ECO D2.2 Instructional design and scenarios for MOOCs version 1

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Abstract	This document presents a definition for ECO sMOOCs, their characteristics and the underlying pedagogical model. ECO sMOOCs are seen as part of the Open Education movement. Therefore, they are intended to remove all unnecessary barriers to learning and provide participants with a reasonable chance of success in education. This implies 'openness' in the sense not only of no financial cost, but also open accessibility, open licensing policy, freedom of place, pace and time of study, open entry, and open pedagogy. ECO sMOOCs rely on a flexible pedagogical framework, with a focus on networked and ubiquitous learning. This new model is complemented with more detailed possible implementation scenarios.
Keywords	ECO sMOOCs, pedagogical framework, pedagogical model, implementation scenarios, personas

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1   Introduction

The core assumption of this new educational design model for MOOCs is that networked and ubiquitous learning (sMOOCs), with more attention given to mobile platforms will, on the one hand, be better suited for the large diversity of learners in Europe and, on the other hand, offer teachers and course organizers more options to design MOOCs according to these innovative educational principles.

The "s" in sMOOCs stands for "social", since they provide a learning experience marked by social interactions and participation, and "seamless", since ideally they should be accessible from different platforms and integrate with participants real life experiences.

ECO sMOOCs are seen as part of open education. The MOOCs offered by partners are intended to remove all unnecessary barriers to learning and provide learners with a reasonable chance of success in education. This implies 'openness' in the sense not only of no financial cost, but also open accessibility, open licensing policy, freedom of place, pace and time of study, open entry, and open pedagogy.

As such, ECO sMOOCs differ from other MOOCs nowadays by concentrating on concepts like equity, social inclusion, quality, diversity, autonomy and openness. ECO sMOOCs could also have added value compared to other MOOCs by making the courses do-able and stimulating by dedicated design (is criteria for pedagogical design) and making them beneficial by given to participants the choice / opportunity to ultimately obtain formal institutional credits.

To support these values, ECO sMOOCs have significant added value by diversity, i.e. the ECO courses are inclusive and accessible to the wide diversity of citizens; they allow a spectrum of approaches and contexts, accounting for a variety of language, culture, setting, pedagogical strategies and technologies

ECO sMOOCs can vary considerably depending on the purpose and scientific field. Because of this diversity, the principles, characteristics and features presented in this model provide a flexible framework within which ECO sMOOCs should be designed and deployed, with plenty of room for local decisions and choices at the moment of implementation, to guarantee an effective course design that meets the needs of each particular course.

This document is structured as follows. Section 2 describes the characteristics of ECO sMOOCs. In Section 3 the assumptions and pedagogical principles of the pedagogical framework are given. These are then elaborated into a pedagogical model. Given the flexibility of the pedagogical model, we highlight those aspects that every ECO sMOOC should honour and implement in Section 4. Section 5 illustrates how specific scenarios could be implemented: first by describing how expected users of ECO sMOOCs might perceive and work with the ECO sMOOCs; next by providing an example on how to implement some likely scenarios, such as working in groups. Because correct use of video and audio can enrich user experience, we describe how best to make use of them.

During the course of the project, two updates of the deliverable are foreseen. This will allow us to update and fine-tune the pedagogical model and align it with the ECO sMOOC platforms taking into account the experiences gained during the pilots. This is ongoing work. Annex 1 illustrates some features that MOOC

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platforms must have or should have to support the pedagogical framework. Future versions of the deliverable will accommodate this and will be expanded with instructions for MOOC designers.

2 Characteristics of ECO sMOOCs

2.1 Summary of what's a ECO sMOOC

Criteria for ECO sMOOCs in general

- ECO sMOOCs will only focus on MOOCs and not on derivatives like mOOC, SPOC, COOC, etc.
- For MOOCS we adopt the definition that it is an online course designed for large number of participants that can be accessed by almost anyone anywhere as long as they have an internet connection, is open to everyone without entry qualifications and offers a full/complete course experience online for free. For justification and notes we refer to section "What's a MOOC and what's not?"
- A MOOC includes educational content, facilitation interaction among peers (including some but limited interaction with academic staff), activities/tests, including feedback, some kind of (nonformal) recognition options and a study guide / syllabus.

