Virtual networks and the new definition of Knowledge: Towards a policy analysis

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Abstract

The radical transformation of knowledge access and knowledge production for teaching and learning that higher education institutions around the world are currently experimenting due to the use of technologies and virtual networks, constitutes a platform from which to build new networked learning and new academic interactions. The possibility of instant access to multiple resources of information is transforming the way users around the world access, produce and learn knowledge. However, this significant transformation has not always been echoed by a formal policy agenda at the institutional level. There is still a big gap between technology applications in higher education, and the creation and application of policy strategies to enhance and to regulate these interactions. This paper explores the impact of the Internet in teaching and learning processes at the start of the 21st century and examines the opportunities to stimulate discussion towards policy creation. A discussion about Internet access and differences between Universities in Europe and Africa is introduced. The authors examine the connectivity between users, contents and technologies, and provide a platform for reflection from which to examine the role of the Internet and the creation of virtual environments as important participants of this transformation. Complex processes of knowledge access and knowledge transformation are explored in the framework of policy analysis within higher education institutions around the world.

Keywords

Knowledge Access, virtual networks, knowledge production, higher education

Introduction

The arrival of the Internet into our daily lives and activities has radically change the way knowledge is access and organized. The possibility of instant access to multiple sources of information is transforming not only the way people access, produce and share knowledge, but also the way we share content, interacting not in isolation, but in vital life networks. This premise has been analysed by several learning theorists around the world. However, little has been done to develop policies at the higher education level that will contribute to the extended and regulated use of the Internet and digital technologies for education. Furthermore, when some of this policy making exploration has taken place, higher education institutions do not follow suit and are slow to react, promote, and regulate (Muassad & Capretz, 2015; Annand & Jensen, 2017).

Moreover, even if complex processes of transition that higher education institutions are suffering triggered by the great influence that the digitalization of content has brought into teaching and learning, the impact of these process has not been homogenous across educational institutions around the world. Examples of this is the data report in the 2015 version of the Horizon Report, compared with the research developed by Bloom et.al. (2015) in Sub-Saharan Africa.

In the following lines some of the main trends or key drivers for change triggered by the Internet and the use of digital technologies in higher education are presented. The main concern of the authors is to proposed topics and

rubrics for policy analysis keeping in mind that these trends have influenced transformation in a very uneven way.

Decentralization and knowledge co-creation

The growing capacity of information and communication technologies (ICTs) as well as the expansion of portable devices, enhanced by the dropping of their cost and there increasing processing capacity, has made of this type of digital technology a social platform which is enabling a very intense flow and exchange of information (Becker et al., 2017; Cobo & Burkle, 2017). For the last decade, Internet has become a social sphere where communities can create and disseminate knowledge and information to others (C. Cobo, Scolari, & Pardo Kuklinski, 2011). This phenomenon has not only diversified the mechanisms of knowledge production but also it has brought deep implications into what was traditionally understood as valid knowledge (Keen, 2015). Similarly, this phenomenon has also has impacted in what some authors suggest as the end of the expertise monopoly that universities had for centuries (Nowotny, Scott, & Gibbons, 2003), towards a more inclusive model where Open Educational Resources are produced within the HEIs and shared by learners outside their domain (Allen, I.E., Seaman, J., 2014).

New forms of knowledge production: Collaborative research

The increasing connectedness and interdependence between societies in the 21st Century has impacted how knowledge is being produced: the creation of new knowledge happens in a much more distributed way. Currently, there is a growing number of collaborative research ventures carried on partially or totally by virtual networks. Academic researchers work across the world in the identification of solutions for different diseases, financial proposals to offer new economic resources, etc. This possibility represents a great advantage for interdisciplinary and interdisciplinary knowledge production (Gibbs, 2015); (Enright & Facer, 2016). Moreover, a large number of collaborations in academia are carried on in research, much less in providing joint diploma and degrees (Guri-Rosenblit & Duart, 2017).

New venues of knowledge recognition

The promise that the Internet will facilitate the emergence of the new "global learner" (Hicks, 2003), has been supported by more recent research (Guo, 2014; Young-Ming, H., 2015; . Students around the world do not have any longer the restrictions of local spaces and familiar universities when content and knowledge can be disseminated through network and virtual classrooms disregarding financial constrains. Many innovative global campuses have been established or in a process of being established in the last decade. A remarkable example is the Global University in South Korea that is composed of 10 mini-campuses, each of which is under the auspices of a different university (five are under the responsibility of European universities, and five are under the responsibility of US universities). The focus in this university is on graduate studies and advanced research which is monitored by faculty from the different universities, and is carried on both on campus and through virtual platforms.

