

THE FOURTH INDUSTRIAL REVOLUTION IN HIGHER EDUCATION AND WORK: AN ASSESSMENT

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INTERNATIONAL FEDERATION OF CATHOLIC UNIVERSITIES
Higher Education Foresight Unit

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FOREWORD

In 2018, the International Federation of Catholic Universities (IFCU) published its first review of developing trends in higher education and the workplace, which focused on the disruptive effects in these two areas of technologies associated with the Fourth Industrial Revolution. With that report, titled *Emerging Technologies in Higher Education and the Workplace: An Assessment*, IFCU initiated the yearly publication of a broad overview of the state of higher education and labor that would also provide reflection on emerging and developing trends, and on where they may lead. The 2019 iteration, *Higher Education Today and Tomorrow: A Critical Assessment*, examined in sharper focus a number of evolving tech-based policies and practices in universities – some shaped by the need to accommodate the changing demands of the labor market – with a view to fostering a debate on the possible adverse effects of these transformations.

These two reports have now been joined in a single volume with the intention of offering member universities and the higher education community at large a wide picture of the momentous challenges currently being faced by colleges and universities across the world.

The backdrop to this initiative is the unprecedented level of disruption that the advent of information technologies, automation, robotization, artificial intelligence and machine learning are now wreaking on our societies, in particular through their transformative impact on, put simply, what *learning* and *working* is bound to mean for generations to come. Often

compared to previous movements of epoch-making proportions such as the (First) Industrial Revolution, which disrupted the nature of labor in Europe and beyond through the 19th century, the Fourth Industrial Revolution that began developing at the turn of the 21st century has already taken on one additional, singular dimension: that of a pace of change unprecedented in the history of humankind, whose effect is to narrow ever so rapidly the window of foreseeability. This poses massive challenges for societies at large, and for higher education in particular.

The commoditization of higher education that has emerged over the past two decades has already upended the operating model of institutions of higher learning in many parts of the world. As members of governance bodies in universities strive to adapt to the new, perplexing landscape of developing technologies, it is of the utmost importance that they keep abreast of these trends and of their import and potential consequences – whether in the form of new opportunities or of systemic crises that require a full reassessment of operating models and fundamental objectives.

With these two reports, alongside regular like-minded events and programs, IFCU positions itself as a consultative entity that aims to provide its member universities and the higher education sector at large with the information and thought-provoking contents that can help stakeholders make enlightened managerial decisions to weather the historic upheaval that the transformations underway are carrying in their wake. Beyond this pragmatic and direct goal, IFCU also seeks to foster a more extensive debate at society level on the broader economic, social, ethical, philosophical and spiritual transformations involved in the Fourth Industrial Revolution. The following reports should be viewed as a stepping stone toward this goal.

**Emerging Technologies
in Higher Education and the Workplace:
An Assessment
2018**

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Introduction

In March 1964, a group of prominent American thinkers calling itself the “Ad Hoc Committee on the Triple Revolution” sent a report to then president Lyndon B. Johnson in which they warned that the transformations brought about by “cybernation” or, as they put it, “the combination of the computer and the automated self-regulating machine” would result in “a system of almost unlimited productive capacity, which requires progressively less human labor.”

The report thus identified automation as the potential gateway to a dramatic revolution. The other two revolutions referred to in the name of the committee were, respectively, nuclear weapons and the civil rights movement. The accompanying letter expressed the authors’ concern that Americans and their leaders were “unaware of the magnitude and acceleration of the changes going on around them” and that, if the recommendations in the report were not adopted, the nation would be “thrown into unprecedented economic and social disorder” (see A1, Cover letter to the Triple Revolution Report).

Among the policies recommended to the U.S. government for tackling the wave of automation in the labor market that the authors foresaw was the implementation, over time, of a guaranteed income for all Americans, employed or not.¹

¹ John D. Pomfret, “Guaranteed Income Asked for All, Employed or Not,” *The New York Times*, March 22, 1964.

Earlier still, in 1949, Norbert Wiener, an MIT mathematician, wrote an essay (which for mundane reasons never made it to publication) for the *New York Times* on the subject of “what the ultimate machine age is likely to be.” In it, he explained that “roughly speaking, if we can do anything in a clear and intelligible way, we can do it by machine.” He also stated that the machines that were then “on the verge of being built” would “control entire industrial processes” and “even make possible the factory substantially without employees.” “These new machines”, he claimed, “have a great capacity for upsetting the present basis of industry, and of reducing the economic value of the routine factory employee to a point at which he is not worth hiring at any price.”²

Several decades followed, in which it was easy to dismiss such warnings and view their authors as doomsayers who had turned out to be flatly wrong. Through the 1950s and 1960s, most of the West went on to experience unparalleled economic prosperity, with unemployment rates that governments in many countries across the world, including in Europe, can only dream of today. In addition, history had indeed witnessed other periods of transition from one production mode to another, which had also had their critics and Cassandras, and humankind had by and large adjusted. To limit the query to the not-too-distant past, it is worth remembering that the technological advances of the Industrial Revolution in the 19th century were still barely imaginable at its dawn, in 1815.³

However, though it would presumably not occur to many observers of history today to lament the advent of the Industrial

² John Markoff, “In 1949, He Imagined an Age of Robots,” *The New York Times*, May 20, 2013.

³ Richard J. Evans, *The Pursuit of Power: Europe 1818-1914*, Preface (U.K.: Penguin Books, 2016).

Revolution, it is also worth pondering on the fact that the technological innovations that era brought about which directly affected manufacturing – the core of the Industrial Revolution, in particular the textile industry that, even prior to that time, had been a large employment pool in England and other European countries – substituted machines for human labor through countless manual tasks and jobs within just a few decades. The result in labor terms was a massive loss of jobs not only in Europe (with the Luddites in Britain starting to destroy machinery as early as in 1811 and eventually leading, among other factors, to the emergence of labor unions) but, more tragically, also in India and later China, which had been England's traditional centers of textile manufacturing and where millions were left unemployed, with many actually starving to death.⁴

Thus the transition into the industrial age was, by all accounts, not a smooth one, including in economic terms. Though many additional jobs were eventually created by the Industrial Revolution and the new era brought about not only unprecedented productivity but also, over decades, a remarkable improvement in living standards in the West, real wages stagnated for almost half a century in 19th-century England.⁵ It also took roughly a century and a half from the start of the Industrial Revolution to see the modern welfare state and the vast improvements it brought in the social conditions of employed and unemployed people take hold. Nor did the entrenchment of the welfare state in the West after the Second World War mean the consolidation of relative prosperity for workers. As Norbert Wiener and the authors of the Triple

⁴ Sven Beckert, *Empire of Cotton: A Global History* (U.S.: Vintage Books, 2014).

⁵ "Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation," McKinsey Global Institute, December 2017, p. 33.

Revolution report had foreseen, automation and robotization did begin to spread in industry from the 1970s (albeit not with the dire consequences on labor they had envisaged), once again boosting productivity to unprecedented levels, while over the same period, in the United States in particular, real wages stagnated again, reaching a peak in 1973 and never quite returning to the same level after the sharp drop caused by the oil crisis. Measured in 2013 dollars, average wages for production and nonsupervisory workers were in fact 13 percent lower in 2013 than in 1973 (see A2, Productivity growth vs. compensation growth in the U.S., 1947-2009).⁶

The backdrop to the wave of automation and robotization that affected industrial labor during that period was of course the emergence of globalization. Economists are still debating whether Western economies lost more jobs to the former or the latter during those decades, though the emerging consensus today seems to be that automation was the main culprit.⁷

⁶ Martin Ford, *Rise of the Robots: Technology and the Threat of a Jobless Future* (U.S.: Basic Books, 2016).

⁷ See, for example 1) Daron Acemoglu, David Autor, David Dorn, Gordon H. Hanson and Brendan Price, "Import Competition and the Great U.S. Employment Sag of the 2000s," *Journal of Labor Economics*, Vol. 34, No. S1 (Part 2, January 2016), in which the authors estimate that 2.4 million American industrial jobs were lost solely to the rise of Chinese imports between 1999 and 2011; 2) Jean-François Jamet, "Où va l'industrie européenne ?," *Questions d'Europe* n° 82, Fondation Robert Schuman, December 3, 2007, where the author shows that 2.8 million jobs across the EU were lost to relocation and outsourcing to Asia between 1996 and 2006; on the other end of the argument, i.e. automation has caused more job losses than globalization, see 3) Michael J. Hicks and Srikant Devaraj, "The Myth and the Reality of Manufacturing in America," Center for Business and Economic Research, Ball State University, June 2015, in which the authors demonstrate that of the 5.6 million manufacturing jobs the U.S. lost between 2000 and 2010, 85 percent were eliminated through automation rather than international trade; and 4) Loukas Karabarounis and Brent Neiman, "The

The question, therefore, may well be whether lessons can be learned from history to assess the potential impact of the latest wave of automation, which now involves not only robotization but the exponential expansion of artificial intelligence (AI), on the labor markets of the future.

Current assessments of what proportion of existing jobs may be lost in the coming years to robotization and AI (technologies that have begun to merge) vary widely, showing anywhere from a 14 to 54 percent automation impact on jobs.⁸ It might, however, be a telling sign that sales of industrial robots worldwide went up 29 percent in 2017 compared to 2016, while according to an estimate by the International Federation of Robotics the operational stock of industrial robots worldwide will have more than doubled by 2020 compared to 2014 (see A3, Growth and forecasted growth in operational stock of industrial robots 2008-2020).⁹ As in the past, forecasts among the vast literature and media articles devoted to the subject are fairly neatly divided between, on the one hand, doomsayers who predict the end of human work as we know it with dire consequences of unprecedented economic inequality, and, on the other, fierce advocates of the AI revolution who foresee a world in which people, finally rid of the menial and repetitive aspects of work, will be free to unleash their creativity and devote more time to leisure. Regardless of the substance of forecasts, many reports ask, in reference to the past: is this time different?

Global Decline of the Labor Share,” *The Quarterly Journal of Economics*, Oxford University Press, vol. 129(1).

⁸ Darrel M. West, “Will robots and AI take your job? The Economic and Political Consequences of Automation,” Techtank, The Brookings Institution, April 18, 2018.

⁹ World Robotics Report 2018, International Federation of Robotics.

There is one immensely significant dimension with respect to which it can already be said that yes, this time is different. Both the Industrial Revolution and the wave of automation that began to soar from the 1980s in an increasingly globalized world overwhelmingly affected manual jobs, whether in agriculture or in industry. The AI revolution, in contrast, has already begun to spread to occupational sectors that require middle- and high-skilled workers, in other words workers with a college education.¹⁰

It therefore seems safe to assume that institutions of higher learning across the world are now facing a challenge of unprecedented proportions in the various phases of their modern-era development.

Over the last few decades, globalization has already significantly refashioned the sense that many universities across the world have had of their core mission. Increasingly, colleges and universities have become a marketplace where they behave as competitors who endeavor to draw in students that they view as consumers. The – evidently economic – rationale behind this rapid shift clearly defines college education primarily as a pathway to future job security and high earnings for enrolled students. Students themselves have in recent decades consistently viewed higher education as just that promise – though this perception has begun to sour.¹¹ Critics see this evolution as a deplorable shift from the tradition of a scholarly education whose quintessential function for centuries has been to pass on knowledge and encourage a spirit of inquiry among

¹⁰ See, for example Jeffrey J. Selingo, “Are Colleges Preparing Students for the Automated Future of Work?,” *The Washington Post*, November 17, 2017, and Nancy Gleason, “Higher Education Must Prepare for the Rise of Machines,” *Times Higher Education*, The World University Rankings, March 30, 2017.

¹¹ “Not What it Used to be,” *The Economist*, December 1st, 2012.

the young in attendance, even if the growing demand in government for educated officials that developed from the 13th century in Europe introduced early on the objective to train students toward a broad range of occupations.¹²

The development of digital technology that has penetrated higher education over the last decade – as it has every other dimension of human life and the labor market in particular in many countries across the world – seems to render the need for a reassessment of the mission of colleges and universities even more acute than the wave of internationalization of higher education already has. The digital revolution poses a double challenge to higher education: in the methods and practices of learning and of teaching, and in the very substance of what is taught in view of the disruption that emerging technologies are bringing to the labor market. Countless questions arise today in the minds of university administrators and faculty, and in societal debates at large: What should a college education contribute to students at a time when most observers of evolving labor trends and education experts agree to predict that the future of work will make the very idea of a life-long career obsolete and replace it with life-long learning? How will college education remain relevant? Will it? As more and more universities and governments begin to focus on and invest in the STEM (Science, Mathematics, Engineering and Mathematics) fields, what will become of the Humanities and the critical skills their teaching is supposed to impart? How will colleges and universities survive in an increasingly competitive, increasingly global environment?

These are some of the questions that this report seeks to investigate, through a focus on both the context and the loci in

¹² R.W. Southern, *The History of the University of Oxford* (UK: Oxford University Press, 1984).

which this revolution is playing out. Part One explores the global framework that has made these questions relevant by examining the commoditization of higher education. Part Two provides an overview of the penetration of digital technology and AI on and off campuses to date and seeks to assess developing trends in the transformation of higher education. Part Three focuses on the labor market to gauge the impact of emerging technologies on labor markets to date, review developing trends and attempt to determine what skills will be in demand tomorrow.

In providing an overview of and some reflections on the disruptions to come in higher education, the author of this report does not claim to possess or offer specific expertise in the emerging technologies per se. Rather, the intention is to explore the subject through a social science lens, with a view to informing and encouraging fruitful debate among the managing teams of universities that are members of the International Federation of Catholic Universities, and, hopefully, also among those that are not.

PART ONE

**The global context:
The commoditization
of higher education**

In 1979, Edward Fiske, a former *New York Times* education editor, wrote an article for *The Atlantic* where he described what he viewed as “the most traumatic change now under way in American higher education: the shift from a seller's to a buyer's market.” He recounted how, faced with the prospect of a demographic squeeze, American colleges and universities were increasingly resorting to marketing strategies and techniques designed by and for the corporate world, and to “importing” foreign students to boost enrollment. He stressed the need to “consider whether selling education is significantly different from selling cars or soap” and pointed out the perils involved in seeing colleges and universities adjust programs to meet the needs of the “market” and lower evaluation standards to ensure that the students they had enrolled at such great costs would indeed graduate. “Inherent in the marketing approach to institutional survival”, he warned, “is the assumption that whatever will sell is right.”¹³

Though advertising the merits of the education provided by their institution was in no manner a novel concept for colleges and universities at the time, it is now clear that the late 1970s and early 1980s were the beginning of a new era – one in which, irrespective of demographic trends, the need to turn an institution of higher learning into a brand name that would also attract a growing number of international students would become key to enrollment and endowment success, or, simply, to survival.

¹³ Edward J. Fiske, “The Marketing of the Colleges,” *The Atlantic*, October 1979.

1. Internationalization and globalization

As shocking as such practices may have appeared to Fiske at the time, many universities across the world, yielding to the growing forces of the globalized market, have since then gone far beyond, in adopting not just policies of strategic planning and marketization borrowed from the corporate world but also entire business models. One broad impact of this evolution has been an increased focus on curricula that translate into employability for students and the embracing of internationalization strategies that include, *inter alia*, overseas partnerships, the development of branch campuses, and catering to increasingly diverse and increasingly international cohorts of students.

Understanding the transformations of the past few decades in higher education requires spelling out the distinction between internationalization and globalization. An internationalization process implies the development by a college or university, situated in a given national context, of relations with other institutions situated abroad within their own cultural, social and economic national systems. Such strategies remain fully in the control of universities that engage in them. In contrast, the process of globalization transcends national boundaries and entails dynamic forces and movements to which universities are submitted and on which they become dependent. More than internationalization, globalization puts on institutions of higher learning a type of pressure that poses multiple challenges to their governance bodies, which struggle to retain a modicum of distinctive identity, character and values. Many universities have responded to globalization by rescaling their activities and engaging in franchises, joint ventures and the quest for foreign direct investment. The role of national states remains

significant in that states continue to determine the funding system for higher education and to contribute to its budget while granting recognition of diplomas and setting national-scale performance standards. However, this often adds pressure on academic institutions to seek international expansion.

2. From administration to governance

These transformations have in turn upended the definition of university administration. In his classic 1986 book on the subject, Burton Clark identified the concepts of knowledge, beliefs and authority as key to the understanding of how universities are organized. He defined the structural dimension of universities, regardless of national system, as a “triangle” of coordination (that, he underscored, could generate tensions within the institution): one, market-like, between the educational offer and the demands of students and families; one between the university and the state authority; and one between the faculty corps and the professional administration.¹⁴

As business concepts began to penetrate academic institutions in the move toward the “entrepreneurial” university, the authority of the third pair, the “community of scholars” on one hand and the administration on the other, which together had constituted historically the core of the university, began to decline. The boundaries between universities and other institutions in the society at large began to blur while external – increasingly international – stakeholders, virtually absent in the early 1980s, began to acquire an increasingly decisive role, in particular as board members. Over time, the concept of “university administration” was replaced with that of “governance” – a mode of management that entails much more

¹⁴ Burton R. Clark, *The Higher Education System, Academic Organization in Cross-National Perspective* (U.S.: University of California Press, 1986).

complex decision-making processes because it opens to a much broader community that often joins the local to the global and can include “industry, professional bodies and the media.”¹⁵ The five propositions formulated by Gerry Stoker in 1998 to define the concept of “governance” remain a sound analytical framework to envisage what the governance of globalized universities is today.¹⁶

3. Commoditization

With the end of the Cold War, history may not have “come to an end”, as proposed in the early 1990s by Francis Fukuyama, but it did impose on the world a single economic model.¹⁷ Propelled by the IT revolution, globalization has been both the process whereby this model was spreading across the planet and the end result of the imposition of this model across the planet. As trade, communications, finance and people were beginning to move more freely through national borders, the forces of the market and the dominance of the principles they conveyed – transactional relations, the pursuit of profit, consumption as the overarching goal proposed to the global society – went on to assert themselves universally. Prompting nations to increase their international competitiveness, globalization has compelled governments to prioritize the production of a highly-

¹⁵ Graham Baldwin and Rick Wylie, “The Governance of a Globalised University, Towards Global Localisation,” Rick Wylie (ed.), *Higher Education and Regional Growth: Local Contexts and Global Challenges*, Policy Network (U.K.: Rowman and Littlefield International, 2018), p. 90.

¹⁶ These five propositions are: 1) a set of institutions and actors drawn from both within and without the institution; 2) relations of power dependence between these institutions; 3) several networks of actors; 4) management and techniques that aim to steer and guide rather than rely on authority; 5) blurred boundaries and responsibilities among institutions and actors. See Gerry Stoker, “Governance as Theory: Five Propositions,” *International Social Science Journal* 50 (1998).

¹⁷ Francis Fukuyama, *The End of History and the Last Man* (U.S.: Macmillan, 1992).

skilled labor force and the investment in research and development – pathways to gaining a competitive edge in a competitive world. This has reshaped education policies and, inter alia, induced institutions of higher learning to adapt to the needs of the global market.

The process, however, went much further, altering the delivery of higher education in three major ways. First, as most dimensions of individual and social life in the developed world were becoming commodified, so higher education began to be approached by universities and the society at large as the “selling” of a service to “customer” students, thereby causing a leading segment of the higher education sector to start “drifting into a market-oriented system” where education would be seen as a “commercial product to be bought and sold like any other commodity.”¹⁸ Second, the so-called “commercialization” of higher education came to be understood as referring to both the growing connections between universities and the private sector, and the push to have public education institutions adopt or mimic the management mode of the private sector.¹⁹ Third and perhaps most dramatically, education increasingly came to be viewed in social and cultural terms as a service worth purchasing if and only if it virtually ensured the means for students to successfully compete in the global economy, that is, to obtain profitable and lasting future employment.²⁰

¹⁸ Frank Newman, Lara Couturier and Jamie Scurry, *The Future of Higher Education: Rhetoric, Reality, and the Risks of Market* (U.S.: Jossey-Bass Publishers, 2004).

¹⁹ James L. Turk (ed.), *The Corporate Campus: Commercialization and the Dangers to Canada's Colleges and Universities*, Introduction: What Commercialization Means for Education (Canada: James Lorimer and Company Ltd., 2000).

²⁰ See Tatjana Takševa, "The Commercialization of Higher Education as a Threat to the Values of Ethical Citizenship in a Global World," *UCFV Review*, 2.1, 2008, pp. 8- 27.

To mention only one example, the University of Texas in an almost comical embodiment of this perception, has made available to students a digital tool that allows them to see how much they can expect to earn ten years after graduation depending on the major they will choose.²¹

This is of course in stark contrast with the time-old conception of knowledge that is worth pursuing for its own sake and for the public good it potentially generates, which the learning and teaching activity – and the university as a whole – have been grounded in since Greek Antiquity.