Additional conditions for ECO sMOOCs compared to other MOOCs

- Prefer to offer courses with full access to full course content at all times (always by anyone anywhere)
- ECO sMOOCs may have fixed dates or not, depending on the institution's choice for a particular course.
- Most ECO sMOOCs provide an access route to credit-bearing curriculum as an additional service (to be paid for) next to other free recognition options as a badge and/or certificate of completion.
- ECO sMOOCs have well designed rubrics for peer-assessment and use AI engines for the integration of massive qualitative assessment.
- ECO courses are inclusive and accessible to the wide diversity of citizens; they allow a spectrum of approaches and contexts, accounting for a variety of language, culture, setting, pedagogics and technologies and include localization possibilities, etc.
  - having special attention to people in risk of social exclusion and people with visual and hearing disabilities
  - ECO sMOOCs (and its platforms) are multilingual (at least Spanish, English, Italian, French and Portuguese), including subtitled educational materials
  - support local case studies, geolocalization, RFID
- Apply open licensing policy (reuse – remix – rework – redistribute). All content in ECO MOOCs do have an open content license like creative commons (and are as such open educational resources OER). Open licensing policy is also preferred for educational software in the MOOCs platforms (open source) and for the data produced in MOOCs (open data) to improve learning and the educational offer.
- Apply a quality model

- Enables mobile access. The platform should be accessible from every mobile device. Maximum usability, especially from mobile devices.

Pedagogical conditions of ECO sMOOCs
- Courses are do-able and stimulating by dedicated design
- Avoid a pedagogical approach of only associative learning. Hence, ECO will not produce xMOOCs, but will apply connectivist, (social) constructive learning and/or situated practices as the dominant approach.
- The pedagogics supports independent learning and have a learner centered approach.
  - Some ECO sMOOCs may even apply open pedagogics-didactics and/or leverage massive participation.
- Create collaborative learning opportunities and for that apply, for example, networked learning or social learning.
- Support adaptive learning strategies, e.g.using learning analytics.
- Will support context information activities/tasks by ubiquitous, pervasive and contextualized learning.
- ECO sMOOCs enable the possibilities to adapt to the changing intentions of participants during the course.

2.2   What's a MOOC and what's not?

Wikipedia defines a MOOC as (accessed 8 April 2014, note that this description is regularly updated).

> "*A Massive Open Online Course is an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for students, professors, and teaching assistants*"

This definition is not strict and already led to many discussion about what's a MOOC and what's not?, about the history and who started with a MOOC?, the in-/exclusion of some courses in several MOOC portals, etc. Moreover it has led to many variants as presented in the overview in figure 1 (SURF, 2014).

We should however note that the project is about Massive Open Online Courses, not about a variety of possible online courses as defined in figure 1. According to our current model for MOOCs (see next section), if it is not massive, or designed to be massive, it's not a MOOC; if it is paid, it's not a MOOC (not free/gratis); if there are criteria for enrolment and a selection of participants, it's not a MOOC (not open); if it is blended, it's not a MOOC (not online); if it is not a full course experience, its not a MOOC etc.

❖   The ECO project focuses only on MOOCs and not on derivatives like mOOC, SPOC, COOC, etc.

But in general it is already accepted that every letter in MOOC is negotiable. And as such there are many different definitions of MOOCs (next to its variants as listed in figure 1). Consequently European projects like ECO could also potentially be ill-defined as well. As such the HOME project (Higher education Online:

MOOCs the European way) started to produce a document with several possible definitions of MOOCs in order to adopt a widely accepted definition, at least within the European context. Moreover partners of ECO project agreed on to define ECO sMOOCs as an essential pre-condition for all WPs.

