Liberal Education 2.0:
Developing Students' Capacities for Multicultural Effectiveness, Creativity and Innovation

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Like most American educators, I have long been a zealous advocate for the concept of liberal education. I happen to be a political liberal, but that is not the sense in which the term is used in the phrase "liberal education." Rather, the goal of a liberal education is to "liberate the spirit" of college students, so that they may be well prepared to live lives of satisfaction and contribution.

As I use the term, a liberal education is designed to help undergraduates acquire knowledge, master skills, and develop virtues that they will sustain them for six or seven or eight decades after graduation. The time horizon is what distinguishes liberal education from vocational education. Vocational education focuses on job skills for a single decade. Liberal education focuses on life skills for many, many decades.

To be sure, life skills necessarily include career skills. But the career skills that are the objective of a liberal education have to be portable, as college graduates move from chapter to chapter to chapter in an ever more rapidly evolving economic environment.

Naturally, one of those career skills is the ability to build serious expertise. One of the most difficult lessons for smart students to learn is that IQ is not enough to get them where they want to go. At the top, everybody has a high IQ. They can smell a fake from miles away. They need to learn how to master the knowledge and skills that define expertise in a

particular domain, and that is why a liberal education is more than just general education. The student is required to make and fulfill a commitment to a major field of study.

At the same time, liberal education has always required students to extend themselves, to acquire knowledge and skills and virtues that transcend their major field of study, narrowly understood.

For starters, liberal education has pushed students to develop a sophisticated understanding of what it means to "have knowledge" at all. Knowledge is a blend of two elements: an assertion of so-called fact, coupled with a sense of how much confidence we have that the so-called "fact" is really true.

For example, I have "knowledge" that says, "The earth is pretty round, and my confidence level is close to 100%."

And to give another example, I have "knowledge" that says, "Our universe contains black holes, but my confidence level is much lower than 100%, because I am really just trusting the authorities who tell me that it does."

To enjoy this sophisticated understanding of what it means to have "knowledge," liberal education teaches students to think critically about the two sources through which they acquire information about the world: their own direct perceptions, and the accounts that they receive from others. They come to see how each source of data can be erroneous.

First, their own perceptions can be erroneous due to perceptual illusions or their own cognitive biases. And second, the account they receive from another person can be erroneous either because the other person has made a sincere mistake or because the other person wanted to mislead them deliberately. Liberally educated adults build their knowledge of the world through a Bayesian process by which they receive information, form tentative beliefs, and then refine and adjust those beliefs as they receive further information over time.

So, in addition to the experience of developing expertise in a chosen domain, what knowledge, skills, and virtues are essential preparation for an adult life of satisfaction and contribution? This is, of course, a con-

testable (and, indeed, hotly contested) subject. I do not have time this morning to defend my own catalogue of qualities to a skeptic, but I would like nonetheless to offer a quick overview of the elements that I would include in what I shall refer to as "Liberal Education Version 1.0," in order that you have the context for the main point of my presentation: that in the twenty-first century this catalogue should be expanded to include two new qualities.

In the universe of knowledge, I believe that a well educated adult should have studied the historical development of humanity's most influential ideas: especially in the natural sciences, in moral and political philosophy, and in economics. I also believe that a well educated adult should have studied the history of cultural expression through literature, art, and music. And finally, I believe that a well educated adult should have studied global political history.

In the universe of skills, in addition to the ability to think in sophisticated ways about "knowledge" and how we acquire it, I believe that a well educated adult should have developed a quality that the poet John Keats called "negative capability." Keats recognized that whenever people face two conflicting arguments, they naturally seek rapid closure. After all, conflict creates psychological tension; it is human nature to make that tension go away by declaring one argument to be stronger and the other weaker, one argument to be right and the other wrong.

Keats wrote with deep admiration about the kind of person who can resist this entirely natural impulse. He wrote about how Shakespeare could "luxuriate in uncertainties and doubts, entertaining two opposing ideas without irritable reaching after fact and reason." "Negative capability" is the term that Keats used for this ability to entertain two opposing ideas "without irritable reaching after fact and reason."

