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Opportunities and challenges for the future of MOOCs and open education in Europe

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Introduction

In order to encourage open education in European Member States, the EC (European Commission) launched the Communication *Opening Up Education: Innovative Teaching and Learning for All Through New Technologies and OER* [1] in September 2013. The Communication brings to the fore the advantages that digital technologies generate for widening participation in education and stimulating innovation in learning and teaching through digital content with a focus on OER (open educational resources). *Opening Up Education* was also launched to contribute to the Europe 2020 goals of increasing competitiveness, promoting more employment opportunities and having a better skilled workforce in the EU (European Union).

Although the accomplishment of open learning policies and practices depends greatly on member states' efforts, the EC can contribute by promoting best practices and supporting dialogue across member states [1]. The EC can also help to tackle fragmentation by proposing a shared understanding of what open education is and demonstrating its potential for the progress of education in Europe.

The OpenEdu [2] project is being carried out by the IPTS (Institute for Prospective Technological Studies) and was commissioned by the Directorate General for Education and Culture to provide scientific support to the Communication.[4] Its main goal is to document and analyse the scope and reach of open education in HE (higher education) and to develop a framework aimed at helping European HEIs (higher education institutions) to become more open and deal with the related challenges and opportunities.

This chapter presents intermediate results from the OpenEdu study. It argues that open education goes beyond MOOCs (massive open online courses)

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and OER. It demonstrates this by proposing nine[5] dimensions that are key to understanding open education and for the further development of open education by HEIs in Europe. In addition, results from three of the main studies of OpenEdu will be taken to discuss the motivations and barriers for opening up education by HEIs (OpenCases), representative data on the uptake of open education in five European countries (OpenSurvey) and an analysis of recognition and assessment practices in MOOCs (OpenCred). Each study is designed on a quantitative or qualitative basis and aims to gather updated information on the development of open education in Europe.

Contemporary open education in higher education institutions

Open education has been a subject of interest to educators for decades. It is difficult to specify exactly when it came into existence, but in the late 1960s, it was already an *avant garde* concept with the emergence of the open universities. Open education, as we understand it nowadays, is a concept which has evolved over decades and assumes different meanings depending on the context in which it is applied. In this chapter, open education is treated in a contemporary way. Today, open education is based on digital technology to support teaching and learning. It can be understood as a mode of delivering education using ICTs (information and communication technologies), which offers multiple ways of learning and alternative access routes to formal and non-formal education. Above all, it aims to be open to everyone.

It is precisely due to the advances in ICTs for learning that contemporary open education has become possible. It is based on the free (gratis) access to educational resources and the use of ICTs to produce and share them. Universities all over the world have increasingly been involved with open education, by offering free courses via the Internet, accessible to anyone with a connection, and by sharing educational content as OER.[6] The provision of MOOCs by well-known universities worldwide has given a boost to the development of open education.

The dimensions of open education

A number of issues were identified during the research process for OpenEdu. For instance, it was not clear for the majority of HEIs involved in the research how opening up education could take place at an institutional level. There was no strategy, and often institutions limited open education to OER or MOOCs. Also, the institutions offering open education generally have no strategy for communicating

[5]The dimensions were work in progress at the moment of writing this chapter. They have evolved to ten dimensions in order to include "Research as a core dimension".

[6]OER are free educational resources which contain an open licence indicating how the resource can be used (e.g. whether sharing or repurposing is permitted). For more information see the Creative Commons licences at http://www.creativecommons.org.

