Digital Information Networks and the Future of Online Learning

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INTRODUCTION

Digital information networks, with their tremendous amounts of data, constitute a challenge to the capacity for an individual to know the relevant aspects of society, a knowledge that international agencies often acknowledge as being an essential aspect of citizenship. Are there solutions for this very practical question? Is it possible to make profit from those big quantities of data? What are the role and importance of education, science, technology, and the humanities for contemporary societies, particularly for online universities? (Calhoun, 1996).

A very relevant practice of online teaching involves using the Internet to learn and produce new forms of knowledge. It is easy today, through Google and Wikipedia, to instantly reach knowledge that in the past would take years to consolidate into one’s memory in a form that could be usefully retrieved when circumstances required. Such an ease of access is likely to soon be increased by the launching of Google’s eyeglasses, where the Internet could be projected into one’s eyeglasses upon request. This general, easy-to-access knowledge is useful for increased self-consciousness and understanding of the world, as well as to the improvement of the quality of social interactions, but has a reduced market value and can often be overly shallow (Glimcher, Camerer, Fehr, and Poldrack, 2009). The creation of useful-employment in the future requires the empowerment of society’s capacity for developing content that is both unique and portable into digital networks. The essence of future online learning will be its capacity for helping/allowing students to discover and discern the best forms for filtering digital information that is balanced, credible, and relevant. The key for success will not consist of having librarian knowledge, but rather on the development of learning by doing, thus satisfying the capacity to attain knowledge in an autonomous way (Beinhocker, 2006).

In this article, Caetano and Lori (henceforth, we) reflect on the lines of development that we view as possible for universities that offer online teaching opportunities in Europe. We specifically focus on the extent to which these universities are addressing the developmental needs established by governmental and non-governmental agencies, international economic agencies (e.g. European Union (EU), Organization for Economic Co-operation and Development (OECD)), and by European associations that are invested in education and skills-training (e.g. European Association of Distance Teaching Universities.
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(EADTU)) (Dehaene & Brannon, 2011). As an example, we share the modifications that Aberta University, a public, four-year online university has implemented toward continuing Portugal’s pioneering efforts in the field of online teaching. Using practical examples and theoretical discussions, we will present a vision of what we believe will be the future of education and the role online education will play in this vision.

The Current State of Technology Integration in Europe

The reform of higher education in Europe can currently be seen as a “reform of the reform”, i.e., as the reform of the democratic access to the universities. This democratic access took place in most European countries within the last 30 years of the twentieth century and resulted in a dramatic increase of students attending higher educational universities. Today, one of the main educational goals in Europe is not only to increase the number of students attending universities, but also to ensure the quality and relevance of their qualifications upon graduation and throughout the remainder of their careers. Education is viewed as being a continuous process throughout life, therefore the question becomes, how do we make better educational policies for better lives? (Freedman, 2005).

Undoubtedly, the question above is being addressed by universities all over the world, as efforts to redesign infrastructures to accommodate the multiple forms of constantly emerging technologies has taken center stage (Layne & Ice, 2015). In Europe, for example, these modifications being made in higher educational universities stem from the immediacy by which European legal and political systems began integrating emerging technologies into their internal policies and infrastructures. Because the EU starts from a commerce-based association, the European Economical Community (EEC), the legal systems were integrated by policymakers before the European integration of university systems, but the university integration across the EU is already an on-going process (Groenwegen & Van Dijck, 1993; Buchholz, 1989). The European legal system as a whole was designed to make sure that commerce would transform the EU into the most developed world area. It was the European Council of Lisbon (the political EU leading body) in 2000 that established the EU policy for science and development, and declared as one of its goals the establishment in the EU of the world’s most competitive and dynamic knowledge-based economy (EU, 2002). The intention of developing a digital EU society supported on tools and methodologies of the online education approach is proposed in the Europe 2020: Europe’s growth strategy document produced in 2013 (EC, 2011). To understand the impact that such changes will have in the academic sphere within European societies, e.g. the growing gap between the high budget universities and the low budget universities, it is necessary to analyze what initially served as the catalyst for these changes (Steiner, 2009; Castells, 2005). Some technological developments are simply products that have been improved. For example, it is simpler now to print the text that we write, e.g. using a personal laser printer, but the
printing of written text is not new at all. However, many emerging technologies allowing for immediate access to knowledge and skills in ways that were unfathomable even in the recent past, are the technologies that will serve as the focus in this article. Additionally, we further provide our thoughts on the practical implications that these emerging technologies may impart on the field of online education.