World class universities are supported by the idea of globalizing the entire academic community. The globalization of higher education has enhanced the funding of world-class universities in many national jurisdictions which compete for excellent students and faculty and get generous funding from their national governments. Part of the requirements for a becoming a world-class university is engaging a high proportion of transnational students and prominent academic faculty from universities abroad. Dgital literacy is seen as a social practice, where participation is crucial to an individual survival and where gender identify plays a crucial role (Brown & Czernieweicz, 2017).

New venues for knowledge transfer and networked learning

Asynchronous and ubiquitous possibilities of access to knowledge, research, and networking that the digitalization process are facilitating, also represents a good opportunity to break the distances between

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universities research and development, and the transfer of knowledge into industry (Meredith & Burkle, 2008). The connections between these two important partners make possible not only science development, but also the possibility of connecting research with society real needs and expectations. A good example of this are the multiple research projects that are funded around the world by local or global organizations (such as the Global Bank, UNESCO, the EU and Council of Europe, etc.) to promote partnerships between higher education institutions and small and medium size companies or large corporations. Furthermore, new technologies radically influence the way knowledge is acquired by supporting the possibility of networked learning, understood as the possibility of connecting learners, and learners with tutors in the creation of learning communities (Jones, 2015).

The European Union, in its strategic framework for education and training 2020 (EU, 2009) promotes collaboration between state members to share information, strategies and common activities in higher education. EU states are working together building and promoting alliances about, for instance, the development of skills and its transnational recognition, working in social inclusion and opening up education through new technologies. There are a number of European associations in the field of open and distance teaching and learning. One example of these is EDEN (European Distance E-learning Network) which shares knowledge and improves understanding amongst professionals in distance education, and in e-learning, to promote policy and practice across Europe and beyond. EDEN was create 25 years ago, has had a strong position in the European continent, and it is currently considered among the most relevant open education policy makers within the EU Commission. (EDEN, 2016)

A vision for knowledge dissemination: The creation of virtual networks in higher education

Higher education institutions around the world have become key players in the new forms of knowledge production that the Internet and the digital world has made possible. Moreover, the internationalization of higher education that technologies and mobility have brought to systems worldwide, requires our attention.

Universities and colleges have a long and distinguished history as centres of higher education and learning. The model for delivering education has, until recently, remained largely unchanged: face-to-face classes, diligent out-of-class study by students, and regular assessment of learning. During the decade of 1990 new educational initiatives using internet for teaching and learning purposes appeared, and at the end of this decade traditional distance universities introduced internet as a communication tool between professors and students and a way to access to academic information like learning materials. On 1995 the "Universitat Oberta de Catalunya" (UOC) located in Barcelona, Catalonia (Spain) was launched as a first world's online university, with an educational model based on internet. Learning materials and academic communications were possible using the Internet and a new educational possibility started for traditional face-to-face universities and for lifelong learning systems.

With the development of new technologies, particularly the Internet, the accessibility of university education has broadened, allowing students who might normally be unable to attend a campus, to engage in learning (Collins and Halverson, 2010).

The globalization of higher education has enhanced the funding of world-class universities in many national jurisdictions which compete for excellent students and faculty and get generous funding from their national governments. Part of the requirements for a becoming a world-class university is engaging a high proportion of transnational students and prominent academic faculty from universities abroad. Some of the collaborative research ventures are carried on through virtual networks.

Furthermore, the Internet has allowed for a more efficient distribution of course materials to on- and off-campus students, as well as new platform for discussion and interaction. This Internet-based potential is now being revealed in the launch of massive open online courses (MOOCs) throughout the world.

The Open Access movement and the MOOCs phenomenon constitute a relatively recent development in higher education. These open courses provide an illuminating example of collaboration among a growing number of higher education institutions, and provide open access to sources of scholarly information, libraries and diverse

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data bases. Such sources might be most beneficial for higher education institutions in countries that suffer from severe shortages of adequate academic manpower and research facilities. All of the OER and MOOCs provision is carried on through the Internet. However, so far follow ups indicate that the majority of users who benefit of these resources are from developed countries, and are people with academic degrees.