While there is no sound argument to be made on behalf of a higher education that would provide no economic benefit, the broad significance of this trend must be clearly understood.

One of the crucial transformations under way in this context is the alteration of the teacher-student relationship. Nothing in the tradition of the pedagogical endeavor had allowed any observer before to imagine that teachers were in the business of “selling” educational contents to students. As pointed out by James Turk, an instructor’s role cannot be compared to that of a sales assistant selling a product and aiming to “please customers”. It is, rather, “to challenge students, to provoke new ways of thinking, to make students uneasy with what they have taken for granted.” This, Turk points out, “can be a difficult and unsettling process – the opposite of what is to happen to a retail customer who is to be placated and soothed into buying a product.”²²

²¹ Katherine Mangan, “A New Tool Breaks Down Earnings Potential for Different Majors. Here’s What You Need to Know,” *The Chronicle of Higher Education*, April 6, 2018.

²² Turk, *The Corporate Campus*, p. 6.

Yet commoditization has prompted universities to introduce and expand systems of learning outcomes measurements that aim to quantify the benefits of education to students, thereby mimicking the methods used in the market to assess performance – of products in terms of customer satisfaction, of employees in terms of productivity, of corporations in terms of meeting sales objectives, etc. Jerry Muller argues that the “metrical canon” relies, wrongly, on the belief that it is both possible and desirable to substitute numerical indicators of comparative performance based on standardized data for judgment acquired through personal experience and talent. Indeed, he warns, in the field of education, this trend, extended in the United States to primary- and secondary-education level, while it consumes a vast amount of federal resources, has not had the expected result of boosting overall educational achievement.²³ In addition, Daniel Koretz shows that while the metric-based approach has had a minimal net effect on student learning, it has had a demoralizing effect on teachers, whose career progress has become dependent on the students’ own measurement of their performance.²⁴ The ultimate embodiment of the university as a marketplace where performance can be measured and rated as that of any commercial enterprise is of course the now predominant diktat of world university rankings – a metric whose methodology and even underlying principles have long been the object of controversy both in the society at large and within institutions of higher learning.²⁵

²³ Jerry Z. Muller, *The Tyranny of Metrics* (U.S.: Princeton University Press, 2017).

²⁴ Daniel Koretz, *The Testing Charade: Pretending to Make Schools Better* (U.S.: University of Chicago Press, 2017).

²⁵ Alia Wong, “The Commodification of Higher Education, Colleges and Universities Have Become a Marketplace that Treats Student Applicants Like Consumers. Why?,” *The Atlantic*, March 30, 2016.

It can safely be argued that the broad outcome of education, unless it is expected to be nothing other than a framed diploma that opens the gate to a lucrative job, does not lend itself to easy and instant quantification. Well beyond the provision of a pathway to work, college education has carried a time-old tradition of self-development ultimately aimed at enhancing the civic virtues of individuals and their sense of responsibility to the collective – be it the sum of their fellow human beings, the community, the nation, or – now – the world. One of the most significant challenges faced by higher education today is that of deciding what share of students’ learning should address these unquantifiable and vastly unmarketable benefits.

Another, even more dramatic, transformation produced by the commoditization of higher education may well be, ultimately, the status of knowledge itself. Market-driven forces, bolstered by growing supranational convergence of higher education policies and forms of regulation combined with the penetration of university governance by private-sector stakeholders, are increasingly weighing on the question of what constitutes valuable knowledge in higher education. Universities are thus subjected to growing pressures to prioritize both academic fields and research through the lens of a utility calculus. Knowledge taught is hence veering away from the proverbial pursuit of “truth” toward what may suit or serve the interests of powerful market actors. In the developed world, this results in the increasing common public view that “liberal arts and value-based learning have gone out of vogue.”²⁶ Many books and articles in professional and general publications have indeed been decrying the demise of the humanities (See A4, Number of teaching jobs in English and foreign languages fields advertised

²⁶ Beth Potier, “Teaching or Research? Students or Consumers? Role of Money, Technology in Education Eyed,” *The Harvard Gazette*, October 18, 2001.

in the MLA Job Information List 1975-76 to 2016-2017). They underscore the fact that liberal arts and the humanities provide students with multiple benefits. Philosophy, history, literature and other liberal arts disciplines, they argue, are falling prey to the economic rationale that has overtaken higher education and puts a premium on business, health, engineering, technology, security and other disciplines in demand in the economy. But the study of liberal arts and the humanities, they emphasize, do give students transferable skills that employers seek out, such as, *inter alia*, critical analysis, the ability to question assumptions, and language and writing skills. Unlike STEM fields that may impart a more tangible market value to a degree, these disciplines cultivate in students what is genuinely and uniquely human – qualities that machines will probably (or hopefully) never be able to possess.²⁷ The very fact that a market utility argument has to be made in defense of the preservation of liberal arts and the humanities is in itself an apt indication of where they stand as disciplines, not just among students but also in decision-making processes among university governance.²⁸ On the other hand, a rising academic current argues that it is technology itself that will save the humanities. A fledgling subset known as the Digital Humanities has begun to rise, premised on the idea that computational tools and methods applied to the deciphering of classic texts – thus with

²⁷ See Nick Anderson, “Going for the Hard Sell as Interest in English Major Declines,” *The Washington Post*, April 10, 2015; Steven Pinker, “The Intellectual War on Science,” *The Chronicle of Higher Education*, February 13, 2018; Stanly Fish, “Stop Trying to Sell the Humanities,” *The Chronicle of Higher Education*, June 17, 2018; Paul Jay, *The Humanities "Crisis" and the Future of Literary Studies* (U.S.: Palgrave Macmillan, 2014); George Anders, *You Can Do Anything: The Surprising Power of a “Useless” Liberal Arts Education* (U.S.: Little, Brown and Co., 2017).

²⁸ Randall E. Stross, *A Practical Education: Why Liberal Arts Majors Make Great Employees*, (U.S.: Stanford University Press, 2017).

capabilities the human brain has never possessed – will shed entirely new light on great works.²⁹

Research carried out in academia, which has for so long been a symbol of excellence for institutions of higher learning especially in the United States, is also affected by the diktat of market rules. As public budgets aimed at supporting it dwindle away, its funding is increasingly provided by private corporate actors. The consequences for basic research, which does not offer the promise of a quick return on investments, have been dire, as funding goes to applied research that can lead to patents and commercialization.

4. Financial impact

Globalization has also entailed profound transformations in the financing of higher education. As pointed out above, the expansion of private-sector funding that has made universities accountable to external, non-state actors just as the capacity of national governments to support higher education was declining has contributed to spread the view that a college degree is a commodity that, like every other, should come with a price.³⁰ This has translated, *inter alia*, into the increase of tuition fees in many countries where college education is not overwhelmingly public and free. It has also opened the playing field to a growing number of for-profit providers that have been enabled to operate across national borders. Within colleges and universities, it has, for example, prompted the growing use of adjunct faculty, who work part-time for lower wages and fewer benefits and now comprise the vast majority of instructors in American academia – a cost-cutting trend that further devalues

²⁹ See, among multiple books, Steven E. Jones, *The Emergence of the Digital Humanities* (U.S.: Routledge, 2013).

³⁰ See Philip G. Altbach, “Why Higher Education is not a Commodity,” *The Chronicle of Higher Education*, May 11, 2001.

the teaching activity (see A5, Share of U.S. college and university faculty by tenure, 1969 and 2009, and A6, Trends in faculty employment status, 1975-2011).

Globalization has had some positive consequences on the development of higher education. It has promoted education policies that broaden access to students of merit from socio-economic categories that were broadly left out before, and has fostered an “increasingly international and mobile academic profession” as well as the creation of “global research networks.”³¹

Yet the commoditization of higher education remains a process driven by academic institutions situated in the West – North America, Australia and leading European Union countries – and more likely to benefit that part of the world. In that sense and in a number of other respects, such as the quiet lowering of evaluation standards for graduation, the assumed mission of fostering equality that commercialized higher education claims to have taken on comes across as arguable at the very least.³²

Greater fears yet are rising of a future world ridden with soaring inequality as we stand on the threshold of the AI revolution.

³¹ Philip G. Altbach, “Higher Education and the WTO: Globalization Run Amok,” *International Higher Education*, The Boston College Center for International Higher Education, No 23, Spring 2001.

³² Muller, *The Tyranny of Metrics*.

PART TWO

Emerging technologies on and off campuses: Trends

This part first explores the changes that emerging technologies have already brought about in higher education and then proposes an assessment of changes to come.

To such a proposal it may be objected that, at a time when technological advances in the field of computers, automation and artificial intelligence are virtually occurring daily, a “now/in the future” approach constitutes a methodological hurdle rather than a path toward more clarity, simply because an “in the future” item may become a “now” item in a matter of weeks. There is merit in this observation, because the pace of technological innovation today makes it more difficult both to draw a sharp distinction between present and future, and to predict the future (provided that the latter has ever been less than difficult).

In the field of higher education, however, the trends observable today have been in the making for well over two decades, and there seems to be a broad consensus among experts as to at least what the very-near future will bring. Many universities across the world have been implementing some of the relevant fruits of technological innovations, and the perfect coincidence of transformations induced by the processes of internationalization and globalization explored in Part One with those generated by technology does lend credence to the endeavor to separate present and future for methodological – and indeed clarity – purposes. Absent technological advances in communication, in particular with respect to the production and circulation of data, there would have been, after all, no internationalization and globalization processes in higher education.

1. What has changed: The penetration of digital technology and AI on and off campuses

“The world is going to university”, *The Economist* declared in a 2015 article describing how mass higher education was invented in the United States in the 19th century and, after spreading to Europe and East Asia in the 20th, is now expanding through the rest of the world, with the exception of sub-Saharan Africa. Between 1992 and 2012, the global rate of college-age population at university grew from 14 to 32 percent, and the number of countries with a ratio of enrolled students above 50 percent from 5 to 54 (see A7, Increase in college graduates in South Korea, U.S. and OECD countries 1995-2016). “University enrollment”, the article says, “is growing faster even than demand for that ultimate consumer good, the car.”³³

The paradox in this fact is that while countries across the world continue to draw inspiration from the American system, the merits of getting a university education are being increasingly questioned in the United States. Several reasons account for this growing skepticism, in particular the ever-rising costs of higher education to national budgets and families. Distrust clearly began to develop in the aftermath of the Great Recession of 2008. Graduates who then sought to enter the workforce were faced with the prospect of unemployment and underemployment at levels unprecedented in previous decades, and the perceptual impact of that crisis has proved to be long-lasting (see A8, Unemployment and underemployment rates for college graduates aged 21-24, 2007-2018). In the wake of the economic crisis, the belief that a college degree was a safe ticket to a well-paying job could no longer be taken for granted.

³³ “The world is going to university,” *The Economist*, March 26, 2015.

Though the global economy has vastly recovered over the last decade, this same belief is now being questioned again on a far wider scale and with a much broader impact for colleges and universities. The issue at stake today is no longer whether the economic outlook at the time of graduation will allow recipients of a tertiary education to rapidly obtain profitable employment, but to what extent, given the pace of technological changes in the labor market, this will even be possible. This concern arises after a decade in which, following the Great Recession of 2008, a new approach to higher education called the “student-success movement” grew to question the role of higher education, not only because of rising costs to families but also in view of low graduation rates and gaps in outcomes between students of different socio-economic and ethnic backgrounds.³⁴

The learning experience in many universities across the world today is already dramatically different from what it was even a decade ago. It suffices to focus here on a handful of innovations that emerging technologies have made possible to grasp the significance of the changes in what “studying” means that have already taken place.

Online learning. Whether as part of the curriculum for enrolled students or as an offer geared to a wider public, online courses have been part of the learning practices in higher education since the early 2000s. The advantages they offer students enrolled at university are by now well known: flexibility, ability to follow courses without having to get to a classroom, the possibility to study when most convenient, etc. When they first emerged as an alternative to classroom learning, online courses, and indeed the full online colleges, both non-profit and for-profit, that then began to multiply, were

³⁴ “Student Success,” in *The Future of Learning*, *The Chronicle of Higher Education*, 2018, p. 11.

indeed widely seen as a service that had the potential to revolutionize the meaning of higher education.

This was particularly true of massive open online courses (MOOCs), launched a decade later in 2011 with the awesome promise of democratizing university learning by allowing virtually anyone who wanted to take a college course to do so, in many cases at no cost. In just a few years, the MOOCs offer grew exponentially, from 3 initial courses opening on line in October 2011 to 7,465 in June 2017.³⁵ (See A9, Growth of MOOCs 2012-2018) By the end of 2017, Udacity, one of the leading providers, had reached a total of 81 million cumulative learners.³⁶

MOOCs have undoubtedly achieved some of the goals their creators had intended, such as making high-quality educational resources available to categories of people across the world who would not be able to attend similar courses in person. Yet they have not thus far, as first announced, revolutionized access to higher education – let alone “kill” university degrees as many enthusiasts had predicted they would when the first courses were going on line.³⁷ By 2013 or 2014, it was becoming apparent that completion rates for online courses were particularly low – ranging between 5 and 13 percent through various surveys.³⁸ Subsequent research showed that online courses were more likely to attract a demographic segment

³⁵ “Cumulative Growth in Number of MOOCs, 2011-17,” *The Chronicle of Higher Education*, August 13, 2017.

³⁶ By the Numbers: MOOCs in 2017, Class Central, <https://www.class-central.com/report/mooc-stats-2017/>

³⁷ “Will MOOCs Kill University Degrees?,” *The Economist*, October 2, 2013.

³⁸ See for example Maria Konikova, “Will MOOCs be Flukes?,” *The New Yorker*, November 7, 2014, and D.F.O. Onah, J. Sinclair and R. Boyatt, “Dropout Rates of Massive Open Online Courses: Behavioural Patterns,” edulearn, the University of Warwick, United Kingdom, 2014. https://warwick.ac.uk/fac/sci/dcs/people/research/csrmaj/daniel_onah_edulearn14.pdf

already well educated and employed, more male than female, and living in the developed world. In addition, a majority of distance learners were taking these courses out of intellectual curiosity or for work advancement rather than to acquire an essential education that they could have no other access to. A majority of beneficiaries were, in other words, part of the precise segment that the MOOCs offer did not primarily target, because they were a segment that was or had already been involved in higher education and were already doing well.³⁹ Accordingly, among enrolled students, online courses have also proved by and large to be handled more successfully by learners who were already better equipped to study than by those requiring pedagogical support.

It can therefore at the very least be said that, in terms of pedagogical progress, online courses have not brought about the promised revolution. They have also opened an entire dark side to higher education that the creators were apparently unable to foresee and that has to do with the integrity of students. Coursework on the internet has indeed multiplied the possibilities of cheating – now emblematic of the IT penetration in academia. Today, we live in an age of multinational cheating schemes that involve countless “essay mills” – services located in Asia or Africa that offer students to write their term papers or even take an entire online course (with a guaranteed top grade) for them, for a fee. With students in the developed world increasingly focused on getting the degree that gets the job and increasingly oblivious to the broad merits of higher education, essay mills have become a booming business that allows educated individuals in the developing world to make a decent living at writing papers that enable those students to cheat – an

³⁹ See for example, Gayle Christensen, Andrew Steinmetz et al., “The MOOC Phenomenon: Who Takes Massive Open Online Courses and Why?,” November 6, 2013, <http://dx.doi.org/10.2139/ssrn.2350964>

innovative way to perpetuate or even deepen North-South economic inequality. The classroom itself is no longer a relatively safe ground for evaluation: the rise of technology has bred social media sites and apps that provide answers to quizzes and exams taken in class on fact-based questions, or allow students who previously took the exams to pass on answers.⁴⁰

More broadly, the availability of online resources that rely on crowdsourcing has changed the relationship that students have to the material and subjects they study, and poses significant challenges to instructors, who can no longer view themselves as sole legitimate disseminators of content. Natasha Jankowski, director of the National Institute for Learning Outcomes Assessment based at the University of Illinois and Indiana University, sums up in these terms the transformed teacher-learner relationship: “It’s about authentic demonstrations that are externally facing so students can be part of this data-rich environment and about how we’re helping each other collectively to move us from a ‘gotcha’ assessment to creating a developmental learning experience. It’s a different teaching-learning mentality.”⁴¹

While technologies such as virtual reality, augmented reality, and 3-D printers are making their way onto campuses, in particular in scientific disciplines, those that for now seem to dramatically alter the configuration of the academic path for a growing number of students across the world are systems of educational technology and the new science they are producing: Learning Analytics.

⁴⁰ On the ways of cheating that technology has made possible, see “How Students Cheat in a High-Tech World,” the Focus collection of articles on the subject published in 2016 by *The Chronicle of Higher Education*.

⁴¹ Emma Kerr, “What a Controversy Over an App Tells Us About How Students Learn Now,” *the Chronicle of Higher Education*, May 15, 2018.

Ed Tech and Learning Analytics. Over the last few years emerging technologies have spawned the exponential development of software and AI-aided, cloud-based technology – Ed Tech in short – that aim to adapt learning methods and customize curricula to fit each student’s ability to move forward at his or her own pace. These systems use analytics to assess competency in the different areas of the curriculum, and then let students take the time to reinforce weaker areas, thereby creating a customized curriculum. Still in the early stages of development, Ed Tech is promoted by its startup creators as having the potential to end the practice of instructors teaching to the classroom average while lower-level learners are unable to catch up and those with the better abilities remain disengaged. The promise is that by automating ability assessment and the tracking of learning difficulties, better outcomes can be obtained by each student and by the class as a whole. In the process, the instructor shifts from the role of knowledge provider to that of facilitator and problem solver. Away from the classroom and from online courses, the technology also helps students refashion their curriculum as they move forward toward graduation. A growing number of universities in the developed world are thus partnering with tech companies and investing resources in developing the online collection of student data that is needed to power Ed Tech – an activity known as Learning Analytics.⁴²

Learning analytics consists in the collection of mainly two types of data: information about who incoming students are, such as

⁴² Investopedia Academy, which offers online financial courses, see <http://www.investopedia.com/terms/e/edtech.asp> and Education Technology, an EdTech news online magazine. Also see <http://www.edtechnology.co.uk/Article/what-the-edtech-learning-analytics>.

demographics and performance in secondary education, and activity data as they move through the curriculum toward completion, such as how they are performing on course work and requirements, connections to the internet, comments posted on discussion boards, etc. Some systems track mobility on campus such as trips to cafeteria, the gym, the library or the tutoring center. Much as the tech giants collect user data on the internet to “enhance users’ internet experience”, i.e. concretely to direct to users advertising they are more likely to be responsive to, learning analytics gathers data that will make possible the personalization of the student’s learning process. The technology used includes prediction (Predictive Analytics) that allows the college to identify trouble spots and intervene to boost performance. Through language-based and visual methods, algorithms detect underlying patterns and relationships in the data to help pinpoint learning difficulties and strengths. With the tailoring of the learning process to every student’s singular learning personality as the ultimate goal, the educational focus in gathering data about students’ performance – which has of course always existed at university, mainly through evaluation – shifts from outcomes to process. Ben Maddox, chief instructional technology officer at New York University, defines learning analytics as the use of “data from, about and with students to improve the learning environment and to research how we see, identify and understand more about learning.”⁴³

The broad idea is to remedy the “one-size-fits-all” approach that higher education has been traditionally grounded in, and to reduce or even close achievement gaps among students of

⁴³ At Learning Analytics Summer Institute, June 11-13, 2018, Columbia University, NY.

increasingly diverse socio-economic and ethnic backgrounds so that more students can perform well at university, thereby increasing graduation rates. The overall societal goal, one might say, is one of social justice.

As with any data collected by the Big Four tech companies, data collected via learning does pose the question of data protection and ethics, which analytics faculty and professionals are aware of. As is the case everywhere else on the internet, the students' consent is obtained through the forms they sign upon admission. By and large, the consensus in the higher education community seems to be that, since the sole purpose of learning analytics is to help students "enhance their learning experience", the risk of data misuse is very low to nonexistent.

Learning management systems (LMS) are the range of software applications that power all these technology-based activities, from online courses to blended learning that combine both online and traditional learning, and flipped classrooms where the delivery of instructional content is carried out online and classroom time devoted to questions and debate. LMS provide platforms that teachers at primary- and secondary-education level use across the world to manage their teaching and are also an option for employee training and retraining. They have thus also penetrated the market of higher education, and were valued at 5.2 billion dollars as an industry in 2017, with projections of this revenue more than tripling by 2021.⁴⁴ Google, Microsoft

⁴⁴ Julia Boorstin, "A Lesson Plan from Tech Giants on How to Transform Education," CNBC, DISRUPTOR/50, <https://www.cnbc.com/2017/03/28/microsoft-google-and-facebook-see-billions-in-future-of-education.html>

and Apple have joined this vibrant market by offering free educational online tools.

