



Legal Educational Platforms and Disciplines of the Future

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Abstract

Provision of quality education has become a leading challenge in the world today. In 2005, world university population was 138 million. In Cameroon's state universities, the student population of the universities of Yaoundé University II and Ngaoundéré for example, was respectively some 27,000 and 23,000 in 2017/18. These numbers pose problems of cost, geography, infrastructure and educational delivery platforms that the confines of traditional university and its departments cannot accommodate. This article attempts a definition of the legal educational platforms and the disciplines of the future in Cameroon. The article was prepared through a combination of archival and internet search, and expert consultation. Archival and Internet research was carried out through an analysis of the existing literature in the domains of web technologies, online learning courseware, robotics and artificial intelligence (AI) as well as of legal disciplines and delivery platforms. Expert consultation was attained through qualitative interviews and exchanges with university administrators. The results show that web technologies, the Internet, MOOC, edX and Coursera hold solutions to some of the problems of platforms. Robotics and AI now enhance courseware delivery while dictating where policy, legal disciplines and the law should go. Robotics and AI have also disrupted the concept of 'labour' and 'rights'. Similarly, machines and AI rely on personal and corporate data to function but attacks on network confidentiality, availability and integrity have given birth to new legal disciplines such as the laws of cyberwarfare, data-governance, digital intellectual property, e-commerce and electronic contracts.

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Résumé

L'éducation est l'un des dix principaux problèmes du monde d'aujourd'hui. En 2005, la population universitaire mondiale s'élevait à 138 millions d'individus. Par exemple, la population étudiante des universités de Yaoundé II et de Ngaoundéré (universités publiques camerounaises) était respectivement d'environ 27 000 et 23 000 en 2017-18. Ces chiffres posent des problèmes de coûts, de géographie, d'infrastructures et de plateformes de diffusion d'enseignement que l'université et ses départements ne peuvent supporter. Cet article tente une définition des plateformes de formation juridique et des disciplines du futur au Cameroun. L'article a été préparé en combinant des recherches documentaires et Internet, ainsi que des avis d'experts. Les recherches documentaires et sur Internet ont été menées à travers une analyse de la littérature existante dans les domaines des technologies du Web, des supports d'apprentissage en ligne, de la robotique et de l'intelligence artificielle ainsi que des disciplines juridiques et des plateformes de diffusion. Les consultations d'experts ont été réalisées au moyen d'entretiens qualitatifs et d'échanges avec les autorités universitaires. Les résultats montrent que les technologies Web, Internet, MOOC, edX et Coursera apportent des solutions à certains problèmes de plates-formes. La robotique et l'intelligence artificielle améliorent désormais la fourniture de didacticiels, tout en montrant la voie aux politiques, aux disciplines juridiques et à la législation. La robotique et l'IA ont également perturbé le concept de « travail » et de « droits ». De même, les machines et l'IA reposent sur des données personnelles et professionnelles, mais les atteintes à la confidentialité, à la disponibilité et à l'intégrité du réseau ont donné naissance à de nouvelles disciplines juridiques, notamment celles relatives à la cyber-guerre, à la gouvernance des données, à la propriété intellectuelle numérique, au commerce et aux contrats électroniques.

Introduction

Today's advances in technology are immense and far-reaching. They are affecting legal educational platforms and conventional disciplines. The knowledge economy¹ in Cameroon is now marked by the exponential skills needs of the digital era. Added to this phenomenon, the availability of information in all disciplines on the Internet is combining with the ever-increasing rate of computer literacy, Internet of Things² and Internet penetration,³ to powerfully question the future relevance of some current disciplines and conventional delivery platforms of legal education. This is because:

'The education system of the future will undergo a transition from a heavy emphasis on teaching to a heavy emphasis on learning. Experts will create the courseware and the students will learn anytime or anywhere at a pace that is comfortable for them, learning about topics that they are interested in'⁴ and now is the time for adaptation.

The Cameroon government has responded to this trend by opening new state universities authorising the creation of higher institutions of learning by the private sector and encouraging Internet literacy by offering laptops for free to some university students. It is however doubted that this is neither adapted to the problems, changing times and available technical options nor appropriate. Based on the foregoing and the attendant problems, this paper attempts to define the legal educational platforms, which could be availed of, as well as the disciplines of the future.