Acronym	Meaning	Reference
MOOC	Massive Open Online Course	http://en.wikipedia.org/wiki/Massive_open_online_course (this description is regularly updated)
mOOC	Micro Open Online Course	Mini courses, offered by OER University: www.oeruniversity.org www.scienceguide.nl/201311/na-moocs-nu-de-mooc.aspx.
SPOC	Small Private Online Course	Online course, often closed (enrolment is limited to the institution's own, paying students) www.bbc.co.uk/news/business-24166247.
SOOC	Selective Open Online Course	SPOC, without restrictions in terms of the number of enrolments, but based on a selection process designed to limit the number of participants. Also referred to as an SPOC. http://etcjournal.com/2013/09/26/spocs-are-mooc-game-changers/.
DOCC	Distributed Open Collaborative Course	MOOC in which participants collaborate on the basis of distributed expertise. Very similar to the cMOOC. http://moocs.com/index.php/from-mooc-to-docc-new-directions-in-open-online-education
LOOC	Local Open Online Course	Derived from a MOOC, but offered online to the institution's own student community; may be adjusted. Not available outside of the community. www.ecampusnews.com/around-the-web/loocing-future-digital-learning.
MOOR	Massive Open Online Research	MOOC with a substantial research component. For example, participants may be offered the opportunity to contribute to ongoing research projects during the course. www.technoduet.com/mooc-spoc-moor-and-the-walking-dead-the-journey-continues.
ROOC	Regional Open Online Course	MOOC with a regional appeal, reflected in the language used or the specific cases. Regarded as a MOOC application for higher professional education institutions. http://blog.han.nl/hanicto/van-mooc-naar-rooc/
HOOC	Hybrid Open Online Course	MOOC with an intensive focus on student participation. This may vary from mixed classes with students also taking the on-campus version of the course, or the delegation of supervision tasks to active participants. www.universitybusiness.com/article/course-connections-new-mooc-phase-student-engagement.
COOC	Classically Offered Online Classes	Online course that seeks to emulate the classroom-based approach. The actual extent of this course's openness is unclear. www.nebhe.org/thejournal/coocs-over-moocs/.

Figure 1: Overview of MOOC variants (SURF, 2014)

2.2.1 Adopted definition for MOOCs in general

On basis of the proposal by HOME project, and many discussion among ECO partners, we propose to adopt the following definition for MOOCs. Some discussion notes on these dimension and criteria are referred to by [.] and can be found here after.

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		Dimension definition of MOOC	*Criteria deciding for a MOOC*
M	**Massive**	An online course *designed* for large number of participants [1]	- Number of participants is larger than can be taught in a 'normal' campus class room / college situation (>148 = Dunbar's number) - The (pedagogical model of the) course is such that the efforts of all services (including of academic staff on tutoring, tests, etc.) does not increase significantly as the number of participants increases.
O	**Open**	Course can be accessed by almost anyone anywhere as long as they have an internet connection.[2]	- Course accessible to all people without limitations.[2a] - At least the course content is always accessible [2b] - Course can be accessed anywhere as long as they have an internet connection
		Open as in freedom of place, pace and time. [3]	Most MOOCs nowadays have a fixed starting and end date and as such are not open in pace or in time. Next, a pre-defined pace and/or a fixed starting date and end date is NOT seen as an explicit criteria to distinguish between MOOCs and other courses.
		Open to everyone without entry qualifications.[4]	No qualifications / diplomas needed to participate the online course.
		Course can be completed for free [5]	Full course experience without any costs for participants
O	**Online**	Complete course online [6]	All aspects of course are delivered online

C	Course	Unit of Study [7]	The total study time of a MOOC is minimal 1 ECTS (typically between 1 and 4 ECTS)
		The course offers a *full* course experience including 1. educational content 2. facilitation interaction among peers (including some but limited interaction with academic staff) 3. activities/tasks, tests, including feedback 4. some kind of (nonformal) recognition options 5. a study guide / syllabus	1. educational content may include Video – Audio - Text – Games (incl. simulation) – Social Media – Animation 2. offers possibilities for interaction, such as social media channels, forums, blogs or RSS readers to build a learning community 3. participants are provided with some feedback mechanism. Can be automatically generated (e.g., quizzes), only by peers (peer-to-peer feedback) and/or general feedback from academic staff, etc. 4. Always includes some kind of recognition like badges or a certificate of completion. A formal certificate is optional and most likely has to be paid for. 5. study guide / syllabus includes instructions as to how you may learn from the presented materials and interactions.