In the promotional material disseminated by LMS professionals and at conferences and fairs in which they participate, great emphasis is consistently put on the fact that the human dimension remains at the core of every one of these innovations and of all pedagogical tools aimed at assisting students. Yet criticism of present performance is also rising – more often, naturally, from non-stakeholders. One major objection raised against the spreading use of these technologies is that by focusing on individual students who create an entire relationship with the associated devices and platforms, Ed Tech does not foster the development of social skills – one area in which AI is particularly weak – as interacting with teachers and peers in a physical classroom does. This of course mirrors the growing societal concern over young people spending more time nowadays interacting with a screen than with any human in their surroundings.

On a broader scale, while online courses have so far failed to live up to their democratization promise and it is too early to seriously assess the overall impact of educational technology on performance enhancement and graduation rates in higher education, the virtues of customized learning vs. traditional education delivered in “one-size-fits-all” format appear to be taken for granted among all stakeholders as well as an overwhelming segment of non-stakeholders. Lost in the debate is the fact that these technologies clearly aim to make the learning experience less constraining, more game-like, in short more to the taste of the individual student. This does raise the question of whether there is indeed sizeable progress in habituating young people to reject constraint, to grow intellectually and mentally in an educational landscape where the rewards of pain – of long attention spans that have to be

devoted to understanding complex, not always immediately stimulating, material, of the sense of being somewhat behind the best students in the class and having to invest efforts in catching up – are all but absent. Needless to add, arguments on behalf of such a “retrograde” view of education, and even questioning that seeks to shake up the assumptions behind the concept of customized learning, are barely audible in the current hype on the subject. They are, nevertheless, worth hearing.⁴⁵

2. What’s under way: An assessment

Devoting even a minimal amount of attention to the ongoing debate among AI specialists and observers at large makes one thing clear: the window of predictability on the advances AI and other emerging technologies may make in the future, near or far, is extremely narrow. Any firm scenario that may therefore be proposed as to what the future of technology in education may look like in any number of years would not just be a bold proposition, but also one very likely to be wrong. Only one prognosis can be made with more than relative safety: no promise of disruption to the disruptive seems to appear on the horizon. It is therefore reasonable to envisage continuity.

Discernable trends. It is thus clear that technologies that are developing today on and off campus will expand, both in nature and geographically, as governments across the world increasingly invest in them and struggle for their higher education systems not to be outpaced. The trends underlined in the previous section will keep evolving as emerging technologies – such as for example the use of robots as chatbots to enhance

⁴⁵ For an argument on behalf of “rigidity,” see Kathleen Lowrey, “Old-School Learning Provides Firmness in a Disrupting World,” *Edmonton Journal*, June 1st, 2017.

tutoring and advising – take hold and eventually lose the adjective.

By most accounts, the learning experience of tomorrow will be more active and interactive and take place in an environment that blurs the boundaries between the traditional classroom and the world outside of it. It will be less of a self-contained activity and more of an exchange with the “real world”.

Already prominent among pedagogical strategies today is what is called “experiential learning”, a “process through which students develop knowledge, skills, and values from direct experiences outside a traditional academic setting”, which includes “internships, service learning, undergraduate research, study abroad, and other creative and professional work experiences.”⁴⁶ This may be the way that students’ social skills, unaddressed, as seen above, by educational technologies, will be fostered and developed. “In the future,” says MIT’s Sanjay Sarma, learning will have to “take place everywhere, not just in the classroom or at school.” Learning processes will have to generalize the “practice of the flipped classroom, with shorter modules that take into account the fact that the average maximum attention span is ten minutes.” Education will aim to develop in everyone an “instinct for learning, a culture where people are constantly learning.”⁴⁷

The overall goal of learning strategies will be to develop competencies that allow students to adapt to any change through the waves of technological transformations they will

⁴⁶ What is experiential learning?, Experiential Learning Center, University of Denver, Colorado
<http://www.ucdenver.edu/life/services/ExperientialLearning/about/Pages/WhatIsExperientialLearning.aspx>

⁴⁷ Sanjay E. Sarma, professor of mechanical engineering and vice-president for Open Learning at the Massachusetts Institute of Technology, EmTech Next 2018, June 4-5, 2018, MIT Media Lab, Cambridge, MA.

experience in their future. To that end, teaching will no longer be focused on imparting knowledge but on helping students learn to learn, acquire a skill to learn that they will carry with them through their professional life, in which they will constantly have to learn and relearn. As Deloitte’s Janet Foutty puts it, the motto of higher education will shift from “learn to work” to “work to learn.”⁴⁸ In fact, Tom Galluzzo of IAM Robotics says, the education of the future will not necessarily consist in getting a degree but will emphasize getting hands-on experience with technologies.⁴⁹

Preparing to face the future. There is a prevalent sense among education experts and other stakeholders that higher education, often accused of poorly preparing students for the challenges of professional life because, among other things, the university is vastly disconnected from the corporate world, will no longer have the option to maintain this status quo in future years. As digital and AI-technologies, coupled with automation and robotization, are transforming the workplace at a pace never experienced before by humankind, introducing and even immersing students in the world of work during their college years will become an imperative. This already takes the form of various types of partnering between universities and companies or factories – a trend that college governance will have to follow and expand in the future.

In fact, what all forecasts are unanimous about is the prediction that the leading type of education in the future will be life-long learning – one of the solutions proposed to deal with the technological tidal wave that is rapidly rising. As viewed in Part One of this work, globalization and internationalization have

⁴⁸ Janet Foutty, chairman and CEO of Deloitte Consulting, EmTech Next 2018.

⁴⁹ Tom Galluzzo, CEO of IAM Robotics, EmTech Next 2018.

already pushed universities to reshape their programs and curricula to meet labor market needs. The technological revolution will push them further in that direction in the coming years, with calls already rising to make college education closer to vocational training and apprenticeships.⁵⁰ This evolution will probably continue to take its toll on the humanities and liberal arts, but the imperative to remain competitive in the international marketplace will leave college governance with little choice to not follow suit.

Joseph Aoun, the president of Northeastern University, recommends a holistic strategy for higher education to keep students relevant in the labor markets of the future. He believes that colleges and universities should promote curricula that include experiential learning and together provide technology, data and human literacy – i.e. literacy in skills that are unique to humans such as innovation, entrepreneurship, communication, global thinking, team work, etc. He is among those who advocate a leading role in life-long learning for universities.⁵¹

One recent innovation that combines the concepts of higher education and life-long training might point the way toward sustained future relevance for universities: the “open-loop university” created by Stanford University in 2014. Rather than a traditional degree obtained over four consecutive years, students can choose to accumulate six years of study whenever they want through their professional life. Michigan University went even further when it gave its MBA graduates the option to

⁵⁰ See for example Scott Carlson, “Why Colleges Need to Embrace the Apprenticeship,” *The Chronicle of Higher Education*, June 4, 2017.

⁵¹ Joseph E. Aoun, *Robot-Proof: Higher Education in the Age of Artificial Intelligence* (U.S.: The MIT Press, 2017).

return for an executive-level program, free of charge, through their lifetime.⁵²

These emerging and developing strategies for universities to maintain relevance in the world of tomorrow may come across as a tall order. Institutions of higher learning are often viewed as conservative bureaucratic machines that require time to adopt and adapt to changes. In the current context, there is the added problem that, in the future, technology and the way it is transforming the workplace may outpace any change that universities that strive to remain competitive will be able to put in place.

The expansion of education technology and increasing reliance of universities on it to reinforce their legitimacy, relevance and efficiency has already given rise to much criticism. Predictive analytics is only a fledgling trend among universities across the world. Even in the United States, only seven percent of universities have reported deploying these systems at institution level, though over half of all colleges are either piloting or expanding their use.⁵³ Yet fears already focus on the possibility that the classroom of the future may become too heavily dependent on these technologies, to the point that they will be allowed to prescribe not just *how* students learn but also *what* they learn.⁵⁴

⁵² Danielle Paquette, "In the Future, College Never Really Ends," *The Washington Post*, June 6, 2018.

⁵³ "Students Success," *The Chronicle of Higher Education*, p. 13.

⁵⁴ Nikol Rummel, Erin Walker and Vincent Aleven, "Different Futures of Adaptive Collaborative Learning Support," *International Journal of Artificial Intelligence in Education*, June 2016, Volume 26, Issue 2, pp. 784–795.

The adverse effects of digital and AI technology on social skills may also become an even greater issue as the use of devices expands in education the way it already has in all facets of young (and not-so-young) people's lives. In parallel, in the obsessive drive to remain competitive and relevant, many universities seem to underinvest in those skills that AI is said to lack, such as critical thinking, creativity and empathy – which, admittedly, are not easy to teach. This is taking place at a time when the student generation, immersed in the internet and mobile devices since infancy, exhibits, according to research, declining abilities in the kind of literacy that comes from reading: mindful knowledge acquisition, inductive analysis, critical thinking, imagination and reflection.⁵⁵ Meanwhile, no substantial evidence has surfaced to date that these technologies improve student learning, while the “focus on quantifying classroom experience”, says Molly Worthen, an assistant professor of history at the University of North Carolina, “makes it easier to shift blame for student failure wholly unto universities, ignoring deeper socio-economic reasons that cause many students to struggle with college-level work.”⁵⁶

Finally, another reasonable fear at global scale is that of seeing the penetration of digital and AI technologies in higher education deepen the economic divide between North and South. Free platforms may make it easier for teachers in schools with few resources to improve the quality of primary and secondary education, but universities in the developing world may rapidly become even less able to deliver education that matches international standards and prepares students for competitive jobs that will benefit national economies.

⁵⁵ Patricia M. Greenfield, “Technology and Informal Education: What is Taught, What is Learned,” *Science*, vol. 323, January 2, 2009.

⁵⁶ Molly Worthen, “The Misguided Drive to Measure ‘Learning Outcomes,’” *The Chronicle of Higher Education*, February 23, 2018.

PART THREE

The future of work

What will automation do to jobs? This is the question that every stakeholder in and observer of the labor markets of today and tomorrow is raising these days. The answer, to say the least, remains elusive.

“There are about as many opinions as there are experts”, claims an article in the MIT Technology Review. It then provides a list of forecasts, some of which go as far as 2035, that make it clear that there is no consensus among the numerous institutions now engaged in offering projections about jobs to be created and destroyed by automation. Looking at any given target year that these forecasts put forth also makes it clear that no distinct trend emerges even there (see A10, Predicted jobs automation will create and destroy).⁵⁷

Putting some context around the issue requires an examination of what labor trends have been emerging and developing over the past decade as an earlier product of technology and global trade – in short, of what is now called the “gig economy”.

1. The new casualization of work

As is often the case with neologisms, different definitions can be found for what the gig economy means. In simple terms, it is an economy where the form of labor that becomes pervasive is “a way of working that is based on people having temporary jobs or doing separate pieces of work, each paid separately, rather than working for an employer.”⁵⁸ The term “gig” in the sense that is used here appeared in 1926 in reference to jobs assigned for a specific time, and often to “an entertainer’s engagement”.⁵⁹ The more elegant name for roughly the same concept is the

⁵⁷ Erin Winick, “Every Study We Could Find on What Automation Will Do to Jobs, in One Chart,” *MIT Technology Review*, January 25, 2018.

⁵⁸ Cambridge English Dictionary on line.

⁵⁹ Merriam Webster’s Collegiate Dictionary, 10th edition, 1993.

“collaborative economy”. At the core of all definitions lies the fact that jobs emblematic of the gig economy do not come with a permanent contract and are not permanent jobs. Nor do they come with the labor protections and benefits that have been typical of the welfare state. Their legal status is often blurry. They can be based on short-term contracts or done on a free-lance basis by independent contractors, and they now often involve online collaborative platforms intermediating work with individuals on line. The array of jobs in this category is very broad, ranging from delivery, ride hailing, restaurant and housecleaning jobs to translation, design and consulting (and outsourced essay writing). Gig economy workers in white-collar occupations are also referred to as “digital nomads”.

The gig economy has rapidly spread around the globe, bringing the opportunity of employment for young people in regions where youth unemployment is high such as parts of sub-Saharan Africa and Southeast Asia, or where steady employment for low-skilled youth is lacking such as parts of Europe. These jobs also help people with regular employment generate additional income. According to a 2016 Pew Research Center study, 24 percent of Americans reported earning money in the previous year from what is also called the “platform economy”.⁶⁰ Leading gig work platforms praise their business models as innovations that will create a revolution in labor markets because they “can help lift people out of poverty”. Enthusiasts believe that this “new world of work” can “have structural benefits on the global economy, such as raising labor force participation and improving productivity.”⁶¹ Proponents

⁶⁰ Aaron Smith, “Gig Work, Online Selling and Home Sharing,” Pew Research Center, Internet & Technology, November 17, 2016.

⁶¹ Mark Graham, Vili Lehdonvirta, Alex Wood et al., “The Risks and Rewards of Online Gig Work at the Global Margins,” Oxford Internet Institute, University of Oxford, 2017.

of the gig economy point out the benefits of flexibility, autonomy and potential higher incomes that it provides to its workers. Critics, on the other hand, emphasize the casualization of labor that the gig economy has brought about, offering in most cases no minimum wage, no sick or overtime pay, no paid vacation and no health insurance.

As traditional employers increasingly turn to the digital platforms for extra staffing according to need and see an advantage in the lower labor costs the outlet affords, labor experts are concerned that this growing trend will jeopardize steady work based on permanent contracts. “We’re seeing only one trend here,” says Diane Mulcahy, author of a book on the subject, “which is that the gig economy is big and getting bigger. Companies will do just about anything to avoid hiring full-time employees.”^{62, 63}

Millennials’ participation in the gig economy is rising, and many value the alternative form of work it proposes more than traditional steady jobs.⁶⁴ Whether this, added to the economic factors already mentioned, indicates that the gig economy will indeed revolutionize the world of work remains an open question. A 2016 report compiled for the European Commission concedes that collaborative platforms have the potential to profoundly transform the labor market. But it also finds that, with a rate of 0.05 percent European Union workers involved in these jobs at present, there is no sign thus far that the gig

⁶² Abha Bhattarai, “Now Hiring, for a One-day Job: the Gig Economy Hits Retail,” *The Washington Post*, May 4, 2018.

⁶³ Diane Mulcahy, *The Gig Economy: The Complete Guide to Getting Better Work, Taking More Time Off, and Financing the Life You Want* (U.S.: AMACOM, 2016).

⁶⁴ Kelly Monahan, Jeff Schwartz and Tiffany Schleeter, “Decoding Millennials in the Gig Economy: Six Trends to Watch in Alternative Work,” Deloitte Insights, May 1st, 2018.

economy is having a significant impact on the traditional labor market or on job creation and destruction in Europe.⁶⁵

More broadly, the structure of work has been shifting away from the classical lifetime career or even long-term employment framework that had dominated labor markets for generations. In the age of startup glamour, steady long-term jobs may no longer be a primary objective even for young people with a college education. Within corporations, the structure of work is changing as well. Management no longer means handing down the rules and projecting authority but being a team leader. Skilled staff is increasingly hired on a project basis, and then moves on. Work is increasingly done elsewhere, anywhere, anytime, even by those who still belong to a company that has physical offices somewhere.

Will this developing reconfiguration of labor coincide with the wave of AI, robotization and automation and thus result in a positive impact on labor, or will the two trends collide, with a compounding effect on job losses?

2. Robotization, automation, AI: phase one

AI was first envisaged as a human fantasy in science fiction novels and movies that began to multiply in the first half of the 20th-century. It may, however, be argued that crafting automatons out of gold and bronze and assigning them various tasks such as guarding, serving or going to combat was a matter of routine for the gods of Ancient Greece.⁶⁶ The modern origin

⁶⁵ Willem Pieter De Groen, Ilaria Maselli, “The Impact of the Collaborative Economy on the Labour Market,” CEPS Special Report No. 138, June 3, 2016.

⁶⁶ The hounds of Alcinous, immortal creatures guarding the palace of King Alcinous, and the twenty tripods of Olympus mounted on golden wheels and serving the gods gathered on Mount Olympus, all fashioned by Hephaistos,

of AI is credited to Alan Turing, of Enigma codebreaking fame, who explored its mathematical possibility. The term itself was coined in the first academic conference on the subject at Dartmouth College in 1956. AI has thus been studied for decades, with advances in search and machine learning algorithms, and breakthroughs that for a long time elicited wonder only among scientists (see A11, Artificial Intelligence timeline 1930-2000).

Assessing the impact that automation and AI may have on future jobs could start with an analysis of what effect the penetration of robots has already had on industrial jobs – an activity sector that has been exposed to automation for several decades. Researchers Daron Acemoglu (MIT) and Pascual Restrepo (Boston University) did just that, in a 2017 study for the National Bureau of Economic Research titled “Robots and Jobs: Evidence from U.S. labor Markets”. In it, they focus on the effect that the increase in robot usage had on the employment rates of different areas and industries in the United States between 1990 and 2007, while controlling for the influence of other factors such as job offshoring and increased imports from China. They find that each new robot added caused the loss of 3 to 5.6 jobs in a commuting zone observed, and a drop of 0.25 to 0.50 percent in local wages. They see negative effects “on essentially all occupations, with the exception of managers [...]”. Predictably, the major categories experiencing substantial declines are routine manual occupations, blue-collar workers, operators and assembly workers, and machinists and transport workers.” While the metrics of the impact may appear small, it must be noted that the authors adopt a restrictive definition of robots (fully autonomous, multipurpose), and that these are pre-AI era robots. In addition, they note that “interestingly, and

the god of craftsmanship and blacksmiths, are only two of many automatons described in Homer’s *Iliad* and *Odyssey*.

perhaps surprisingly, we do not find positive and offsetting employment gains in any occupation or education groups.” Thus the job loss due to robot penetration was not compensated for by job creation of another type. However, they assess that even under the most aggressive scenario, the fraction of U.S. employment being affected by robots is relatively small, at least for the time being. “There is nothing here”, they conclude, “to support the view that new technologies will make most jobs disappear and humans largely redundant.”⁶⁷

Addressing elsewhere the subject of emerging technologies and how they affect labor, Acemoglu, like many other economists, distinguishes between enabling technologies, which complement and increase the productivity of certain types of skills, and replacing technologies, which take over tasks previously performed by labor – each with very different labor implications. While enabling technologies are found to increase wages and labor demand because they increase workers’ productivity, replacing technologies have the opposite effect. However, Acemoglu adds, many technologies combine enabling and replacing elements. Replacing technologies have already had a significant labor-reducing impact on jobs involving, inter alia, assembly tasks, switchboard operation, mail sorting, packing, stock trading, cash dispensing and operating machines. He points out that AI can be used not only for replacement but also for creating new tasks and functions, yet that at present the focus of investment is on the former rather than on the latter. However, if too many resources are directed at AI that replaces tasks and not enough at AI that creates new tasks, both labor and productivity, he warns, will suffer. On a

⁶⁷ Daron Acemoglu and Pascual Restrepo, “Robots and Jobs: Evidence from U.S. Labor Markets,” MIT Economics, <https://economics.mit.edu/files/□de4r>

final note, he warns that “we are getting ready for the technologies of the 21st century with an educational system that was designed in the mid-20th century and has been going backwards ever since.”⁶⁸

People across the world are now witnessing and experiencing daily the automation of tasks performed by humans only a few years ago – in automated check-out at retail stores, in e-commerce and through automated call-center systems, at hospitals and clinics. What has been the fate of workers thus replaced? Aggregate data at macroeconomic level on how many jobs have already been lost to digital and AI-powered automation is difficult to come by. But amid the warnings of major potential damage to labor in years to come, some voices have been rising to stress that we are already seeing significant labor disruption. Former U.S. Treasury Secretary and Harvard economics professor Larry Summers talks about “labor-substitutive innovation”, which, he argues, has so far only vastly benefited the top one percent. He believes that we are “only in the early innings of such a wave.”⁶⁹

From the innings to the wave, the recurring question with the elusive answer remains: what future impact?

⁶⁸ Massachusetts Institute of Technology, EmTech Next 2018, June 4-5, 2018, MIT Media Lab, Cambridge, MA. See also Daron Acemoglu and David Autor, “Skills, Tasks and Technologies: Implications for Employment and Earnings,” Ch. 12 in *Handbook of Labor Economics*, Orley Ashenfelter and David Card (eds.) (U.S.: Elsevier B.V., 2011).

⁶⁹ See interview in Jim Tankersley, “Robots Are Hurting Middle-Class Workers, and Education Won’t Solve the Problem, Larry Summers Says,” *The Washington Post*, March 3, 2015.

3. Impact of robotization, automation and AI on the future of work

Technological transformations have always resulted in short- to medium term job losses before economies could generate substantial job creation again. As seen in the introduction, the Industrial Revolution defined disruption, yet Western economies subsequently – mainly after the Second World War – went on to reach unparalleled productivity and prosperity, including for the working class. Could *this* disruption, in contrast, lead to a prolonged period of dire unemployment for millions or more and require decades for the global economy to adjust again?

