



Strategic Note on Virtual Multiversity of the Future

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Introduction

We are entering disruptive times in every sector of the economy with artificial intelligence (AI) based upon BIG DATA¹. DATA became new epistemic landscapes. Digital transformation of every company whatever its size, is a must in developing and emerging countries (amplified by COVID pandemic): FIN TECH, HEALTH TECH, eCOMMERCE, e-meeting platforms and EDTECH are booming.

New disruptive technologies and standards abound: NO SQL, NFC, LIFI, VR/AR, Blockchain, Cloud, DATA ANALYSIS (Artificial intelligence) with promising DEEP LEARNING. Every sector of the economy will be transformed in the BIG DATA era with virtual "intelligent" assistant for every human activity.

"In 2020 Algorithms altered the jobs of 1 billion workers in the planet" (www.graziti.com). Management of companies and governance will also be drastically changed moving from an experienced-based top down decision process to data-driven bottom up decision process². Technology and management are closely interconnected in the future.

Higher education in the world: the disruptive e-learning (MOOC based) dimension in the MULTIVERSITY of the future

In 2000, there were 100 million students in the world and more than 196 million in 2012; In 2000: 25% fewer students in BRIC countries than in developed countries; in 2015: 75% more students in BRIC countries than in developed countries! In 2000 there were 2 million international students, 4 million in 2015 and 8 million expected in 2025 (x2)^{***}. Rethinking higher education is a social priority!

The market share of the global e-Learning market is today more than \$190 billion. It is estimated 325 billion by 2025 <https://www.didacte.com/fr/articles/le-marche-de-la-formation-en-ligne-est-en-forte-croissance>.

We are shifting from traditional universities (with a middle age model with students moving to centripetal universities and flocking in amphitheaters to get degrees for transient learning) to higher education and life-long learning in third places (home included) where degrees move to students and professional /SKILL certificates are delivered in much shorter time than traditional degrees!

We may see the "decline of universities and the emergence of higher education"^{*}. The future of work will be a competition between EDUCATION and TECHNOLOGY: "if SKILL building does not catch up with the rate of the technology progress the G20 economy could lose up to 11 trillion dollars in cumulative GDP growth in the next 10 years"^{**}.

Learning should be envisioned thru experiential techniques and Proofs of Concepts (POCs) shifting the focus from institutions

¹Steve Lohr "DATA-ism" (inside the BIG DATA revolution)".

²Henry Schildt "The DATA imperative" (how digitalization is reshaping management)

to individuals. LEARNING is bottom up while EDUCATION is top down transmission of knowledge. POCs are enablers to knowledge creation. We should imagine higher education building bridges between the DATA/Knowledge economy and the INNOVATION ECONOMY.

We entered a new disruptive era of higher education with two major dimensions corresponding to market needs:

- The blended e-learning MOOC-based dimension amplified by the covid (and broadband internet) with the remote delivery of fully-certified degrees moving to students;
- Short-term professional certificates (three to six months) leading to jobs; this typical important service required by continuous education is completely missed by traditional universities.

Mooc revolution and skill tsunami

Over the next decade, the 14 G20 Countries could miss out as much as US dollars 11.5 trillion of cumulative growth promised by intelligent technologies if they can't meet the future SKILL DEMAND!" (in « It is learning : just not as we know it » Accenture report to G20, 2018). Current education and corporate learning systems are not equipped to address the coming revolution on SKILL demand; there is a race between higher education which is traditionally top down (and sometimes never down) and LEARNING which is bottom up! We claim to develop learning by doing (within microcredentials named "gradeos" in Europe) and empower the most vulnerable people to get survival skills re-skilling and up-skilling in our data centrics economy. We are proposing to face the digital revolution on skills leading to jobs by leveraging learning partnerships between higher education and industry to reach that goal of experiential learning.

The MOOCs (Massively Open Online Courses) revolution launched in 2012 in the University of Stanford has reshaped the world of remote education with online learning platforms such as Coursera, Udacity, Edx and FUN. In addition to the video recording of courses, MOOCs bring three main new features to the online learner: a social network of learners (with a community manager in supervision mode) allowing to create virtual classrooms with an active student community, video-tutoring (increasingly personalized) with professors and systematic interaction between learners

and teachers making their course inter-creative (e.g. exercises corrected by students in peer-to-peer mode).

By the end of 2018, more than 900 universities worldwide had created more than 11,000 MOOCs (<https://www.edsurge.com/news/2019-01-02-year-of-mooc-based-degrees-a-review-of-mooc-stats-and-trends-in-2018>). - There were 500 MOOCs in 2013 against more than 3000 MOOCs in 2014 (x6) and 35 million registered MOOCs in 2015 (start of MOOCs in 2012!)*

Teaching based on distribution of educational CONTENT (in brick and mortar fashion, i.e. concentrated in a fixed centripetal space with a top-down distribution) will undergo the same revolution as all the traditional players in the e-commerce world for multimedia content and services such as TV, music, video, banking, transport or trading - with new players exclusively online or hybrid (click and mortar). AI will contribute to such a shift in blended learning and graduation patterns both for students and professors with academic institutions that will have to evolve towards multi-channel, centrifugal modes of delivery using the disruptive dimension of MOOCs.

In order to integrate this double dimension, blended learning (MOOC based) and skill acquisition, we coin the word "multiversity" (word created by Pr Kerr Chancellor of Berkeley university in 1968 when universities faced a major disruption in their interface to economy and social usefulness) to mark these new disruptive paradigms to be integrated in any higher-education project of the future!

