A Framework to Understand, Analyse and Describe Online and Open Education in Higher Education

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Abstract: This position paper addresses online and open education. It presents a simple, yet comprehensive framework that can be adopted by any higher education institution in seek of: (1) clarification of terms and concepts related to online and open education, (2) awareness of issues and challenges to set up strategies for online or open learning, (3) informed choices and their impacts on operationalization actions, from an institutional point of view, (4) perspectives on crucial issues, such as mobility, that HEI faces in a context of internationalization, (5) awareness of policymakers and teachers on what open and online education is.

1 INTRODUCTION

Over the past years, digital technology has become an integral part of educational systems. The aim is to enable new forms of instruction in higher education institutions (HEI). Technology has somewhat transformed teaching practices (like the blended learning or the flipped classrooms); new mindsets have been adopted (like the open education and its OER's and MOOCs), and constraints due to time or spaces have drastically evolved.

In 2015, UCLouvain adopted a new institutional digital strategy. It aims to exploit digital and online capabilities to enhance the creation, dissemination, and diffusion of knowledge as well as to promote openness. OER's, open coursewares, MOOCs and other forms of online education are at the heart of our priority (Deville, 2018). Nevertheless, we must agree with Major (2015) that "there is surprisingly little information available about what teaching online really means for the faculty". When focusing on pedagogy rather than technology, we are surprised how confused our teachers are about the new available educational models that digitalisation makes possible. As a consequence, many teachers adopt a "wait-and-see" attitude (Lebrun, 2018) towards online learning or show a lack of awareness of the possibilities offered by open education. Teaching has to evolve to cope with the digital age and we feel that there is a real need for clarification to effectively foster online and open education within institutions.

In this position paper, we propose a framework to promote description, discussion, understanding and judicious adoption of online and open learning. The objectives are (1) to clarify the underlying concepts, (2) to analyse issues and challenges one has to face when setting up strategies for online or open learning, (3) to propose informed choices and their impacts on operationalization actions, from an institutional point of view, (4) to consider perspectives on crucial issues, such as mobility, that HEI faces in a context of internationalization, and (5) to raise awareness of policymakers and of teachers on what open and online education is.

We first introduce the components of our framework and we clarify the underlying concepts. The framework, relying on a simple four-axes approach is then presented. It is then used to address the following questions: what does it mean to go online? With what impact on the teaching practices? How to integrate openness and associated concerns? To conclude, the paper confirms the advantages of the framework.

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2 UNBUNDLING TEACHING INTO FOUR COMPONENTS

The framework we propose is derived from Witthaus' model (Witthaus, 2017), which unbundles teaching activities into four components usually entangled in regular face to face teaching. Unbundling these components provides blocks that can opportunely be assembled in various ways and helps to consider - and discuss - the various ways of organizing teaching and learning in the digital age. These four components are content, learning pathway, interactions, and assessments.

Figure 1: The 4 components of teaching.

Content stands for the content to be learned, the topics to be mastered.

Learning pathway (named 'teaching' in Witthaus' model) refers to how the students are guided to process the content: what activities they are asked to do in which order, how they are incited to engage to create meaning from the different pieces of content (reading, exercises, quizzes, etc.). Like Nilson (2017) recalls, "interaction with content paves the way for successful learning" and is therefore of high stake: instructional designers are well aware of the importance of providing learning pathways that provide clear and meaningful guidance on how to interact with the content to be learned.

Interactions (named 'support' in Witthaus' model). Effective learning requires some forms of interaction and collaboration: students-students interactions, group interaction (whole-class or small groups) and teacher-student interactions (communications and discussions including feedbacks, diagnosing, etc.) (Moore, 2005). The development of a learning community is the main concern of this third component.

Assessment focuses on the formal recognition of learning outcomes in the context of an accreditation system (credentials) wherein summative performances provide opportunities for learners to demonstrate their competencies and knowledge mastery.

3 STARTING DEFINITIONS

Before proposing a systematic approach to online learning and openness, keywords must be defined.

