstrate that success, but rarely, except for the NSF data, is the information from different university PR offices comparable, or even accurate.

The real output from university based research appears through its primary product: publication. The purpose of a research enterprise is to advance knowledge, but unpublished knowledge is of use to almost no one. Unpublished research often represents mostly lost effort because others who might have used those results must redo the research to make progress. For the research enterprise, the gold standard of performance is publication in a peer-reviewed forum.

Peer review is the effort we make to ensure that the results of research meet the methodological standards of our various disciplines. Peer review does not determine whether a research discovery is right or wrong, but seeks to ensure that the reported results followed from a rigorous application of relevant methodological standards. If a physics paper announces something new and different about gravity, we will want other physicists to review the process used to find this result and determine that it appears free of major errors. Peer review is hardly fool proof, but it serves as a reasonable filter to keep out flawed results.

What will likely change our understanding of university research competition is our increasing ability to track and evaluate the quality of individual peer reviewed publications, especially in the sciences. Large scale databases constructed by Thomson-Reuters *Web of Science* or Elsevier's *Scopus* now allow us to identify publications, and references or citations to those publications, in peer reviewed journals and other venues.

If someone publishes a scientific finding in a prestigious journal or conference proceeding, and others in that field find the finding of such value that they use it when they develop their own research and cite that article when they publish, then the first paper probably reported something important. Today, we can capture almost all the articles in most journals and other venues, at least in most of the science fields. We can assign measures of importance to each publication and then assign the publication with its ranking to its author and author's university. The result is an opportunity to rank universities by the significance of their faculty and staff research publications, by field, worldwide.

The evolution of this form of fine-grained evaluation, which like all forms of evaluation is not without its controversies, is likely to shift the discussion of university research preeminence from overall research power as reflected in the

institutional measures such as those used in our Top American Research Universities, to peer reviewed research accomplishments in specific fields. This shifts the conversation from evaluation by size and reputation and overall resources to evaluation by research publication results.

A project called the *Global Research Benchmarking System* (GRBS), based on the Elsevier *Scopus* database and sponsored by the United Nations University's International Institute for Software Technology and the Center for Measuring University Performance of Arizona State and UMass Amherst, has developed the tools for this analysis of publications and provides access through their website. Using these tools, we can benchmark institutional publication performance in great detail. This database tracks the publications in 23 top level disciplines and 251 sub disciplines. It can also provide data on a higher level aggregation into 15 areas. As an indication of scope, the 2012 release covers just under 25,000 source titles including journals, conference proceedings, and book series, and then captures items within those titles including articles, reviews, and conference papers.

The big institutional players in American research will do fine under any plan (the top 50 and especially the top 25 or so), with their faculty and staff publications appearing in the top levels of almost every field. These institutions have such well-developed research enterprises and such broad portfolios that they perform well whatever the measure. However, the second and third tier institutions, and some in the second 25 of the top 50, that do not have the scale and resources to compete in every field will now be able to identify those research areas where they do compete at the top world level and receive recognition for this accomplishment.

As we improve the process of using this exceptionally rich data, we will find that universities whose faculty work in only one or two fields may well have a higher ranking within those fields than the equivalent activity of faculty from richer and overall higher productivity institutions. A university that does not appear at the top of an overall university ranking may have a high position within the ranking of a specific field. We may not be the most powerful research university in America, but we can have the highest ranked polymer chemistry group in the world.

For some time, many research universities have sought to develop strategic research agenda, identifying those fields and programs that have the greatest chance of national and international distinction, and then invest preferentially in these areas. Many strategic plans and other institutional artifacts speak to the realization that not every institution can excel in all research fields, expecting focused efforts to produce better results. The success of these strategies have been

inhibited in many cases by the absence of good data to help identify the relative performance of faculty in specific fields within universities as a guide to investment programs that may well take many years and are sure to be politically controversial within the institution. The emergence of tools such as the *Global Research Benchmarking System* provide the externally validated reference points to measure where a university's faculty fit into the competition for research preeminence in specific fields.

The next five years will see us struggle with our new-found expertise in tracking research results. Several difficulties are inherent in these good, fine-grained data.

The *Global Research Benchmarking System* uses a variety of evaluation techniques to rank the impact of journals and articles using a range of statistical techniques that measure the value of publications by the citations others make to that work. The methodology for developing the various citation metrics are complex, the mathematics for some are sophisticated and therefore obscure to most university policy makers, not to mention the faculty themselves, and the rationale for the various indexes of impact provoke high energy controversy. Even though the complexity and power of these data can produce controversies over interpretation and evaluation, the discussion is on a much higher level than the controversies over the generally discredited methodology of US News and similar surveys.

In this conversation about the structure and competition among research universities over the next five years, the critical element for any research university remains the faculty. Faculty define the research accomplishments of the institution, and the competition for the best faculty is and will continue to be the most important process for sustaining university research success. In most American research universities the faculty drive the cost of the research enterprise. This is not because faculty receive outsize compensation, although some are reasonably well paid.