Traditionally, the relationship between education and the economy was based either on the technical-functional or on the modernization theories. Those theories are similar and differ only on whether they emphasize the effects of education on creating job-relevant skills, the technical-functional theory; or on creating job-relevant attitudes, the modernization theory. The technical-functional theory has tended to be more popular on developed countries, while the modernization theory has tended to occur more on underdeveloped countries (Rubinson and Browne, 1994). Both theories correspond to industrial societies where states had a lot of weight on both the economy and people's lives, and that is no longer true for contemporary societies. Technological development and free movement of factors of production have changed the nature of things. Today, the virtual economy is becoming more dominant - Google and Wikipedia are good examples – and, because of that, the success of collective action depends crucially on the autonomy and knowledge of individuals (Beinhocker, 2006; Freedman, 2005).

The Knowledge Economy

The basis for one’s decisions is no longer dependent on the allocation of goods by the state, but rather on the knowledge people have and on the choices they make. Therefore it is crucial to promote the education and the training of people in order to make them more autonomous (Steiner, 2009; Barnett, 1992). Knowledge here is understood as useful information, by useful meaning that is capable of making products better. This is relevant as in modern economic theory (Beinhocker, 2006) knowledge is wealth. It is private knowledge that allows to create value in products, more than the access to raw products, e.g. iron or gold, which are now of equalitarian access except for raw products with strong military usage, such as uranium. There are also economical differences in the world because the distribution of raw product is not equal across the globe, but the greater source of economical differentiation is the unequal distribution of knowledge (Beinhocker, 2006). It is thus correct to affirm that the present society is increasingly having a knowledge-based economy.

Searching for equality is reasonable given that people have equal rights to human dignity, but it is also true that people often work to gain socio-economical advantages over those that work less. Thus, sharing knowledge universally would increase equality but would likely reduce people's interest in working. The best approach would likely be a
middle of the road approach where it is maximized the availability of the knowledge that is not proprietary, whereas all people are taught the best methods for developing knowledge that can be proprietary. It is in learning this middle of the road approach that online academic programs can have a very relevant effect on online educational expansion. We’ll also argue that online learning has an important potential role within the European economy. As evidenced by several studies in the field of neuroscience, in situations of interdependence, what the individual considers to be rational behavior strongly depends on what the individual explicitly knows from personal and societal experiences (Whitehead, 1978 & 1995; Calhoun, 1996; Oishi, Kesebir, 2012). The empowerment of individuals is useful for the cultures where it already exists, as it is the case of the countries of northern Europe, but it is even more useful for southern European cultures where the existence of such empowerment is less prevalent (Norrie, 2005). The online learning is an opportunity for students from southern European countries to be more in touch with other students and to make a qualitative leap through this training, thus becoming more independent in both their behavior and decision-making.

The situation in Europe after the 1999 Bologne Agreement between 29 European countries led to a reform of the curricular systems in Europe, which has been a collection of good and bad events, as it happens in all reforms. But with what was learned from that and from the EU Science funding FP7 program a new set of goals and guidelines have been prepared by the governing bodies of the EU. Approved in 2011, Horizon 2020 is the EU continuation of the FP7 program that started being fully implemented in 2013. The purpose of the Horizon 2020 focuses on the creation of inclusive, innovative, and safe societies (European Commission, 2011). This foci directly results from the overarching urgency to eliminate recession and proactively re-launch the European economy. According to this program, the EUs global competitiveness demands budgetary consolidation and structural reform; but, mostly, demands strategic investments in all areas, with a special focus on research and innovation. According to the European Commission, it is necessary to become a society that is more efficient in the use of its resources in all areas of economical activity. According to the perspective presented by the European Commission, research and innovation will improve both prosperity and quality of life, through the creation of “worldwide public goods” (EC, 2012).