Problems in Context and what the Future Holds

Education, its cost and its utility, constitutes one of the top problems of today's world.⁵ The share number of people seeking to acquire a degree today is a problem of no small magnitude. In 2005, world university population was 138 million. According to the IDP Australian Testing projection, in 2025, 7.2 million people will be seeking university education abroad.⁶ Of the state universities, in Yaoundé University II and the University of Ngaoundéré for example, the student population was respectively some 27,000⁷ and 23,000 in the 2017/2018⁸ academic year. Of this number in the University of Yaoundé II, 16,000 of them were taking law and political sciences degree courses while in Ngaoundéré, 5,000 were pursuing law and political science careers. These numbers pose problems of educational delivery platforms and their suitability.

The ability of educators (including individuals, private and public institutions of higher learning) to reach potential students has generally been limited by geography. In most instances, a potential student and persons seeking knowledge must physically move to within commuting distance or into a campus in order to have access to course instructors, classes and materials. Furthermore, potential students etc. are generally limited to proximate sources of courses of instruction, tutoring or training. Consequently, a prospective student must either seek to learn a given subject from whatever local means of instruction is available or move her household in order to access preferred sources of instruction. Many prospective students are deprived of receiving instruction from other, possibly better-qualified instructors or institutions located outside their locale.⁹ Similarly, educational institutions have been limited to serving only those students located within commutable distance of their campus. Added to these problems is the uncertainty that is posed by dwindling energy sources and rising poverty.

It follows from the foregoing *inter alia* that, demographic growth and economic realities of the digital age create new demands that the confines of especially the traditional university and its departments cannot

accommodate. In other words, the changing demands of today's world and the search for solutions is a major problem that drives educational planning; especially in terms of infrastructure development, human resource capacity building and financial mobilization/positioning for quality education for tomorrow. In digital age Cameroon, training for a degree in law best reflects these problems.

Obtaining a law degree (which is an eligibility condition for most legal professions) has conventionally entailed geographical relocation to an accredited educational institution (often a university) resulting in infrastructure and other constraints and at no small cost. Web technologies, robotics, artificial intelligence and the Internet, MOOC, edX and Coursera hold the promise of solutions to some of these problems for the future.

Web Technologies and the Internet¹⁰

With the advent of networked computers and communications, future law students can avail themselves of educational material without having to leave their respective homes. Currently available options include: the use of the virtual learning environment (VLE), blogs, wikis, and podcasting and e-learning 2.0 and AI assisted robots.

The VLE has been the traditional approach to e-learning structured around courses, timetables and testing. This approach is however too often driven by needs of the institution rather than the individual learner (Sullivan 2013).¹¹

The wiki is a simple online and collaborative database designed to enable anyone who accesses it to contribute or modify content using simplified mark-up language.¹²

Podcasting is the use of a series of audio/video digital media files for the sharing or distribution of information or knowledge via the Internet (Ashley 2007).¹³

A blog is an on-line diary (journal) made available on the Internet by an individual. The big advantage of the blog over say VLE, WIKI and Podcasting is that it lets readers add comments (which could be from teachers, peers or a wider audience) and encourages students to keep a record of their thinking over time.¹⁴

E-learning 2.0 as coined by Stephen Downes¹⁵ takes a "small pieces, loosely joined" approach that combines the use of discrete but complimentary tools and web services such as blogs, wikis and other social networks to support the creation of ad-hoc learning communities. The foregoing are alternative enablers of access to courseware or educational material of the Web technology and Internet platform. The said material must however be available to be accessed.

Online Learning Packages

Online learning packages that provide content as educational material for use in Web technologies include MOOCs, edX and Coursera. MOOC stands for Massive Open Online Course. They are distance-learning courses run online by many universities worldwide thanks to the Internet. Creators of MOOCs were motivated by the need to provide study opportunities for learning to individuals who could not otherwise access the learning – for free. Countries outside the US such as Saudi Arabia are using MOOCs to combat skills gaps in labour markets. Its potential for large-scale change is massive.