Online. We mean by **'online'** anything that can be found (objects) or happens (actions) on the internet. In a rather broad way, Bates (2016) defines **'online learning'** as "*any form of learning conducted partly or wholly over the Internet*" and insists that online learning is "*a mode of delivery, a way of delivering education to learners, not a particular method of teaching. Online learning can support a wide range of teaching methods*". Hence there is frequent confusion and misunderstanding when speaking about online learning (Bayne, 2015). Indeed, online elements may contribute to teaching designs in different ways and proportions. Inspired by Bates (2016)'s "continuum of online learning" and Allen (2016)'s "online course classification", we propose to consider the following thresholds to distinguish four different categories of online learning:

- ***Web-assisted*:** 1%-29% of the teaching components are online. That means that most of the course still happens face to face (in the class), maybe with some digital "classroom aids" (Bates, 2016).
- ***Blended*:** between 30%-79% of the teaching components are delivered online, i.e. can be found or happen online, outside the classroom.
- ***Online*:** 80% or more of the teaching components can be found or happen online, outside the classroom. Allen adds "typically have no face-to-face meetings". We are then in a distance learning context.
- ***Full online*:** 100% of the teaching components happen online.

Course. The concept of **'course'** has different understandings. It may be "*series of lessons or lectures on a particular subject*"[1]"*usually leading to an exam or qualification*"[2] and may vary from a "*unit of teaching*" level to an "*entire programme of studies*" level[3].

[1] Course [Def. 5]. (n.d). In Collins Dictionary. Retrieved January 27, 2020, from https://www.collinsdictionary.com/dictionary/english/course.

[2] Course [Def. A1]. (n.d). In Cambridge Dictionary. https://dictionary.cambridge.org/fr/dictionnaire/anglais/course.

[3] Wikipedia (collective authors), 2019. Course (education). https://en.wikipedia.org/wiki/Course_(education).

As part of our clarification framework, we propose to define a course as "*a set of resources and activities intentionally combined and designed to allow learners to reach announced learning outcomes related to a specific topic (knowledge, skills, and competencies)*". This set is time-framed, supported by dedicated instructors, course team, tutors (or any other designation), and usually leads to assessments that provide a form (that may vary) of credentials. Each one of the Witthaus' derived teaching elements is involved in the proposed definition: content (resources), learning pathway (intentional design to trigger learning), interactions (learning community during a period) and assessment (acknowledgment of mastery).

Open Education. Openness in education has different meanings (see for example the discussions in Weller (2014 and 2018), and Economides (2018)). Among all the shades and "silos of practices" (Weller, 2018) of this concept we focus on two key values:

- The '*share'* value: Open education means to share any kind of educational production (learning resources, teaching strategy, teaching tools, etc.) in a way that allows others to use it, distribute it, transform it, etc. It involves the idea that what others share is valuable and invites teachers to seize and exploit productions shared by others. This value promotes the vision of a global collaborative community of educators and learners.
- The '*open access'* value: "*Open education is designed for access because it removes the traditional barriers that people often face in obtaining knowledge, credits, and degrees — including but not limited to cost. Access is fundamental to open education and is the basic principle that has informed and driven the open education movement from its inception*." (Blessinger, 2016)

By combining those two perspectives we propose to define Open Education as "*a movement aiming to make education universal, accessible to as many people as possible. (...) It involves sharing educational resources and practices to delete access barriers. Learning opportunities are then multiplied and invite every learner to seize them."* (translated from Mathelart (2019)).

4 A SYSTEMATIC APPROACH TO ONLINE LEARNING AND OPENNESS

Our four components model (Fig.1), complemented by the definitions of the terms online, courses and open education, allows us to propose a framework which allows us to systematically address the following questions:

1. How to go online? How may each of the above components be supported by online learning?
2. What teaching and learning practices are suited for. the different components?
3. How to share and give the world access to open resources and teaching components?

For each type of components, we address some issues and concerns, at an institutional level, when adopting openness.

Model 1: (Open) Educational Resources

Educational Resources. Educational resources are any **content** that helps teachers to teach and students to learn: presentation, publication, visuals, statistical tables, etc. In this model, we intentionally exclude the notion of learning pathways between pieces of content.

Going Online with Resources. Online digitalized version of educational resources come in a wide variety of forms and formats such as online presentations or animations, infographics, 3D visualization, video, webcasts, audios, podcasts, worksheets, publications, maps, visuals, manipulative, apps, software, simulations, and many others as listed by Shank (2014).

Teaching and Learning Practices. Online resources are educational materials for formal classroom teaching and personal learning outside the school. Their content and their granularity usually encompass topics in such a way that they are considered as an enrichment to in-class activity or support to confirm, deepen or enlarge students' understanding after the class. As the learning pathway is missing, guidance provided by the teacher remains necessary. Typically, online educational resources are used in the context of **web-assisted courses**, in which most of the course happens in the class (Figure 2.A).