As suggested above, experts and observers of the current transformations can be broadly sorted into an optimistic camp versus a pessimistic one. The former, in which members and leaders of the tech industry dominate, believes that this turning point in history will have compensation effects typical of the self-regulating power of the market comparable to those of similar technological revolutions in history. Among the pessimists, some conjure up the specter of human work as a whole made virtually obsolete. One main argument put forth by the pessimists is that this technological revolution is radically different from the previous ones. This trend has been embodied since 2013 by the seminal analysis of Frey and Osborne, in which the two Oxford University economists demonstrated that up to 47 percent of all American jobs could be lost to automation in the near future. They argued that what makes this wave of technological advances different is that machine learning (the ability of AI systems to learn independently from experience through data without being programmed for it) and mobile robotics allow machines to perform tasks that until now have been considered uniquely human – which goes far beyond the

routine and repetitive tasks that AI has all but conquered. This new scope of automation includes cognitive actions such as self-driving and legal writing. This, the authors believe, will translate into automation that, unlike in previous waves of transformation, will not yield the compensation effects of sufficient job creation that had occurred over time in the past.⁷⁰

In 2014, a year after the publication of this study, the subject of technology and unemployment dominated the World Economic Forum meeting at Davos. A Pew Research Center survey carried out at the summit showed that participants identified “structurally high unemployment/ underemployment” as the second global risk of highest concern in a list of ten.⁷¹

One important driver of the fear generated by the AI revolution is that it is now believed that it will affect white-collar as well as blue-collar jobs, while the initial prevalent perception had been that, as in the past, the main impact would be on low-skilled jobs, so that at the very least the change, though daunting, would remain on known territory. Indeed, as early as 2012, Vinod Kholsa, a Silicon Valley investor, ventured to predict that in health care AI would make 80 percent of doctors redundant.⁷² Another prevalent forecast is that AI and robots will affect the developing world even more than the developed one, because,

⁷⁰ Carl Benedikt Frey and Michael A. Osborne, “The Future of Employment: How Susceptible Are Jobs to Computerisation?,” Oxford University, September 17, 2013. www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf

⁷¹ Jacob Poushter, “World Economic Forum Survey Identifies Top 10 Global Risks for 2014,” Pew Research Center, January 23, 2014.

⁷² Vinod Khosla, “Do We Need Doctors or Algorithms?,” Temin and Company, January 10, 2012, www.teminandcompany.com/must-reads/perception-psychology/160-do-we-need-doctors-or-algorithms

as automation gains ground in the West, industrial jobs outsourced to developing countries will collapse (much as what happened with the rise of the Industrial Revolution). A 2016 United Nations report estimates that two thirds of all workers in the developing world could be replaced by automation.⁷³

Though there seems to be a prevalence of research supporting the pessimists' camp, other studies have found that job elimination from automation was vastly overestimated. A 2016 OECD working paper establishes that automation and digitalization are unlikely to destroy a large number of jobs. It rejects the occupation-based approach of Frey and Osborne and suggests instead a task-based approach. It argues that the estimated share of jobs at risk should not be equated with actual employment losses for three reasons. First, automation is a slow process and technological substitution does not usually happen as expected. Second, workers can adjust to technological changes by switching tasks, which prevents unemployment. Third, technological changes also generate new jobs by stimulating higher competitiveness and demand for new technologies.⁷⁴ In addition, this year, the Brookings Institution analyzed 28 industries in 18 OECD countries from 1970 to 2018 and found that automation not only did not reduce the overall number of jobs available but even increased it, though it also showed that automation has caused wage stagnation by reducing the share of human labor in the value added to work.⁷⁵

⁷³ "Robots and Industrialization in Developing Countries," UNCTAD, November 2016.

⁷⁴ Gregory M.T. Arntz and U. Zierahn, "The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis," *OECD Social, Employment and Migration Working Papers*, No. 189, OECD Publishing, Paris.

⁷⁵ David Autorand and Anna Salomons, "Is Automation Labor-Displacing? Productivity Growth, Employment, and the Labor Share," BPEA Conference Draft, Spring, the Brookings Institution, 2018.

As the handful of research publications mentioned here from an overwhelming volume of analytical work produced on the subject over the past three decades makes clear, we are back to the original observation that forecasts of job losses to automation and AI in the coming years, and arguments made on behalf of one side or the other, far from dispelling the confusion, result in adding to it. This poses a major problem for a host of stakeholders in today's society such as, among others, policymakers, business owners and leaders, workers and, most significantly, for the higher education sector.

Be that as it may, the next logical question is that of what skills will be in demand in the labor markets of the future.

4. Tomorrow's skills

Research, media articles and societal debates on the subject of how to prepare future workers for the challenges of the automating economy are also plentiful. Paradoxically though, they all seem to be pointing in similar directions – a surprising fact in view of the heterogeneous character of impact forecasts.

Most studies and prognoses converge to establish that broadly new skills will be necessary for people to either simply survive, or thrive – depending on one's outlook – in the digital and AI age. As seen above, a growing number of institutions of higher learning across the world are already undertaking major changes in the curricula they propose to students and in the guidance they offer through academic programs. However, by most accounts, many more educational transformations will be needed for well-paying work to remain a viable option in the years or decades to come, and these transformations of course do not solely involve colleges and universities.

Besides the lack of visibility in future labor trends, first and foremost among the factors that are putting educational and training institutions in a difficult position is the pace of technological advances. A 2015 Burning Glass Technologies report showed that the demand for data-science skills had tripled over only five years. It also concluded that many of the skills needed to remain in demand in the future labor markets – such as, *inter alia*, organization, communication, negotiation, and writing, analytical and computer skills – were skills that could be learned throughout a professional path.⁷⁶

Earlier this year, the McKinsey Global Institute published an extensive report on future skills (see A12, Automation and AI will change the skills needed in the workforce). The study quantifies time spent on 25 core workplace skills today and in the future in the United States and five European countries, focusing on five activity sectors: banking and insurance, energy and mining, healthcare, manufacturing and retail. It proposes five key findings, three of which apply to the skill supply side. First, the demand for technological skills (least in demand today) will surge by 55 percent until 2030, followed by emotional skills (e.g. leadership, managing others). Second, the demand for basic cognitive skills (e.g. data input and processing) and manual skills (e.g. equipment operation) will drop by 14 and 15 percent respectively. Third, the demand for high-skilled workers will grow and job loss caused by automation will mainly affect low-skilled workers, thus exacerbating the growing inequality trend of the past two decades.

⁷⁶ The Human Factor, The Hard Time Employers Have Finding Soft Skills,” Burning Glass Technologies, 2015 www.burning-glass.com/wp-content/uploads/Human_Factor_Baseline_Skills_FINAL.pdf

Many other studies and findings could be reviewed, with similar results. Unlike with research seeking to forecast the proportion of jobs that will be eliminated by AI and automation and within what timeframe, foresight surveys that focus on skills draw a clear picture of where to go for young people who are considering post-secondary training or education options. What remains to be seen is whether many institutions involved in post-secondary education, universities in particular, will be able to implement the changes that would allow them to impart those talents.

Tomorrow's skills seem to be embodied by two major characteristics. First, competences across the board, even with high levels of specialization, will have to include a mixed range of both professional and personal skills. Second, acquiring skills will no longer be confined to the formative years of life but will continue throughout professional life via life-long learning, i.e. life-long training and retraining.

This clear-cut end to a rather perplexing overview of future trends in labor warrants a direct transition to the broad conclusion of this report.

Conclusion

Taking stock of the dramatic societal and economic transformations that are under way prompts the question: are we ready?

Much of the literature devoted to the future of work argues that the answer is no. Governments and lawmakers are not by and large moving to put forth policy and legal frameworks aimed at reining in the impact of what may be a tidal wave on developed and developing societies alike. Proposals abound, such as government funding of lifelong training and retraining, the implementation of a universal basic income or even – at Bill Gates’ suggestion – taxing robots. It is beyond the scope of this report to attempt to weigh in on such questions. But focusing on institutions of higher education alone inspires the same question: are they ready?

To remain relevant in the face of such daunting changes can be a harrowing endeavor, and it must be feared that not all academic institutions will be able to live up to the challenge. Pointing the way toward how colleges and universities should evolve to adapt are the two major characteristics that the current research consensus seems to ascribe to the skills that will be in demand tomorrow: the ability to engage in life-long learning, and the acquisition of hybrid and nimble skills. It would seem wise to imagine that only those universities that can rapidly embrace this new reality and reinvent themselves accordingly have a chance of thriving in what is certain to be an even more competitive landscape in the future. Many may dislike how these trends will affect the very core and nature of

higher education. But just as an alternative economic model is yet to emerge across the planet, so it seems that there will be little leeway in seeking unconventional paths.

Depending on the socio-economic policies of countries, initiators and actors of life-long learning frameworks today are mainly found either in the business sector, where employers invest in training and retraining staff, or at state level where governments engage in policies that either update or redirect workers' skills – in many cases without devoting the necessary impetus and budgets to the task. This is unfortunately true of the United States and most of the European Union, with the exception of Scandinavian countries, which have been implementing efficient reskilling policies for their populations for decades. In years to come, universities, which have by and large stayed away from or even looked down on these programs, should become major players in life-long learning. The example of Stanford's "open-loop" university and of Michigan University may be an indication of a wise developing trend. An economy where knowledge acquired at an early stage in life will no longer last through an entire career path seems to offer an opening field of development and growth for institutions of higher learning intent on remaining competitive. The budgets and organizational efforts required to seize this opportunity may render the choice difficult for countless universities, but there is little doubt that the prospect carries high potential for the higher education sector.

Hybrid skills, the other marker for future skills in demand, can also be seen as an opportunity. Reorienting curricula to foster such flexibility will require a type of restructuration that makes increasing room for interdisciplinary teaching and learning. This too, for many institutions, will represent a major endeavor. But in a tech-dominated society, striving to cater to this need

may well be what could spell redemption for the humanities and liberal arts. A growing number of universities are now offering hybrid degrees in science and humanities and calls are rising from education professionals, the business sector, international institutions and other stakeholders to put an end to the dichotomy between the two broad fields in tertiary education.

In the final analysis, the world to come, such as delineated in these countless reports, studies and surveys, may well prove unendurable if the thoughtfulness, sense of moral and ethical priorities and historical continuity, and – simply – the elevated literacy that the study of the humanities have bestowed on students for many centuries are not a foundational part of the spiritual compass among the educated youth.

Appendices

A1. Cover letter to the Triple Revolution Report

March 22, 1964

Dear Mr. President:

We enclose a memorandum, *The Triple Revolution*, for your consideration. This memorandum was prepared out of a feeling of foreboding about the nation's future. The men and women whose names are signed to it think that neither Americans nor their leaders are aware of the magnitude and acceleration of the changes going on around them. These changes, economic, military, and social, comprise *The Triple Revolution*. We believe that these changes will compel, in the very near future and whether we like it or not, public measures that move radically beyond any steps now proposed or contemplated.

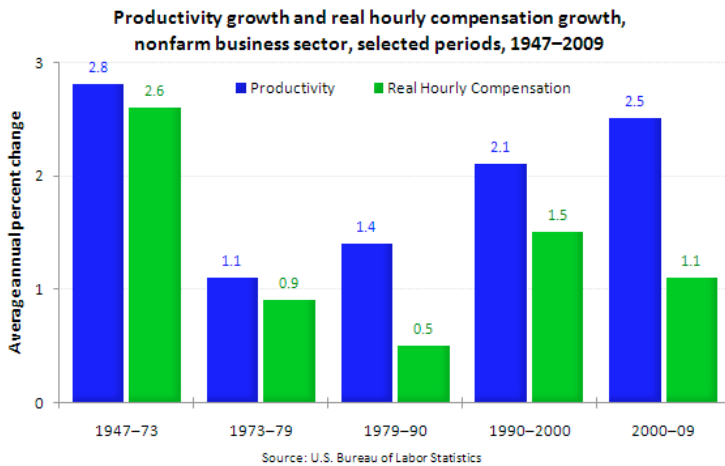
We commend the spirit prompting the War on Poverty recently announced, and the new commissions on economic dislocation and automation. With deference, this memorandum sets forth the historical and technological reasons why such tactics seem bound to fall short. Radically new circumstances demand radically new strategies.

If policies such as those suggested in *The Triple Revolution* are not adopted we believe that the nation will be thrown into unprecedented economic and social disorder. Our statement is aimed at showing why drastic changes in our economic organization are occurring, their relation to the growing movement for full rights for Negroes, and the minimal public and private measures that appear to us to be required.

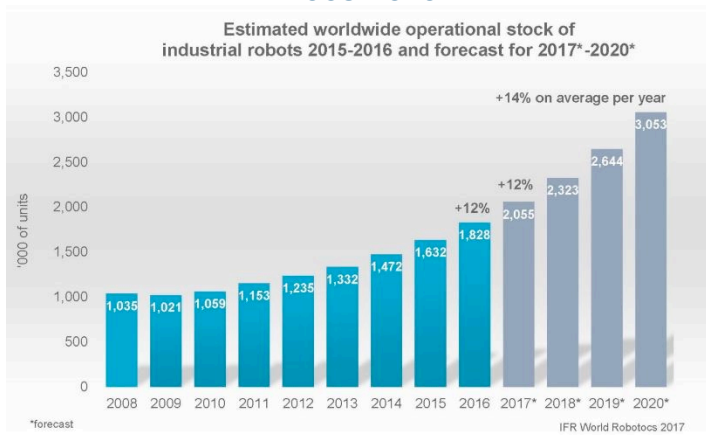
Sincerely,

Donald G. Agger	Gunnar Myrdal
Dr. Donald B. Armstrong	Gerard Piel
James Boggs	Michael D. Reagan
W. H. Ferry	Ben B. Seligman
Todd Gitlin	Robert Theobald
Roger Hagan	William Worthy
Michael Harrington	Alice Mary Hilton
Tom Hayden	David T. Bazelon
Ralph L. Helstein	Maxwell Geismar
Dr. Frances W. Herring	Philip Green
Brig. Gen. Hugh B. Hester	H. Stuart Hughes
Gerald W. Johnson	Linus Pauling
Irving F. Laucks	John William Ward

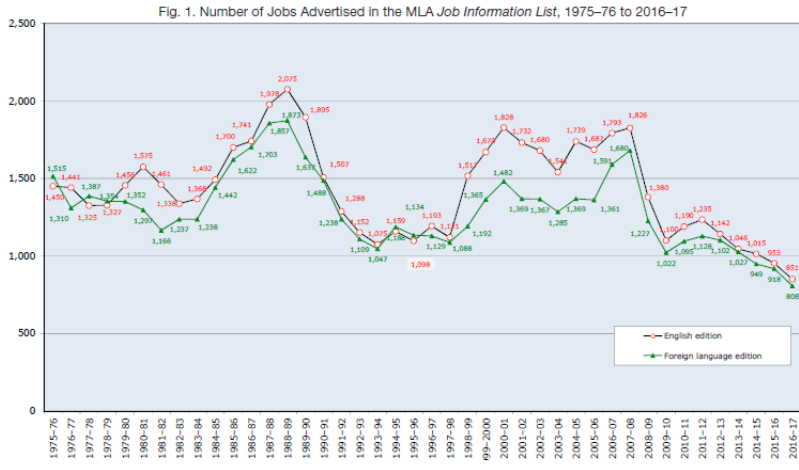
A2: Productivity growth vs. compensation growth in the U.S. 1947-2009



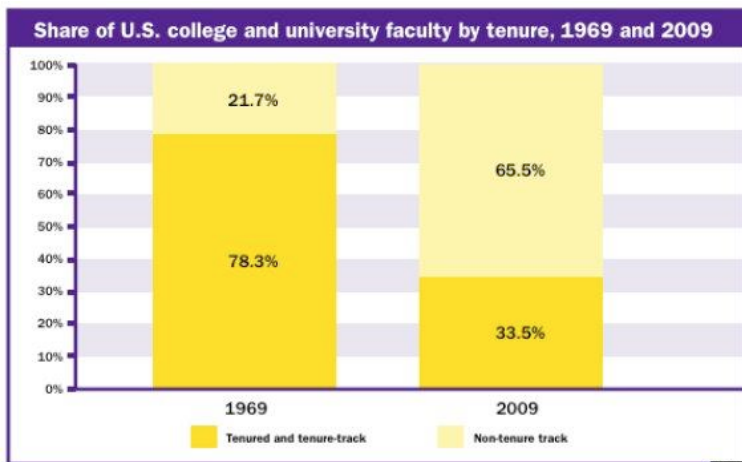
A3: Growth and forecasted growth in operational stock of industrial robots 2008-2020



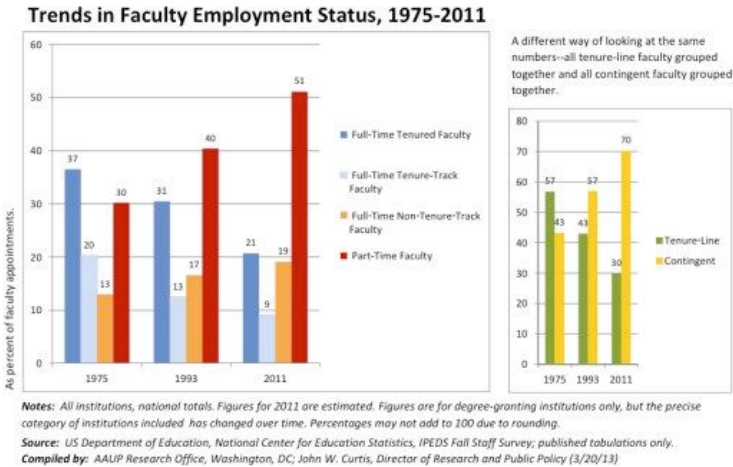
A4: Number of teaching jobs in English and foreign languages fields advertised in the MLA Job Information List 1975-76 to 2016-2017



A5: Share of U.S. college and university faculty by tenure, 1969 and 2009

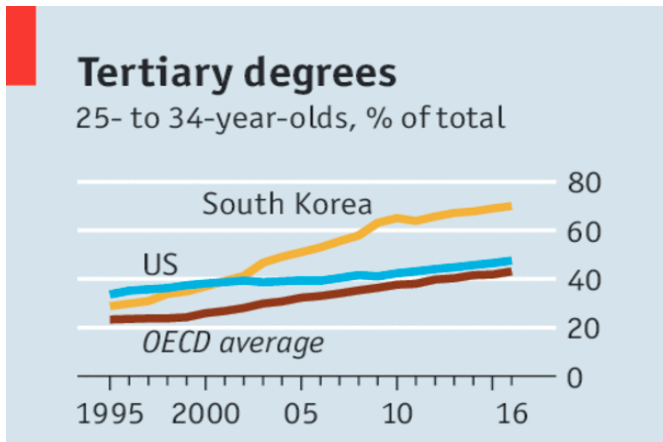


A6: Trends in faculty employment status, 1975-2011



AAUP

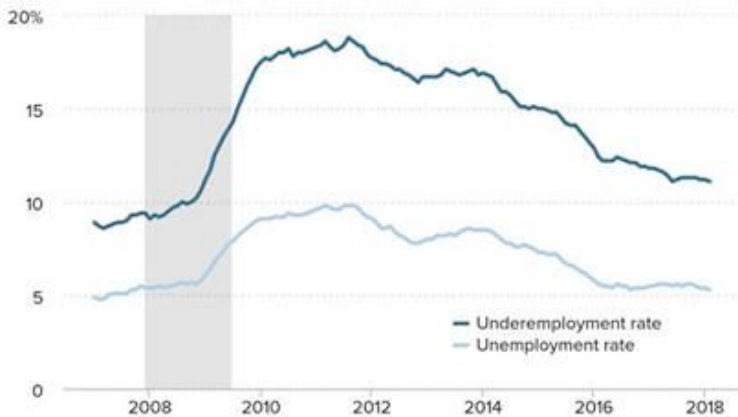
A7: Increase in college graduates in South Korea, U.S. and OECD countries 1995-2016



A8: Unemployment and underemployment rates for college graduates aged 21-24, 2007-2018

The underemployment rate for young college grads is still significantly higher than it was before the recession

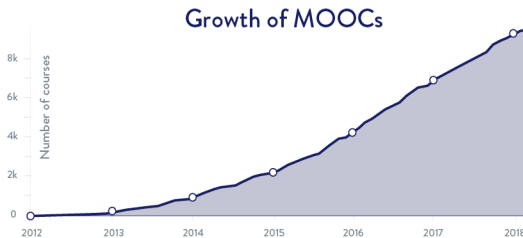
Unemployment and underemployment for young college graduates (ages 21–24) not enrolled in further schooling, 2007–2018



Note: This series is based on a 12-month moving average. The most recent data point is the average of March 2017 through February 2018.