MOOCs give students the option of studying a subject in depth without the constraints of a traditional university course. EdX and Coursera are MOOCs consortia that currently partner with top universities to develop MOOCs, so students learn from distinguished professors from world's best universities and educational institutions. This adds to MOOCs legitimacy.

Instead of face-to-face lectures or seminars, MOOCs classes are recorded on video and materials (like auto graded lectures and peer reviewed assignments and community discussion forums), are uploaded to the platform. The student can then access them whenever, and wherever, they want to, thanks to the Internet. It is possible to review the material as often as required, so that rather than having to rely on sketchy lecture notes, the entire lecture can be reviewed again. When a course is completed, a sharable electronic course completion certificate is received.

Unlike traditional university courses, most MOOCs can be available free of charge – with no worry of having to pay huge tuition fees! In law, law lectures, legal forms etc. are available on the internet for free, on virtually every subject. Coursera and edX offer paid 'verified certificates' for successful completion. Students must pass assessments and prove their identities. Employers can confirm certificates online. Students who pay for MOOCs often gain access to extra features like reception of additional feedback from instructors as well as access to supplemental readings and assessments. Some MOOCs, like edX's Global Freshman Academy with Arizona State University, offer college credit. Indeed edX has partnered with 14 universities to launch MicroMasters – students complete a portion of a Masters through several MOOCs and a capstone and then apply to finish it on campus. MOOCs completion rates are improved when students pay something as payment adds a level of commitment that dissuades dropping out at any point. So new paid MOOCs have had the effect of diminishing some negative perceptions (like low completion rates in the free MOOCs option).

Robotics, Artificial Intelligence, the Internet of Things, Legal Disciplines and Policy

Robotics is a word that derives its etymological roots from two Czech words 'robota' (obligatory work) and 'robotnic' (Serf) to describe a new class of 'artificial people' created to serve humans (Ross 2016:35).¹⁶ Artificial Intelligence (AI) is the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages. Robotics and AI have combined through application programs (Apps) to drive what has become known as the 'Internet of Things' (IoT), where any object has the potential to transmit and receive data (Ross 2016:132),¹⁷ from cars, homes, watches, to clothing and appliances like refrigerators, gates etc.

Applications of Robotics, AI, IoT: implications

Industry is benefiting from robotics and AI such that many routine tasks in work places are taken away from pesky workers and put into the cheaper, more efficient, and less vocal hands of robots! In factories, robot carmakers are happy to work 24 hours a day in the dark, with no breaks; no absences for social reasons etc. Robots in call centres and ATMs have replaced man and provide services and answers to requests by clients. In the classroom today in over 70 countries, French humanoids like NAO assist in teaching science and computer science classes.¹⁸

GPS trackers are used to monitor where drivers are going and to track cars etc.¹⁹ Cameras keep watch on staff in the workplace.²⁰ Complex algorithms are now embedded in coffee machines to enable one brew the coffee one drinks to the strength one wants.²¹ Machines can now analyse, carry out lab tests on human samples, interpret results, prescribe corresponding drugs and alert on impending ailments.²² Designer babies can now be born through editing the genome of the human embryo.²³ Mines in Australia have been using driverless mega-trucks to shunt ore around.²⁴ The US military uses unmanned smart drones to launch attacks in the Middle East and Niger (Africa). Google and other car manufacturers are lobbying hard to get driverless cars on to public roads, arguing that they are safer than human-driven vehicles.²⁵ Surgical systems like Da Vinci Surgical Systems²⁶ now carry out cardiac valve repair etc.

Reliance on 'Artificiality' by the use of machines or complex algorithms, for the provision of service/ labour and the satisfaction of needs is a common denominator that underlies robotics and AI. The implications of the foregoing applications are seismic and to say the least, disruptive of conventional legal concepts.

Robotics, AI, IoT and Legal Disciplines

The digital revolution exemplified by robotics, AI and IoT is disruptive of the concept of 'labour'. This has a chain of consequences that range from 'data' as a factor of production and as driver of robotics, AI and the IoT, to unimaginable vulnerabilities of the 'confidentiality' of data, resulting in the birth of legal disciplines²⁷ of the future.