Openness. Online educational resources are called Open Educational Resources (OER's) whenever "*they are released under an open license that permits no-cost access, use, adaptation, and redistribution by others with no or limited restrictions*" (Miao, 2016).

They are therefore characterized by free access and perpetual "open license" such as a Creative Commons (CC) license: once published, OER's can be repurposed and adapted, following their licensing permission, which allows improving the content, to update the resource or to make it more closely aligned with the specific educational need. Openness refers here to the 5R principles (Retain, Reuse, Revise, Remix, Redistribute) (Wiley, 2019).

Some Issues and Challenges. Teachers can exploit (open) educational resources provided by other instructors, possibly belonging to another HEI while remaining in charge of the pedagogical scenario, of providing support to the students and of assessing their new capacities. Teachers can also develop online educational resources and release them in an open mode by licensing them with a CC license. Within a course, every mix is possible: part of the content can be turned online but not open (accessible to regular students only), or turned online and shared openly (with anyone), or imported from other instructors. (see Figure 2.B).

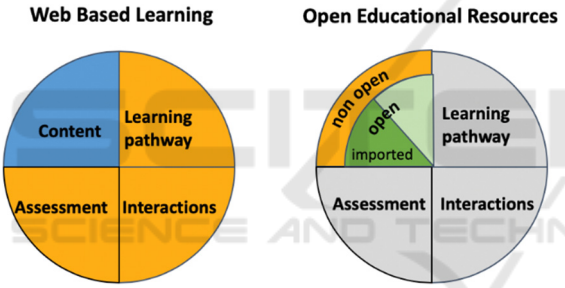

Figure 2: A (Web-based learning. Content, in blue, is online) and 2.B (The mix of educational resources within a course. Open is in green).

A double challenge one has to face is (a) to familiarize and train teachers to distribute OER's in an adequate open licensing model and appropriate formats, so anyone can use them, and (b) find OER's of quality.

OER's are hosted on dedicated repositories most of the time searchable by discipline, keywords, and metadata (e.g. oercommons, Openstax, Merlot). Institutional involvement in OER's requires investment whether to foster the development of OER's or to set up its repository.

Model 2: (Open) Courseware

Coursewares are learning objects that aggregate contents and learning paths to form structured coherent self-contained learning packages. They may be complete and comprehensive for a set of learning topics or offer partial coverage. Unlike courses (as we define them), these modules are self-paced and are not instructor-led.

Going Online with Learning Pathways. Online coursewares are more than a collection of juxtaposed online educational resources gathered on a web site; they propose a relevant and accurate content with an internal structure and a pedagogical organization that addresses a coherent set of learning outcomes. They may contain digital activities aiming to stretch, in a formative way and a self-assessing mode, the abilities of the students such as quizzes, flashcards, puzzles, drills, etc.

Thanks to the most recent technology, the most advanced activities are animated, interactive, immersive and truly multimedia with rich content. Using these self-paced learning objects, students learn on their own by running them any number of times at any time.

Teaching and Learning Practices. In this model, both the content and the learning pathway are available online. Used within a course by teachers, coursewares find their place in **blended courses** in which a significant part of face-to-face activities has been replaced by self-paced online learning activities. Remaining activities are those for which neither educational resources nor courseware are available, or which requires face-to-face interactions. Blended learning remains an instructor-led activity that takes place in a lecture hall, a classroom, or a lab (Figure 3.A). As stated by Weilandt (2019), "*The majority of reasons why educators choose to blend their courses revolves around accessibility, pedagogical effectiveness and course interaction*". Blended learning is a multi-faced concept that requires "*sound pedagogical planning to create well-paced and coherent learning experience for students*". Therefore, instructional design might be quite challenging for teachers who are not used to blended learning conception. By unbundling components, Witthaus' model helps teachers to give attention systematically on 3 major quality concerns: (a, related to component 2) to focus on the conception of engaging online courseware by providing situations and effective tasks that cognitively engage learners (in contrast, for instance, to page-turning material); (b, related to components 2 and 3) to seek for a global coherence between online courseware and in-class learning activities; (c, related to all components) by keeping in view the required alignment between learning outcomes, activities, and assessments.