Today, education is an economical activity capable of generating transactional goods that can be exported, and it is thus a major engine for the growth of national Gross Domestic Product (GDP). The Horizon 2020 program gives economical incentives to activities that promote a “smart, sustainable and inclusive growth” (EC, 2011, p. 2). The Horizon 2020 assumes itself as a rupture with the past, through the generation of ideas, growth, and employment for the future. Education is now, together with research, a key and essential priority for a sustainable and inclusive growth of the EU. In universitary education, it is no
longer enough, as it was in the past, to give knowledge to passive students; but rather it is necessary to give them the chance and the means to achieve, implement and transmit top-level ideas. For the European Commission, the goal is thus to provide students with top-level research infrastructures, so that top-level research can be conducted by bringing to the EU the best researchers in the world. On the other hand, it is also clearly stressed the importance of dissemination of scientific research from industrial production, such as education; therefore, the education sector is being viewed by EU as an important producer of immaterial, yet valuable goods. This new approach by the EU will start to promote European universities not only as places for teaching, but also as places where patent creation and start-ups are expected to occur. In terms of funding, special attention is given to the Future and Emerging Technologies (FET)—in particular, digital educational networks. This attention can be observed by the large funding of the FET by the EU structural funds (large funds destined to create EU infrastructures).

The digital networks are seen as “essential facilitating technologies” for the increase of EU’s competitive capacity in the context of globalization. They are also a priority of the Europe 2020 EU strategy, of which the Horizon 2020 is a part. The social challenges addressed by the Europe 2020 program are the great common concerns not only of the EU inhabitants, but of the entire world. This “planetary consciousness” of the EU leads to a financing preference for challenges that have a global nature and application. The EFT will thus play an important role in the European societies by allowing for the integration of research, education, and innovation with high-level of excellence that can be applied at a global level. These three dimensions constitute what the European Commission calls the “triangle of knowledge” (EC, 2002; EC, 2009; EC, 2011; EC, 2012) (see also refs. (Locke, 1690 (1959); Caetano, Curado & Jacquinet, 2000) for a general classic perspective on the relevance of ideas in society).

In accordance with the Europe 2020 strategy, the Horizon 2020 program gives priority to digital networks. The strategy is intended to give high priority for funding projects that are likely to have a high impact in terms of improving the economy and the job market, such as the large-scale implementation of essential technologies. This approach must be complemented with measures to ensure that the Horizon 2020 program is available to diverse individuals or groups who are producing work and research that will have a positive impact. The Horizon 2020 program specifically states that the talents must be cultivated and supported so as to develop work at an excellent level, allowing for European researchers and innovators to benefit from instruments, networks, and financing of the EU science funding Horizon 2020 program (EC, 2011). This program will include the establishment of strong connections with EU programs such as teach/study abroad Erasmus program. The idea is promoting not only physical mobility of teachers, researchers and students, but also virtual mobility; it is also envisaged to establish relations not only in
Europe, but partnerships all over the world. The connection to the Millennium goals approved by the United Nations (UN) is also made explicit. The eighth goal of the Horizon 2020 is the establishment of a global partnership for development (EC, 2011, p. 11), which focuses on the interaction between research and education. It is in the EU’s goal of having a global reach in research and education that online teaching has its highest potential of being highly efficient because of online teaching’s capacity for operating at a global scale and low cost through the use of the available digital networks.