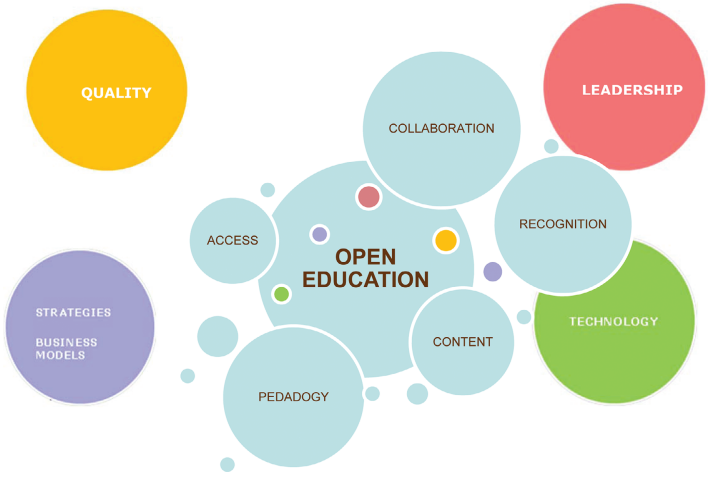
open education policy to staff, and neither do they have a business model. Often, the desire not to be left behind was what motivated institutions to engage with open education. Other institutions questioned whether they should actually be engaged with open education and whether open education was just a temporary trend.

Thus it seemed important to show that OER and MOOCs are components of open education rather than its totality. It also seemed important to show that open education has existed for many years, and as technologies for learning have evolved (particularly over the last two decades), open education has been reshaped to follow this evolution and embrace the possibilities that now arise.

Open education, as OpenEdu research data suggest, depends first of all on the setting up of clear strategies, the purposeful and appropriate use of ICTs for learning, and staff engagement and skills. Policy support, at both member state and institutional levels, also appears to play an important role. With this in mind, the OpenEdu project started to explore what open education consists of in practice for HEIs. Nine areas were identified, which were called dimensions of open education to indicate the scope of a certain area or component of open education (Figure 1). For example, these areas can be found in the work of Uvalić-Trumbić and Daniel [3], Weller [4], Ros et al. [5], Murphy [6], Wiley and Hilton, III [7], among many others. These dimensions embody the most common practices and perceptions associated with open education in HE settings.

Five of the nine dimensions identified for open education are core dimensions, and four are transversal dimensions. The core dimensions can easily be identified in practices around open education. They are access, content, pedagogy, recognition and collaboration. The transversal dimensions of open education, in turn, provide the foundation for the realization of the core dimensions. These dimensions are leadership, strategy and business models, technology and quality.

Figure 1



OpenEdu: dimensions of open education in higher education institutions
The sizes of the bubbles do not imply superiority/inferiority of one dimension over another.

Both the core and transversal dimensions interact with one another. Together, they enable open education practices to be shaped in particular ways in HEIs. Institutions which wish to start or further develop open education, can explore these dimensions as suggestions for the development of opening-up strategies and business models.

The following sections provide a brief description of each dimension.

Core

1. Access: refers to the removal or lowering of barriers for the learner to study
2. Content: refers to the free (gratis) online availability of teaching, learning and research materials, with or without an open licence
3. Pedagogy: refers to the use of technologies for opening up the range of pedagogical methods
4. Recognition: refers to both the process of issuing a certificate, diploma or title which bears formal value and also to the process of formally acknowledging and accepting a certificate, diploma or title issued by a third-party accredited institution
5. Collaboration: refers to any practice or policy of an organization that prompts the exchange of knowledge in the format of OER, free (gratis) content or open access research, and the exchange of open educational practices and tools.

Transversal

1. Strategies and business models: constitute the detailed planning of the open education activities of an institution
2. Technology: refers to the technological infrastructures and software which facilitate opening up education in its different dimensions
3. Quality: refers to the level of excellence of an institution's open education offer
4. Leadership: refers to the promotion of sustainable open education initiatives via a 'leadership of excellence and transparency' approach which encourages both top-down and bottom-up efforts.

On the basis of the nine dimensions, OpenEdu will propose a framework for HEIs designed to help institutions make strategic decisions on open education. The aim is that, by defining open education and developing its core and transversal dimensions, the framework will promote a common understanding and language on open education in Europe and, as a result, facilitate exchange of knowledge and experiences. The framework will be designed to encourage HEIs to choose and focus on specific dimensions in the design of their open education institutional strategies.

It will also provide examples of existing practices that can inspire the development of an institution's own strategies. In the following sections, evidence from OpenEdu research into existing practices are presented.

