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The increased complexity of Higher Education collaboration in times of Open Education

El aumento de la complejidad de la colaboración de la Educación Superior en tiempos de Educación Abierta

ABSTRACT

The Open Society movement, which goes back to noble fathers such as Bergson and Popper, and which is today declined along issues such as Open Government, Open Innovation, Open Data, Open Access and Open Source, is having a strong impact on the world of Higher Education. It is undeniable that universities around the globe are under an increased "complexity pressure", due to growing international competition, globalisation of education and budget cuts, but also to the ICT revolution that is re-shaping teaching, learning and all other aspects of university life. In this context, Open Educational Resources (OER) and Open Educational Practices (OEP) are increasingly being considered as an option both to face the increasing students population in times of budget cuts and to increase the accessibility and equality of higher education. The paper will look at some dimensions of this increased complexity, focussing on emerging technologies and on emerging practices of students and staff mobility enhanced by ICT. We believe that ICT and Open Education are not only making more efficient and more accessible teaching and learning in universities, but are somehow starting to change the fundamentals of academic contexts, and we claim that to take stock of this potential it is important to be able to understand and managed the increased system complexity of contemporary and future Higher Education.

KEYWORDS

Higher Education, Open Education, ICT, Complexity, OER, Virtual Mobility.

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1. Context and background

The higher education world is facing increasing and new challenges, taken in a tension between the pressure to increase performance, which is placed both on universities and on their graduates, and the increasing budget cuts, especially in those countries most affected by the actual economic crisis. The impact of this pressure is partly an efficiency-raising, restructuring, innovating one, but it also contributes to the strengthening of flexibility. Universities today operate in a global environment and are challenged to update and internationalise their study programmes, to establish partnerships, to engage in mobility and, at the same time, to do all of this in a cost-effective way, keeping the cost for learners and governments at a reasonable level.

Looking at the latest Higher Education developments in some trends emerge (Learnovation consortium 2010), which are believed to have an influence of future developments in the area. First, the Open Education movement is challenging the well established idea of universities as the "owners" of knowledge (Glennie et al. 2012) and is opening new prospective in terms of where the core business of universities is: not only producing and delivering content and certifying learning achievements, but also supporting students to become lifelong learners and learn how to make sense out of a wider and wider availability of contents. Second, the "revolution of learning outcomes", supported for instance by the Bologna Process in Europe (Zgaga 2011), challenges the disciplinary structure and the knowledge –centred way of teaching of most higher education institutions and encourages a more systemic dialogue with employers and other stakeholders, metaphorically leading the Ivory Towers towards the concept of Ivory Bridges, i.e. potential leaders in organising the knowledge-based regional/internationalised development model in which research, higher education and innovation are the cornerstones. Third, internationalisation of higher education provision is increasing, as a consequence of globalisation of economy and multiculturalism (Zgaga et al. 2013): beside the classic mobility of researchers, lecturers and students, new forms of joint degrees, virtual mobility and structural cooperation among Higher Education institutions of different are emerging across the globe, to a large extent supported by ICT. Finally, the recognised social demand for equity in access to and progress/completion of higher education programmes challenges Higher Education Institutions to find new ways of organising/supporting learning in which the use of ICT allows to combine efficiency and quality of academic input as well as support processes (Camilleri and Mühleck 2012).

Along all these lines, the use of ICT in Higher Education is gaining ground, often seen as a solution to the need to educate an increasing HE population within the existing financial constrains, with Open Educational Resources (OER) increasingly being considered as an option by universities around the world. In its Communication "Rethinking Education" (European Commission 2012), the European Commission is making the point very clearly: "technology offers unprecedented opportunities to improve quality, access and equity in education and training. It is a key lever for more effective learning and to reducing barriers to education, in particular social barriers. Individuals can learn anywhere, at any time, following flexible and individualised pathways". Further, promoting the creation and use of OER is high on the agenda of international organizations, e.g. the OECD, the UNESCO and Commonwealth of Learning (COL), while some governments, such as the Netherlands, Poland, Indonesia and the USA have started to make large investments in developing Open Educational Resources.