I believe that negative capability to defer a rush to closure is one of the key distinguishing qualities of highly successful people. And it is a quality that Liberal Education version 1.0 has an excellent track record of nurturing within college students.

I would include two other skills in this essential catalogue: numeracy and multilingualism. In very different ways, each of these skills provides

a person with an ability to walk through a door that would otherwise be locked. Each skill can immeasurably broaden the horizons of a person's life.

And in the universe of virtues to be nurtured through liberal education, I would identify six:

First is curiosity. One should develop one's hunger for learning, to push past that voice inside our heads that is always telling us we have learned enough and do not need to keep going.

Second is empathy. One should develop the ability to see through the eyes of others, to stand in their shoes, to feel their joy and also their pain.

Third is authenticity. One should develop the ability to speak honestly in one's own true voice, to overcome the natural impulse to say things that are untrue because one fears the social consequences of speaking truthfully.

Fourth is courage. One should become brave enough to make mistakes, brave enough to make a fool of oneself in front of others, brave enough to do the right thing, even knowing full well that others may laugh.

Fifth is humility. One should appreciate one's own fallibility, how easy it is to be wrong, even when one is absolutely certain that one is right.

And sixth is generosity of spirit. One should graciously give others permission to be imperfect, to make mistakes, without interpreting such occasions as proof that one is somehow superior.

So those are the elements of knowledge, skill, and virtue that I believe motivate what I am calling Liberal Education 1.0. And for those of us who were fortunate enough to have received a liberal education way back in the twentieth century, I think most of us would say that those lessons served us well.

My main point this afternoon, however, is that Liberal Education 1.0 is no longer sufficient to meet the needs of the students of today, the students we call the millenials and the jiu ling hou. In order to be well pre-

pared for lives of satisfaction and contribution in the twenty-first century, they need more.

Two forces have combined to dramatically transform what is required of a twenty-first century college graduate: (1) globalization, and (2) information and communications technology. I will now take a few moments to sketch out the extent of their transformative impact. I will then turn to the question of what this implies for the construction of Liberal Education 2.0.

Let's start with globalization. Everyone here is aware of the explosion in international trade that has taken place over the past four decades. Before 1970, exports and imports accounted for less than 30% of the world's collective gross domestic product. Since 2010, however, exports and imports have accounted for more than 60% of global GDP.

Trade is a key element of why it makes sense to refer to this as an Age of Globalization. The exchange of goods and services across national boundaries increases global interdependence. Trade is addictive. It enables everyone to enjoy higher standards of living by specializing their production according to principles of comparative advantage. Moreover, once people begin to enjoy higher standards of living, they don't want to see them reduced. They don't want trade to slow down. In the best of worlds, this leads them to view people in other countries as valuable partners in trade. It may not make them friends, but it surely makes it harder to see them as enemies.

And yet, we are living in much more than just another Age of Globalization. I want to suggest that it is an Age of Convergence. The developments over the past 40 years concern more than just exchanges of goods and services across trade networks. They also concern the increased flow of ideas across cultural and political networks. They concern the heightened frequency of conversations across national borders, the greater extent of cooperation, the deeper sense of identification, the enhanced fellow-feeling that people today feel with people who, in an early era, might simply have been dismissed as "foreigners."

We are most assuredly not all the same, but our cultures are converging. Even more importantly, our aspirations for our world are converging as well.

A university in Zurich, Switzerland, known as ETH has developed a quantitative measure of globalization that is appropriate to an Age of Convergence. It is called the KOF Index, and it measures globalization along economic, social, and political dimensions. Naturally, the KOF Index measures flows of trade and of capital, together with restrictions on those flows. But it also goes much further, measuring personal contacts across borders, information flows across borders, and something it calls cultural proximity. It even goes so far as to measure countries' participation in international politics and governance through embassies, treaties, international organizations, and the like.

The KOF Index has been calculated for the period from 1970 to the present, and I encourage you all to explore it online. According to the index, during this period globalization has proceeded most quickly in the economic sphere. And yet, social and political globalization have also increased dramatically, especially since the creation of the World Trade Organization.

