A Tale of Two Speeds: Challenges for Research Universities

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This manuscript represents a presentation to the Annual Conference of the Association of Anatomy, Cell Biology and Neurobiology Chairpersons. The author is responding to the question, "How can university administrations nurture both interdisciplinary and inter-institutional collaboration and cooperation?" The presentation makes the point that university administrators must be cognizant of the changing dynamics of interdisciplinary and inter-institutional collaboration and cooperation due to the speed of the Internet and the speed of travel today. Those institutional leaders, and their universities, that recognize that the world has become flat will flourish, while those locked in a silo mentality will perish. Exp Biol Med 231:1255–1256, 2006

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How can university administrators nurture both interdisciplinary and inter-institutional collaboration and cooperation? This is certainly one of the most important issues confronting 21st century research universities. I believe that the proper execution of this issue for all research universities can and will have profound ramifications not only on universities, but on humanity as a whole. If I may be so bold, universities, especially research universities in the 21st century, are at a very interesting and some would call it precarious position in the societies they serve, in the nations they belong to, and in the world.

This topic, or should I say, this challenge, is indeed timely. It is part of a much bigger challenge. There are truly serious, global and grand challenging issues confronting humanity: looming of pandemics; energy shortage challenges; ignorance and severe poverty, even in the so-called first world; lack of tolerance and hatred of fellow human beings, to name just a few. Solutions to these grand challenges certainly will come from non-silo thinkers with bold visions and innovative skill sets. Indeed, some would say that research universities are lighthouses dotting this turbulent sea. Is it not the mission of research universities around the globe to nurture such individuals?

Flat Earth and Two Speeds

In my mind, research universities need to respond to what Thomas Friedman has called the "flat world" (1). In Friedman's view there are connections between knowledge centers, across this flattened world, linking them into a single global network. This global network is ushering in an unprecedented era of collaborative innovation based on technology. I would argue that the flat world is due to two very different speeds. First, there is the speed of light. As everyone knows, the Internet by exploiting the speed of light has altered the way mankind thinks and operates.

However, there is another speed, which I think is just as important. It is the speed to move large objects like you and me. Here I have a more personal anecdote. As recently as the early 1960s, students going from Asia to the United States to pursue higher education usually took a boat, which took 3 weeks of travel time. You can imagine that in the mind of a student making that trip, there is the perception that he/she may never see his/her homeland or parents again. I can assure you that during the same period, no student in the United States going off to college would have had such a feeling. Surely this was one of the reasons why many tears were shed on the docks at departure. However, with today's transportation speed, while it is still a far cry from "beam me up, Scotty," the 21-day trip is reduced to between 10 and 12 hrs of flight, from takeoff to touchdown. This is roughly a 40-fold increase in speed. Tears are certainly not necessary in this paradigm!

So what does this all mean? There is an old Chinese saying, "Studying ten thousand books is not as fruitful as traveling ten thousand miles!" Human beings are going to all corners of the globe, and intellectual and economic developments, achievements, and for that matter, failures, are no longer regionally confined. The success or failure of a region or a nation, one may argue, to a large extent will depend on how globally enlightened are its leaders and how often and high a percentage of its population travels to all

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corners of the globe. Indeed, the global grand challenges I mentioned earlier are now the responsibilities of all, not a few.

The individual research university can no longer serve merely a local region, catering to regional needs. I firmly believe that as we move more and more into the 21st century, there will be more and more melting of international boundaries because of these two speeds. Research universities are entities almost forced into catering to a wider region, if not the entire globe. As such, they will overlap, if not geographically, surely Internet-wise and people-wise, with other universities.

Research Questions

Embedded in the two speeds paradigm, I think university administrators in the United States, as never before, need to be cognizant of the global issues I have outlined above. How, or should, one tackle unsolved problems that have a much broader goal? The ultimate goal is, of course, to benefit humanity. I should stress that this is not to say that one should not do research that is based on curiosity. Indeed, I am quite sure that it was entirely through the curiosity of Watson and Crick that the structure of DNA was discovered, without which I seriously doubt we would even have a conference like the one here! On the other hand, it is also true that there is now an explosive knowledge growth, coupled with an ever-expanding growth of technologies, so much so that we can ask broader questions. Indeed, if people cannot travel easily, if there are no high-speed networks and computers, if the barrier between information technology and genomics is not lowered, the genome project will not be completed. Neither could one begin to think about systems biology, bioinformatics, postgenomic disease research, and so on.

Therefore, research administrators should be fully alert to the fast transformation of the research landscape and encourage researchers to pursue what the late Alan Bromley referred to as "grand challenges" (2). Research administrators within the university should and must create a comfortable environment whereby working on such grand challenge problems, from funding to infrastructure to seamless communication with researchers and research administrators in other institutions, is highly encouraged. When I entered graduate school in physics, I had to select a spectrum of "physics problems" to make contributions to. While most of these problems were exciting and unsolved, their scopes could be considered as rather limited and hence would not fall into the definition of a "grand challenge." I am sure that my biology friends, my chemistry friends, my mathematics friends, my civil engineering friends, and so on, had to make analogous choices. While this paradigm is still quite prevalent today in the silo structures of universities, more often than not one now hears researchers asking questions of a much more general and broad nature. Let me give you one example: "How can we ensure that transportation of grain in the United States is secure and seamless?" Obviously a plethora of knowledge is needed to deal with this problem, from agriculture to economics to network security to human behavioral science to rail scheduling on a massive scale, and the list goes on and on. However, what is also clear is that problems of this nature can be tackled only because of the interplay of the two speeds we have been discussing earlier. Research of this nature will require individuals possessing different skill sets, probably distributed throughout different institutions.

Epilogue

The issue here is profound and deep. Our nation, and indeed humanity, depends upon us coming up with the most appropriate solution. It is interesting how speed seems to alter human behavior. Indeed, it was the speed of the "Zeros" in World War II that was the determining factor that caused Japan to attack Pearl Harbor and not San Francisco. Now the two speeds—for the Internet, the speed of light, and travel, speed for physical objects—are changing our human landscape.

To summarize, the following are ways in which university administrators can nurture interdisciplinary and inter-institutional collaboration and cooperation. We can recognize that we do live in a flat world where the Internet and the speed of transportation have lowered the activation energy for interdisciplinary, inter-institutional, and international collaboration and cooperation. We can stimulate our faculty to reach out across scientific and geographic boundaries when forming research teams. We can work with administrators from other institutions on common intellectual property agreements, common equipment grants, and seed money to stimulate inter-institutional projects. We as administrators must always remember that our function is as facilitators. Vision and change comes from the university faculty. Our administrative job is, indeed, to nurture and provide an environment where our faculty can be creative, entrepreneurial, and successful. We need leaders willing to inspire and explain the new flat world and how to thrive within this new paradigm.

1. Friedman TL. The World Is Flat: A brief history of the twenty-first century. New York: Farrar, Straus and Giroux, 2005.
2. Bromley DA, Ed. Grand Challenges: High performance computing and communications. The FY 1992 U.S. Research and Development Program. Committee on Physical, Mathematical, and Engineering Sciences; Federal Coordinating Council for Science, Engineering, and Technology; Office of Science and Technology Policy, 1992.