OpenCases: enablers and barriers for opening up education in HE

OpenCases is a qualitative study of the OpenEdu project which focuses on nine in-depth case studies on open education practices of the following institutions or projects: OERu, ETH Zurich (TORQUE), FUN (France Université Numérique), TU Delft, Carlos III de Madrid, Open AGH, Open University of Bavaria, ALISON (Advanced Learning Interactive Systems Online) and OpenupEd[7]. The study aimed to understand in detail the motivations, enablers and barriers for HEIs to opening up education. It explores institutional engagement in open education through the analysis of how openness occurs in different areas, which also constitute the mission of universities: teaching, research and public service [8]. These areas are looked at in relation to the above listed dimensions of open education.

The study methodology is based on a review of the literature, desk research and the production of a catalogue of mini-cases which showcase current practices in openness in HE, which is intended to be published. In addition, OpenCases is based on interviews with institutional stakeholders in nine in-depth case studies of HEIs and their partnerships.

Table 1 provides a summary of motivations and barriers reported by HEIs for engaging with open education. Widening access and providing free online education to all are the most typical reasons given by universities for getting involved in open education. OERu, for example, which is one of the case studies in OpenCases, argued for sustainable and affordable HE for all learners via open education, whereas, in the TuDelft case study, increased and widened access to HE is emphasized. These views are compatible with the concept of education as a public good, which is linked to HEIs' third mission. This third mission generally relates to public service, which is conceptualized as public engagement aligned

Table 1
Institutional perceptions of motivations for and barriers to open education

Motivations for open education	Barriers to open education
Increased university visibility	Time constraints by academics
Increased access to lifelong learning	Lack of strategy and a shared vision
International trend	Need to develop scalable technologies
Free education to all	Designing for reuse
Improved learning outcomes for students	Passive resistance by academics
Development of new teaching strategies	Lack of a financial sustainability model
Development of new technologies for learning	Need for training academic staff on open education

NB: items are not listed in order of importance.

[7]The OpenCases study is carried out by the University of Bath and the IPTS. For further information, see http://is.jrc.ec.europa.eu/pages/EAP/opencases.html. See also the forthcoming JRC-IPTS report: OpenCases: case studies on openness in higher education.

with service to the community. The other two missions are institutional strategy and political priority [9].

Another important aspect for all interviewees in the nine case studies is increased visibility and reputation. Open education opens up possibilities for new marketing strategies and for reaching out to new audiences. The case of FUN, for instance, clearly shows how state support for the advancement of open education can help to promote the visibility of a national education system, and also to increase access to lifelong learning. It seems that, in the future, universities will engage with open education as a means of realizing their third mission and, at the same time, of building new market opportunities.

In relation to the barriers to the provision of open education (Table 1), OpenCases shows that academics occasionally have a 'passive resistance' (e.g. according to the FUN case study) to getting involved. Time constraints for academics also appears to be a challenge that must be overcome (e.g. the TuDelft case study), along with the development of a common institutional understanding or approach to open education and open education materials (e.g. the ETH Zurich case study). The lack of an institutional strategy on open education and a shared vision was also mentioned as a challenge. The OERu argues that the main challenge is the need for tools and technologies that enable scalability. They also argue for a 'design-for-reuse mindset' (of both technology and content) in order to make inter-operability possible.

OpenSurvey: a survey of practices, beliefs and strategies in five European countries

OpenSurvey was a quantitative study in the OpenEdu project designed to provide an overview of the current level of institutional engagement with Open Education in Europe.[8] It investigated the practices, beliefs and strategies of HEIs. A survey collected data on the different ways in which HEIs engage with open education (or not) in the different dimensions of openness.

In this survey, a representative sample of HEIs in five selected EU member states was carried out: France, Germany, Spain, Poland and the U.K. (specifically England). The sampling frame consisted initially of 1264 HEIs, providing a final gross sample of 889 institutions in the five countries after all sampling corrections had been carried out. After extensive fieldwork, the survey yielded 178 actual respondents.

The topics covered by the survey were: (i) the current offer of open education; (ii) the institutional strategies on open education; (iii) the perceptions about open education; (iv) the motivations that drive HEIs to be engaged with open education and (v) the challenges faced by HEIs in carrying out open education.