According to Curran (2004), e-learning strategies adopted by universities have been approaching the core issue from the perspective of three most frequent objectives: widening access to educational opportunity, enhancing the quality of learning and reducing the cost of higher education. The Learnovation project has noted (2009) that term "evolved distance education" is increasingly being used to describe the evolution of the traditional distance education providers, such as open universities, accompanied by an increasing emphasis being put on the organisation of the learning process and on instructional design approaches, coupled with increasing availability and affordability of ICT-based tools and with a generalized increased digital literacy.

Ubiquitous and affordable access to ICT tools has brought to a proliferation of creative ICT solutions born either within or outside Higher Education settings, which are being used by academic professional, support

staff and students, and that are influencing as well the governance practices of universities. If it is true that, especially at the undergraduate level, ICT-supported solutions are largely inspired by classroom teaching and ICT is primarily used to support existing teaching structures, we must not forget that some upcoming technology waves, such as the one of big data and learning analytics, are promising major changes in the very next years. To confirm how imminent full ICT integration is perceived, one should notice that the 2014 NMC Horizon Report states that the full integration of online, hybrid, and collaborative Learning will be the driving change factor in higher education over the next one to two years (New Media Consortium 2014).

In line with this reasoning, the eMundus project consortium believes that the increased massification of ICT in Higher Education and of Open Educational Resources and Practices (OEP) are having an impact that touches upon the very core of the higher education sector, affecting how universities expect and plan their future. The project (www.emundus-project.eu) is putting forward a vision where OER and OEP should not be seen only as a solution to the urging challenges of reducing the unitary cost of higher education - moving towards a "market-oriented" global higher education system, but also as a way to help establishing long-term international partnership, aiming for an open international setting where universities cooperate based on their capacity not only to attract international students but to meaningfully cooperate with counterpart universities.

2. Changing the way things are done: MOOCs and Virtual Mobility

The level of increased complexity that higher Education institutions are facing can be well understood if we consider that universities are increasingly changing the way they run their core activity, that is teaching, and the way they deal with mobility of students and staff – an activity which dates back to the dawn of universities in the XI century. Universities today are running these two very core activities partly in new ways, as it can be understood if we look at MOOCs and Virtual Mobility.

Massive Open On-line Courses (MOOCs) have burst since 2012 as an alternative source to get free courses from top universities through the Internet. These courses aim at providing an experience similar to face to face tuition with the best world-wide professors, and want to offer an adequate platform for interactive learning: sets of videos with integrated questionnaires, weekly assignments, discussion forums, programming environments and interactive simulators, final grading exams, etc. MOOCs represent with no doubts an extremely powerful approach able to allow ubiquitous access to higher education, reaching students from remote areas or disabled categories. Further, MOOC would allow reusing and mixing materials that were not initially conceived to be presented together. Still, the "democratisation potential" of MOOCs is to be demonstrated. The HOTEL project (www.hotel-project.eu) has noted that, in contrast to other technologies that are born outside education and are then adapted for learning purposes, MOOCs have emerged from the educational area. Different ideologies have driven MOOCs in two distinct pedagogical directions: the "connectivist" MOOCs (also called cMOOC) which are based on a connectivism theory of learning that gives importance to networks developed informally; and content-based MOOCs (known as xMOOCs), which follow a more behaviourist approach (Yuan and Powell 2013). The first one, cMOOCs emphasise connected, collaborative learning and the courses are built around a group of like-minded 'individuals'. The second one, the xMOOCS model (xMOOCs) is essentially an extension of the traditional pedagogical models practised within the HE and WPL settings but also facilitates the implementation of new practices like "Flipping the classroom" or "Microlearning". The complexity rise brought by the MOOCs "wave" has to do, apart from the technical challenges in terms of broadband and adaptation of teaching styles, with the fact that MOOCs impact on the openness of the curriculum, of the learning process, of assessment methods and off the used platform (Yuani and Powell 2013). In times of MOOCs, universities need to cope with learners mixing educational resources and activities to meet their needs; instructors, and experts have to generate and share new ideas during the learning process, in an interest-guided learning fashion; in terms of assessment, formal evaluation of learning results is making space for new assessment methods carried out by teachers and peers during the learning process; finally, learning platforms must be able to support a dynamic and interactive open education community, while cloud–based services and open standards would facilitate interoperability and meaningful content exchange.