[1] Note about massive:

A MOOC differs to other Open Online Courses by the number of participants. There is no precise number to define "massive" and it might even depend on characteristics like number of people speaking the language of the MOOC offered. Stephen Downes (2004) proposed the use of the Dunbar's number. Dunbar's number (148) is the cognitive limit of number of people with whom one can maintain stable social relationships. As such the number of participants is larger than can be taught in a 'normal' campus class room / college situation.

Wikipedia in their definition uses "unlimited number of participants" but maybe we should be cautious about that. We feel that a course isn't less open if it doesn't allow for unlimited participants. You may have to set a maximum number according to the resources you have available when you offer the course. As long as there's a policy of "first come, first served" and no selection process based on whatever criteria, it still is an open course. Letting numbers go a lot higher than your technological resources (or other considered essential) can handle will result in the course being cancelled.

However, we also need to take into account the teacher time, i.e. the efforts of academic staff on pay-roll of institution offering the course. As MOOCs are for free it cannot rely heavily on teacher time. Teacher participation in the course needs to be very well thought through – a bit here and there, strategically – but

people cannot have the expectation of interacting directly with him/her or having a lot of presence on his/her part, as would be the case in a formal (online or offline) course. Consequently the teacher workload and participation in MOOC needs to be very carefully designed. It's a free/gratis course, whose support rests heavily on the community and where participants should not be given the expectation of an amount of teacher presence similar to what they might expect in a formal / paid for course.

As such the definition of massive is related to the *design* of the course (note that Wikipedia uses the verb *aimed*). Teacher time should be used scarcely in a MOOC. You need to rest on peer feedback, peer assessment and formative assessment through formative activities (or embedded in the materials). Assessment is time consuming and you cannot offer it for free. Besides, this is much the model of formal learning - teachers teach, students learn, teachers assess - and that is not how we view MOOCs.

[2] Note about Course can be accessed by almost anyone anywhere:

Ideally this must be defined as "Course can *always* be accessed by *anyone anywhere* as long as they have an internet connection". However, this criterion cannot be seen as absolute. Most likely this criterion should be used on a scale from 0% to 100% where, depending on criteria, in a specific case one can say "this is a MOOC for 80% regarding open accessibility". We will need to work both criteria and the weight of each criterion plus an algorithm to calculate the %.

[2a] Some MOOC providers do put limit to people who can access the course. For example by have an age limit of 16 or block participants from sanctioned countries (so not accessible by anyone anywhere).

[2b] Most MOOC nowadays don't provide access all the time. However, they do provide access to the course during limit time, mostly only between start and end date of course. For some MOOC providers the content of MOOCs are always accessible even if they have a fixed starting and ending date during which they guarantee the availability of course content in the platform. In other MOOCs both the content and forum are always accessible. In addition very few MOOC providers offer courses that always provide access to whole course by anyone anywhere.

As such we changed the definition into "Course can be accessed by almost anyone anywhere as long as they have an internet connection". However, as ECO partners we strive for those course that can be assess fully (always by anyone anywhere).For example we also (at least initially) free access to the course contents and activities to anyone interested and original content that can be openly downloaded and even adapted (with credit to the developer or permission from him, akin Creative Commons 3.0 licenses).