As a result of the advent of robotics and AI, policy and economic theory is now confronted with the relevance of 'labour' as a factor of production. Increasing reliance on robotics and AI seriously questions the future validity of 'income tax' as a revenue stream for the State. Will an increased and unbridled use of robots not significantly reduce the critical mass of citizens who pay tax on income? This is a first disruption.

Secondly the growing and irreversible reliance on robotics and AI questions the relevance of the conventional meaning of the word 'labour' as well as of 'the right to work' as a human right in the Digital Age. This is because, 'labour' conventionally meant bodily work or human physical effort.²⁸ It is no longer so with artificial intelligence empowered robots and driverless cars. Will the 'right to work'²⁹ be restricted to 'humans' or robots too will have and enjoy rights?

Where will the line be drawn between the rights of humans and rights of machines considering that man creates the latter? Since morality and rights are based on consciousness, should robots albeit smart but inanimate and bereft of morality, have rights? Will humans simply "afford" robots and machines rights, even if they won't ask for them (like animals)? What rights will robots made by other robots then have? What are the intellectual property rights of robots that for example make other robots or create things? Can robots, like gay and lesbian persons, adopt children, vote, have a right to protection, privacy, freedom etc.?

There is a strong current of opinion led by Raymond Kurzweil³⁰ to the effect that robots must be conferred rights³¹ especially as consciousness is not a scientifically testable proposition. If the 'right to work' is redefined as a result, will that right be limited to humans or extended to robots that man created? The foregoing questions and opinions are fuelling the development of the law relating to robots and justification that 'robot law' be taught in law faculties on the same footing as say company, corporate law or human rights law.

Thirdly, Apps enable the use of digital technologies as tools and as weapons. As weapons, killer robots (like those used by the US Navy and smart drones that are used in warfare today) are capable of identifying the enemy and deciding to attack or not etc. Were this allowed to continue will it not be indicative of a decadent society that is bereft of morals?³²

Fourthly, parting with the kind of personal and corporate data on which machines must rely, may be a trade-off for services rendered by robots in return. The cost of this to man and corporate bodies is the loss of confidentiality! Confidentiality and the protection of 'data' is a subject that is at the centre of legal issues relating to data and their protection as well as a factor of production, just like land was, during the agrarian revolution. In other words, whoever owns data owns a gold mine today. The 2018 Cambridge Analytica³³ data harvesting scandal of Facebook and its affiliate 'Cambridge Analytica',³⁴ highlights questions of the need for a better understanding of rights to digital age data, the extent and use of the said right to data posted by a subscriber on his social media account! This is because, the CEO of Facebook, questioned by the US Congress, admitted that Facebook is 'responsible' for what it publishes.³⁵ The implication here is that holders of Facebook accounts part with their intellectual property rights over data they post on their Facebook page. Through this medium then, Facebook owns and becomes 'responsible' for this data as its publications.

Conclusions or Where Policy and Legal Disciplines Should Go

The developments just reviewed seem to dictate where policy, legal disciplines and the law should go. It is therefore logical to ground some policy and ethical conclusions on the foregoing. Some legal disciplines like datagovernance, digital intellectual property law, cybersecurity law, law of cyber warfare, cybercrimes law, robotics law, digital age labour, insurance and tax law and more, are evident from the foregoing.

Policy and Ethics

Cameroon, has opted for massification of university education in law and the social sciences. Web technologies reviewed earlier now provide and constitute an educational platform for policy to adopt. Government policy and their implementation permitting, prospective law students can avoid the cost and trouble of geographical relocation to university towns in Cameroon, embrace Web technologies backed by the MOOCs model and obtain a recognized law degree issued by a local or foreign university.

As a corollary of the above policy, universities offering law degrees will have to elaborate law courseware in modules that are then posted online and managed based on the Coursera and edX models or better, and engage and undertake law faculty curriculum redesign inspired by legal disciplines of the future.

Secondly, the advent of the AI or the use of robots with smartminds raises ethical issues that have to be addressed at policy level if man is not to be rendered irrelevant by the machines he created. There is need for policy to regulate the development of Apps themselves, define what level of independence can be abandoned to developers of Apps who, for example, give birth to conscious robots or smart machines. Here, policy on robotics Apps can draw lessons from world reaction to the discovery of nuclear energy that led to the creation of the International Atomic Energy Agency³⁶ (IAEA) in 1957.