In terms of the overall supply of open education (OER and MOOCs mostly), the OpenSurvey study shows that more than four out of ten (42.4%) universities in these five countries are offering OERs and/or MOOCs. Almost

[8]OpenSurvey was a study conceptualized by the IPTS, as well as co-designed and carried out in 2014–2015 by ACA (Academic Cooperation Association) in collaboration with the IPTS.

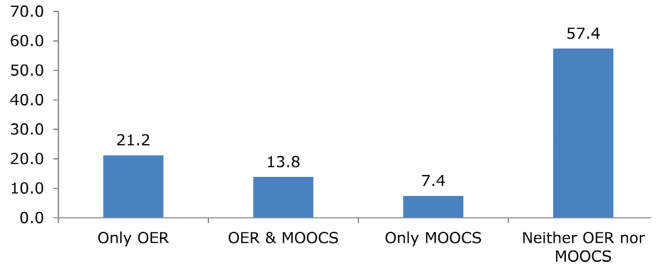


Figure 2

Supply of contemporary open education by higher education institutions in five European countries

Source: [10].

60% of them have not yet engaged with open education (57.4%). Figure 2 also demonstrates that the provision of OERs (35%) was more widespread in April–June 2015 than the provision of MOOCs (21%).

In terms of MOOCs only, OpenSurvey shows that clear differences between the five countries exist. In France, Spain and the U.K., the proportion of universities which are offering MOOCs is similar and relatively high (around 35%), compared with 10.0% and 8.4% respectively in Germany and Poland. Institutions in all countries plan to offer MOOCs; however, both France and Poland stand out in this respect, with 26.2% and 23.7% respectively of HEIs in these two countries planning to offer MOOCs in the near future.

The number of universities offering MOOCs is certainly increasing, but the promise to widen access for all is not automatically fulfilled. The vast majority of MOOC participants are HE students, former students or upper-secondary education students who are likely to enter HE [11]. MOOCs are more likely to be followed by young professionals who find in them a means of gaining additional skills for their professional practice or who use MOOCs as a break from a daily

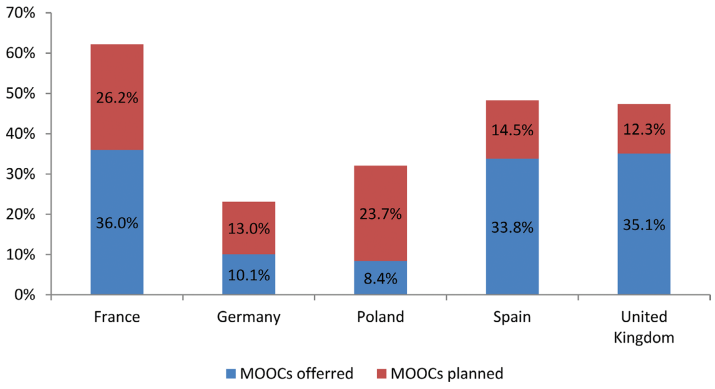


Figure 3

MOOCs offered and planned in five countries

Source: [10].

work routine in which they learn something new.[9] To enable a wider group of learners to benefit from MOOCs, these open learners will need to have both the digital competences and self-directed learning skills to be able to learn via open education. This combination can be labelled 'Open Education Competences' [12].

In terms of the financial viability of MOOCs for HEIs, OpenSurvey had similar results to some of the cases in the OpenCases study. Scepticism is widespread as to the financial viability of all forms of open education. This may be due to the high investment needed to offer open education at the beginning, which may be reduced afterwards and even bring in some return on the investment, as the TUDelft case study illustrates.[10]

Another important result of OpenSurvey was that recognition of learning outcomes is a barrier to open education for 77% of the responding institutions in OpenSurvey. This issue is explored in more depth in the OpenCred study of the OpenEdu project.