[3] Note about pace and fixed starting- and end date

We didn't include pace and/or a fixed starting date and end date as an explicit criterion to distinguish between MOOCs and other courses. The criterion preferred is that it must be a complete/full course experience including (nonformal) recognition option. As such participants start on a certain date and need to finish. Fixed dates and pace imposed by the institution is only one option that is nowadays mostly used in MOOCs that adhere to a teacher transferring knowledge model). Other pedagogical models must be included for example referring to a learner centred approach, i.e. it is the learner who is put central. In those pedagogical models the learner decides what to learn, when, how and what pace. Here the non-formal and informal networked learning and social learning have a place, as the learning has to be organised bottom-up. Learners need to be involved in the whole process and for example also take on the role of co-producers and even as coach. An example is the recently launched role play MOOC was with

magic school Hogwarts (read blog). This 'MOOC' is in the first year self-paced (see FAQ, "When are my assignments due").

But we must emphasise that also these (ECO s)MOOC will need to be finished with some kind of (non-formal) recognition option and consequently have an end date. As such ECO accepts that some (ECO s)MOOCs are designed without a pre-defined start and end date. It is open for contextual choices, i.e. MOOCs may have fixed dates or not, depending on the institution's choice for a particular course. Openness is also about freedom of choice. The unbundling of higher education (HE) is on all aspects including the freedom to choose starting dates and pace. Hence, a fixed starting and end date and a fixed pace are not criteria to be imposed on courses to define them as MOOCs. Other criteria (such as what is a complete course) are more important and discriminative.

[4] Note about entry qualifications
In present MOOC offering everyone is allowed to follow the course. But that doesn't imply that MOOCs are only offered at novice level. All MOOCs require some basic skills of ICT and language skills by definition. And there are courses that require extensive prior knowledge and skills. But these knowledge and skills are not tested beforehand, nor are any formal qualification needed to enter the course. Some providers offer remedial courses (to be paid for) as part of their business model.

[5] Note about offering a complete course for free
MOOC participants should be offered a full and complete course experience without any costs (for free/gratis). However, additional services may be offered as part of the business model. Such services may include remedial courses, additional tutoring by academic staff and additional certification options. Regarding the latter, participants should always have the opportunity to get a badge or a certificate of completion for free (that's important difference between opencourseware and MOOC). Please not that Udacity recently decided NOT to offer any certificate for free certificate anymore (effective from 16 May 2014, see blog). Hence as they don't apply a freemium model, and offer no other recognition options for free (e.g. Badge) Udacity does not offer a full complete course for free anymore.

In our view, course and formal accreditation must be unbundled, i.e. two separate processes. As for formal certification (e.g., part of accredited curriculum), will require academic staff and other resources (if you resort to any form of exam or face-to-face assessment) that need to be paid for. It's not part of the MOOC itself, but recognition afterwards of a relevant learning experience. Coursera, for example, provides a certificate when completing a MOOC when passing all required quizzes, but you can pay for additional certificate (like verified certificate). For example, by November 2013 the OpenupEd partnership (http://www.openuped.eu/) offered 174 MOOCs of which over 100 had some opportunity for formal recognition as ECTS (European Credit Transfer and Accumulation System) (http://ec.europa.eu/education/tools/ects_en.htm) credits. In some cases, such as UNED Abierta, a freemium model is used where the same MOOC can be certified at three levels: badges earned for completion of specific activities, a credential for completion of the majority of activities and a final online test, and full certificate with ECTS credit obtained after a proctored test (Read & Rodrigo, 2014).

[6] Note about offering complete course online

The criterion used is that all aspects of course should be delivered online. But that the participant of a MOOC can choose to have some offline activities (the criteria uses "*delivered* online") or that additional services require face-to-face (f2f) meeting or even the presence at an exam/test centre for an additional certificate. But such off-line / f2f activities are not part in MOOCs, i.e are only optional. Participants cannot be asked to attend to a meeting at a certain place as obligatory.