A second development is Virtual Mobility. Internationalisation of higher education provision is the "natural" reply to globalisation of economy and multiculturalism: beside the classic mobility of researchers, lecturers and students, virtual mobility practices among Higher Education Institutions of different countries are emerging, to a large extent supported by ICT. Virtual Mobility has a significant potential to address several objectives within the modernisation process of universities: it can complement physical mobility of students and researchers, it can enhance research collaboration, it can enforce capacity building, providing further opportunities for post-graduate students and researchers, to deliver joint titles, to jointly develop curriculum and to further exploit the ICT potential. Ultimately, Virtual Mobility is a facilitator and aggregating element providing overall coherence to HEIs fundamental activities. The complexity of adopting Virtual Mobility practices, as an approach aimed at the internationalization of higher education in a balanced and "mutual benefit" approach, has been studied by the MOVINTER project, and can be structured along eight dimensions. Following the Movinter work (Movinter consortium 2010), worthal mobility deals with a) students from different countries who mainly study in their local (chosen) university with their fellow students and without going abroad to study for long periods of time; b) interaction an communication among groups of students/teachers based in different countries to discuss diversity depending on national/local/contextual elements; c) cooperation in designing, implementing, course programme evaluation; d) joint choice of the subject to be studied through VM; e) joint curricula design - which adds value in terms of reciprocity and mutual benefits between the HEIs in the different countries; f) joint production of learning resources (through reflective tools, non-interactive tools, collaborative tools, communication tools, social networking tools); g) joint titles - wherever possible, based on a long term confidence relationship and h) mutual confidence relationship.

The emergence of MOOCs and Virtual Mobility practices are challenging the well established idea of universities as main owners of knowledge stored in libraries with limited access, and opening new prospective in terms of where the "core business" of universities is: producing and delivering content, certifying learning achievements, supporting students to become lifelong learners and learn how to make sense out of a wider and wider availability of contents. As said before, the introduction of these innovations can have a "marketization" impact on the HE world but can also contribute - if properly managed and planned – to the creation of a more balanced international higher education field, where intercultural collaboration is guaranteeing the development of skills and competences of graduates despite of their possibility to move.

3. Doing totally new things: augmented reality, learning analytics, natural user interfaces, immersive technologies

Apart from changing the way teaching, learning and mobility take place, ICT is allowing also to explore totally new ways of working in higher education. This is increasing even more the level of complexity, because the change needed at the institutional and at the individual level to take full advantage of the possibilities have to do with issues such as leadership, vision, new sets of skills and new processes.

A first emerging area is augmented reality. This refers to the real-time use of information in the form of text, graphics, audio and other virtual enhancements integrated with real-world objects. Augmented reality is able to enhance learners' interaction with the environment. Interesting pioneering projects making use of this technology to support learning processes exist, such as the Virtual Anatomy tool which provides real-time 3D modeling of the human anatomy to replace the Cadaver Lab at Boise State University, or the ARMAR project from Columbia University, on which augmented reality is used to support training for heavy equipment maintenance and repair. Unlocking the hiding curriculum is a project from University of Exeter that works through a mobile app that transform the University campus into an accessible learning resource to support formal and informal learning in the field of Biodiversity studies.