A9: Growth of MOOCs 2012-2018

CLASS CENTRAL

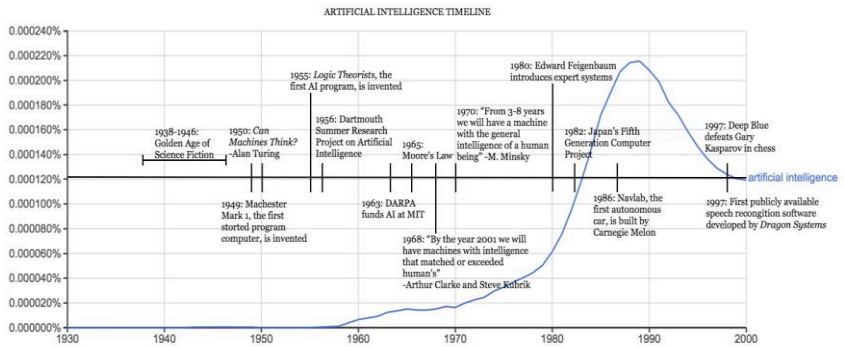


By the Numbers: MOOCs in 2017

A 10: Predicted jobs automation will create and destroy

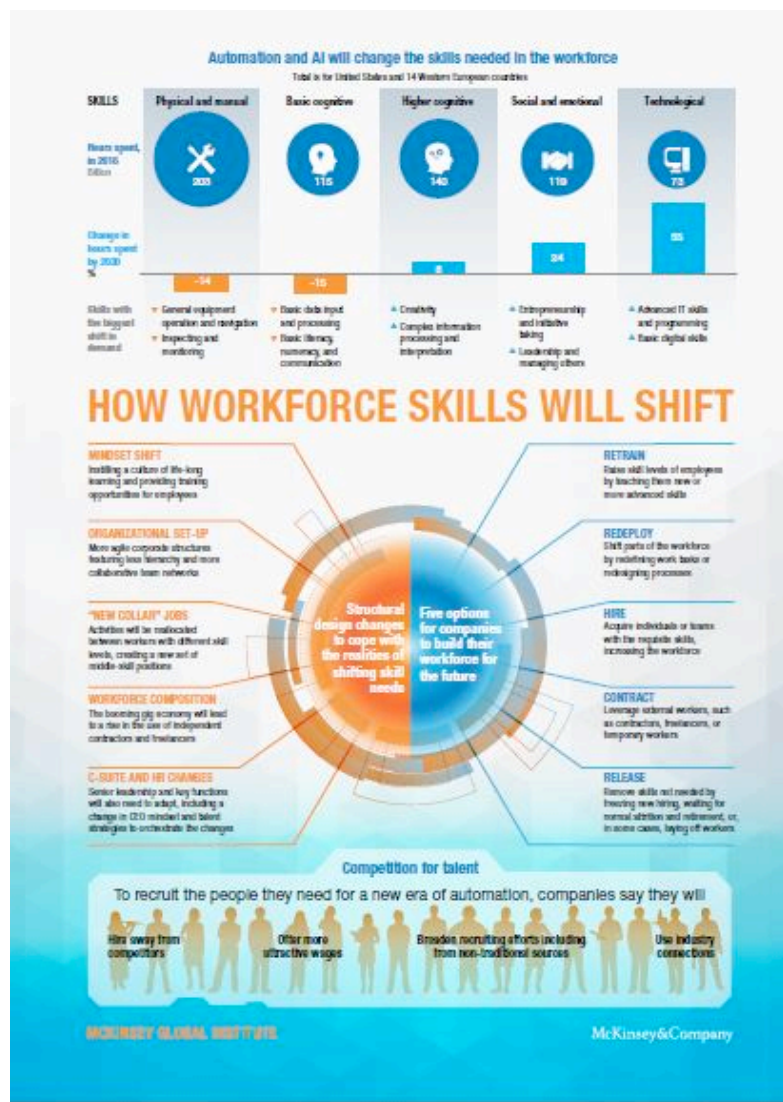
When	Where	Jobs Destroyed	Jobs Created	Predictor
2016	worldwide		900,000 to 1,500,000	<u>Metra Martech</u>
2018	US jobs	13,852,530	3,078,340	<u>Forrester</u>
2020	worldwide		1,000,000-2,000,000	<u>Metra Martech</u>
2020	worldwide	1,800,000	2,300,000	<u>Gartner</u>
2020	sampling of 15 countries	7,100,000	2,000,000	<u>World Economic Forum (WEF)</u>
2021	worldwide		1,900,000-3,500,000	<u>The International Federation of Robotics</u>
2021	US jobs	9,108,900		<u>Forrester</u>
2022	worldwide	1,000,000,000		<u>Thomas Frey</u>
2025	US jobs	24,186,240	13,604,760	<u>Forrester</u>
2025	US jobs	3,400,000		<u>ScienceAlert</u>
2027	US jobs	24,700,000	14,900,000	<u>Forrester</u>
2030	worldwide	2,000,000,000		<u>Thomas Frey</u>
2030	worldwide	400,000,000-800,000,000	555,000,000-890,000,000	<u>McKinsey</u>
2030	US jobs	58,164,320		<u>PWC</u>
2035	US jobs	80,000,000		<u>Bank of England</u>
2035	UK jobs	15,000,000		<u>Bank of England</u>
No Date	US jobs	13,594,320		<u>OECD</u>
No Date	UK jobs	13,700,000		<u>IPPR</u>

A11: Artificial Intelligence timeline 1930-2000



Source: MIT Technology Review, Erin Winick, Jan. 25, 2018

A12: Automation and AI will change the skills needed in the workforce



**Higher Education Today and Tomorrow:
A Critical Assessment
2019**

Corinne Mellul

**INTERNATIONAL FEDERATION OF CATHOLIC UNIVERSITIES
Higher Education Foresight Unit**

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Introduction: Where do we stand?

Last year's annual IFCU report, the first of its kind, aimed to propose an overview of developing global trends in higher education and the labor market under the impact of emerging technologies and artificial intelligence (AI).

These trends have only reinforced themselves and come into sharper focus throughout the professional literature since. Hardly a conference or summit on higher education worldwide today fails to celebrate – and sometimes ponder on – the benefits attached to the dramatic transformations that the so-called Fourth Industrial Revolution is bringing about in both teaching and the substance of what is taught in tertiary education, and in the workplace.

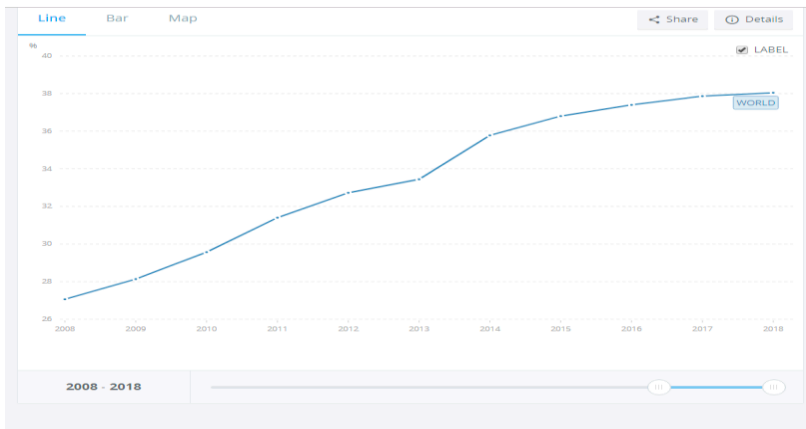
The broad context in which these changes are occurring, the mass commodification of higher education that has been spreading across the world since the 1990s, shows no early signs of receding or even of expanding at a slower pace, let alone of a possible shift toward an alternative model. On the contrary, the ongoing development of digital technologies seems to offer an unlimited, ever-growing array of opportunities for universities and colleges willing to enlarge their offer in academic programs at costs vastly inferior to those of traditional, “low-tech” education, once the initial investments are amortized.

This trend is indeed likely to take on new momentum in the near future, in particular in the United States, where college enrollment has been on a steady decline for eight years in a row.⁷⁷ A further, nationwide drop beginning in the 2020s is

⁷⁷ Michael T. Nietzel, *College Enrollment, Spring 2019: The Downward Slide Continues*, Forbes, May 30, 2019.

expected.⁷⁸ With, among other factors, tuition costs that keep outpacing inflation, incomes that continue to stagnate and growing skepticism regarding the value of higher education as a gateway to a lucrative job, the competition between colleges and universities to attract an ever-smaller pool of young prospects will only increase.⁷⁹

Whether this trend will sooner or later affect the global level nevertheless remains to be seen, as the gross enrollment ratio worldwide shot up over the past decade from 27.06 percent in 2008 to 38.042 percent in 2018 (see graph below).



Source: UNESCO Institute for Statistics

School enrollment, tertiary (% gross)

Gross enrollment ratio: ratio of total enrollment, regardless of age, to the population age group that officially corresponds to the level of education shown.

⁷⁸ Emma Pettit, *Other Changes on the Horizon*, The Chronicle of Higher Education, February 18, 2019.

⁷⁹ Bill Conley, *The Great Enrollment Crash. Students aren't showing up. And it's only going to get worse*, The Chronicle of Higher Education, September 6, 2019.

Another, parallel phenomenon observed in last year's IFCU report is the internationalization process that has been developing in the higher education sector against the backdrop of globalization. Not unrelated to (but not solely explained by) the increasing need for colleges and universities to compete just as businesses do under the growing pressures of the market, internationalization has pushed institutions of higher learning to expand their reach outside of their national borders – by increasing their intake of international students, by opening campuses abroad, by partnering up with like-minded institutions across the globe to form joint research frameworks or projects, etc.

The same preliminary remarks can be made here. Since 2016, a growing number of countries have reinforced their national support for the internationalization of higher education.⁸⁰ Overall, internationalization is “increasingly seen as a means of improving institutional and national visibility and influence.”⁸¹ At European level, the European Commission launched at the end of 2017 the European Universities Initiative, a program aimed at fostering transnational alliances of higher education institutions that develop “a long-term structural cooperation and offering” toward “systematic mobility and recognition of learning periods in partner universities, complementary curricula and joint degrees.”⁸²

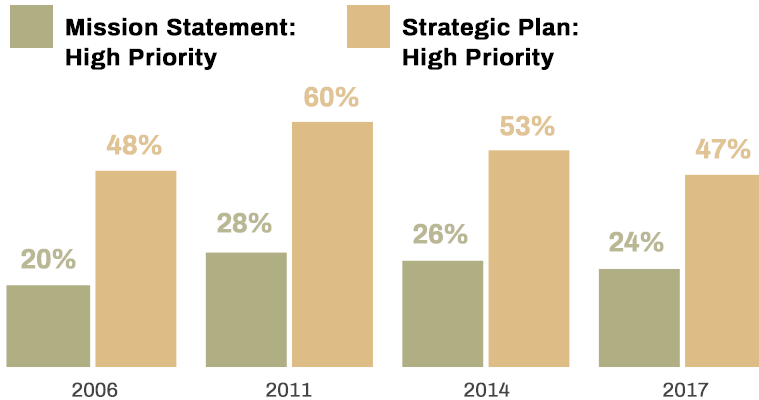
⁸⁰ British Council, *The Shape of Global Higher Education: International Comparisons with Europe*, May 2019.

⁸¹ University of Oxford, *International Trends in Higher Education, 2016-17*, 2017.

⁸² European Commission, *European Universities, A Key Pillar of the European Education Area*

https://ec.europa.eu/education/sites/education/files/document-library-docs/education_european_universities_factsheet_2019_final.pdf

Here as well, however, the United States seems to have begun to be outpaced, as the share of American colleges and universities reporting that internationalization is a high priority in their strategic plans dropped from 60 percent in 2011 to 47 percent in 2017 (see graph below).



Source: Association of International Education Administrators

Global Emphasis on the Decline

The share of colleges reporting that internationalization is a high priority in their strategic plans and mission statements rose and then dropped between 2006 and 2017.

This decline must be viewed in the context of a growing disillusionment among the American population regarding the promise of globalization – mainly of increased prosperity and the benefits of the “global citizenship” that internationalization would foster. Added factors have been the increasing suspiciousness toward foreign students that has developed under the current administration, and the eagerness displayed by some leading universities to sign

lucrative deals with countries that have a poor track record on civil and human rights.⁸³

In a larger international context whose features, therefore, have not markedly evolved over the past year and where no significant early warning signs of major disruption can be detected, this IFCU annual report proposes to focus and expand on some of the educational trends that were brushed over in last year's issue, with a view to providing a critical reflection on their broader meaning and possible import. The trends discussed in this report involve first the learning process, then the value of the university education, and finally what the university of tomorrow may look like. Under each of these broad headings, we propose to review several developments that may prove particularly crucial for their potential medium- to long-term transformational impact, both on the institution and on students – thus on society.

The objective in offering a critical assessment of ongoing transformations on and off campus is to engage our readers, at IFCU level and beyond, in a broad debate on what may be some of the more arguable dimensions of these transformations. Indeed, institutions of higher learning across the world do partake in an increasingly shared environment fraught with uncertainty and challenges that create or reinforce the pressures under which they operate. But they also have agency, in the sense that they can be *agents of change* rather than mere followers of change. And agency requires a clear-eyed vision, not only of potential opportunities provided by an evolving context, but of possible adverse developments as well.

⁸³ Karin Fischer, *How International Education Lost Its Sheen*, The Chronicle of Higher Education, March 28, 2019.

It is therefore our hope that the 2019 issue of IFCU's annual report, as it is circulated and read among the membership and beyond, will stimulate critical and fruitful discussions at transinstitutional level on the shape of the future in higher education. These discussions should indeed address the potential adverse effects of all the transformations under way.

PART ONE

Learning redefined

Learning and teaching activities today increasingly rely on multiple market- and technology-driven innovations that few could have even imagined only two decades ago. Together, these transformations have already profoundly altered the ways in which education is conveyed in universities and colleges around the world. This part proposes a critical review of tech-assisted learning, of the overall smoothening of the learning process that technology has facilitated, and of what is done with educational data.

1. Tech-assisted learning

The flipped classroom. The traditional lecture as a teaching mode has been under consistent criticism across the professional literature and mainstream media for over a decade.⁸⁴ In most cases, the type of lecturing thus targeted is of the driest form: a professor reading out verbatim from written notes. Lectures designed to engage students through interactive exchanges or the use of apps for instant student feedback and answers to quizzes are generally not viewed as harshly. This strand of criticism is predicated on the assumption that the attention span of today's students is shorter than in previous generations and that passive sitting time devoted to the presumed absorption of knowledge generates boredom. One overriding belief among proponents of the technology-reliant education is indeed that the latter

⁸⁴ See for example these two typical (mainstream) articles that reproduce the standard arguments against lecturing: Donald Clark, *Ten reasons we should ditch university lectures*, The Guardian, May 15, 2014, <https://www.theguardian.com/higher-education-network/blog/2014/may/15/ten-reasons-we-should-ditch-university-lectures>; and Matt Pickles, *Shouldn't lectures be obsolete by now?*, BBC News Business, November 23, 2016, <https://www.bbc.com/news/business-38058477>

should aim to combat the risk of students getting bored at any time through the learning process.

With the rise and expansion of blended learning, the flipped classroom is therefore increasingly replacing the lecture. Its practice began in the US in 2008, with the overall goal of improving learning outcomes. In a reversal of the conventional logic, the flipped classroom allows for the knowledge-transmission part of the teaching act – the “lesson” – to take place on line, away from the instructor, while the “homework” part is done in the classroom. In this new setting, expectations from students shift from the old “doing better” imperative to “doing differently”, and the emphasis is no longer on the knowledge that students are able to absorb but on what they are able to do, i.e. the competencies they are able to acquire. Far from undermining the role of instructors, it is argued, the flipped-classroom method gives the educational mission a new, more constructive dimension.⁸⁵

When it appeared, the flipped-classroom approach suited the then emerging view that, in the instant-knowledge era of the internet, memorization as a learning method was becoming obsolete. Used today in more than half of universities in the US (though slower to catch on in Europe), the flipped classroom has for the past decade been touted as a far more efficient learning method than the traditional in-class dispensation of knowledge by the “sage on the stage”, and as one of the best ways to reduce the achievement gap.⁸⁶

⁸⁵ Marcel Lebrun, *La classe inversée*, lecture at Sciences Po, Paris, December 11, 2018.

⁸⁶ “The term “achievement gap” refers to any significant and persistent disparity in academic performance or educational attainment between different groups of students, such as white students and minorities, for

Yet a number of recent studies have begun to question the overall benefits of doing away with the lecture. A UK research involving 1,170 students finds that those who are taught via traditional lectures are less likely to drop out of university early.⁸⁷ Not least interesting about this angle of investigation in what causes students to drop out is the fact that it deviates from the now conventional wisdom of assessing early withdrawal from higher education in correlation to social and demographic factors such as gender, race and geography. More surveys suggest skepticism as to the actual added value of the flipped classroom. A randomized control trial conducted jointly this year by the MIT Department of Economics and the National Bureau of Economic Research at the United States Military Academy at West Point on two mandatory core-curriculum courses, Introduction to Calculus and Principals of Economics, finds that the flipped classroom produced only short-term gains and only in Calculus, while it had no effect on Economics. By the time of the final exam, any advantage linked to the flipped-classroom approach had faded. In addition, the flipped classroom had broadened the achievement gap, consistently driven by white, male and higher-achieving students. The authors of this study thus encourage educators to “exercise caution” in selecting to use the flipped classroom.⁸⁸ An older study offers a more mixed view: in 2009, a Middle Tennessee State University mathematician compared student performances in a statistics class that had been split into a traditional-learning group and

example, or students from higher-income and lower-income households.”
The Glossary of Education Reform,

<https://www.edglossary.org/achievement-gap/>

⁸⁷ Anna McKie, *Students less likely to drop out if taught via lectures, study finds*, Times Higher Education, October 18, 2018.

⁸⁸ E. Setren, K. Greenberg, O. Moore, M. Yankovich, *Effects of the Flipped Classroom: Evidence from a Randomized Trial*, School Effectiveness & Inequality Initiative, Discussion Paper #2019.07, August 2019.

a flipped-classroom group, and found that students in the latter were less satisfied with how they were oriented to the learning tasks but that they had become more open to cooperative and innovative learning methods.⁸⁹

At last year's Teaching Excellence Summit (a *Times Higher Education* event), James Conroy, the vice-principal for internationalization at the University of Glasgow, argued that promoting active learning at the expense of lectures undermines the value of "slow and difficult" learning. He cited a body of evidence (including UCLA research by educationalists Robert and Elizabeth Bjork) that shows strong long-term "retention and recall" of knowledge acquired through lectures. Conroy added that the traditional lecture, when well designed, is an efficient way of learning because it "requires concentration, analysis and judgment" from students – skills that are in demand on the labor market. He decried the assumption that today's students have shorter attention spans, calling it a self-fulfilling prophecy.⁹⁰

Digital distraction. Additional signs may point to an emerging reverse trend away from the all-encompassing reliance on technology in the classroom. A book written in 2016 by a psychologist and a neuroscientist, *The Distracted Mind*, underscores the limited cognitive-control abilities of the human brain, and shows how interference in the form of constant distraction from mobile devices and the ensuing temptation to multitask will hamper our ability to concentrate on a specific action, despite our complex goal-setting abilities. Unlike previous technology advances (e.g. the printed press),

⁸⁹ Jeremy F. Strayer, *How learning in an inverted classroom influences cooperation, innovation and task orientation*, Springer, July 20, 2012.

⁹⁰ Jack Grove, *Don't believe the anti-lecture myths, says Glasgow vice-principal*, *Times Higher Education*, July 12, 2018.

the authors explain, the current wave is unfolding so fast that our brains, though endowed with natural plasticity, are unable to navigate the pace of innovations. This phenomenon is compounded by our instinctual attraction to information, because of the “small bursts of pleasure” it produces in the brain. The authors describe how we will be tempted to turn to our devices for quick stimulation multiple times during the day – in particular for distraction when we are supposed to concentrate on a task. We then fall prey to a cycle that provides short-term rewards in exchange for longer-term accomplishment (e.g. checking social media accounts vs. finishing that term paper – or grading that pile of term papers!).⁹¹ This book has received ample media coverage, in professional and generic outlets alike.⁹² It echoes and reinforces findings and arguments put forth in a number of earlier books.⁹³

The fact is that instructors today find themselves in constant competition with laptops and cellphones for their students’ attention in the classroom. A study presented in April 2019 at the American Educational Research Association by Abraham Flanigan, a postdoctoral research associate at Ohio University’s school of communication, finds that students surveyed were digitally distracted during 25 percent of the time in their least-favorite course and – even more sobering –

⁹¹ Adam Gazzaley, Larry D. Rosen, *The Distracted Mind, Ancient Brains in a High-Tech World*, MIT Press, 2016.

⁹² For example, its findings were profusely featured in a Chronicle of Higher Education series of articles entitled *The Distracted Classroom* that appeared through March-April 2019.