For research faculty to deliver results, the institution must invest large sums in space, equipment, technical and administrative staff, and graduate programs. This investment, which looms large at the time of a single hire (rising to as much as a million dollars or more), requires constant nourishment from essential new equipment, more laboratory space, and additional expert support staff. As the faculty member succeeds in gaining more external funding, subsidies for the uncovered costs of those grants will rise.

When the best research faculty consider multiple offers of employment, and the best will have many such offers, they consider not only the improved salary but equally and often even more importantly the package of research support available and the existence of a research group or groups in the same field or allied fields with their attendant equipment and collaboration.

High quality and high productivity research faculty believe themselves to be special, and of course they are. But they also believe that their unique talents and capabilities require a top level platform to support their achievements and enhance their ability to publish world challenging scientific results. They want to be part of an enterprise that is itself successful, has a reputation and projection in the world of major universities, and most importantly can help accelerate their own achievements.

Many universities in search of sustaining or achieving research preeminence will find it easier to get first rank research results if they focus on a few fields where they have the platforms required by the best faculty, rather than offer limited support structures for a wider array of specialties. With the advent of evaluation systems like the *Global Research Benchmarking System*, institutions that focus need not give up the opportunity to appear preeminent among the great universities in American and the world.

A university that does not appear in the top ranks on a comprehensive ranking of research institutions (like the Top American Research Universities) may nonetheless appear among the top performers, neck and neck with Harvard or Michigan or Stanford or UCLA, in fields where it has successfully concentrated its resources. Over the next five years, as more and more fields have their publications captured effectively within these large databases, the opportunity for institutions to focus their research investments and receive recognition for the results will continue to improve.

Faculty, Undergraduates, and Research: Some other consequences also flow from a more focused research effort. The traditional model of the research university imagined that all faculty carried a research obligation as well as an undergraduate responsibility. The faculty handbooks clearly articulated a uniform expectation for research and teaching as a requirement for promotion and especially tenure. The common ground for these institutions imagined most faculty carrying a good to excellent research portfolio along with a strong to excellent teaching performance.

However, as many research universities find it advantageous to concentrate their research investments in a few areas, rather than in all the fields implied by

their undergraduate curriculum, the faculty will find themselves falling into two, not always clearly defined, categories: Those expected to do world class research and supported by the institution for that purpose, and those expected to teach substantially more and carry a much lowered or no expectation for published peer reviewed research results. Although the rise of the non-tenured contingent faculty reflect this trend, for most research universities this group of faculty has not yet become the primary drivers of teaching programs. Instead, we find some departments gradually losing the authority to offer the PhD, the token of a research enterprise, with a resulting increase of faculty attention on undergraduate and master's level education.

It is likely that over the next five years we will continue to see a growing separation between the high powered research activities of an institution and its undergraduate enterprise. Even today, in most research intensive institutions, some faculty primarily engage in the operation and support of the instructional content and context while others primarily focus on research. Although in the past, this differentiation in function may well have resulted organically, as faculty originally hired for their research potential found themselves less engaged in research and identified a more useful role in the undergraduate enterprise where their talents for innovation and creativity found better use. Over the next five years, we will see more faculty and staff hired directly for undergraduate program delivery while others are hired primarily for research performance. In such a world, the paths for promotion and tenure will surely also diverge.

The advent of sophisticated Internet enabled instructional platforms, and the growing effectiveness of some reliable forms of computerized evaluation of student performance will also accelerate this divergence of the university's teaching and research enterprise. Although the notion of free instruction through MOOCs or similar universal platforms probably pose no significant threat to elite selective undergraduate programs (at least within the next five years), every undergraduate enterprise will find it increasingly useful to integrate technological scale into their instructional programs for their residential students and some captured at a distance.

Technological innovation in undergraduate education shifts the institutional investment priorities, increasing the value and number of technical personnel while reducing the number and value of faculty instructional personnel. We have seen the first round of this process as university libraries have become increasingly about technology, computer digitization, and large scale high tech organizations, and less about librarians working with students or faculty on academic subjects. While the

new forms may be more effective, they require different people with different skills to operate the enterprise.

Yet within this panorama, we will also find that the value of the high touch, high quality context for research university undergraduate programs will likely grow. In part because it is so expensive, only the most selective institutions that can charge for these elite services will be able to sustain them. The differences between the high level institutions (public or private, large or small, research or liberal arts) and those less selective and less financially secure will grow larger. The impact of all the turmoil in post-secondary education will impact research universities less than primarily teaching institutions, and they will impact the selective institutions of all types less than the non-selective institutions.

The Next Five Years

Finally, we need to take a bit of a longer frame to properly assess the next five years.