Openness. As OER's, open coursewares are online resources characterized by a free and perpetual grant

of the 5R permissions through an open license, to share with the whole world a significant part of pedagogical contents and approaches.

When using open coursewares, teachers exploit open coursewares provided by other instructors, possibly belonging to another HEI, while remaining in charge of the support provided to the students, of the organization of human to human interactions (students-students and instructor-students) and the assessment of their new capacities, as shown in Figure 3.B. This scenario could be further detailed by decomposing the non-open part from the open one, as in Figure 2.B.

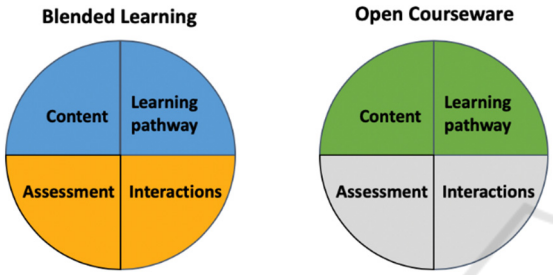

Figure 3: A (Blended Learning) and 3.B (Open courseware).

Some Issues and Challenges. Besides gaining time, using open coursewares can improve teaching practices thanks to the exposure to teaching approaches from colleagues from different backgrounds. Adaptability is a mandatory keyword to foster reuse. Teachers who release open coursewares have to find an appropriate trade-off between tailor-made (and sometimes culture-specific) content and generic, flexible learning objects. Availability and compatibility are also of concern. Two modes of diffusion are encountered: online version (hosted on a specific software dedicated to educational purposes, such as an LMS or a web platform) or downloadable files hosted in an often dedicated open repository (such as the MIT courseware initiative or the Saylor Academy project). In this latter version, the open courseware must be downloaded and installed on a target computer and cross-compatibility is a concern. In the former, the courseware can directly be exploited and compatibility with devices is a priority. Using pre-existing coursewares can save time for teachers and costs to students (Hilton, 2014). Accessibility and findability of quality coursewares must be taken into account by HEIs wanting to promote open coursewares. Finally, as in OER's, maintenance and sustainability are challenges that institutions should consider when adopting an open strategy, as documented in Atkins (2007).

NB: The first two models both relate to *resources*. In this context, openness is mainly a matter of "*share*" value: access, use, and reuse, licensing, dissemination and discovery are of the greatest importance. This opens up a new way of mobility, besides the students' mobility: the mobility of resources and coursewares. The last two components, which we are now going to address, relate to the learning experience one provides to students. Openness becomes here a matter of "*open access*" value. This opens the door to another form of mobility: a virtual mobility of students.

Model 3: (Open) Course

The combination of content, instruction paths, and human interactions addresses a more complete model of education. Interactions are designed to support and deepen learning and enhance participant engagement. Yet, in this model, the final assessment leading to an official credential is not covered here and is discussed in the 4th model.

Going Online with Human Interactions. Model 3 implies interaction moments that have to be planned. Unlike online courseware, available anytime, an online course is structured around time-framed sessions: 'course runs' that set out the start and end dates.

A wide range of interactions may occur within an online course: interactions managed at the level of the whole course learning community, interactions into smaller groups or between two persons. They may be designed to happen asynchronously, between instructors and students or between students, by means, for instance, of discussion forums (opportunities to questions and answers, invitations to share experiences or confront opinions, etc.) or using collaborative writing tools (elaborate a glossary together; gather a collection of concrete examples of how the topic being learned is applying in the daily life; etc.). Most LMS include functionalities that support such interactions and collaborative constructions, but external tools are sometimes used (mail, blogs, social media…). Interactions may also be designed to happen synchronously, which requires scheduled meeting times: individual or group project presentations; discussions about reading publications; interactive feedbacks, etc.

If in a face-to-face classroom, interactions may occur quite naturally, they may be less spontaneous in an online course. Therefore, they must be explicitly integrated into the pedagogical scenario and decisions must be made by the teacher about the tools to be used to create an effective learning experience.

Teaching and Learning Practices. Technology transcends teaching, and learning environments by making possible online modalities that support interactions, questions and answers, feedback, collaboration, sharing, discussion, debate, peer review, peer instruction, etc.

Keep in mind that in this third model, assessment that leads to the acknowledgment of mastery and/or the official credential is not covered, and therefore does not happen online. The remaining components may be organized fully online (Figure 4.A) or a significant part but not all activities are online (Figure 4.B), leading respectively to Online Learning or Blended Learning.