⁹³ See for example Nicholas Carr, *The Shallows: What the Internet Is Doing to Our Brains*, W. W. Norton Company, 2010; Sherry Turkle, *Alone Together: Why We Expect More From Technology and Less From Each Other*, Basic Books, 2012.

12 percent of the time in their favorite course.⁹⁴ Among other consequences, this emerging student behavior, though still taking place in the classroom, is developing at the expense of the benefits inherent in a learning experience where all of the exchange, all of the back-and-forth, all of the sharing, is a social activity carried out by and between humans rather than avatars or algorithms.

Some educators are therefore now taking a clear stand against the use of laptops and mobile phones in class, and they are sharing that experience in the media. A humanities professor at San Francisco State University makes students who signed up for a course called “The Reading Experiment” part with their phones and laptops when the class begins, and asks them to read complex authors such as Nietzsche or Sartre for stretches of four hours (with short breaks). The professor, David Peña-Guzmán, says the goal of the experiment is to “reignite [the students’] love of attentive reading” in an age when students are no longer taught to read “attentively, intentionally, and purposively.” Enrolled students enjoy the sessions and seek to replicate them at home – although, Peña-Guzmán points out, there must be a self-selection bias since those signing up for the course are more likely to like reading in the first place.⁹⁵ A lecturer in education at the University of Bath also recounts how he has banned the use of laptops in a class of second-year students – i.e. digital natives – to “foster critical thinking by promoting active class participation”, and

⁹⁴ Abraham E. Flanigan, *Digital Distraction across Courses: Self-Regulation of Digital Device Use in Favorite Versus Least Favorite Courses*; see Beckie Supiano, *Digital Distraction Is a Problem Far Beyond the Classroom. But Professors Can Still Help*, The Chronicle of Higher Education, April 7, 2019.

⁹⁵ Anna McKie, *Scholar takes students’ phones and makes them read for four hours*, Times Higher Education, May 2, 2019.

how, despite initial fears that they would be unable to take handwritten notes as fast as they could type, the students have come to embrace the instructor's view that "thinking and participating during our two-hour sessions is more valuable than taking notes."⁹⁶

More substantially, an op-ed piece of November 2017 in *The New York Times* has fueled the debate within academia about the potential benefits and drawbacks of banning the use of electronics in classrooms. In it, Susan Dynarski, a professor of education, public policy and economics, at the University of Michigan, argues that "a growing body of evidence shows that over all, college students learn less when they use computers or tablets during lectures" and they "also tend to earn worse grades." She cites, among other studies, a Princeton and UCLA experiment in which students were randomly assigned either laptops or pen and paper during a lecture, and those using laptops turned out to have a substantially worse understanding of the lecture than their pen-and-paper-equipped peers.⁹⁷ The explanation for such results is that students who type notes tend to take down verbatim what they are hearing while those who handwrite, because they are slower at it, have to process the information in order to extract the main points.

Cognitive losses. There may be yet unknown, longer-term adverse cognitive consequences of the ubiquitous use of electronic devices by the younger generations. At an education conference in Budapest this year, researchers presented a pilot program they had devised to help elementary-school children learn handwriting, because data have shown that the

⁹⁶ Ioannis Costas Batlle, *For deep learning, close lid on laptops*, Times Higher Education, February 21, 2019.

⁹⁷ Susan Dynarski, *Laptops Are Great. But Not During a Lecture or a Meeting*, The New York Times, November 22, 2017.

time young children now spend on electronic devices hampers the development of their fine motor skills, and this affects their ability to master handwriting.⁹⁸ Michel Desmurget, a neuroscientist who heads a research team on brain plasticity at France's National Center for Scientific Research, has just published a book titled *La fabrique du crétin digital. Les dangers des écrans pour nos enfants* (roughly translating as "The manufacturing of the digital idiot. The dangers of screens for our children"), where he warns that numerous studies already show how the extensive use of tablets and mobiles by young children damages their cognitive abilities, language development and capacity to concentrate, in particular with reading-age children spending more and more time behind screens, away from books.⁹⁹ With part of the learning/teaching process now transferred to digital tools, PISA, the OECD's Program for International Student Assessment, shows through surveys that studying via devices decreases the quality of the learning, resulting in lower grades and reinforcing the achievement gap. "What we are witnessing today", Desmurget says, "is an unprecedented experiment of massive decerebration" – which Desmurget believes is becoming a public health issue.¹⁰⁰

Adaptive learning. More broadly, market- and technology-driven pedagogical innovations in tertiary education over the past two decades have been shaped by the belief in "adaptive

⁹⁸ Ivett Szalóme Horváth, Ilona Veres-Balajti, "Improving handwriting style with physiotherapy training in elementary school", University of Debrecen, Department of Physiotherapy, 29th Annual Conference of EURASHE: Future students, future universities, future jobs. Professional higher education in a changing world, May 16-17, 2019, Budapest.

⁹⁹ Michel Desmurget, *La fabrique du crétin digital. Les dangers des écrans pour nos enfants*, Le Seuil, 2019.

¹⁰⁰ Interview in *Le Monde*, October 23, 2019.

learning” – learning that rejects the “one-size-fits-all” model and adapts to each student’s learning needs and abilities. The end result is learning – and education – that is evolving from a standardized to a customized model. “I used to teach one class of 100 students,” says Doug Williams, the adaptive learning coordinator at Arizona State University, “but now I teach 100 classes of one student each.”¹⁰¹ This approach turns the educator in the classroom into a “mentor”, a “motivator”, a “coach” or a “trainer” (all of these terms are standardly used in the literature), who prioritizes engaging students to meet challenges rather than imparting knowledge – a vast body of which, it is often suggested at professional events, can now be found on the internet. Universities that lead the switch to adaptive learning usually provide training in these methods for their faculty. For academics who have no access to such programs, the transition can be very difficult, as the new role assigned to the instructor upends the millennia-old assumption that teaching implies, first and foremost, the imparting of knowledge to the younger generations.

Professionals of higher education argue that the model of provision of knowledge is changing mainly as a response to students’ demands.¹⁰² This fact explains, inter alia, why the future does not bode well for the traditional lecture, deemed boring by 60 percent of students according to one study.¹⁰³

¹⁰¹ Mc Graw Hill sponsored content, *Teachers Will Drive Equity at Scale by Becoming Adaptive Learning’s Biggest Advocates*, The Chronicle of Higher Education, <https://www.chronicle.com/paid-article/teachers-will-drive-equity-at/273>

¹⁰² British Council, Going Global 2019 Conference, May 13-15, 2019, Berlin.

¹⁰³ Sandi Mann, *Why do 60% of students find their lectures boring?*, The Guardian, May 12, 2009.

Boredom, as mentioned above, has become the number one enemy on the path to graduation. But does easy learning hold a better promise?

2. Smoothing the learning process

Patience and effort. The technological innovations that have taken over many university classrooms and much of the e-learning industry indeed seem to be primarily aimed at purging as much as possible the entire learning experience of boredom. At a conference on higher education in Budapest this year, a young tech innovator described how the idea for an educational product aimed at fostering student engagement with the learning material came to him by explaining that he had wanted the same addictive quality in his product as there is in a Candy Crush game.¹⁰⁴

Yet “effective learning requires a lot of hard work, and students – much like all humans – prefer things to be easy”, says James Lang, a professor of English at Assumption College in Worcester, Massachusetts, who is involved in learning research. He remarks on the difficulty of getting today’s students to develop learning habits based on patience and effort rather than a search for instant gratification when all of the apps they use through the day have been built to provide an easy, fast-paced, habit-inducing experience that requires as little mental effort as possible.^{105, 106}

¹⁰⁴ 29th Annual Conference of EURASHE: Future students, future universities, future jobs. Professional higher education in a changing world, May 16-17, 2019, Budapest.

¹⁰⁵ James M. Lang, *How Can We Convince Students That Easier Doesn’t Always Mean Better*, The Chronicle of Higher Education, March 10, 2019.

¹⁰⁶ See Eyal Nir, *Hooked: How to Build Habit-Forming Products*, Penguin, 2014, mentioned by James M. Lang.

Patience and effort in the learning experience are being shunned today because of the – warranted – fear that they might produce boredom. But boredom, wrote Walter Benjamin, is “the dream bird that hatches the egg of experience.” Joe Moran, a professor of English at Liverpool John Moores University, uses this quote to suggest that “boredom is the occasional price we pay for being in a state of suspended possibility, on the other side of which we might find more creative ways of being human.” He reminds the reader that the word *student* derives from the Latin *studium*, meaning “eagerness, painstaking application” and that a good student is therefore one who takes pains.¹⁰⁷ This inevitable dimension of the learning process has been so underplayed by the developing technological trends of the past two decades in higher education as to spawn an ever-expanding industry of cheating that enables students to outsource their assignments, from the simple term paper to the doctoral dissertation.¹⁰⁸

¹⁰⁷ Joe Moran, *What you missed in class today: quite a lot, actually*, Times Higher Education, March 28, 2019.

¹⁰⁸ See LSE Impact Blog, *University students are buying assignments – what could, or should, be done about it?* February 28, 2017 https://blogs.lse.ac.uk/impactofsocialsciences/2017/02/28/university-students-are-buying-assignments-what-could-or-should-be-done-about-it/?utm_source=sfmc&utm_medium=email&utm_campaign=2704133_AgendaWeekly18October2019&utm_term=&emailType=Newsletter; Corinne Mellul, IFCU 2018 Annual report, *Emerging Technologies in Higher Education and the Workplace: An Assessment*, pp. 17-18; Anna McKie, ‘There’s clearly a demand, there’s clearly a supply’, Times Higher Education, September 13, 2018; Farah Stockman and Carlos Mureithi, *Cheating Inc.: How Writing Papers for American College Students Has Become a Lucrative Profession Overseas*, The New York Times, September 7, 2019; Anna McKie, *Contract cheating requests ‘blatant and wide-ranging’*, Times Higher Education, October 11, 2019.

Learning as a struggle. Can the position still be advocated that the learning process necessarily entails unpleasantness and therefore the capacity to endure willingly through at least partly constraining tasks and activities? The answer to such a question can only be complex and controversial wherever higher education has become a commodity subjected to the rules of the market, thus to an objective of customer satisfaction using the same rationale as an airline or a hotel – which, *inter alia*, explains the omnipresent use today in the higher education industry of catch phrases such as “improving the student experience” or the “student’s brand experience”.

Something does remain to be said on behalf of knowledge acquisition being at the core a *struggle*, mostly with and against oneself, in which pleasure should come less from the process than from the ultimate mastery of the knowledge or skill acquired. In the absence to date of massive data showing a clear qualitative added value in the broad use of Ed Tech (or in online learning for that matter), this is at least a debate worth having, at the broadest scale possible.

Other tech-driven trends are converging toward making studying – or even the entire pathway to graduation – easier. The dominant one among them is the growing use of educational data.

3. Know-all data

Learning data. Learning analytics, part of it predictive, has been in expanding use across universities for over a decade. Data mining that enables student profiling based on demographics and performance records aims at improving learning outcomes, mainly through profile-based customization of both the learning path and the curriculum of students. The overall goal is to improve student academic

success rates.¹⁰⁹ One example is Georgia State University, a pioneer in applying data analysis to the goal of student success. For the past six years, the institution's system has tracked every enrolled student for 800 different risk factors, triggering alerts when a student seems at risk. Over a recent year, the system thus prompted over 150,000 interventions resulting in 54,000 one-on-one meetings between advisers and individual students. As a result, the university now graduates 2,800 more students than it did before it adopted the system, with a notable increase in minority and low-income students among the additional graduates.¹¹⁰

Customization and learning outcomes. An important means of achieving data-supported student success is the customization of undergraduate course programs, which allows students to modify their curriculum according to their needs, preferences and pace of learning as they move forward. Program customization is viewed by its proponents as a state-of-the-art formula for boosting graduation and retention rates. “Tailoring the education experience to students’ individual needs and interests is among the most popular strategies for improving schools today,” says this year’s *Hechinger Report* on the future of learning, “and it gets a lot of attention.”¹¹¹ Program customization, however, means that a student’s grades may reflect ingenuity in selecting courses that match his or her ability rather than the capacity to deal with a curriculum that is standard for all. It also has at least one major drawback, in that letting students curate their own

¹⁰⁹ See Corinne Mellul, IFCU 2018 Annual report, *Emerging Technologies in Higher Education and the Workplace: An Assessment*, p. 19.

¹¹⁰ *Technology and Tomorrow’s Students*, a special report by The Chronicle of Higher Education, 2018.

¹¹¹ *The Hechinger Report*, Future of Learning, October 10, 2019.

curricula based on their personal profile and preferences inevitably narrows the scope of knowledge most will be exposed to as a pathway to graduation. Does this not ultimately betray the university's promise to introduce students to a "whole new world of knowledge"?¹¹²

As for the focus on improving learning outcomes, some professionals are beginning to recognize that even data mining that solely targets better outcomes is hampered by the sheer complexity of the educational environment. "Big data", says Zhonghou Chen, an assistant professor of physics at the University of Central Florida, "don't necessarily give you better educational research. It's better-quality big data." In using these data to adapt their teaching, academics are confronted with the fact that a classroom is not a laboratory, and that "coming up with a simple cause-and-effect experiment is usually not possible." With different enrollments through the semesters and the variations in teaching styles between instructors, the effects of course design and evaluations on students over time are difficult to measure. "Vacuuming up a whole bunch of data from your learning-management system", says Charles Dziuban, director of the Research Initiative for Teaching Effectiveness at the University of Central Florida, "isn't going to help untangle those complex interactions and give neat and clean answers about what works".¹¹³

Tracking locomotion. Individual student e-monitoring is also expanding toward the adoption of systems aimed at tracking students' movements on campus – a policy that is

¹¹² Anna McKie, *How to equip graduates for the future*, Times Higher Education, March 7, 2019.

¹¹³ Beth McMurtrie, *Can Data Make You a Better Teacher?*, The Chronicle of Higher Education, February 3, 2019.

increasingly raising questions about the thin line between tracking and surveillance. The broad objective of movement tracking is to foster better learning behavior. In the US, public universities in particular are eager to use these data because they are strongly motivated to improve their retention and graduation rates among the growing segment of lower-income and first-generation students they cater to. For example, California State University at Sacramento recently joined many other institutions in adopting movement-tracking software that enables the institution to track students' movements everywhere on campus 24 hours a day, seven days a week, through the students' laptops and cellphones. These operations are typically outsourced to software provider companies that store and analyze the data. Now vastly an opt-in choice for students, this growing practice, which has existed for a few years largely without students' knowledge or consent, does not, by and large, cause suspicion among college-age youths, who have never known a world "where they didn't swap access to their data for increased convenience or efficiency." Whether students care or not, this does raise privacy, data security and ethical issues. A forthcoming Educause survey finds that while over 70 percent of American college students believe that their institution is appropriately safeguarding their personal data, only 44 percent understand how their institution uses such information, and only 45 percent believe that it benefits them. "I think most of it is snake oil", says Chris Gilliard, a professor of English at Macomb Community College in Michigan. "There's very little independent research that suggests these things do what the companies say they will do." On the technical side, it is unclear whether student data produced in aggregates may obscure the fact that each student is an individual with a singular situation and singular needs. Five years of tracking student academic and movement data has

for example convinced the University of North Carolina at Greensboro that it was best not to categorize students in large data-based groups. Recent research has in fact showed that nudges and other interventions, including those based on movement tracking, meant to guide students to good academic habits, may not be particularly effective.¹¹⁴

Holistic well-being. The use of student-profiling and behavior-tracking and mapping data that feed learning analytics is now also expanding from the primary objective of enhancing learning outcomes and customizing the learning process and curriculum to that of overseeing the “holistic well-being” of students and of creating “accompaniment for a full life” on and off campus. The latter may extend to factoring in whether students have breakfast, how many hours of sleep they get, whether they maintain healthy eating habits, and what sense of community belonging they have on campus. The focus here is still on student success, but the scope of data gathering and intervention in students’ lives is penetrating the private realm to unprecedented levels. For example, Tecnológico de Monterrey in Mexico, which has put in place this type of monitoring system in partnership with a technology provider, aims at fostering among its students “human flourishing” defined as “the conscious development of people, looking for their physical, intellectual, emotional, spiritual and social fullness, that positively impact their environment and society.” Self-realization of students is the overall goal thus pursued by Tecnológico, which uses a “Wellness model” (the “Wellness Wheel”) to promote human flourishing through the consistent tracking of seven dimensions of the students’ lives: physical, spiritual,

¹¹⁴ Source for the entire segment on tracking: Lee Gardner, *Students under Surveillance? Data-tracking enters a provocative new phase*, The Chronicle of Higher Education, October 13, 2019.

emotional, social, intellectual, financial, and occupational. Data gathering for each dimension is mined for early-warning signs of difficulties. Mentors monitor the information on the Wellness Wheels of students and meet with them regularly as well as in case of alert.¹¹⁵

While any endeavor aimed at improving a student's well-being should be viewed favorably, the growing use of data for this purpose in universities and colleges raises at least four questions: 1) Should it be left to the university to define and *prescribe* what overall well-being consists in? 2) Should a student's overall well-being defined as physical and mental fitness primarily be the responsibility of institutions of higher learning, at the risk of undermining the ethics of individual responsibility? 3) If the university adds to its educational mission that of nannying students and thus becomes a "helicopter" institution in its guidance of young people, how does this, combined with the technology-driven effort to lower the difficulty of learning and the use of data to customize the learning pathway to each individual's needs, prepare students for the inevitable hardships of adult and professional life in which, particularly in work situations, they will be confronted with tasks, conditions and people that are not customized to their profile and that they will have to deal with nevertheless? 4) Last but not least, what are the actual risks of invasion of privacy and misuse of the inordinate amount of tracking and surveillance data of the individual involved in this practice?

¹¹⁵ Presentation by Tecnológico de Monterrey at Higher Ed Summit Horizons, October 10, 2019, Paris.

PART TWO

The devaluation of the university education

Technology-driven innovations are combining with the imperatives of market rules to now begin to bring about an ontological change in the overall mission of the university. This part aims to foster a critical debate on the devaluation of the university education, both that which has already occurred over the past two decades, and that which is to come under the employability diktat, with the possible demise of the humanities as one of the most significant consequences.

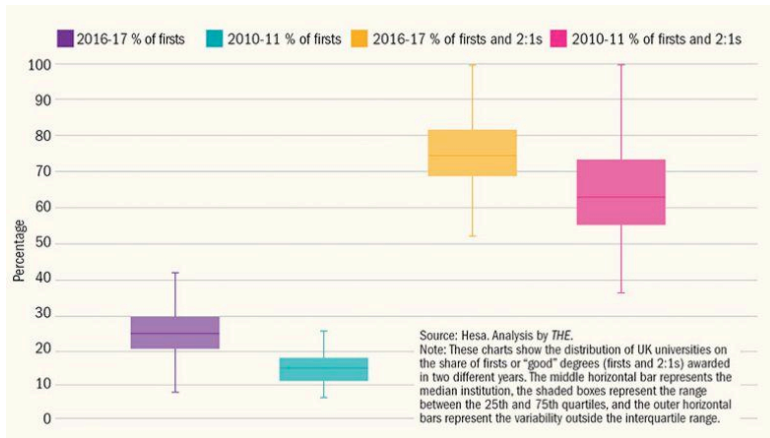
1. Studying and graduating on the cheap

An unwritten rule across the university now “prohibits academics from failing students”.¹¹⁶ Two main, interconnected, factors – grade inflation and the lowering of academic standards – account for the deployment, vastly under the radar, of this rationale across academia roughly over the past two decades.

Grade inflation. The backdrop to grade inflation is the increasing commoditization of higher education, in which higher education becomes a service and students and families the customers. With the rise of tuition and other costs and the sacrifices that a college education imposes on a large number of families despite the various schemes of financial aid and scholarships available across much of the world, graduating with a degree has increasingly come to be viewed by students as a form of entitlement. Higher education in many parts of the developed world has turned into an investment that simply must pay off. This vision of the university is compounded by the ever-increasing competitiveness between institutions of higher learning vying for more enrollments –

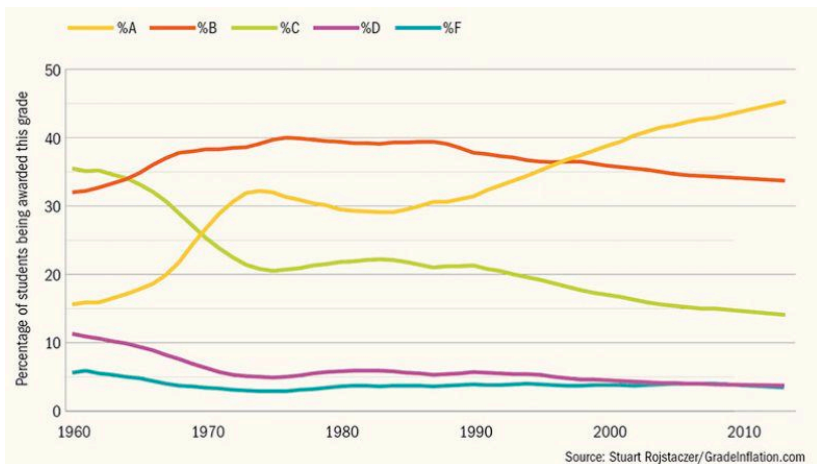
¹¹⁶ Anonymous author, *Giving the customers what they want is not always right*, Times Higher Education, March 7, 2019.

many of them under the pressure of annual rankings – with the knowledge that graduation rates are a metric of prime relevance in a student’s selection of where to apply. In June 2018, *Times Higher Education* published a vast comparative study of grade inflation across several regions of the world, first observing that the proportion of students in the UK receiving “good” degrees (either a first – top ranking – or a 2:1 – immediately below – in the UK’s undergraduate degree system) had gone from just over half in 1996-97 to three quarters in 2016-17. Firsts alone, which are synonymous with excellence, jumped from 8 percent to 26 percent during the same period, while the share of students graduating with 2:2 or third (the two lower categories) almost halved. The rise became more pronounced from 2010 (see graph below).