For the last 30 years, the EU has made universal access to education a priority; however, with the modified goal of establishing excellence-based interactions in society, it is being realized that mass education has not guaranteed an equality of job access for everyone. On the contrary, given the differing quality of teaching institutions, the different access to university formation has led to social inequality. Examining the world university rankings, it is also clear that countries where the governments have a more direct control on the universities are not the countries that have the best universities. Therefore, it is important to promote the equality of access to education opportunities without being dependent on a direct control by the countries’ governments. In this light, online education is in a unique position to achieve both equalitarian access and independence from over-bearing control by the countries’ governments (Lane, 1993, 1995), namely the European countries. Through digital networks, availability of access to information is clearly leveling the playing field, however reducing governmental quality control –especially in instances involving online learning with international education institutions, it is imperative that there is agreement regarding quality control among all partnering institutions.

Online education has been for a long time seen as a second-opportunity education oriented towards older adults already working who did not have the chance to follow the standard education system. But with the recent development of powerful digital networks and free access to large quantities of information, online education has become increasingly more attractive both because of its cost efficiency (the teacher/student ratio is smaller than in face-to-face universities) and because of its wide reach (online universities can reach the whole world). By understanding the growing advantages of online teaching, European policy-makers have been greatly increasing the incentives for research in online education. An example of such incentives is the increase in funding by the EU toward EADTU projects concerning quality in higher education, such as E-xcellence and E-xcellence Next projects. Both of these projects aim to clearly define and establish quality standards for online education. Funds are directly allocated toward efforts to increase collaboration between institutions and professionals working in the field of online, namely the national agencies for assessment and accreditation of higher education (Ubachs, 2012; North, 1990).
The Institutional Economical Context

The present context of transforming educational systems in Europe gives a heightened relevance to interuniversity consortia and partnerships that embrace and support advancements in scientific, technological aspects, and the expansion of educational programs. The present legal structure in Europe has been inspired by both governmental and organizational efforts and practices in the United States and various European countries. Cooperation in education matters has been assuming a great relevance with the homogenizations of the national university educational systems across Europe.

Although originally well-intentioned to extend education to all, the financial structure supporting the national university educational system was deficient, hence leaving an aftermath of overreliance of student quantity over quality. This lack of quality, in turn, has left a gap in the assurance of obtaining employment upon graduation. In many countries, no special attention was paid to the specificity and potential of online/distance learning universities. Some universities have been paying attention to the specificities of online learning, but such an attention is not common. The laws in the EU countries typically promote the building of inter-university consortia and of partnerships between universities and several types of institutions. In some countries, there are universities that are fully dedicated to online learning, for example, in Portugal, Spain, and the United Kingdom. While in other countries, such as The Netherlands and Germany, many university professors simultaneously teach at their respective face-to-face university and do the online teaching through their face-to-face university and/or through their national online university.

There is a strong movement in Portugal for face-to-face universities, which are geographically close, to become integrated in larger super-universities—the advantage being the reduction of costs, the budgetary increase which allows for higher-scale projects, and an improved position in the world university rankings. A recent example is the effort to join the University of Lisbon with the Technical University of Lisbon. But online universities have the clear advantage of not needing geographical proximity to be merged with another university. Portugal’s fully-dedicated public university, the Aberta University, has been making an effort to increase the degree of collaboration with several fully-dedicated online universities, such as UK’s Open University and the Universitat Oberta of Catalonia, but also with traditional face-to-face universities.

Not all online universities have similar number of students; examples of large online universities are the British Open University or the Spanish Universidad Nacional de Educación a Distancia with many tens of thousands of students, while examples of medium-size universities are the Aberta University and the Universitat Oberta of Catalonia with a few tens of thousands of students. And even if online universities have similar numbers of
students, it should not be assumed that similarly sized universities work in similar manners. For example, the medium-sized Dutch Open Universiteit works in a very different manner from the two mentioned medium-sized universities (e.g. adopting different pedagogical approaches, and using different online interaction strategies).