The IAEA was created in response to the deep fears and expectations that resulted from the discovery of nuclear energy as demonstrated by the dropping of atomic bombs on Hiroshima and Nagasaki in Japan during WWII. The international community has since then policed the development, ownership and use of nuclear power through the IAEA. Judging from the trends in the Digital Age, there is every indication that the development of APPS and their uses has at least, the same negative potential as the nuclear technology.

The case of APPS that enhance the use of digital technologies might however be much more complex to resolve by the simple regulation of ‘use’, such as is the case with nuclear technology. Were policy to be restricted to rules governing ‘use’, as is the case for example with Cameroon’s Digital Age laws,³⁷ after APPs are available, the consequence might be the same or worse than was the case with the atomic bomb.

Legal Disciplines of the Future

Attacks on network confidentiality,³⁸ availability³⁹ and integrity⁴⁰ as legal problems of the past two decades have given birth to especially the law of cyberwarfare, cybersecurity law and cybercrimes law as new legal disciplines. The Cambridge Analytica scandal is indicative of the place of data-governance as a major legal discipline of tomorrow. On this will depend digital intellectual property law, e-commerce law, electronic contracts law and more.

In addition to the foregoing disciplines, the level of disruption caused by robotics and AI to the concept of ‘labour’ and ‘rights’ alluded to earlier, pushes for ‘the law of robotics’ as well as for a substantive revisit of current labour, insurance and tax laws to the extent that they will never be the same again. The bounds of insurance liability for prejudice arising from the use of ‘things’ that are manned by robots or loaded with AI like driverless cars and trucks are yet to be defined. “Occupation” which is respected and rewarded by society may need to replace the concept of the ‘right to work’. ‘Labour’, tax and insurance laws as disciplines in law faculties and as a subject of legislation for the legislator now have to be revisited.

Notes

1. Defined by Powell, W W and Snellman, Kaisa: ‘*The knowledge Economy*’ Annu. Rev. Sociol. 2004. 30:199–220 as ‘production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence’.
2. Mobile network penetration in Cameroon stands at 90% in 2018 per ‘Mobile White paper Cameroon’ study carried out by Jumia Commercial platform and Sac International quoted by Cameroon-info.Net March 17, 2018.
3. Internet penetration in Cameroon is 25% of its estimated population of 24.5 million inhabitants per ‘Mobile White paper Cameroon’, a study carried out by Jumia Commercial platform and Sac International published in Douala on March 14, 2018 and quoted by Cameroon-info.Net on March 17, 2018. Above 68% of youth between 15-24 are Internet users according to a survey conducted by Mediametrie in 2017: <https://fr.linkedin.com/.../cameroun-les-chiffres-de-létude-médiamé...>
4. Developer Madwire, <https://www.futuristspeaker.com/business-trends/the-future-of-education/> published March 3rd, 2007 accessed May 27, 2018
5. The others being (2) energy, (3) water,(4) food, (5) environment, (6) poverty, (7) terrorism, (8) disease, (9) democracy (10) population per Warren H Buffet quotes at <http://www.ruleson investing.com>. ‘...the people who are most successful’ .
6. International Student Mobility - Observatory on Borderless Higher ... www.obhe.ac.uk/documents/.../International_Student_Mobility_Patterns_and_Trends
7. Statistics obtained on 21/03/2018 from the registration services of the two faculties that make up most of the population of the University of Yaoundé II at Soa.
8. The Cameroonian University population in 2018 is estimated at of upwards of 100.000.
9. seeing school systems through the prism of pisa - OECD.org www.oecd.org/.../programme-for-international-student-assessment/pisa/33858946.pdf
10. <https://www.disruptordaily.com/top-10-online-learning-platforms-watch-2018/>
11. Sullivan, Kirk P.H. - 2013 - Education <https://books.google.cm/books?isbn=1466644877>
12. <https://en.wikipedia.org/wiki/Wiki>
13. P Ashley Teaching with Technology Podcasting - Carnegie Mellon University https://www.cmu.edu/teaching/technology/whitepapers/Podcasting_Jun07.pdf
14. R Mason E-Learning and Social Networking Handbook - Semantic Scholar <https://pdfs.semanticscholar.org/45c7/bc8513109888ce36e6d3085ff52c439c8c7f.pdf>
15. who used the perception e-Learning 2.0 for the first time mentioned in his article when he stated: “For all this technology, what is important to recognize is that the emergence of the Web 2.0 is not a technological revolution, it is a social revolution”. This statement means that nowadays, the usability of the technology gets simpler and simpler so that we are not forced to learn to use them in a technological way, but in a social one: <https://pdfs.semanticscholar.org/54bb/52d5787492c5f04a93356bb53bb3e527b6b8.pdf>