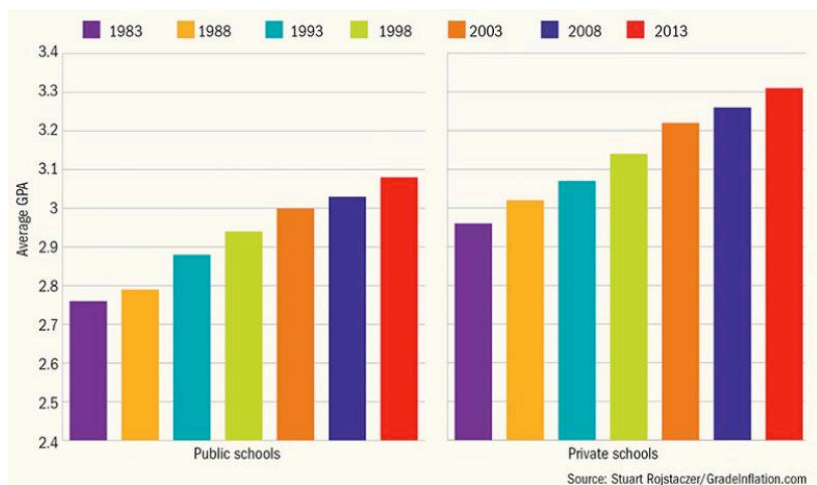


Distribution of UK universities for share of firsts and ‘good’ degrees

Many professionals (and students!) in the UK either reject or are at least uncomfortable with data correlating grade inflation with the commercialization of higher education. It is, however, difficult to assume that general student performance has made such leaps over the past two decades simply because students are much more gifted today than their predecessors of twenty years ago. In the US, the trend has been researched and documented for years, and publicized by GradeInflation.com, among other outlets. Researchers there show that the ratio of American students achieving A grades, as well as the average GPA (grade point average over a full program) have consistently increased since the late 1980s (see graphs below and next page).



Grade distribution in US four-year colleges over time



Average GPA at four-year colleges and universities in US

According to one specialist, Stuart Rojstaczer, this rise of both grades and GPA scores should be mainly correlated with student satisfaction surveys, which are used to assess an instructor's quality and are instrumental in decisions to grant tenure – thus prompting untenured academics to inflate grades. “When you charge that kind of money,” Rojstaczer says, “you tend to view your students as customers who need to be satisfied rather than acolytes in search of knowledge.” As for non-tenure-track lecturers serving on year-to-year contracts, Derek Bok, the former president of Harvard University, argues that while they represent today more than two thirds of college instructors, many of them are not properly vetted, and “studies indicate that extensive use of such instructors may contribute to higher dropout rates and to grade inflation.”¹¹⁷ Similar trends can be observed in Canada, where researchers have correlated grade

¹¹⁷ Derek Bok, *The Struggle to Reform our Colleges*, Princeton University Press, 2017.

inflation with public funding being allocated to high-enrollment departments, though tuition fees are considerably lower there than in the US. Germany and Australia, also examined in this article, are more inconclusive cases – the former because grades there have been consistently rising but over a longer period of time while higher education is mostly free, the latter because grades have been steady and there is no aggregate data available to analyze possible correlations at system level.¹¹⁸

The lowering of academic standards. The other factor accounting for the prohibition to fail students, the lowering of academic standards, is even more invisible. Discussing some of its roots and context in public debate almost automatically exposes the speaker to a flurry of outraged reactions. Yet ways must be found to examine this question in a straightforward manner, away from any political framing or labelling, because the combined effect of grade inflation and the lowering of academic standards will prove corrosive over time for institutions of higher learning. One clear rationale behind the steady lowering of academic standards over the past two decades, many commentators recognize, has been the market-driven imperative to draw in ever-larger enrollments in countries where higher education is costly and tuition revenue essential for colleges and universities. But the phenomenon is occurring as well, and as much, in countries where higher education is free or virtually free. This points to the other logic behind this trend, observable mainly in the developed world, i.e.

¹¹⁸ Source for the entire segment on grade inflation: Simon Baker, *Grades anatomy*, Times Higher Education, June 28, 2018. For an older view of the declining quality of higher education in the UK, also see Geoffrey Alderman, *Why university standards have fallen*, The Guardian, March 10, 2010. For a more substantive analysis of the entire issue, see, for example, James Côté and Anton L. Allahar, *Lowering Higher Education, the Rise of Corporate Universities and the Fall of Liberal Education*, University of Toronto Press, 2011.

the need to accommodate the requirements of policies aimed at increasing diversity among student enrollments. One option to reduce – and eventually perhaps close – the achievement gap in its socially-determined dimension from the moment in time when social justice and equality began to rise toward the top of government agendas could have been, historically, to solidly and consistently assist meritorious candidates to college from underprivileged backgrounds in attaining the level of proficiency required by the better or by most institutions. Many programs, public or civil-society driven, were indeed developed in the 1970s and 1980s to achieve just that. Yet it seems that over time, in the evolving *zeitgeist* of the multicultural society combined with the mounting economic pressures generated by the commoditization of higher education, the leading trend that has developed instead has been that of an overall lowering of academic standards, both in admissions and in performance assessments – in other words an across-the-board levelling of outcomes. Today, even elite schools such as the University of Chicago and Princeton University are following the decision of hundreds of other American universities and colleges (over 220 since 2005 according to the National Center for Fair and Open Testing) to drop the requirement that applicants submit their SAT or ACT (standardized college entrance exams) or GRE (for graduate programs) scores.¹¹⁹ In Europe, Oxford University is launching two programs aimed at increasing its proportion of students from underrepresented backgrounds from 15 percent at present to 25 percent by 2023, one of which is clearly open to candidates with substandard average grades.¹²⁰ In a similar

¹¹⁹ Valerie Strauss, *A record number of colleges drop SAT/ACT admissions requirement amid growing disenchantment with standardized tests*, The Washington Post, October 18, 2019.

¹²⁰ University of Oxford, “Two new Oxford initiatives to help students from under-represented backgrounds”, May 20, 2019

vein, Sciences Po, one of France's most prestigious institutions of higher learning in the field of humanities, is eliminating its time-old competitive written exam as an entrance rite of passage, with a view to attracting a more socially diverse student body.¹²¹

The question is therefore raised of whether, in order to broaden the base of eligible candidates, a consistent path aimed at bringing deserving students from poor backgrounds up to standard would not have been preferable to the gradual downward shift in overall educational standards that has emerged since the 1990s. Initially aimed at promoting *equal opportunities*, a laudable objective, this broad societal movement, which affects primary and secondary education as well, seems to have fostered a “race to the bottom” of academic standards that has translated into the promotion of *equal outcomes* instead. Many other factors – such as, inter alia, the global economy, the rise of the internet and communications technologies with, for example, their impact on reading skills, etc. – have of course contributed to this decline. But in so far as the integration of ethnic minorities was a goal, the question must be raised of whether such a movement has not been predicated in part on an underlying assumption that holding these minorities to the same high standards required of the majority would fail – thereby failing those same minorities.

<http://www.ox.ac.uk/news/2019-05-20-two-new-oxford-initiatives-help-students-under-represented-backgrounds>

¹²¹ France Info, “Fin des épreuves écrites, sélections sur dossier, ouverture sociale... Sciences Po réforme ses procédures d’admission pour 2021”, June 25, 2019, https://www.francetvinfo.fr/societe/education/admission-post-bac/sciences-po-reforme-ses-procedures-d-admission-pour-2021_3506971.html

There is no reason to believe that these general trends – grade inflation and lowering of standards in the name of broadening the student base – will not continue in the future. According to Derek Bok, many college leaders in the US recognize the existence of problems “such as grade inflation or a decline in the rigor of academic standards,” but few are willing to “believe that these difficulties exist on their own campus.”¹²² Yet American students nowadays “seem to be spending much less time on their course work than their predecessors did 50 years ago, and evidence of their abilities suggests that they are probably learning less than students once did, and quite possibly less than their counterparts in many other advanced industrial countries.” Bok points at the fact that “federal efforts over the last several years have focused much more on increasing the number of Americans who go to college than on improving the education they receive once they get there,” so that “by concentrating so heavily on graduation rates and attainment levels, policy makers are ignoring danger signs that the amount that students learn in college may have declined over the past few decades and could well continue to do so in the years to come.”¹²³

It can at any rate be said that going to college and getting through it today is easier than it was two or three generations ago, and that a college degree has therefore become cheaper –

¹²² Derek Bok, *The Struggle to Reform our Colleges*, Princeton University Press, 2017.

¹²³ Derek Bok, *Improving the Quality of Education*, Inside Higher Ed, September 21, 2017
<https://www.insidehighered.com/views/2017/09/21/how-improve-quality-higher-education-essay>

not in financial cost where it is expensive, but in the effort required to graduate.

Student success. One of two main obsessions that the commodification of higher education has spawned is thus well captured in the now omnipresent motto: “student success”. The technological advances of the globalizing world have been deployed by institutions of higher learning primarily toward achieving this objective. This has translated into an overriding focus on retention and graduation rates. In-house student-success experts are now a regular feature of a growing number of universities and colleges. In the US, institutions of higher learning, when faced with lagging student performance, are transitioning away from a focus on student weaknesses toward the question of “how they are failing students” – which implies suppressing the notion that a student’s performance can be substandard and discussing instead how the institution “could do a better job of serving learners.”¹²⁴

While student success has always been an ultimate goal of higher education for both students and administrators, this evolution toward a *quasi-guarantee* of success, at least in the way that a growing number of universities advertise themselves, was never part of the promise. It is the penetration of market rules in tertiary education that has rendered this outcome inevitable, since customer satisfaction – along with profit – has always been a paramount business objective. The same logic applies to the broad imperative of an ever-expanding customer base, which has prompted colleges and universities to devise strategies aimed at increasing enrollments, with the now emerging trend of partnering with

¹²⁴ *Technology and Tomorrow’s Students*, a special report by The Chronicle of Higher Education, 2018.

outside companies that take over student recruitment and retention operations.¹²⁵ The ultimate quid pro quo has been the lowering of the global quality of higher education.

One overall question this state of affairs raises is that of whether a university education, as the contemporary promotional discourse suggests, *should* actually be a goal for an ever-widening proportion of the college-age population – part of whom may in fact see its needs better fulfilled in other types of programs such as vocational training or on-the-job learning.

The latter forms of education are in fact now increasingly being viewed as alternative, perhaps more adequate, responses to the growing focus on learning that translates into labor-market defined skills. As employability is fast becoming the seemingly exclusive goal of any form of apprenticeship, universities are rushing to join the trend.

2. Employability above all else

University curricula today increasingly promote the dispensation of skills that a student will be able to transfer directly to the workplace. “It is now conventional wisdom among decision makers in and out of governments in most nations”, says Tom Cutterham, a lecturer in US history at the University of Birmingham, “that graduate career prospects should be at the top of every university’s list of priorities.”¹²⁶ The discourse of employability now pervades most societies

¹²⁵ See *The Outsourced University*, a special report by The Chronicle of Higher Education, 2019.

¹²⁶ Tom Cutterham, *Employability is an ethical issue*, Times Higher Education, June 20, 2019.

and educational policies in most of the world. Students, who in many countries have to shoulder the cost of higher education through loans they will have to repay once working, do not need much convincing that they should opt for programs that are presented as the most valuable in terms of employable skills. Even where higher education is inexpensive or virtually free, employability has become the paramount goal in getting a college education, and the *US News & World Report* ranking now includes social mobility criteria in its formula.¹²⁷

Skill-providing programs. The employability imperative is causing a change of paradigm in what universities offer to impart, from *knowledge* to *competencies*. Broadening and democratizing higher education means that, while learning through experiences (professional, human, social) is promoted, all forms of knowledge of all students, regardless of previous learning backgrounds, can be validated.¹²⁸

This new paradigm is prompting universities to leap beyond the concept of mere course credentials and use technology to match the skills acquired in a course to those required for a job. Georgia State University, a pioneer in the deployment of data-based technology, thus gives its students access to an e-portfolio, which students fill throughout their program with “artifacts” such as videos of speeches in class or projects demonstrating their competencies. These are then mapped to skills in demand in the job market, such as critical thinking, leadership, communication and understanding of other

¹²⁷ Chris Quintana, *Other Changes on the Horizon*, February 18, 2019.

¹²⁸ 29th Annual Conference of EURASHE: Future students, future universities, future jobs. Professional higher education in a changing world, May 16-17, 2019, Budapest.

cultures.¹²⁹ Among other consequences, the “skills imperative” has created a fledgling industry of consultant organizations that offer to assist universities in rethinking their curricula toward graduate employability. Once such company, the QA (Quality Assurance) Commons, aims to “narrow the gap between higher education and employment”, and transform higher and post-secondary education to prepare students for employability. It delivers to client universities a certification based on a list of skills it has identified as essential for labor-market worthiness in the 21st century.¹³⁰ Other corporate actors offer general advice. Burning Glass Technologies, an analytics software company that provides data on job growth, the demand for skills and labor market trends, thus recommends three strategies that students should adopt to avoid underemployment: “evaluate the underemployment risk when choosing a major; avoid underemployment by building the skills to succeed; accrue meaningful and relevant work experiences before graduating.”¹³¹

De-siloed learning. More broadly, a common strategy recommended to universities that seek to rise to the employability challenge is to encourage the development of interdisciplinary programs. Experts insist that only a broader spectrum of undergraduate teaching can offer students the flexible and transferrable problem-solving and creativity skills they will need in the work situations of tomorrow. According to Nancy Gleason, the director of the Yale-National University of Singapore Center for Teaching and Learning,

¹²⁹ *Technology and Tomorrow's Students*, a special report by The Chronicle of Higher Education, 2018.

¹³⁰ <https://theqacommons.org/>

¹³¹ *Majors that Matter: Ensuring College Graduates Avoid Underemployment*, Burning Glass Technologies, October 2018.

traditional academic disciplines are not suited to the cognitive challenges of the Fourth Industrial Revolution at undergraduate level.”¹³² This theme is regularly explored at international educational events, and everywhere, the breaking of disciplinary barriers is advocated. The most often heard verb in this respect is “de-specialize”.

While interdisciplinary approaches are now permeating academic research, this strategy is proving a challenge with curricula for many institutions, because of the centuries-old reliance on siloed, clearly-bounded fields of knowledge and study. The trend is nevertheless emerging of combining teaching in both IT and the liberal arts, often with resistance on the part of faculty trained and experienced in one discipline.

De-siloed learning offered in universities that have been the locus of specialized knowledge may, however, entail a major liability: “by giving more priority to breadth at the expense of depth, is there a risk of making [students] jacks of all trades but masters of none?”¹³³

Basic skills deficiency. An additional, more endemic problem is the fact that many universities still struggle to impart the basic generic skills that developing trends in the workplace indicate will be in increasing demand in years to come. These skills include problem-solving, critical thinking and even writing, and are now looked upon by university leaders as among “the most important goals of an

¹³² Nancy Gleason, *Higher education must prepare for the rise of the machines*, Times Higher Education, March 30, 2017.

¹³³ See Anna McKie, *How to equip graduates for the future*, Times Higher Education, March 7, 2019.

undergraduate education.”¹³⁴ Yet research by Ross Williams, an Australian econometrics expert who has used PISA data to make comparisons between 31 OECD countries in Europe, North America, Asia and Oceania, shows that while skills such as literacy and numeracy are developed in earlier education, universities do little to actually enhance them.¹³⁵ As for critical thinking, though studies show that 99 percent of American academics view them as an “essential” or a “very important” goal of higher education, a survey of sample exams at elite liberal arts colleges and research universities reveals that fewer than 20 percent of the exam questions actually test for this skill.¹³⁶

Exams and essays at risk. Another trend that could emerge in the future in the rush to comply with the employability diktat may be the demise of final exams and essays as the primary mode of performance assessment. These long-standing forms of evaluation are coming under increasing attack as testing methods that are out of sync with what the Fourth-Industrial-Revolution jobs will require tomorrow. What is suggested instead is called *authentic assessment*. A research paper, “Using principles of authentic assessment to redesign written examinations and tests”, published in January 2019 in *Innovations in Education and Teaching International*, proposes to “improve authenticity in test assessment methods through promoting realism, cognitive challenge and evaluative judgment during the planning, administering and following up of assessment

¹³⁴ Derek Bok, *Improving the Quality of Education*, Inside Higher Ed, September 21, 2017, <https://www.insidehighered.com/views/2017/09/21/how-improve-quality-higher-education-essay>

¹³⁵ John Ross, *Universities ‘struggle to boost generic skills learned at school’*, Times Higher Education, May 23, 2019.

¹³⁶ Bok, *ibid*.

tasks.” This represents a radical departure from current assessment methods, based on “knowledge recall, reasoning and structured writing” and thus calling for knowledge retention. Authentic assessment would rely instead on “knowledge assimilation, problem-solving and team work”, closer to what a professional context calls for – thus eliminating, for example, the extensive writing of the essay to the benefit of the concise type of writing more often required in a job. Likewise, the individual work embodied in exams, tests and essays – deemed here to focus on “lower-order skills” such as memorization – should be replaced by assessment focused on collaborative tasks that enhance “higher-order skills” such as problem solving and critical thinking, in which students work together rather than compete against each other. These suggested modes of evaluation are viewed as more “realistic” because they are contextualized to the “real world”. Few institutions to date have switched to this assessment approach, but those that have are said to be observing a high level of satisfaction among students. Proponents also argue that authentic assessment can help reduce the widespread contract cheating that now raises suspicions over research papers and essays.¹³⁷

The obsession with skills. At the annual Davos conference this year, Carol Christ, chancellor of the University of California, Berkeley, warned attending business leaders of the dangers to keep obsessing about skills. It is, she argued, “limiting and almost even dangerous to say that the university should only be about professional training.” She decried the alarming “distorting effect” that the employability imperative had “for certain disciplines to the sacrifice of others” and

¹³⁷ See Anna McKie, *Time to get real*, Times Higher Education, May 23, 2019.

reminded those present that a “university is a repository for all knowledge.”¹³⁸

The rise of employability as the motto of higher education is indeed bound to come at the expense of other objectives that have been historically associated with the university as a rite of passage. With the employability rationale changing the substance of what is taught, the humanities, whose scope far exceeds the employability criterion, are becoming a discipline at risk.

3. Will the humanities survive?

A July 2019 article in *The Economist* decries the decline in the academic study of history at university under the pressure of the employability imperative – a phenomenon echoed across the West, and even more acutely in the United States, where total enrollment in history has shrunk from 34,642 in 2008 to fewer than 25,000 in 2017.¹³⁹ What remains of the discipline among professional historians, *The Economist* argues, no longer makes room for “great matters of state” as “vital areas of the past, such as constitutional and military affairs, are all but ignored.” Instead, today’s history academics are “learning more and more about less and less”, focusing on the “marginal rather than the powerful, the poor rather than the rich, everyday life rather than Parliament.” While it was necessary to counter-balance the old-school sole focus on the deeds of white men, this new fashion, the article says, “has gone too far.” Students who still choose to study history no longer acquire “a general sense of the history of their own country” but are exposed instead to a mosaic of special subjects that

¹³⁸ David Matthews, *Skills obsession ‘dangerous’*, Times Higher Education, January 31, 2019.