The KOF Index suggests that the world we inhabit today is very different from the world we were born into. Forty-five years ago, the things that people touched and the people they interacted with generally came from close by. Their sense of society was national, or perhaps somewhat regional.

Forty-five years ago, people's many networks of interaction were, to a very significant extent, bounded networks. Today, people feel much more closely connected with human beings everywhere on the planet. Our hopes and dreams are converging.

I do not want to overstate this convergence. Our hopes and dreams have obviously not completely converged. The world is not flat. National borders still matter. Being in China is different from being in South Korea, which is different from being in North Korea, which is different from being in India, which is different from being in Japan.

The remaining differences reflect in part the different choices that national communities have made about their political and economic systems. Those choices have a profound impact on the tone of everyday life. Just as importantly, those remaining differences also reflect differences in linguistic and cultural systems. Even if the most important values and are attitudes are shared universally, different cultural traditions shape the way that people come to express those values and attitudes in daily life.

A very interesting psychological literature has documented how children who are born with the same biological wiring develop different cognitive patterns as they grow up in different cultures. They come to perceive things differently, and they come to analyze things differently, because they were taught different answers to the questions, "What matters? What is important?"

More than a decade ago, interest in this field of research was accelerated by the publication of Richard Nisbett's book, The Geography of Thought. The book is filled with provocative examples, drawn from rigorous psychological experiments. At the risk of oversimplification, these examples give support to the following proposition: people who are raised in Asian cultures tend, in their observations of the world, to focus more intently on an object's relationship to its context, whereas people who are raised in Western cultures tend to focus more intently on the characteristics of an object that do not change if the object moves from one context to another.

A more recent contribution to this field is Gish Jen's book, Tiger Writing. Gish Jen's mother grew up in Shanghai, and her father grew up in Jiangsu Province. Her parents each moved to America as young adults, and they met one another in New York. Jen grew up in the suburbs of New York, and studied at American universities. As an adult she wrote a series of award-winning novels that have earned her recognition as the "Great American Novelist."

In Tiger Writing, Jen applies Nisbett's analysis to her own family. She describes how her parents' experiences growing up in China led them to view and express their identities differently from the way her own experiences growing up in America led her to view and express her

own identity. And she describes how, as an adult, she worked to understand and integrate both worldviews into a new, more complex identity.

This research literature implies that cultural differences offer us an enormous potential benefit, waiting to be tapped. Culturally diverse teams of people are capable of seeing issues in more complex, subtle, and accurate ways than homogeneous teams, because the individual members of diverse teams can bring multiple perspectives to bear on a problem, and the group can integrate those different perspectives in more powerful ways.

This benefit, however, comes inseparably linked with a cost. A culturally diverse group of individuals can produce a richer, more subtle group analysis only if they are able to overcome the very real risks of cross-cultural misunderstanding.

The world today therefore values more highly an individual's ability to help culturally diverse groups to work well together, to recognize cross-cultural misunderstandings, to surmount them. These are the abilities of the bridge person.

An effective bridge person must have three qualities. He or she must be able to see the world from his or her own culture's perspective and also from that of a different culture. He or she must be able to engage sympathetically with all perspectives, using the skill of negative capability to avoid rushing to declare one perspective right and the others wrong. And he or she must be able to explain how a cross-cultural misunderstanding occurred, in terms that allow everyone to move forward together without feeling that they have lost face.

The skills of the effective bridge person are higher-order skills than, say, the ability to run a least-squares regression: they are important for more than their ability to yield discrete outcomes. Rather, the skills of the effective bridge person are catalytic. They are technologies that drive new kinds of processes. They multiply the force that individuals bring to bear on any given problem.

Our world needs effective bridge people. An essential component of Liberal Education version 2.0 must therefore be a commitment to help students become effective bridge people.

The second key transformative force has been information and communications technology, and its impact has been just as clear, and just as powerful, as the impact of globalization. Last year, Erik Brynjolfsson and Andrew McAfee published The Second Machine Age. The book demonstrates how information and communications technology has changed the landscape of what human skills are valuable. Robotics, artificial intelligence, and data science are transforming the kinds of tasks that can be done by machines, and are therefore transforming the list of qualities that are most critical for people to nurture.