Long-range online universities are typically marked by the existence of a much smaller number of teachers per student than face-to-face universities. This difference is based on the used teaching methodologies, basically that in online teaching students are expected to be a lot more autonomous than in face-to-face universities and that they can attend the lectures at any time by just downloading the materials (in general, multi-media materials which allow for multiple forms of interaction). Both the greater student autonomy and the thoroughness of the support materials greatly reduce the number of required teachers without reducing the quality of what is being taught. We will even argue in this work that what is taught at online universities can potentially be considerably better than what is taught at face-to-face universities. An obvious advantage in the reduction of teachers is that universities can potentially become cheaper, while actually increasing the quality of the education.

The face-to-face universities are certainly aware of the potential of online teaching, but the teaching load of online teaching is considerably higher than that of face-to-face teaching; and so teachers in face-to-face universities are often reasonably weary of committing themselves to online teaching. The inexistence of a differentiation between face-to-face and online teaching is often negative career-wise to those professors that focus on online teaching, therefore appropriate legislation needs to be enacted. A policy recently adopted by the Aberta University that is likely to be positive for other fully-dedicated online universities, is to have their teachers linked to face-to-face research institutions, thereby increasing their scholarly productivity.

For different reasons, both Germany and Brazil are keenly aware of the importance of online learning; Brazil because of its size, and Germany because of its ever increasing economical interaction with both China and Russia. It is actually the success of its interaction with the two large-size countries that is behind the more recent, and very strong, economical success of Germany. When one thinks about countrywide high quality education in linguistically mostly homogenous countries such as Brazil, Russia, or China, then online learning should be strongly considered. For online learning to be successful in the EU, it must be done by strongly multilingual professors, as the courses will need to be multilingual.

In face-to-face universities there are teachers and tutors, but, in online universities, besides those two, the web designers also play a very important role. The teaching
technologies in online universities are therefore possible to patent, and indeed Aberta University is in the process of patenting some of its teaching techniques. This interplay between media technology and teaching will be opening new forms of teaching how to work with information-rich content. Through online universities, we will be able to see the development of a new form of teaching within online learning environments with a high level of quality, and that can be taught to segments of the society that were previously disenfranchised.

**Information Access as a Universal Right**

Until recently, the information grabbing techniques learned at online universities were only useful when people were in front of computers, which was useful to only a fraction of the available jobs. But the development of technologies, such as the Google eyeglasses, where all the information in the web can at any time and place be downloaded to a person’s eyeglasses, means that answering the questions to any exam in any discipline will become more and more trivial. But if answering to an exam is trivial, then why should students take exams, since all those exams measure is the difficulty of Internet access? By using eyeglasses such as those, and its future improvements, it will be possible at any time to be immersed in 2D and 3D virtual realities representing anything we want to be informed about. Thus, as those technologies become more and more available, the only exams that make sense are those that measure people’s capacity to access and process that information available in the web; and online universities are very well-suited to teach and test those types of skills. The access to all existing information by anyone anywhere constitutes a powerful mechanism for the promotion of human dignity, and so we are proposing that this access should be a fundamental human right. Like all the rights that have a monetary cost associated to them, its implementation will be gradual and not immediate, but nevertheless it should be a goal of any civilized nation.

Universal access to information does mean homogeneity in the quality of the technologies used to assess and process such information. The quality of teaching in the future, and already in the present, will be about how well the teaching institution has trained the students on their capacity to assess and process the web’s huge amount of information. The sovereign states are changing their functions and structure not only through the appearing of large deeply integration areas such as the EU, but also through the emergence of sovereign individuals that will create diffuse virtual sovereign aggregates of people having common goals; with the common goals being economical, religious, linguistic and/or other. But, regardless of what kind of societal structures are being created, the type of knowledge gained in online universities is likely to be more appropriate for a life in those types of societies.
As we mentioned, online universities are capable of having more students with less money. This is likely to increase the monetary capacity of a university, and there are practical advantages to a university on having easily available funds. Money is useful in improving universities when it is applied so as to increase people’s productivity, rather than their sense of comfort. In societies with a very strong work ethic, meaning that people feel uncomfortable when they are not producing, and those feelings are reinforced by their environment, comfort is not a danger. But when societies are tolerant about lack of production, then feeling comfortable about not producing can become a stable living condition; and when that occurs, then the lack of production will tend to increase with time rather than decrease. The act of producing something innovative always implies an effort, conflict with the status quo, and the risk of becoming ostracized. For a behavior that comports so many risks to occur, it is necessary that the incentives to produce innovations are clear, strong, and non-extensible to those that do not innovate.