*Paul Gibbs "Thinking about higher education" Springer 2014.

** ACCENTURE Report for G20YE, 2018.

*** (Investing in higher education internationalization) INVESTIR DANS L'INTERNATIONALISATION DE L'ENSEIGNEMENT SUPÉRIEUR. (Nicolas CHARLES and Quentin DELPECH Avec la contribution de Julian MICHELET, Janvier 2015).

The higher education needs from the data economy market: synergy between Multiversity and professionals with AI momentum

We entered the "4th paradigm of Science" (as quoted by Jim Gray, Turing Award): the paradigm of the science of DATA. Every sector

of the economy (traditional or circular) will be drastically impacted and there is a dramatic shortage in the world for DATA SCIENTISTS.

AI Is colonizing every sector of the economy. “Deep learning can turbocharge every industry. Deep Learning will add 30 trillion dollars to the global equity market capitalization during the next 15-20 years”* (Note: 13 trillion dollars for Internet in the last 20 years). AI Includes technology such as Machine learning, Deep Learning, Natural language processing and computer vision. AI can offer insights, guidance, predictions and feedbacks based upon the vast amount of analyzed DATA. “AI will contribute 13 trillion dollars to the global economy over the next 10 years”**.

“An IDC report found three-quarters of commercial enterprise applications could lean on A.I. by next year alone, while an Analytics Insight report projects more than 20 million available jobs in AI by 2023. Due to A.I. and ML’s transformational reach, specialists with the right skills could find themselves with job opportunities across a wide range of industries”***.

DEEP LEARNING is quoted also as “software 2.0” * due to the fact that DATA are used to write software with concrete applications in assisted driving, language translation, writing code (Python, JSX, CSS,.. cf GPT-3 from OPenAI), conversational computing, article writing, post in social networks, web-page design and consumer applications (for recommendation).

*BIG IDEAS 2021” ARK Research, 1/26/2021

** Harvard Business Review, Dec 2019, p40

*** Job trends in AI (Nov 2020) <https://insights.dice.com/2020/11/16/artificial-intelligence-a-i-job-trends-important-to-watch-in-2021/>

Higher education in Asia

Let us start this paragraph by one quote concerning INDIA

“We will need another 800–900 universities and 40,000–45,000 colleges within the next 10 years”, ... “And that’s not something the government can do on its own”. Kapil Sibal, India’s minister of human resources and development.

“The dominant trend was massification. Nearly one-third of the world’s population (29.3%) is under 15. Today there are 165 mil-

lion people enrolled in tertiary education. Projections suggest that that participation will peak at 263 million in 2025. Accommodating the additional 98 million students would require more than four major universities (30,000 students) to open every week for the next fifteen years Bricks-and-mortar campuses are unlikely to keep up with the demand for advanced education” (Rankings and Accountability in Higher Education).

(UNESCO: Uses and Misuses, UNESCO, Paris, 16-17 May 2011 Closing session Stamenka Uvalić-Trumbić, UNESCO & Sir John Daniel, Commonwealth of Learning).

On-line Higher education and Moocs in China: “2020, year of the MOOCs”.

Of all the learners that ever registered on a MOOC platform, one third did so in 2020, making 2020 MOOCs’ most consequential year since the “Year of the MOOCs”***.

Chinese universities either join the existing MOOC platforms as course providers or establish platforms themselves* (Peking University, Chinese University of Hong Kong, Fudan University, etc., affiliated with Coursera; Tsinghua University, Hong Kong University of Science and Technology, etc., cooperated with edX..). Tsinghua University even set up the first Chinese MOOC platform named XuetangX (<http://www.xuetangx.com/>). Up to September 2016, XuetangX has 313 courses and 208, 000 subscribers. Nowadays, 24 platforms offer over 52 000 MOOCs in the Chinese language, more than double the number in 2019.

The origins of MOOC platforms in China can be traced back to November 2011, when 20 courses from Chinese universities were made available online through the OpenCourseWare platform iCourse. Chinese MOOC platforms XuetangX and iCourse (also called Chinese University MOOC) are releasing free online courses in English for global learners. So far, 193 courses from iCourse and 198 from XuetangX have been made available in English. The courses were either directly recorded in English, or English subtitles were added.*** China University MOOC (iCourse) were growing rapidly. XuetangX went from 300 k users in October 2014 to 1.3 million users in October 2015 to 5 million users in October 2016. Meanwhile, iCourse grew from 1 million users in September 2014 to 6.2 million in December 2016***. By the end of 2020, more than 180 million learners had signed up for at least one MOOC. Due to the global pandemic and travel restrictions in many countries,

MOOC platforms have seen a surge in both course numbers and enrollments.

*MOOCs in China: A Review of Literature, 2012–2016 Xiaoqin Li, Yanyue Chen and Xiaojing Gong

** <https://www.classcentral.com/report/chinese-mooc-providers/>

***<https://www.classcentral.com/report/china-mooc-platforms-go-international/>

****<https://www.classcentral.com/report/mooc-based-masters-degree/>

Conclusion: Road to Success in Higher Education

Within this vision of the future of higher education, we sketch the premisses of MOOC-based customized learning paths to student success in degreeing, upskilling and reskilling which is required by the data economy and its attached digital transformation.

These customized learning paths will be dynamically built on AI applications on data lakes gathering many heterogeneous sources: student profiles (IN, OUT), video tracks on MOOC platform, results on P2P exercises and validation points.

Many promising research using deep learning platforms exist and will be addressed in a companion paper.

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