In the era we are entering now, routine tasks that can be expressed as algorithms will more often be carried out by teams that comprise people and machines, working together. People will design many of the algorithms, and machines will execute them. People will be expected to focus on nonroutine cognitive tasks. They will be valued for their interpersonal skills, such as their abilities to listen, to persuade, and to show courage.

In the second machine age, people will be valued more than ever for their creative and innovative capacities. To prepare themselves for that era, they must learn how to tap into their own natural creativity, to generate novel and original possibilities. And they must also learn how to evaluate those possibilities with clear and dispassionate analysis, to ascertain whether their ideas are truly valuable or just bits of clever junk.

The next generation of college graduates must be able to ideate. They must be able to keep returning to the same information, the same data, over and over again, and to see and interpret that same data in new and more insightful ways. They must also be able to risk failure. They must be able to propose a new approach for consideration, recognizing that their idea may be a bad one and may have to be abandoned.

Our world needs the kind of people who can make serious contributions during the second machine age. Therefore, an essential component of Liberal Education version 2.0 must also be a commitment to help students develop their capacities for creativity and innovation.

During the time I have remaining, this afternoon, I will discuss our efforts to develop Liberal Education version 2.0 at NYU Shanghai. But please understand, we are only a development site. We have just entered our third year of teaching, and so we do not have a release version of Liberal Education version 2.0 ready to go. Rather, I want to suggest that we have a strong beta version, a minimum viable prototype that is worth studying.

So let me first describe how NYU Shanghai has been structured to improve on the way that universities nurture the skill of multicultural effectiveness.

The process begins with the way that we assemble our student body. Almost all universities in the world draw at least three quarters of their students from the country where they are located. Not so at NYU Shanghai. Half our students come from China. The other half hail from 62 other countries, all around the world.

That national diversity is, I believe, a crucial starting point for the development of multicultural effectiveness, but it is only a starting point. Students who inhabit a diverse community will not become effective bridge people by accident. People's natural comfort in being around people with whom they share much in common works far too powerfully against that outcome.

The next step at NYU Shanghai, therefore, takes place when we assemble our dormitories. Our freshman students do not choose their own roommates. All roommates are assigned. Every Chinese student is given a non-Chinese roommate. Every non-Chinese student is given a Chinese roommate.

Honestly, I think this may be the most important thing we have done as a university. The students in our first classes have truly taken to heart the opportunity they enjoy to build a unified multicultural student community. They do not criticize themselves for spending time every day in the company of people who share their cultural background. But at the same time, the vast majority of them push themselves to make experience every day as an ebb and flow between the familiar and the different,

taking full advantage of the opportunity their roommate gives them to stretch out and explore.

As a result, I firmly believe that NYU Shanghai students appreciate, much more deeply than typical college students, the features that bind all human beings together as a species. And I firmly believe that our students appreciate more fully how cultural differences can lead to innocent misunderstandings. They really are building their capacities to help multicultural groups overcome such misunderstandings and thereby to capture the astonishing benefits associated with seeing the world from different perspectives at the same time.

Naturally, our effort to nurture multicultural sophistication does not stop with the dormitories. It permeates our curriculum. Classes are taught in English, but all non-Chinese students must learn Mandarin. Every student must study Plato and Confucius, Aristotle and Xunzi, Adam Smith and Mao Zedong.

Moreover, we push our students to move their bodies as well as their minds. They spend their first two years with us in China, but they spend their junior year abroad, studying at NYU campuses that are distributed across fourteen of the world's most important cities before they return to Shanghai for senior year.

So let me repeat an important caveat. Although a critical part of our institutional culture is to actively and explicitly talk about national cultural differences, we have not reached Nirvana. We still have a long way to go before we have anything like a comprehensive understanding of cultural differences, of how they matter, and of how people can deploy practical techniques to interpret and transcend mutual misunderstanding. What we can say with confidence is that we are moving deliberately in that direction.

Finally, I would like to describe how NYU Shanghai has been structured to improve on the way that universities nurture students talents for creativity and innovation.