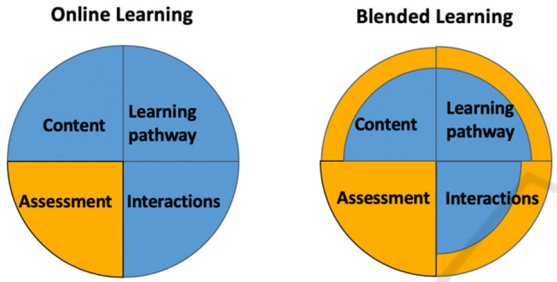

Figure 4: A (Online learning) and 4.B (Blended learning).

In both cases, the challenge is to make the best use of available technologies to engage students in interaction and collaboration. Empirical research tends to favor online teaching and emphasizes that high-quality interaction is one of the factors to take into account (Miller, 2016). Our model helps teachers to focus their attention on ways to engage students outside traditional face-to-face courses, designated by the blue areas in Fig 4.A and 4.B.

Openness. Opening an online course, i.e. a set of timely framed activities and interactions within a learning community, means opening the doors of a virtual classroom to anyone in the world interested to join. Openness here mainly concerns *access.* It's about what's happening online on the internet. Retaining, reusing, revising, remixing and redistribution is not the point, even though the content of an open online course might be openly licensed and available to all. MOOCs (Massive Open Online Courses) are striking examples of open online courses. They are online courses accessible to anyone with a computer and internet access. They are called massive because the enrolment may range from hundreds to several thousand. MOOCs are open because no prerequisites nor major costs block access. They are courses because they have a duration and are associated with a comprehensive set of learning outcomes. MOOCs contribute to Open education by removing the profile entry barrier and lowering the organizational and financial entry barriers. Attending a MOOC is much more flexible than attending an on-campus course. A lot of people worldwide can attend online courses offered by far away institutions they would never visit otherwise. Yet it is not totally flexible; one has to register and while some MOOCs are self-paced, the course run is (maybe loosely) mostly time framed, with deadlines to respect. Most of the MOOCs currently deliver a credential (certificate of attendance or badge), which has no academic but a symbolic value. In most cases, MOOCs don't provide any certification or credits. MOOCs are thus fully compliant with Model 3, even though things are changing. Credit-eligible MOOCs are expanding and MOOCs could, therefore, shift to Model 4 in a few years.

Some Issues and Challenges. Opening a course also means that teachers may exploit MOOCs provided by another university into their teaching. In this model, the content to be learned, the learning pathway and the interactions may be fully outsourced. A blended model may also be encountered: a teacher exploits a MOOC only for part of the content / learning pathway / interactions. For instance, the content of the MOOC could be only a part of the course or the interactions in the MOOC could be complemented by on-campus sessions. In any case, the assessment and the acknowledgment of mastery remain the responsibility of the teacher.

To open the virtual doors of an online course to the world, three conditions are needed: the course must be supported by a dedicated team ready for a massive audience; the instructional design must fit an unknown and potentially massive number of learners as well as an intercultural audience; the course must be made visible and invite to enroll. This requires financial and human resources, and HEIs should be aware of the 'long-term cost' involved by the support to interactions and maintenance from runs to runs.

Finally, MOOC platforms are not OER or courseware repositories but are dedicated educational platforms similar to LSM. HEIs rarely distributed MOOCs themselves and partnership, therefore, have to be established with MOOCs providers such as edX, Coursera, etc.

Model 4: Full (Open) Course for Credits

This last model involves all of the four teaching components, including the assessments of learning leading to an official credential. We are not considering here activities that allow self-regulation, such as self-assessments, feedback or other forms of

formative assessments, sometimes declined as OAR (Gibson, 2016) in their open version and covered, in our framework, by activities and interactions related to the first three components.

Going Online with Assessments. Nilson (2017) reminds us that there are plenty of ways to take advantage of the technology to design effective online assessments and lists several integrity tools and techniques to somehow overcome two major stakes, cheating and identity usurpation. These techniques range (Miller, 2016) from proctored assessments to random exams (questions are randomly selected from a database), anti-plagiarism tools, techniques to lock down forbidden web sites or resources, facial recognition software, analysis of the pattern of typing, etc.