Another application that promises a huge change – and with this a serious increase of complexity – is learning analytics. This is the measurement, collection, analysis and reporting of data about learners and their acti-

vities, for purposes of optimising learning and the environments in which it occurs. Social analytics is about monitoring, analysing, measuring and interpreting digital interactions and relationships of students, topics, content, and include sentiment analysis, natural-language processing and social networking analysis, as well as advanced techniques such as text analysis, predictive modeling and recommendations, and automated identification and classification of subject/topic, people or content . Some projects exist which are taking advantage of this technology: Learning Catalytics a system developed at Harvard University which supports peer-to-peer learning and provides real-time feedback of the interactions taking place during the learning collaborative sessions, or the SoLAR's Open Online Learning Analytics Course which is includes an overview of the current existing learning analytics platforms.

Natural User Interfaces aim at making the platform interface invisible to its users, and is based on nature or natural elements . This kind of interfaces are increasingly being used to allow computers to recognize and interpret natural physical gestures as a means of control, and to allow users to engage in virtual activities with movements similar to what they would use in the real world. Some examples of working projects are Handy-Potter , a natural user interface that can modify and create shapes in 3D based on hand gestures developed by Purdue University, and TeleHuman , a 3D visualization of a person based on Microsoft Kinect sensor technology, which has been created by students working in The Human Media Lab at Queen's University.

Immersive technology refers to technology that crosses the line between the physical world and the digital world, thereby creating a sense of immersion. A fully immersive environment typically consists of multiple hardware and software components that provide perception and interaction with the environment: 3D display, Holography, head-mounted display, 3d audio effects, Surround audio, haptic technologies, machine olfaction and artificial flavour machines. Examples of pioneering initiatives are the Open Orchestra simulation game from McGill University, a platform that uses high definition panoramic video and surround sound to provide musicians with the immersive experience of playing in an orchestra or singing in an opera, with a visualization tool that compares the student's performance to that of a professional musician, ensuring motivation and self-evaluation.

4. Understanding complexity at the international level: the eMundus project

The complexity brought by the Open Education revolution to Higher Education leadership, management, teaching and learning, as well as research practices, is connected with the fact that most of the developments presented above are global by nature, and touch upon the issues of internationalisation and international cooperation of universities. Most of the most successful MOOCs are for example run by consortia of universities, Virtual Mobility is in its nature a bilateral or multilateral cooperation activity, and most of the ICT-intensive developments such as Augmented Reality or Learning Analytics are being developed either through international research projects (such as the ones supported by the European Commission) or through cooperation schemes between universities and IT companies.

This adds a further complexity layer, and calls for action to smoothen the way universities collaborate on those topics. First, the Higher Education community must close the "understanding gap", meaning that recent Open Education developments must be mapped, analysed and coherently integrated in some international collaboration successful patterns from which to extract recommendations for change targeted both to policy makers and to HE stakeholders. Second, the "sharing gap" should be tackled, meaning that flows of information among these practices experts and practitioners from different countries and world regions must be made smoother and must be based on recognized "good practices which work". Finally, the "mainstreaming gap" must be addressed, meaning that the successful practices of supporting international collaboration through approaches such as MOOCs and Virtual Mobility must be made visible as ways to mainstream a meaningful bottom-up use of ICT for learning and must be the basis on which future scenarios and visions of HE international collaboration are built and discussed.

The aim eMundus project, which started at the end of 2013 with the supportof the European Commission, aims to address these three gaps, and by doing so at strengthening cooperation and awareness among European Higher Education Institutions and their strategic counterparts in developing countries such as Brazil, Mexico, Russia, Indonesia, Canada and New Zealand, by exploring the potential of Open Education to support long term, balanced, inter-cultural academic partnership. The project is run with the support of the Erasmus Mundus programme of the European Commission.