On this front we have attempted to build on a fundamental insight that is well supported by scientific research: Meaningful creativity and inno-

vation require a combination of three things: expertise (a mastery of the current state of the art in the domain where one is innovating), originality (an ability to bring something new to that domain), and a passion for truth.

I want to stress here that Liberal Education version 1.0 already goes a long way towards satisfying all three of those requirements. In this area I believe the most we can say is that we are consciously trying to refine what we do so as to promote this objective even more effectively.

Let's look first at the need to do the hard preparatory work of building expertise. NYU Shanghai is of course not unusual in requiring every student to complete a major field of study. Our approach to majors is, however, quite unusual for mainland China. Our students choose their majors for themselves. And we do not allow them to choose their majors until after they have sampled a wide range of subjects during their freshman year. And they are free to change their minds about their majors as they move along the path to graduation. Our hope is that these features will make it more likely that our students learn to find joy in expertise, to feel pride in having done the work to master the state of the art in a given domain of intellectual activity.

We are perhaps more unusual when it comes to how we view the relationship between our curricular requirements and the need to nurture students' capacities for innovative originality. Along with deep expertise, we require our students to acquire intellectual breadth through a combination of a core curriculum and distributional requirements. And we see these requirements as fundamental to our students' creative development.

The scientific research on creativity shows that creative breakthroughs rarely involve the development of an idea that never existed anywhere before. And they rarely involve a simple linear extension of the current state of the art. Rather, breakthroughs occur when someone imagines a new approach to a traditional challenge, and often that imaginative leap is fueled by their experiences in an entirely different context.

Perhaps the classic example of the phenomenon is the way Macintosh computers introduced the ability of users to choose among many fonts, a radical departure from the prior state of the art. Steve Jobs had of course

accumulated depth of expertise in the domain of personal computing. But his innovative leap took place because he also had breadth. He was inspired to think deeply about how personal computers could use fonts because he had devoted a significant amount of time to the study of calligraphy.

I think it is important not to interpret the example of the Macintosh too narrowly. It should not be taken to imply that the "breadth" required by creativity and innovation consists only of being able to pick up information from one domain and then to transport it into a different domain. Rather, the key lesson has to do with the way that studying a second field can nurture values and habits of mind that nourish innovation inside one's own primary field.

A second example might help to make this point more clearly. Brynjolfsson and McAfee contend that a critical skill in the second machine age is the ability to ideate. Ideation means returning to the same set of data, or the same question, that one has visited many times before, and then seeing or suggesting something new, something that was not evident to others, something original.

Suppose one's primary domain is finance and one wants to nourish one's ability to ideate. What discipline might extend one's capacity to do so? I would suggest that one of the best disciplines to study might be poetry. One of the great scholars of poetry in the twentieth century, M.H. Abrams, once wrote a brilliant essay about how great poems have a "fourth dimension" -- time. Someone who has studied poetry understands how to return over and over again to the same poem, the same set of words on a page, and to see something new, something that was not evident before.

A hallmark of Liberal Education version 1.0 is its commitment to require students to become both deep and broad. Our primary enhancement at NYU Shanghai is to link our expectations for depth and breadth explicitly to our ambition to nurture our students' natural creative and innovative capacities.

I should say, however, that our enhancement does go further. We are expanding the list of domains in which we require all our students to ac-

quire knowledge and skills. For example, creativity and innovation in the twenty-first century require an understanding of the role of machines, and the role of algorithms. Our updated curriculum will therefore require all students to have studied algorithmic design before they graduate.

And I must say we have built out quite a robust set of courses that feature algorithmic design in the area of Interactive Media Arts ("IMA"). Through a sequence of courses developed by one of our faculty members who holds a joint appointment at the Tisch School of the Arts, IMA students learn how to use 3-D printers to produce works of art. They learn how to write iPhone apps which can control LED's embedded in a dress to change its appearance. They learn how to build robots that can test the level of PM 2.5 pollution inside an apartment and then use the results to turn air purifiers on and off.