OpenCred: an analysis of assessment and recognition practices in MOOC-based learning in Europe

The OpenCred study [13] was a qualitative study in the OpenEdu project which investigated practices, attitudes and rationales for the types of recognition awarded for open learning, the factors that influenced decisions in this regard and the contexts in which non-formal open learning was recognized.[11]

The study started with desk research, which was followed by interviews. The goal was to identify the ways in which the open education initiatives, consortia and platforms in Europe offer recognition for open learning. The concept of recognition was broken down into different levels of formality, with reference to some recent key discussion documents in the literature, and descriptors were given for each level in the resulting hierarchy (e.g. certificates or badges). Finally, various European open education initiatives were described in terms of this hierarchy of levels of formality of recognition.

The data collected in the desk research phase and the case studies showed that the following three elements of open learning had a significant impact on recognition of open learning: robustness of assessment, affordability for the learner, and eligibility for assessment and recognition. To illustrate the relationships between these elements, OpenCred developed a matrix indicating the typical relationship between assessment and recognition. From this matrix, a series of diamond-shaped graphs representing the tensions between formality of recognition and the other

[9]Preliminary results from the ongoing JRC-IPTS Moocknowledge study show as well that MOOC participants are well educated and either work or study. Most respondents show a relatively high degree of information literacy and interaction skills.

[10]The TU Delft case study will be published in the OpenCases report.

[11]The OpenCred study (2014–2015) was conceptualized and designed by the IPTS and was carried out by the Institute of Learning Innovation at the University of Leicester in collaboration with the IPTS. The final report is expected to be published at the end of 2015. See the information currently available at http://is.jrc.ec.europa.eu/pages/OpenCred/ISUNITWEBSITE-IPTS-JRC-EC.htm.

three elements could be drawn (robustness of assessment, affordability for the learner, and eligibility for assessment and recognition).

Next, graphs were generated provisionally for a number of open learning initiatives. These were thereafter clustered into groupings with similar shapes, forming a typology of recognition across different open education initiatives. It is anticipated that this typology will facilitate ongoing discussion and comparison of recognition practices as they emerge and evolve in the rapidly developing field of open education.

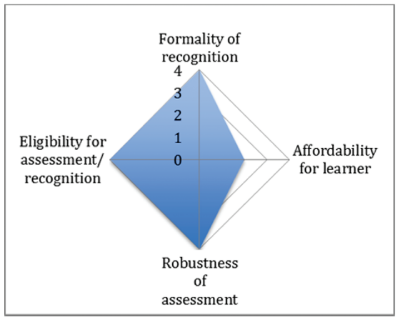
The matrix also indicates that robustness of assessment and recognition of learning are very closely linked for the majority of open learning initiatives found by OpenCred:

> "*This raises a contradiction in the argument that MOOCs represent an opportunity for more accessible and inclusive educational provision. Formal recognition requires tutors to review performance and students to have their identities validated. This all requires financing. To the extent that these costs have to be passed on to the learners* […]*, MOOCs become that much less open and less inclusive. The challenge for institutions is to overcome this low cost and high value incompatibility in the most cost-effective way.*" [14]

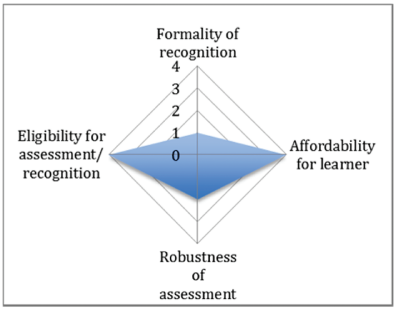
The OpenCred study concluded that robust assessment is central to recognition, and it has a cost. So far, the practice is that institutions either pass on the cost to learners or restrict eligibility for recognition (e.g. by only providing it to learners previously registered in an institution's mainstream course). As stated in the above quotation, this is a challenge for institutions to overcome. The study also concludes that recognition is only partial; there are no whole degrees yet that can be showcased. With regard to identity validation, which is important for recognition purposes, OpenCred research suggests that on-site

Figure 4

Example of a MOOC with robust assessment paid for by learners



Example of a typical MOOC with little or no recognition



Supply of contemporary open education by higher education institutions in five European countries: two examples

Source: [12]; examples from University of Osnabrück MOOC on diversity: 'Data Structures and Algorithms' and from Croatian Academic Research Network (CARNet) MOOC: 'Creating Courses in Moodle'.

exams with identity validation and real-time supervision are perceived as being the most robust form of assessment. Finally, ECTS (European Credit Transfer and Accumulation System) credits are not yet a widely accepted currency for recognition of open learning.