To reach this aim, the project will do three things. First, it will map the global state of the art of MOOCs and Virtual Mobility developments (considered as two key dimensions of the Open Education revolution in higher education) both in Europe and in the involved countries, facilitating the identification of successful patterns of ICT-enhanced international collaboration. Second, it will work to foster global sharing of knowledge, tools, practices around MOOCs and VM, stressing their impact on HE internationalisation and on fundamental issues such as employability, quality assurance, credit recognition, joint degrees. Third, it will promote and mainstream working practices of MOOCs and VMs as a way towards XXI century academic cooperation, making sure that the best practices of the world leaders in the field are transferred to universities which are starting to adopt MOOCs and Virtual Mobility as strategies for their internationalisation. In doing so, the project will support intercultural development of current curriculum components and will generalise successful practices of HE cooperation, based on mutual trust and specialisation, aimed at making emerge the excellence in global HE and, at the same time, broaden equity and accessibility of world level study programmes. Within eMundus, interculturalism occupies a core position, because of its dialogic undertone, seen as a more dynamic alternative to the Cartesian mono-logicality, which is apparently affecting multiculturalism. The project brings together a truly international consortium, coordinated by the MENON Network (Belgium), with the University of Leicester (UK), the International University of La Rioja (Spain), the University of Sao Paulo (Brazil), the Universidad Autonoma Metropolitana (Mexico), the Moscow State University of Economics, Statistics and Informatics (Russia), the OER Foundation (New Zealand), the Athabasca University (Canada) and the Universitas Siswa Bangsa Internasional (Indonesia).

Preliminary work carried out by the eMundus partnership has demonstrated that a number of efforts exist which are trying to close the gaps presented above, but they are not coordinated nor properly articulated to reach the desired impact at the global scale. Some of these efforts focus on the content side of Open Education, others on the mechanisms to enhance students and staff mobility through ICT, but rarely an action tackles both these dimensions. Further, some real-life cases of integration of different universities around the OER concept exist, such as the "OER University" hosted by the OER Foundation in New Zealand, which is part of the project consortium, and which is a sustainable partnership between accredited universities which will free learning to all learners with pathways to gain academic credit from formal education institutions around the world. All the eMundus partners share the importance of running such as integrated exercise and the sense of urgency connected to this work, which is crucial if we want to transform the impressive possibilities offered by Open Education into tools for an equitable, efficient and participated HE international collaboration scheme.

The project consortium is aware that it is not possible to reach its objectives without engaging as many stakeholders as possible, and for this reason intends to work in a fully open and collaborative way. The idea is to engage a number of eMundus Community Partners from the very beginning of the project, and to clearly propose a number of ways they can contribute to the project work. All projects results are being co-developed and published through the www.Wikieducator.org portal, allowing users to comment and enrich the eMundus outcome. Further to this, Community Partners are invited to propose additional activities that they can organise in their own countries and settings replicating the mapping, the webinars or the tools gathering of eMundus. The final objective of this open approach is to be perceived not only as a project with a fixed duration and limited objectives, but rather as a trigger for broader debates, knowledge exchange and best practices mainstreaming, so to get closer to making the project vision a reality.

Notes

(1)   This part is elaborated from the work of the HoTEL project, and specifically from Deliverable "D.1.1.2 Emerging Technologies Landscape report", authored by Carmen L. Padrón Nápoles, Lydia Montandon, Nuria Rodríguez, Luis de-la-Fuente-Valentín, Aurora Carrasco, Kinga Konya, Daniel Burgos and Stefania Aceto.

(2)   See http://campustechnology.com/articles/2012/03/21/boise-state-u-replaces-cadaver-lab-with-virtual-anatomy-tool.aspx

(3)   See http://graphics.cs.columbia.edu/projects/armar/pubs/henderson_feiner_AFRL_RH-WP-TR-2007-0112.pdf

(4)   Unlocking the Hidden Curriculum http://blogs.exeter.ac.uk/augmentedreality/about/

(5)   Social Analytics definition from Gartner Glossary http://www.gartner.com/it-glossary/social-analytics/

(6)   Learning Catalytics https://learningcatalytics.com/

(7)   SOLAR resources http://www.solaresearch.org/resources/

(8)   Natural user interface definition available at http://en.wikipedia.org/wiki/Natural_user_interface

(9)   See http://www.futurity.org/science-technology/3d-design-with-no-mouse-just-hand-gestures.

(10) See http://www.youtube.com/watch?v=yqmiOs0aIhE.

(11) See http://canarie.mcgill.ca/project_nep2_index.html

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