The development of creativity and innovative skills requires us to think beyond the list of topics that students study in class. Creativity and innovation are more likely if one has developed certain qualities of character. Innovators are, for the most part, intellectually playful people, willing to take intellectual risks. After all, it is difficult to innovate if one is afraid to make a mistake, if one does not know how to stand up in front of one's peers and offer something new when one realizes that one's suggestion might turn out to be wrong.

And Liberal Education version 1.0 again gets us off to a very good start in nurturing these qualities of character, because it employs a pedagogy of active learning. Students are not allowed to sit back and passively absorb wisdom from their teachers. Rather, they must understand learning to be an active process in which they are required to present original ideas in their own voices.

Once more, our contribution at NYU Shanghai is to extend this pedagogic effort, in this case by consciously developing our creative environment outside the classroom. We have a launched a Program on Creativity + Innovation ("PCI"), led by a former Vice-Dean of the Stern School of Business. PCI's mission is to ensure that all students, whatever their majors, are constantly thinking about what creativity requires. PCI delivers to all students the message that creativity and innovation is at the

core of leadership in every field, from architecture to business, from cooking to engineering, from fashion to history, from literature to mathematics, from sculpture to physics.

PCI offers students informational sessions on everything from data visualization to new finance techniques to performance coaching. It will soon open the "LiveLab," an entrepreneurship laboratory in which students can work in a shared space to develop their ideas and receive coaching in methods like Steve Blank's so-called Lean Launchpad approach to business development.

PCI also links the NYU Shanghai campus to the dynamic world of innovation in China. It sponsors a speaker series on entrepreneurship, which brings top entrepreneurs from China to meet with students on campus. Last spring a Shanghai accelerator firm hosted a pitching competition at NYU Shanghai. And the university has identified some of Shanghai's most promising entrepreneurial ventures as appropriate educational opportunities where students can further develop their skills through internships.

When I evaluate how this beta version of Liberal Education version 2.0 is going so far, I am cautiously optimistic. We are only in our third year of teaching, and already NYU Shanghai students appear to be displaying unusual levels of creativity and innovation. For example, the first "flashmob" performance in China was staged by NYU Shanghai students. Similarly, the first "hackathon" competition in China was hosted by NYU Shanghai students.

Last year, NYU Shanghai hosted a "BarCamp," devoted to the question of how technology could improve the lives of people with disabilities. Participants in the BarCamp were given the problem of a young man with muscular dystrophy who wanted to play video games with his brother but could move only his index finger. In response to this challenge, an NYU Shanghai student invented a new kind of mouse, called the "joy mouse," that the young man could use. The "joy mouse" won second place in a competition sponsored by DFRobot.

Just as importantly, this student was not content with winning prizes in competitions. He wanted to make a real difference in the world. He

brought the joy mouse to CereCare, an organization that works with children suffering from cerebral palsy. As a result, the joymouse is making a significant difference to the lives of real individuals.

And last year, New York University hosted a competition called HackNYU, a hackathon for students from all three of NYU's degree granting campuses: New York, Abu Dhabi, and Shanghai. Hundreds of students, separated by thousands of miles, worked nonstop for 24 straight hours, competing to create innovative products that may one day revolutionize the way we think about education.

The winning submission was an app called "Discuss," which enables students taking the same class to form a group to that reads the homework together, while highlighting, annotating, and exchanging notes in real-time. It includes embedded discussion boards for comments and questions from students and their professors. The students who invented Discuss were not from New York, a campus with an engineering school and 20,000 undergraduate students. The winning team came from the campus that had only 600 students last year, NYU Shanghai.

So let me conclude by saying that I am bullish on the trajectory of Chinese higher education development today. In many ways, the education sector is a microcosm of China more generally. There has been astonishing expansion of quantity over the past 30 years. When it comes to quality, however, the standard is not yet world-class. Not even the best universities in China have achieved the astonishing level of quality of their students.

But the spirit of reform, opening up, and experimentation is strong in this sector. The demand for quality education is almost insatiable. And I am optimistic that the kinds of experiments that are taking place in China will have benefits not only for China, but also for the quality of higher education around the world. I feel extremely fortunate to be participating in such an experiment at this particular moment in history.