16. Alec Ross, *The Industries of the Future*, Simon & Schuster paperbacks, New York, 2016, p.35
17. Alec Ross, *Ibid*, p.132
18. https://asknao.aldebaran.com/sites/default/.../aldebaranrobotics_asknao_information.p. Accessed March 10, 2018
19. <https://www.nytimes.com/.../gps-devices-are-being-used-to-track-cars-and-errant-spouse>. Accessed March 11, 2018
20. <https://www.theguardian.com/world/.../workplace-surveillance-big-brother-technolog...> Nov 6, 2017
21. <https://www.housewares.org/pdf/guides/Smart%20Home%20Magazine.pdf>
22. Keith Downing's publications page at <https://www.idi.ntnu.no/~keithd/publications/publications.html>. Accessed July 24, 2018
23. *The Economist* December 1st 2018 page 81, *Time Magazine* December 10, 2018 page 15 on babies born with edited DNA
24. <http://www.bbc.com/future/story/20141013-> Accessed March 10, 2018
25. <https://www.nytimes.com/2011/05/11/science/11drive.html> May 10, 2011; www.reuters.com/investigates/special-report/autos-driverless/ Apr 26, 2016
26. www.gundersenhealth.org/Robotic/Surgery. Accessed March 14, 2018
27. Reverted to *infra*.
28. Chambers 20th Century Dictionary
29. Universal Declaration of Human Rights, G.A. Res. 217, 3 GAOR, U.N.Doc 1/777 (1948) Art. 23(1).
30. Robots Will Demand Rights—And We'll Grant Them – time.com/collection-post/4023496/ray-kurzweil-will-robots-need-rights/ sept 2015. *Raymond Kurzweil is Google's chief engineer.*
31. A view shared by Nell Watson engineer :faculty member at California based Singularity University per Cécile Puyhardy (journalist) <https://atelier.bnpparibas/en/smart-city/article/rights-robots-have> (June 2016)
32. For which see '*Le Développement Scientifique qui fragilise la société*' in relation to the Hiroshima bomb etc. in *Le kiosque du Monde* : édition du 6 aout 2015 - Le Monde. [fr www.lemonde.fr/...monde/edition-du-7-8-2](http://www.lemonde.fr/...monde/edition-du-7-8-2).
33. where the firms are alleged to have obtained Facebook users' private data to develop 'political propaganda campaigns' in the UK and the US.
34. A British political consulting firm which combines data mining, data brokerage, and data analysis with strategic communication for the electoral process. <https://cambridgeanalytica.org/>
35. <https://www.recode.net/2018/.../full-text-facebook-mark-zuckerberg-testimony-congr...>
36. <https://www-pub.iaea.org>. Accessed, April,10, 2018
37. Law N° 2010/012 of December 2010 relating to Cybersecurity and Cybercriminality in Cameroon; Law N° 2010/013 of December 2010 relating to Electronic communication in Cameroon; Law N° 2015/006 du 20 April 2015 amending and completing certain provisions of Law N° 2010/013 of 21 December 2010 governing electronic communications in Cameroon; Law N°2015/007 du 20 April 2015 governing audiovisual activity in Cameroon.

