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# What You (Really) Need to Know

By LAWRENCE H. SUMMERS

A PARADOX of American higher education is this: The expectations of leading universities do much to define what secondary schools teach, and much to establish a template for what it means to be an educated man or woman. College campuses are seen as the source for the newest thinking and for the generation of new ideas, as society's cutting edge.

And the world is changing very rapidly. Think social networking, gay marriage, [stem cells](#) or the rise of China. Most companies look nothing like they did 50 years ago. Think General Motors, AT&T or Goldman Sachs.

Yet undergraduate education changes remarkably little over time. My predecessor as Harvard president, Derek Bok, famously compared the difficulty of reforming a curriculum with the difficulty of moving a cemetery. With few exceptions, just as in the middle of the 20th century, students take four courses a term, each meeting for about three hours a week, usually with a teacher standing in front of the room. Students are evaluated on the basis of examination essays handwritten in blue books and relatively short research papers. Instructors are organized into departments, most of which bear the same names they did when the grandparents of today's students were undergraduates. A vast majority of students still major in one or two disciplines centered on a particular department.

It may be that inertia is appropriate. Part of universities' function is to keep alive man's greatest creations, passing them from generation to generation. Certainly anyone urging reform does well to remember that in higher education the United States remains an example to the world, and that American universities compete for foreign students more successfully than almost any other American industry competes for foreign customers.

Nonetheless, it is interesting to speculate: Suppose the educational system is drastically altered to reflect the structure of society and what we now understand about how people learn. How will what universities teach be different? Here are some guesses and hopes.

1. Education will be more about how to process and use information and less about imparting it. This is a consequence of both the proliferation of knowledge — and how much of it any student can truly absorb —

and changes in technology. Before the printing press, scholars might have had to memorize “The Canterbury Tales” to have continuing access to them. This seems a bit ludicrous to us today. But in a world where the entire Library of Congress will soon be accessible on a mobile device with search procedures that are vastly better than any card catalog, factual mastery will become less and less important.

**2.** An inevitable consequence of the knowledge explosion is that tasks will be carried out with far more collaboration. As just one example, the fraction of economics papers that are co-authored has more than doubled in the 30 years that I have been an economist. More significant, collaboration is a much greater part of what workers do, what businesses do and what governments do. Yet the great preponderance of work a student does is done alone at every level in the educational system. Indeed, excessive collaboration with others goes by the name of cheating.

For most people, school is the last time they will be evaluated on individual effort. One leading investment bank has a hiring process in which a candidate must interview with upward of 60 senior members of the firm before receiving an offer. What is the most important attribute they’re looking for? Not GMAT scores or college transcripts, but the ability to work with others. As greater value is placed on collaboration, surely it should be practiced more in our nation’s classrooms.

**3.** New technologies will profoundly alter the way knowledge is conveyed. Electronic readers allow **textbooks** to be constantly revised, and to incorporate audio and visual effects. Think of a music text in which you can hear pieces of music as you read, or a history text in which you can see film clips about what you are reading. But there are more profound changes set in train. There was a time when professors had to prepare materials for their students. Then it became clear that it would be a better system if textbooks were written by just a few of the most able: faculty members would be freed up and materials would be improved, as competition drove up textbook quality.

Similarly, it makes sense for students to watch video of the clearest calculus teacher or the most lucid analyst of the Revolutionary War rather than having thousands of separate efforts. Professors will have more time for direct discussion with students — not to mention the cost savings — and material will be better presented. In a 2008 survey of first- and second-year medical students at Harvard, those who used accelerated video lectures reported being more focused and learning more material faster than when they attended lectures in person.

**4.** As articulated by the **Nobel Prize**-winner Daniel Kahneman in “Thinking, Fast and Slow,” we understand the processes of human thought much better than we once did. We are not rational calculating machines but collections of modules, each programmed to be adroit at a particular set of tasks. Not everyone learns most effectively in the same way. And yet in the face of all evidence, we rely almost entirely on passive learning. Students listen to lectures or they read and then are evaluated on the basis of

their ability to demonstrate content mastery. They aren't asked to actively use the knowledge they are acquiring.

“Active learning classrooms” — which cluster students at tables, with furniture that can be rearranged and integrated technology — help professors interact with their students through the use of media and collaborative experiences. Still, with the capacity of modern information technology, there is much more that can be done to promote dynamic learning.

**5.** The world is much more open, and events abroad affect the lives of Americans more than ever before. This makes it essential that the educational experience breed cosmopolitanism — that students have international experiences, and classes in the social sciences draw on examples from around the world. It seems logical, too, that more in the way of language study be expected of students. I am not so sure.

English's emergence as the global language, along with the rapid progress in machine translation and the fragmentation of languages spoken around the world, make it less clear that the substantial investment necessary to speak a foreign tongue is universally worthwhile. While there is no gainsaying the insights that come from mastering a language, it will over time become less essential in doing business in Asia, treating patients in Africa or helping resolve conflicts in the Middle East.

**6.** Courses of study will place much more emphasis on the analysis of data. Gen. George Marshall famously told a Princeton commencement audience that it was impossible to think seriously about the future of postwar Europe without giving close attention to Thucydides on the Peloponnesian War. Of course, we'll always learn from history. But the capacity for analysis beyond simple reflection has greatly increased (consider Gen. David Petraeus's reliance on social science in preparing the army's counterinsurgency manual).

As the “Moneyball” story aptly displays in the world of baseball, the marshalling of data to test presumptions and locate paths to success is transforming almost every aspect of human life. It is not possible to make judgments about one's own medical care without some understanding of probability, and certainly the financial crisis speaks to the consequences of the failure to appreciate “black swan events” and their significance. In an earlier era, when many people were involved in surveying land, it made sense to require that almost every student entering a top college know something of trigonometry. Today, a basic grounding in probability statistics and decision analysis makes far more sense.

A good rule of thumb for many things in life holds that things take longer to happen than you think they will, and then happen faster than you thought they could. Think, for example, of the widespread use of the e-book, or the coming home to roost of debt problems around the industrialized world. Here is a bet and a hope that the next quarter century will see more change in higher education than the last three combined.

*Lawrence H. Summers is former president of Harvard University and former secretary of the Treasury. This essay is based on a speech Dr. Summers gave at The New York Times's Schools for Tomorrow conference.*

*This article has been revised to reflect the following correction:*

***Correction: January 29, 2012***

Because of an editing error, an essay last Sunday about education in the digital age referred incorrectly to Derek Bok. He served as president of Harvard until 1991, so he was not the immediate predecessor of Lawrence Summers, who took office in 2001. (Neil L. Rudenstine preceded Mr. Summers.)