Building networks in virtual scenarios

Access to the Internet and digital scenarios has given academic also the possibility of using virtual worlds to connect with academic colleagues and students. Virtual reality networks have become possible since the emergence of virtual worlds such as Second Life. Even if its use has been somehow limited by the small number of users so far (we are still in incipient stages for the application of this technology to academia and industry, the possibilities of virtual worlds are enormous (Burkle & Kopp, 2010). Below are some examples for this possibility:

1) Engaging an international community of students. The potential benefits of using 3D virtual learning environments has been analysed by many scholars (Jarmon et al, 2008; Hew & Cheung, 2010; Duncan et. al., 2012) . Exploration of this virtual applications in education have brought positive findings with respect of student's engagement and learning identity among learners in virtual reality environments (such as Second Life). In a more recent research work (2016) on the use of virtual avatars for the transformation of pedagogical practices, Marianne Riis reports that the use of avatars in virtual reality contributed to learning by raising interesting questions among learners and discussing issues around identity and community (Riss, 2016). Many are the benefits of using virtual scenarios to interact with learners. Research has found that in virtual scenarios students engage with content easily, even those for whom participating in the classroom appears to be threatening (Dalgarno & Lee, 2009).

2) Connecting with remote partners in synchronous scenarios: This possibility of the virtual scenarios highlights the relevance of building academic connections across disciplines located in multiple communities. Teaching, learning, and research advance as the partners are multiple, in a global world.

3) Advance science and research in an asynchronous model.
Working on scientific projects towards the advancement of science, virtual scenarios provide the template and the space for knowledge exploration disregarding time or physical constraints. Working with students and peers,

4) Exploring the possibilities of artificial intelligence in virtual scenarios
Although artificial intelligence is not new in some areas of knowledge production (manufacturing, car industry, health, sciences in general), the possibility to explore its applications for teaching and learning are still in an early stages of exploration. As AI applied research continues, new capabilities of technology open new possibilities for teaching and learning that were not even consider in the pat (Barsalou, 2010). In an early research on uses of artificial intelligence to support reading comprehension, Spiro et.al (2017) state that AI applications have a direct application in cognitive processes while reading.

TECHNOLOGY INNOVATION	KNOWLEDGE DEFINITION	IMPACT ON LEARNERS
Open Educacional Resources	Knowledge is content sharing	Immediate access, flexibility, synchronous and asynchronous access
Electronic networks	Networked learning	Multi-point and multi access shared knowledge

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Virtual reality	Informal, flexible, artificial	Engagement, asynchronous Access
Connectedness	Global and local, massive and individual	Individual Access, personalizad, focused
Social media	Shareble, interactive, fluid, immediate	Learning is fun, engagement, interactive, anonymous
Mobile technologies (smartphones, tablets)	Accesible, immediate, customer-driven	Ad-hoc learning, interactive, short, concise
Artificial intelligence	Knowledge representation	Learning is supported, cognitive process are extended

Conclusions and further research

The contents analysed in this paper are in fact still in development. From the use of technologies as a mean to distribute, build and share knowledge, to the capabilities of AI in the construction of knowledge resources that are totally different to what we currently know or expect.

We proposed a path to exploring these possibilities in the near future targeting the construction of policy practices. We are convinced that the flexibility and fluidity that technologies bring to knowledge and networks could be further develop if we:

Create and implement less formal learning cultures and spaces where content is shared and received in multiple forms and modalities
Implement new forms of learning access – such as virtual platforms, online resources, mobile possibilities
Establish multiple interactions with a diversity of networks beyond our original geographical places or disciplines
Explore a diversity of knowledge sources that include the traditional academic arena (face-to-face transmitted in a geographical determined lecture), but expand to other spaces either in a synchronous or asynchronous time framework
Promote active connections between academia and industry, where knowledge access is flexible, relevant, customer driven, and focused
Enlarge our offeres of virtual modalities where knowledge is driven by technology and by access
Facilitate interdisciplinarity and globalization of knowledge access, by creating platforms for mutual interaction across disciplines and countries

Knowledge transformations that virtual networks and digital technologies have made possible requires a rethinking of economic principles and organizational attitudes. We believe that in the near future, knowledge access and knowledge construction will be built in a very different system to traditional forms of teaching and learning. We hope that these lines are seen as a provocation to explore new venues, interact with new contents, and dream about what the future can bring.

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