¹³⁹ Robert Zaretsky, *Teaching in the Twilight of the Humanities*, The Chronicle of Higher Education, February 24, 2019.

offers no overall consistency and leaves out the “sense of broad historical development.” Though a platitude, the adage that history that has not been learned from is bound to repeat itself, the article warns, has indeed pertinence – perhaps more dauntingly in the current geopolitical context.¹⁴⁰ This concern is echoed by Robert Zaretsky, a professor of world cultures and literatures at the University of Houston. He sees in the demise of the academic study of history the consequence of a deeper structural change in the society at large, where “most Americans seem to believe that all the history they need to know can be done by Hollywood or the History channel.”¹⁴¹

More broadly, the demand for STEM (science, technology, engineering and mathematics) programs seems to be growing in inverse proportion to that for the humanities. For example, the number of doctorates being awarded worldwide is broadly on the rise, but the highest growth is seen in science subjects, while non-science doctorates are declining in some countries, e.g. the UK. The reason for the uneven growth is the fact that science PhDs., besides science being a major pole of attraction for international students in Anglophone education systems, are of course in far greater demand outside academia, while those in the humanities are still closely linked to academic positions.¹⁴²

In the US, the declining student demand for a liberal arts education already began a few decades ago, but it accelerated by the end of the last century. With ever-shrinking enrollments in the humanities across the country, most remaining liberal arts colleges have survived by expanding

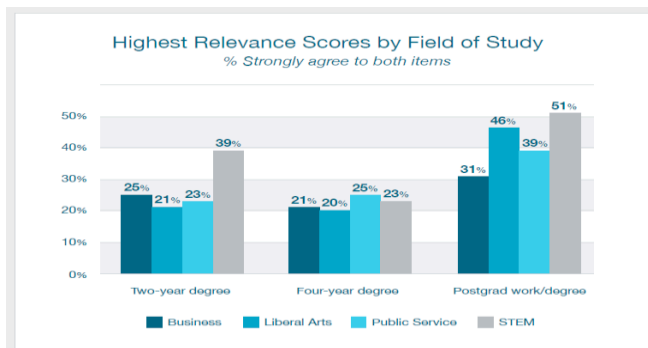
¹⁴⁰ Bagehot, *The end of history*, The Economist, July 20, 2019.

¹⁴¹ Zaretsky, op. cit.

¹⁴² Simon Baker, *Why are science PhDs rocketing ahead?*, Times Higher Education, February 14, 2019.

their offer in vocational programs. Many such colleges are now being marginalized while others are eliminating humanities departments altogether. Victor Ferrall, a former president of Beloit College and the author of a book called *Liberal Arts at the Brink*, argues that this era of lowered admission standards combined with the degrading of speech and writing through texting and tweeting, does not bode well for the future of the liberal arts education.¹⁴³

In 2018, the Strada Education Network and Gallup conducted a survey on the belief of Americans with a college degree in the relevance of the higher education they received. Relevance in the survey is construed as a combination of respondents' belief in both the value and the quality of their higher education. As shown in the graph on the next page, the relevance of a liberal arts education has the lowest score of four broad categories of academic fields at undergraduate level, though it comes in second in relevance at the post-graduate level.



Source: *From College to Life: Relevance and the Value of Higher Education*, Strada Education Network and Gallup, Inc., May 2018.

¹⁴³ Victor E. Ferrall, Jr., *Liberal Arts at the Brink*, Harvard University Press, 2011, and *Are these the dying days of genuine liberal arts education?*, Times Higher Education, May 30, 2019.

On the other hand, liberal arts are also touted today as a field whose study will enhance the “soft skills” in growing demand in the labor market, in particular critical skills.¹⁴⁴ As already mentioned, some universities are indeed revamping their undergraduate core curriculum to include an interdisciplinary combination of science, technology and humanities subjects. This, however, raises the question of what universities seek to accomplish with these introductory courses: provide the basics for further specialization, or connect the way of thinking proper to a discipline to broader social questions?

The humanities have trained generations of students to reflect critically about the world, humankind and societies, and about their own place in all three. They have also produced some of the leading thinkers of the past two centuries at least. This heritage has been at the core of the university as an institution, and has historically translated into its upholding of the clear distinction Max Weber established between a “soul-saving” education and a “skill-acquiring” education in *The Protestant Ethic and the Spirit of Capitalism*. Today, exponential technological changes are upending most of the paradigms modern societies have relied upon for many decades. Should this not massively raise the question of how the demise of this discipline under the diktat of employability *at this particular time* will affect the direction of such changes and therefore the shape of tomorrow’s societies?

In summary, the “skills obsession” that constitutes the emerging response among colleges and universities to the global technological upheaval is already having unprecedented transformational consequences on higher education. The employability diktat will continue to pose

¹⁴⁴ See Tom Cutterham, *Employability is an ethical issue*, Times Higher Education, June 20, 2019.

multiple ethical dilemmas to institutions that have, historically, sought to engage students in the pursuit of a rich intellectual tradition and of greater civic participation at least as much as they have sought to prepare them for employment. The transformations under way in higher education raise serious doubts as to whether, for the main part, universities and colleges will be able to preserve their primary role as spaces where knowledge is passed on, where the world is reflected upon with a critical mind, and where human consciousness is nurtured and enhanced. If, in order to maintain their relevance, institutions of higher learning become instead mere dispensers of skills among other places – whether companies or training centers – offering the same services, what will then be the lasting value, let alone the life-long benefits, of a college education?

PART THREE

The university of tomorrow

The trends and developing practices reviewed thus far offer more than a glimpse at what the university of tomorrow may look like, and already point to nothing less than a change in essence. This briefer, concluding part, explores larger-scale evolutions that bring a global perspective to our attempt at delineating the future for institutions of higher learning, focusing on three momentous macro-changes already under way that will affect the size, purpose and consistency of higher education.

1. Size: the mega-university

As many colleges and universities struggle financially under the constraints described above and will continue to struggle to maintain relevance, it is likely that the emergence of mega-universities on line will accelerate in years to come in the higher-education market. One template could be Southern New Hampshire University, which has risen from a small private institution only a few years ago to a massive online education provider boasting over 92,000 undergraduates enrolled today or, similarly, Western Governors with over 88,000. These institutions offer entire degree programs on line, and seek to cater primarily to working adults over college-age youths – another telling sign of the shape of the future. They target in particular adults with some college education who never graduated. Michael Crow, the president of Arizona State University – another provider of mass-scale online education – calls this population segment (30 million adults in the US) “an unbelievable market”, one he believes universities financially able to afford the initial investment in an all-online offer will increasingly tap into in the future, in particular where enrollments of college-age students keep

stagnating or decline.¹⁴⁵ What makes the prospect of attracting working adults to those programs such a potential boon for higher education on line is the fact that at present, brick-and-mortar universities are not by and large equipped to cater to this public, typically busy with family lives and obligations in addition to, often, a full-time job.

These universities are the embodiment of a disruptive model that seeks growth by upending the conventional concept of credentials established in higher education at large. Providers of competency-based education, they allow students to draw from their life experiences and the proficiency they may have previously acquired in any given subject to earn credits toward degrees. Their business model resembles more closely that of retail giants such as Amazon or Walmart than of the traditional university. Accordingly, they rely on aggressive marketing and branding strategies to offer programs promoting three major advantages to the customer: practicality, convenience and affordability. Key to their success is the lesson they have learned from the disillusionment that followed the promises of the MOOC revolution in the early 2000s: unlike that initial wave of online courses, they provide credentials in demand on the job market. Evolving demographics combined with foreseeable changes in the nature of work due to automation and AI, leaders of these institutions believe, will compel virtually all but elite universities to start catering to older learners if they hope to remain relevant in the educational landscape of

¹⁴⁵ Lee Gardner, *The Rise of the Mega-University*, The Chronicle of Higher Education, February 18, 2019. This article – a large survey on the emerging trend of mega online universities in the US – is the source for this entire segment.

tomorrow. “If institutions are not figuring out how to innovate on behalf of students to increase access and outcomes and ROI,” says Scott Pulsipher, president of Western Governors, they will be seriously “challenged to maintain relevance.”

Traditional universities at present easily look down on this developing model, whose critics point out that if it becomes the norm for large universities, the very concept of a university education and a university degree will lose its prestige and meaning. Competency-based credits and programs, in particular, are raising eyebrows. So does, more generally, the concept of acquiring an education that never provides the wealth of interactions generated by the direct human exchange between instructors and students and among students in a physical space that exists for this sole purpose.

The emergence of life-long learning as a response to the transformations of the labor market under the impact of AI and robotization may be an indication that mega-universities have indeed identified an endless supply of customer bases for the decades to come. If it keeps developing, this pragmatic, credentials-for-jobs approach to higher education, which marks such a stark departure from the traditional vision of a college education, is likely to change the overall shape and purpose of higher education.

2. Purpose: life-long education

The World Economic Forum assesses in its 2018 *Future of Jobs* report that AI and other technologies may affect 75 million jobs worldwide by 2022, while 133 million new roles may emerge from the technological revolution. This spells a future in which working adults, as they move from one obsolescent position to an emerging one, will have to upgrade

their skills regularly or retrain in entirely new fields. Prominent among the questions raised by this prospect is not so much that of whether universities will be able to rise to the challenge as it is that of whether, as institutions, they are apt to even attempt to do so. Indeed, a Gallup-Northeastern University survey conducted in the US, the UK and Canada, and released in June 2019 shows that strong majorities in all three countries believe that life-long education should be provided by employers with government-matched life-long learning accounts rather than by universities.¹⁴⁶ In a move that may be a harbinger of future trends, Amazon opened access to its Machine Learning University, long limited to its own staff, to all developers in late 2018. Many companies, especially the very large ones with the most acute needs in up-to-date skills, are following suit. In the future, corporations will increasingly compete with institutions of higher learning to provide education that is directly transferrable to the workplace.

One overriding concern is how life-long learning and reskilling via higher education should be funded: by governments, by learners with public grants or private loans, by corporations, or through schemes combining several different sources? This is a thorny issue even in countries where higher education is free, because providing life-long access to retraining programs at university level would incur unsustainable costs for governments.

¹⁴⁶News@Northeastern, <https://news.northeastern.edu/2019/06/27/new-northeastern-gallup-poll-people-in-the-us-uk-and-canada-want-to-keep-up-in-the-artificial-intelligence-age-they-say-employers-educators-and-governments-are-letting-them-down/>

Even if funding solutions can be provided, universities could only play a significant role in catering to adult population segments if they accepted to rethink their role and mission in fundamental ways. This would require establishing partnerships with corporate actors to develop strong vocational offers, as, for example, Arizona State University has done with Uber and Starbucks – a prospect many institutions of higher learning do not currently see as part of their mandate.¹⁴⁷

What seems at any rate highly likely to emerge is the gradual demise of undergraduate higher education as the three- or four-year linear journey that it is today, as the window of predictability on jobs that should be in demand after graduation keeps getting narrower. It is indeed sometimes suggested that the graduation ceremony, where it exists, may soon disappear because the notion of “completing one’s education” itself will disappear.

Instead of continuing to view their mission as that of preparing students for the jobs of tomorrow, what universities need to start doing, says Brandon Busteed, the president of Kaplan University Partners, a company that assists American universities and colleges in their growth strategies, “is creating the scaffolding to create an ecosystem where people are constantly being educated and retooled to stay relevant in their jobs.”¹⁴⁸

If embraced by many universities, this trend will necessarily lead to the fragmentation of higher education.

¹⁴⁷ Anna McKie, *When will lifelong learning come of age?*, Times Higher Education, August 8, 2019.

¹⁴⁸ PBS Newshour, *How colleges are preparing students for jobs that don’t exist yet*, December 6, 2018.

3. Consistency: toward fragmentation

One emerging trend pointing to the mutation of the entire higher-education model is the current development of flexible learning formats for part-time students, with, for example, innovative programs in which learners are given up to ten years to complete a graduate degree. These programs rely on flipped classrooms and testing that no longer bears on the knowledge provided on line, and barely on any formal knowledge at all. While all in-class work is in the form of practical workshops, studying is validated by taking into account any prior knowledge students may have.¹⁴⁹

Another, far more momentous process, called the “unbundling” of higher education, is already well under way, with the multiplication of certifications that do not require going through the three or four years of an undergraduate program. In this setup, learners can pick up “micro-credits” or “micro-credentials” (i.e. educational segments in bite size) on line from institutions of higher learning across the world, thus dipping continuously in and out of formal education. This model defines what is known today as “transnational education” – seen by many experts as the way of the future for tertiary education.¹⁵⁰ An alternative path may be that, as public trust in institutions as qualification providers is eroding, institutions of higher learning will find greater growth potential as providers of more informal, need-based knowledge. What seems globally certain is the increasing challenges that will be posed to the relevance of the general certification system, understood as years of full-time

¹⁴⁹ 29th Annual Conference of EURASHE: Future students, future universities, future jobs. Professional higher education in a changing world, May 16-17, 2019, Budapest.

¹⁵⁰ British Council, Going Global 2019 Conference, May 13-15, 2019, Berlin.

studying, at least in part in a specific location, which end in the granting of a degree.¹⁵¹

Various forecasts appear of what higher education will look like in the longer term. They all emphasize the prominence of learning that no longer takes place in a brick-and-mortar institution and in which degrees have become less important, allowing an ever-wider segment of the public to participate at least sporadically in some form of higher education – as is predicted to be the case, for example, for the vast majority of the European population by 2050.¹⁵²

Yet one other possible form that the fragmentation of tertiary education may take in the future is the multiplication of “micro-colleges”. According to Thomas Frey, a futurist who founded the DaVinci Institute in Westminster, Colorado, these structures will offer series of very low-cost modules lasting between six and ten minutes, through which people could learn a specific skill while guided by a “teacher bot” whose role would be to “hyper-individualize” the learner’s path and teach ever faster once it had established the learner’s profile. Students, says Frey, may then learn “perhaps ten times faster than they do today” – which makes it possible to envision a future when an entire college degree can be obtained in just one month.¹⁵³

¹⁵¹ OECD Forum 2019, World in E-Motion, May 20-21, 2019, Paris.

¹⁵² 29th Annual Conference of EURASHE: Future students, future universities, future jobs. Professional higher education in a changing world, May 16-17, 2019, Budapest.

¹⁵³ *Technology and Tomorrow’s Students*, a special report by The Chronicle of Higher Education, 2018.

Conclusion: A necessary debate

A short video titled “Is university worth it?” and produced by *The Economist* points out that the rise in the number of degrees of the past few decades has not led to higher pay for all of the professions that have increased their numbers of graduates. As AI will disrupt the job market, the video predicts, “short, work-focused courses in fast-growing fields such as IT will provide life-long training for all workers.” “Currently,” it concludes, “young people are ill-served by expensive degrees. It is time for a radically different approach.”¹⁵⁴

If the subjects reviewed and discussed in this report make anything clearer, it is that the current tidal wave of global changes affecting the very notion of work may spell the end of the university as we know it, at least in so far as the university has historically been the privileged locus where the love of knowledge could be pursued for its own sake. As humanity stands on the threshold of an era rendered less comprehensible by the pervasiveness of technologies that people are becoming ever more dependent upon, and whose adverse effects may only be emerging, the purpose of this report has been to draw attention to several issues we believe are crucial and must find their place in the broad debate on the future of higher education. As we bring our argument to a close, we propose to put eight questions drawn from it in list form (with page numbers referring to the coverage of the issue in this report), so that readers can reflect on how they may stir a conversation within the higher education community:

¹⁵⁴ “Is university worth it?”, *The Economist*,
<https://www.youtube.com/watch?v=uOouUYXB14E>

1. Tech-reliant learning (pp. 93-102). Growing evidence is pointing to the fact that tech-reliant learning offers no clear qualitative added value and even yields outcomes that are inferior to those produced by low-tech learning. The technological innovations of the Fourth Industrial Revolution are driven primarily by an economic rationale, and, in the current context of marketization of the higher education sector, there is no reason to assume that this should not be the case with Ed Tech as well, geared as it is to boosting retention and graduation rates in an increasingly competitive environment. **Shouldn't the wisdom and long-term impact of the technological expansion under way on campus and on line on the quality of higher education be the object of a wider debate than is the case at present?**

2. Easy learning (pp. 102-104). Developing methods of tech-reliant pedagogy seek to eliminate or at least smooth out the difficulty inherent in the learning endeavor. One significant underlying assumption behind this trend is that today's students have shorter attention spans and that all forms of boredom and other hardships associated with processing challenging, hard-to-comprehend material should be viewed as stumbling blocks hampering successful learning. **Isn't there a sound argument to be made on behalf of the "rewards of pain", the unique sense of accomplishment that comes from constraining oneself to tackle a difficult, occasionally unpalatable task, and carrying it through? In short, can valuable learning truly be made easy and fun, and if so, how does this constitute formative training for future professional challenges?**

3. Program customization (pp. 104-107). The policy of program customization aims to allow students to personalize their curriculum and learning path in ways that suit their particular needs, interests and learning styles. Here again, one of the rationales at play is the increase of retention and graduation rates that enables institutions of higher learning to remain attractive in the market. Though no university would openly admit it, this trend is also part of the overall effort to turn higher education into an easier, less demanding experience. This rejection of the one-size-fits-all model also aims to draw in demographic profiles of students that have been underrepresented until now. **However, is narrowing the scope of knowledge students will be exposed to through their program in line with the fundamental mission of universities, and does it do students a service or a disservice?**

4. Holistic oversight (pp. 108-109). Besides serving as a base for learning analytics, student data are now increasingly used to monitor and steer a student's overall well-being (as defined by the institution), thus increasingly prodding universities to take on a nanny role that has not traditionally been within the scope of their mission. Clearly distinct from, for example, the cultivation of social responsibility and service to society that has been the hallmark of Catholic higher education, this practice is part of the "holistic" vision of the educational path that is now spreading across universities and turning the monitoring of students' physical and mental health as well as their sense of belonging in the institution into one of the objectives pursued by college administration. **Why should universities take on this new role, which has traditionally been played by families or other members of a student's private sphere, at**

the risk of dimming the border between the private and the social life of students? How does that prepare students to adapt to the world of working adults, in which they alone will be responsible for their well-being and personal balance, sometimes in challenging environments? Finally, what are the dangers inherent in the gathering and use of such ample data on the individual's behavior?

5. The devaluation of higher education (pp. 113-122).

Two vastly underdiscussed mega-trends of the past two decades are grade inflation, and the overall lowering of academic standards regarding both admission and graduation. These interconnected trends are an expression of two broad phenomena that have been developing in parallel across Western societies: the commoditization of higher education, which has led to the pursuit of ever-increasing enrollments; and the social justice movement, which has sought to open universities to a growing segment of historically excluded minority groups. Over time, the product of these combined transformations has been a shift of objective from *equality of opportunities* to *equality of outcomes*. Describing the phenomenon in these terms is already highly contentious. **Yet, doesn't the degradation of the overall value of higher education produced by grade inflation and the lowering of standards, whatever creed it is predicated on, deserve an open and candid debate?**

6. College for all (pp. 121-122). Underlying the overall movement highlighted in this report is the assumption that higher education should open up to constantly expanding cohorts of learners from increasingly diverse profiles and backgrounds. While no one can soundly argue against the merit of attempting to redress past discrimination and giving

access to college to any student whose aptitudes will be enhanced by a college education regardless of background, one major question is getting lost in the debate: **Is university a fit outlet for all or even most youngsters? Shouldn't vocational or on-the-job training, looked down upon and underdeveloped in many European countries and in the US, be viewed as a more valuable alternative for students finishing secondary education whose aptitudes are more in line with these modes of learning?**

7. The concentration on skills (pp. 122-128). Under the double pressure of the commodification trend and of the transformations in the demand for skills on the labor market, colleges and universities over the past two decades have increasingly tended to reform curricula away from a knowledge-based general education model toward skill-providing programs that “guarantee” fitness for a job upon completion. As is now often underscored in professional circles, higher education is shifting from the dispensation of knowledge to that of competencies – a change that is, among other consequences, encouraging the growing de-siloing of disciplines. **Should the time-old mission of higher education as an institution that at the core promotes the pursuit of knowledge for its own sake, which relies on strong areas of specialization, be thus jettisoned in the current struggle of universities to remain relevant?**

8. The demise of the humanities (pp. 128-132). One side effect of the concentration on skills, which favors STEM disciplines and other subjects that are touted as gateways to jobs, has been to put the teaching of the humanities in jeopardy. Many struggling universities across the US are already either scaling down their offer in these fields or

shutting departments altogether. Studies in the humanities are increasingly viewed as a futile pursuit that offers lower employment prospects, thus as a bad investment, given the cost of higher education. **For centuries, the teaching of philosophy, history, literature, language or the arts has enabled students to reflect creatively, develop self-knowledge as humans and make societies progress through ideas and the production of new, critical thinking. Has the time come for our unsettled societies to sacrifice this time-old quest on the altar of employability?**

With respect to all things involving technology applied to learning, discourse that deviates from the dominant praise of the untold improvements that data, algorithms and AI will yet bring to education is rarely welcome. Counter-arguments are often viewed as reactionary, Luddite verbiage, typical of doomsayers every time a revolution is under way. But the current revolution is driven by market objectives at least as much as by the ambition to serve humankind, and this warrants the effort to stand back and take stock of what is happening, within and without higher education, on a global scale. It is our hope that this report will not only encourage such a debate but also contribute to it.



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