Conclusion

The OpenEdu project shows that open education practices are increasing significantly in European HE. For example, almost half of the institutions surveyed in five European countries are involved in open education in one way or another. At a more fine-grained level of analysis, we note that the institutions already involved in open education see benefits for their reputation and visibility, although they are still experimenting with sustainability models for open education provision. Recognition is also identified as a very important component of open education, and further efforts need to be made by HEIs to develop cost-effective and scalable recognition models.

It was argued that open education goes beyond MOOCs and OER. Contemporary open education embraces a number of practices and strategies that are part of a broader trend towards openness along nine dimensions: access, content, pedagogy, recognition and collaboration as core dimensions, and leadership, strategy and business models, technology and quality as transversal dimensions. These dimensions are key to understanding open education and for the further development of open education by HEIs in Europe. Working towards a shared understanding of what open education is and providing evidence on how it works are important steps for the further development of open education in Europe.

Disclaimer

The views expressed in this chapter are purely those of the authors and should not be regarded as the official position of the European Commission.

References

1. European Commission (2013) *Opening Up Education: Innovative Teaching and Learning for All Through New Technologies and OER*, http://europa.eu/rapid/press-release_IP-13-859_en.htm
2. IPTS (2013) OpenEdu Project http://is.jrc.ec.europa.eu/pages/EAP/OpenEdu.html
3. Uvalić-Trumbić, S. and Daniel, J. (eds) (2014) *A Guide to Quality in Post-Traditional Online Higher Education*, Academic Partnerships, Dallas
4. Weller, M. (2014) *The Battle for Open: How Openness Won and Why It Does Not Feel Like Victory*, Ubiquity Press, London
5. Ros, S., Hernandez, R., Read, T., Rodriguez Artacho, M., Pastor, R. and Diaz Ortuga, G. (2014) UNED OER experience: From OCW to Open UNED. *IEEE Transactions on Education* **57**, 248–254
6. Murphy, A. (2013) Open educational practices in higher education: Institutional adoption and challenges. *Distance Education* **34**, 201–217

7. Wiley, D. and Hilton, III, J. (2009) Openness, dynamic specialization, and the disaggregated future of higher education. *International Review of Research in Open Distance Learning* **10**, 1–16
8. Vincent-Lancrin, S. (2004) Building futures scenarios for universities and higher education: An international approach. *Policy Futures in Education* **2**, 245–263
9. Etzkowitz, H., Webster, A., Gebhardt, C. and Terra, B.R.C. (2000) The future of the university and the university of the future: Evolution of ivory tower to entrepreneurial paradigm. *Research Policy* **29**, 313–330
10. JRC-IPTS (2016) *How are HEIs dealing with openness? A survey of practices, beliefs and strategies in five European countries*, JRC-IPTS, Seville, in the press
11. Castaño Muñoz, J., Redecker, C., Vuorikari, R. and Punie, Y. (2013) Open education 2030: Planning the future of adult learning in Europe. *Open Learning: The Journal of Open, Distance and e-Learning* **28**, 171–186
12. http://is.jrc.ec.europa.eu/pages/OpenCred/ISUNITWEBSITE-IPTS-JRC-EC.htm
13. Witthaus, G., Inamorato dos Santos, A., Childs, M., Tannhäuser, A., Conole, G., Nkuyubwatsi, B. and Punie, Y. (2016) *OpenCred: An Analysis of Assessment and Recognition Practices in MOOC-Based Learning in Europe*, IPTS, Seville, in the press
14. Witthaus, G., Childs, M., Nkuyubwatsi, B., Conole, G., Santos, A.I. and Punie, Y. (2015) An assessment-recognition matrix for analysing institutional practices in the recognition of open learning. *eLearning Papers* **40**, 32–42