American research university success over generations owes much to their commitment to the pragmatic and the practical. From the beginning, private colleges prepared ministers and business leaders and public universities have always been designed to be practical, pragmatic, and focused on national and individual economic success. The land-grant university reinforced this notion, the response of the nation's institutions to the return of veterans after World War II, the continuous expansion of university academic programs of a professional nature in business, engineering, health and allied health, and of course specialties such as Kinesiology, all testify over the long run that America's research universities always respond to the marketplace.

Even those institutions we might expect to be the most insulated from these trends, most pure in their approach to academic study for its own sake, (the well-endowed private liberal arts colleges), all speak to their constituencies about the practical value of the education they provide. They constantly adjust their programs and curricula to ensure that their graduates will find good jobs or enter graduate schools for economically favorable professions.

We may think that today is a uniquely disruptive moment in American post-secondary education, but for those of us who read history (and a few old enough to be history) this is probably not so. It is, we historians know, common for people to believe that their time is unique, their challenges greater than any that have come before. They may believe that dramatic and earth shattering changes are upon them. We feel more important when we can assert that our time confronts a bigger problem than any in the past. Some of us, however, remember the revolutionary

1960s and 1970s in America's universities, when we were told and believed that nothing would ever be the same again. As a survivor of those times, I can tell you that while change did of course take place, it left universities much as they were.

We no longer teach Greek and Latin as often, we are more open to larger segments of the population, we have fewer graduate students in history, we have significant increases in relevant programs such as Kinesiology, and we have mostly survived the advent of universal email and Internet access.

We will see change in the future, as we have always seen change in the past.

- Some universities will capture the momentum of change and prosper while others will miss out and decline.
- The great universities of yesterday will, however, almost all be the great universities of tomorrow.
- The value of research will grow not decline, but the competition will become ever greater as more and more countries invest in their universities, recognizing the power that research advancement provides.
- The range of differentiated post-secondary programs leading to certificates or degrees or other badges of achievement will expand.
- The popularity and value of the selective four-year residential college context, even in large research universities, for those 18-24 year olds able to qualify and afford the experience, will remain strong and grow ever more valuable.

I remain persuaded that we, in America's research enterprise, are in pretty good shape. We are good at what we do, we pay close attention to our marketplace, we continue to improve our ability to measure the results of our investments, and we will surely sustain our enterprise for the foreseeable future.

We may change, but we will not fade away.

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Source Note:

These comments draw on a sequence of studies and publications, with their references and sources, most sponsored by the Measuring University Performance Center (The MUP Center at ASU and UMass Amherst). See *The Top American Research Universities, 2000-2011* (available online <http://mup.asu.edu/research.html>). The MUP Center has published a variety of specialized studies, listed below, mostly as introductions to the annual reports of the *Top American Research Universities*.

- “Moving Up: The Marketplace for Federal Research in America,” 2011.
[<http://mup.asu.edu/publications/MovingUpFedMarket.pdf>]
- “In Pursuit of Number One,” 2010.
[<http://mup.asu.edu/publications/PursuitOfNumberOne.pdf>]
- “Research University Competition and Financial Challenges,” 2009.
[<http://mup.asu.edu/publications/CompetitionAndFinancialChallenges.pdf>]
- “Competition and Restructuring the American Research University,” 2008.
[<http://mup.asu.edu/publications/CompetitionAndRestructuring.pdf>]
- “Rankings, Competition, and the Evolving American University,” 2007.
[<http://mup.asu.edu/publications/CompetitionAndTheEvolvingUniversity.pdf>]
- “Deconstructing University Rankings: Medicine and Engineering, and Single Campus Research Competitiveness,” 2005.
[<http://mup.asu.edu/DeconstructingUniversityRankings.pdf>]
- “Measuring and Improving Research Universities: The Center at Five Years,” 2004.
[<http://mup.asu.edu/MeasuringAndImprovingResearchUniversities.pdf>]
- “The Sports Imperative in America's Research Universities,” 2003.
[<http://mup.asu.edu/TheSportsImperative.pdf>]
- “University Organization, Governance, and Competitiveness,” 2002.
[<http://mup.asu.edu/UniversityOrganization.pdf>]
- “Quality Engines: The Competitive Context for Research Universities,” 2001.
[<http://mup.asu.edu/QualityEngines.pdf>]
- “The Myth of Number One: Indicators of Research University Performance,” 2000.
[<http://mup.asu.edu/MythNumberOne.pdf>]

Other MUP Center related publications are also available online through the website publications page at [<http://mup.asu.edu/publications.html>].

A book on *How Universities Work* (John V. Lombardi, forthcoming from the Johns Hopkins University Press, 2013) provides a broad overview of many of these issues.

The next edition of *The Top American Research Universities* will include an essay focused on the comparison of GRBS ranking results and the MUP Center's traditional research university evaluation entitled "Measuring Research Performance: National and International Perspectives," which will appear in late 2013.