Openness. The stake of opening a full online course for credits is to deliver to any learner, no matter their profile and background and at a minimum cost, official credentials that would be accepted as valuable currency by any HEI or employer. Witthaus (2016) speaks of "*recognition and credentialization of learning outcomes"* by defining these two concepts as follows. "*Recognition: learning outcomes are formally acknowledged by an educational institution - or employer- which has or has not provided the learning offer and which formally grants the learner the right to access or progress in educational or employment activities. Credentialisation: learning outcomes are formally acknowledged by an educational provider through the act of issuing a credential to the learner, usually on the basis of complete assessment*".

In our 4th model, when making use of a full open online course, a teacher completely delegates the teaching to a third party HEI. The whole course as well as the assessment of learning takes place online and is provided by another HEI, which takes in charge the implementation of the four components, including the credentialization of learning (fig 5.B). In the context of HEIs and formal learning, this makes sense only if the teacher and his/her institution recognize the learning outcomes and the credits delivered by the third party HEI.

According to the degree of openness, we speak of full online courses for credits (SPOCs for credits) or MOOCs for credits. This corresponds to one of the variants of Friesen and Murry (2011)'s model "Open Learning 2.0" in which "*any learner can access any learning content, facilitated by different educators. Assessment can take place at different locations and the body that credentialises learning can be different from the educational institution of the teacher. Different educational institutions or employers would decide to recognise or not recognise the learning outcomes"*.

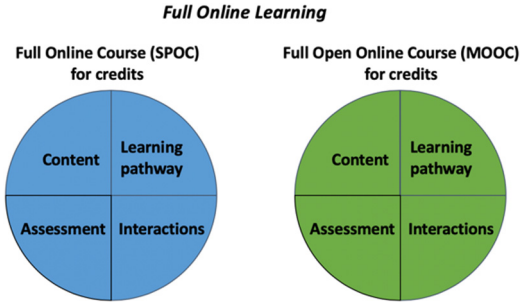

Figure 5: A (Full Online Course (SPOC) for credits) and 5.B (Full Open Online course (MOOC) for credits).

Some Issues and Challenges. This 4th model opens the way to a new form of mobility, the virtual mobility of students between partner institutions. It ranges from virtual courses to virtual study programs (Vriens, 2010). Virtual mobility is still a concept under development and raises new challenges for HEIs, as discussed in Witthaus (2016), such as digital credentialization (digital certificates and digital badges), policies and issues involved in the recognition and awarding of ECTS credits partnership and collaborative initiatives.

At the other end of the spectrum, teachers are organizing online assessments. When openness and exchanges are considered, assessing the learning outcomes of a large number of students coming from a variety of cultures might be quite challenging, in terms of methods, exam marking time, communication and feedback.

5 CONCLUSIONS

Based on Witthaus' model, this paper presents a four-pronged framework that provides a sound help to describe, analyse and discuss systematically some ins and outs of online learning and open education. The advantages of such a framework is to unbundle different levels of concerns that spontaneously arise when speaking of 'teaching in an open digital age': instructional design considerations, faculty support, digital strategy definition, etc.

The framework is flexible and powerful; it also allows us to describe and analyse alternative models that are rarely encountered, such as the one Saylor Academy (https://www.saylor.org/open/) relies on to provide open coursewares (components 1 and 2) for credits (components 4).

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REFERENCES

Allen, I.E., Seaman, F., Poulin R., & Straut T. T., 2016. *Online Report Card – Tracking Online Education in the United States (full report).* Babson Survey Research Group and Quahog Research Group. http://files.eric.ed.gov/fulltext/ED572777.pdf (Retrieved December 2019)

Atkins, DE., Brown, JS., Hammond, AL., 2007. *A Review of the Open Educational Resources (OER) Movement: Achievements, Challenges and new Opportunities*. Available at: http://tinyurl.com/2swqsg

Barker, P., Campbell, L., 2016. *Technology Strategies for Open Educational Resource Dissemination*. In: Open Education: International Perspectives in Higher Education. Open Book Publishers. Cambridge. Available at: http://books.openedition.org/obp/3542 (Retrieved January 2020)

Bayne, S., 2015. *What's the matter with 'technology-enhanced learning'?,* Learning, Media and Technology, 40:1, 5-20, DOI: 10.1080/17439884.2014.915851

Bates, T., 2016. *Online learning for beginners: what is online learning?* In the blog Online Learning and Distance Education Resources. Available on https://www.tonybates.ca/2016/07/15/online-learning-for-beginners-1-what-is-online-learning/ (Retrieved December 2019).