38. According to Alec Ross (in 'The Industries of the Future, Simon & Schuster paperbacks, New York, 2016 p 125), this type of attack aims to steal or release secure information like credit card or social security numbers from a given system in an illicit or unauthorized manner. The US retailer Target was victim of this kind of attack.
39. These are attacks that hit a networks' availability or attacks that are typically known as denial-of-service (Dos) or distributed denial of service (DDos) attacks. They simply cripple the network by flooding it with a massive number of requests that render the site inoperable.
40. Network integrity attacks are more physical in nature, altering or destroying a computer code with a view to damaging its hardware, infrastructure or real-world systems, e.g. the Shamoon attack.

References

- Powell, W W and Snellman, Kaisa: '*The knowledge Economy*' Annu. Rev. Sociol. 2004. 30:199–220
- Sullivan, Kirk P.H. – 2013 – Education <https://books.google.cm/books?isbn=1466644877>.
- P Ashley Teaching with Technology Podcasting ... https://www.cmu.edu/teaching/technology/whitepapers/Podcasting_Jun07.pdf 06.04.2007.
- R Mason E-Learning and Social Networking Handbook - Semantic Scholar; <https://pdfs.semanticschol ar.org/45c7/bc8513109888ce36e6d3085ff52c439c8c7f.pdf>
- Alec Ross, *The Industries of the Future*, Simon & Schuster paperbacks, New York, 2016.
- Chambers 20th Century Dictionary
- Universal Declaration of Human Rights, G.A. Res. 217, 3 GAOR, U.N.Doc 1/777 (1948) Art. 23(1).

Urls

- <https://fr.linkedin.com/.../cameroun-les-chiffres-de-létude-médiame...>
- <https://www.futuristspeaker.com/business-trends/the-future-of-education/>
- WH Buffet quotes at <http://www.ruleson investing.com>.
- [www.obhe.ac.uk/documents/.../International_Student_Mobility_Patterns_and_Trends seeing school systems through the prism – OECD.org](http://www.obhe.ac.uk/documents/.../International_Student_Mobility_Patterns_and_Trends_seeing_school_systems_through_the_prism_-_OECD.org) www.oecd.org/.../programmefor_international_student_assessmentpisa/33858946.pdf, retrieved July 24, 2018
- <https://www.disruptordaily.com/top-10-online-learning-platforms-watch-2018/>
- <https://books.google.cm/books?isbn=1466644877>
- <https://en.wikipedia.org/wiki/Wiki>
- https://www.cmu.edu/teaching/technology/whitepapers/Podcasting_Jun07.pdf
Accessed, March 10, 2018
- <https://pdfs.semanticschol ar.org/45c7/bc8513109888ce36e6d3085ff52c439 c8c7f.pdf>

<https://pdfs.semanticscholar.org/54bb/52d5787492c5f04a93356bb53bb3e527b6b8.pdf>. March 10, 2018

https://asknao.aldebaran.com/sites/default/.../aldebaranrobotics_asknao_information.p

<https://www.nytimes.com/.../gps-devices-are-being-used-to-track-cars-and-errant-spouse>

<https://www.theguardian.com/world/.../workplace-surveillance-big-brother-technolog...>
Nov 6, 2017

<https://www.housewares.org/pdf/guides/Smart%20Home%20Magazine.pdf> Accessed, March 10, 2018

Keith Downing's publications at:<https://www.idi.ntnu.no/-keithd/publications/publications.html>

<http://www.bbc.com/future/story/20141013>

<https://www.nytimes.com/2011/05/11/science/11drive.html> May 10, 2011; www.reuters.com/investigates/special-report/autos-driverless/ Apr 26, 2016

www.gundersenhealth.org/Robotic/Surgery

time.com/collection-post/4023496/ray-kurzweil-will-robots-need-rights/ sept 2015

<https://atelier.bnpparibas/en/smart-city/article/rights-robots-have> (June 2016)

Le kiosque du Monde : édition du 6 aout 2015 – [Le Monde.fr www.lemonde.fr/...monde/edition-du-7-8-2](http://www.lemonde.fr/...monde/edition-du-7-8-2).

<https://cambridgeanalytica.org/>

<https://www.recode.net/2018/.../full-text-facebook-mark-zuckerberg-testimony-congr...>

<https://www-pub.iaea.org>