The major incentive most people look for is to climb up on the social hierarchy. Revolutions are always about a change in the way the social hierarchy is built and/or accessed; and the purpose of the revolution is to change that order into one that the revolutionaries believe is better. Because they believe it to be better, they call it more just, but often revolutions imply changing the judicial system so as to make sure that what the revolutionaries feel is better is what is postulated to be more just. If the sense of what is just was universal, then all political parties would promote the same sense of justice. But what happens in practice is that differences about what is just not only variable across people, but they can even vary for the same person across time. Until recently, the ideal of social justice would be one where the social hierarchy was based on each person’s capacity to produce knowledge (meaning useful information), and thus the importance of learning knowledge in the universities as a mean for creating societal improvements. But the recent development of technologies capable of giving almost-instantaneous access to huge amounts of knowledge at almost any place by almost anyone implies that knowledge is no longer a social differentiator. To some people this is the dawn of an equalitarian future, but we think it is wise to curb that enthusiasm, as we expect that the more likely outcome is a new form of social hierarchy that is not based on knowledge. Rather, that hierarchy will be built on the person’s capacity to reconstruct knowledge in new and different ways, the capacity to innovate based on what is available on the web.

Make no mistake that these methods are not about innovation by imitation; however, it is not the creation of new innovations either. The innovation referred to consists of creating something new by the integration of what is available, and that others want to have, accompanied by making this product available (not necessarily free of charge). The Internet brings the geographic borders down, flattens the mountains some would say (Freedman, 2005), but it also creates a new type of border/mountain which is the huge amount of
completely irrelevant information/services that are available. The battle for the creation of interesting new products will no longer be focused on the products being new, but rather on them being interesting. This means that the relevant difference between information and knowledge (useful information) is on making sure that its usefulness is so clear and publicized that the product will become interesting. Such an alteration of what is relevant about a product will make scientific/technological research increasingly less relevant, and social/psychological/marketing research increasingly more relevant; it also makes a lot of the structure we are using to promote production, such as patents, increasingly more focused on marketing technologies and increasingly less so on technological developments.

Languages are the representation of a joint cultural past, bridges to the construction of a joint future, and barriers to the construction of other joint futures. Languages can indeed both unite and divide people. Another well-known capacity of languages is the building of cultural commerce landscapes that can represent extremely large amounts of money. The more widespread a language, the larger the market of the culture having such language can access. Of course, that translation is always possible, but the existence of a common language helps the building of a common culture. The combined existence of a joint language and culture is very useful in the construction of a joint market. This must be understood as a relevant political issue (Heller, 1991 & 1995).

CONCLUSION

The analysis of the global economical fluxes is both multi-science and multi-technology, and young people understand that it is the managing of that monetary flux that is the essence of what presently constitutes power. Power is no longer in the military as it occurred until the 60s-70s of the previous century, and it is starting to no longer be associated to knowledge about the legal system, but it is rather starting to become associated to the knowledge about the management of economical fluxes. The EU is a paradigmatic example of this shift. Fraternity in Europe can only endure if the production capacity becomes more homogeneous across the EU, otherwise it will not occur. The people of the poor countries cannot live better than the people of the richer countries using the richer countries’ money, nor can they accept to live in worst conditions than in the richer countries forever.

The universities that by lack of scale and/or money cannot produce the best art, science, or technology in the world have the moral duty of trying to show those high achievements of humanity to their students. The online universities are especially well equipped to be that window to world-class quality and achievement that can be open by combining multi-science and multi-technology teaching (Morin, 2008), and at a considerable lower cost than face-to-face universities; even more so if you are a student not living in the richer countries of the world, where one typically finds the top-level face-to-face universities.
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