Blessinger, P., Bliss, TJ., 2016. *Introduction to Open Education: Towards a Human Rights Theory. In: Open Education: International Perspectives in Higher Education*. Open Book Publishers. Cambridge. Available at http://books.openedition.org/obp/3539

Deville, Y., Jacqmot, C., 2018. Digital strategy at UCLouvain: openness matters. In *Open Education Global Conference 2018*, Delft.

Economides, A., Perifanou, M., 2018. *Dimensions of openness in MOOCs & OERs*. Proceedings of EDULEARN18 Conference.

Friesen, N., Murray, J., 2011. *Open learning 2.0. Aligning student, teacher and content for openness in education*. Learningspaces.org blog. Available at http://learningspaces.org/papers/OpenLearning2.0.pdf.

Lebrun, M., Crasset, J., Guisset, M. et Vangrunderbeeck, P., 2019. *Enseignantes et enseignants à l'ère numérique : profils, perceptions des apports du numérique à l'apprentissage et usages dans la formation*. Rapport interne du Louvain Learning Lab. UCLouvain, Louvain-La-Neuve.

Gibson, D., Ifenthaller, D. 2016. *Open Assessment Resources for Deeper Learning.* In Open Education: International Perspectives in Higher Education. Open Book Publishers. Cambridge. Available at http://books.openedition.org/obp/3582 (Retrieved January 2020).

Hilton, J. L., Robinson, T. J., Wiley, D., and Ackerman, J. D., 2014. *Cost-Savings Achieved in Two Semesters through the Adoption of Open Educational Resources*. The International Review of Research in Open and Distributed Learning, 15 (2).

Major, CH., 2015. Teaching Online: A Guide to Theory, Research, and Practice. JHUP; Baltimore, 1st edition.

Mathelart, C., 2019. *Open Education. Quelques clés pour s'en emparer.* Les Cahiers Du Louvain Learning Lab 6–2019. Presses Universitaires de Louvain. Louvain-la-Neuve.

Miao F., Mishra S., McGreal R., 2016. *Open Educational Resources: Policy, Costs and Transformation*. UNESCO and Commonwealth of Learning. Available at: http://hdl.handle.net/11599/2306 (Retrieved January 2020)

Miller M., 2016. Minds Online: Teaching Effectively with Technology. Harvard University Press. Reprint Edition.

Moore, M. G., Kearsley, G., 2005. *Distance Education: A Systems view*, Wadsworth. Belmont, CA.

Nilson L.B., Goodson L.A., 2017. *Online Teaching at its Best*, Jossey-Bass; 1st edition.

Shank J.D. , 2014. *Interactive open educational resources: A guide to finding, choosing, and using what's out there to transform college teaching*. Jossey-bass. San Francisco, CA.

Vriens, M., Van Petegem, W., Op de Beeck, I., Achten, M., Gómez, 2010. *Virtual mobility as an alternative or complement to physical mobility*. In EDULEARN Conference 2010, Spain.

Weilandt, J., 2019.Digital Teaching and Learning at the UOF L. Available at: https://eapatuofl.pressbooks.com/ (Retrieved December 2019).

Weller M. ,2014. *The Battle for Open: How openness won and why it doesn't feel like victory*. London: Ubiquity Press. DOI: https://doi.org/10.5334/bam

Weller M., 2018. *Mapping the Open Education Landscape*: Citation Network Analysis of Historical Open and Distance Education Research. Open Praxis, 10(2).

Wiley D., 2020. Defining the "Open" in Open Content and Open Educational Resources. Available on http://opencontent.org/definition (Retrieved April 2019)

Witthaus, G., 2017. Recognition of open learning and the unbundling of higher education. *EMOOCs 2017 conference,* Madrid. Available on Slide share https://www.slideshare.net/witthaus/recognition-of-open-learning-and-the-unbundling-of-higher-education (last retrieved December the 10th, 2019).

Witthaus, G., Inamorato dos Santos. A., Childs, M., Tannhäuser,A., Conole, G., Nkuyubwatsi,B., Punie, Y., 2016. Validation of Non-formal MOOC-based Learning: An Analysis of Assessment and Recognition. Practices in Europe (OpenCred). DOI:10.2791/809371