Please note that we don't accept the definition of that the Babson Survey Research Group (2014) uses in defining an online course:

- Online courses are defined as those in which at least 80 % of the course content is delivered online.
- Blended (sometimes called hybrid) between 30% and 80% of the course content delivered online.
- Face-to-face instruction includes courses in which zero to 29% of the content is delivered online;

I.e. this definition of the Babson group doesn't apply to MOOC as online courses. In MOOCs all components of a full/complete course should be offered online (and not only content).

[7] Note about study unit

To secure that a MOOC is an unit of study, we defined that the total work/study load for a participant should be at least 1 ECTS. For example MOOC offered by Coursera nowadays last about 6-8 weeks, asking participants to spent at least 5 to 10 hours a week. So that's 30-80 hours in total. In a European context we measure the amount in study time in units of ECTS (about 28 study hours). As such one criterion for a course to be called a MOOC is that total study time of a MOOC should be at least 1 ECTS. If it a smaller, one refers to as a mOOC (see figure 1), a micro course offered by OERu (and as such are not seen as a MOOC).

2.3   What are the characteristics of the ECO sMOOCs?

The main purpose of this section is to describe what makes ECO sMOOcs different to MOOCs in general and what might be the added values for ECO sMOOCs.

2.3.1   Characteristics of ECO sMOOCs based on conceptual values

Already in the DOW the ECO sMOOCs are related to certain conceptual values. Already in the abstract the DOW states

- "*MOOCS have the potential to widen access to education and to improve the quality and cost-efficiency of teaching and learning in Europe*"
- "*…in open education in its continuous effort to improve quality, access and equity in education and training.*"
- "*ECO will focus on … the most successful MOOC experiences in Europe,… results and lessons learnt from these best practices in open and mobile learning.*"
- "*increasing awareness in Europe of the benefits of open educational resources*"
- "*MOOC (courses & communities) could have the potential for lowering or remove technological barriers in learning processes for users with special needs or at risk of exclusion.*"

As such ECO MOOCs provide added value compared to other MOOCs nowadays by concentrating on concepts like equity, social inclusion, quality, diversity, autonomy, openness, etc.

Equity can be defined as reaching out to all who need or want to learn, accounting for their circumstances and competencies. As such ECO sMOOC should be
- open entry (already criteria of MOOCs in general, see page 3 and 4)
- affordable (free/gratis is already criteria of MOOCs in general, see page 3 and 4)
- 'do-able'
- stimulating and
- beneficial

ECO sMOOCs as such have added value compared to other MOOCs by making the courses do-able and stimulating by dedicated design (is criteria for pedagogical design) and making them beneficial by given to participants the choice / opportunity to ultimately obtain formal institutional credits.

★ Additional criteria: ECO sMOOCs offer added value by providing additional services to the MOOC participant providing with real opportunities to participate in higher education. Those MOOCs provide an access route to credit-bearing curriculum. Next to certificates of completion or a 'badge' (as evidence of task completion), ECO partners offers MOOCs with the possibility to obtain a formal certificate (to be paid for), i.e. official credits that can count towards obtaining a degree (in units of ECTS).

Peer-to-peer assessment can be a very effective and formative strategy if it's carefully implemented. That means that each course should design good-quality assessment rubrics for all peer-assessed activities, including group-based tasks. AI engines are also an important instrument for the integration of massive qualitative assessment.

★ Additional criteria: ECO sMOOCs have well designed peer assessment rubrics and use AI engines for the integration of massive qualitative assessment.

Particularly if we think that the aim of MOOCs is to open up access to HE, and by that support equity and social inclusion, other values like diversity and quality are also important.

To support these values ECO sMOOCs have significant added value by diversity. I.e. the ECO courses are inclusive and accessible to the wide diversity of citizens; they allow a spectrum of approaches and contexts, accounting for a variety of language, culture, setting, pedagogics and technologies and include localization possibilities, etc.

★ Additional criteria: ECO sMOOCs are accessible to everybody (open to a maximum level, see definition on page 3), having special attention to people in risk of social exclusion and people with visual and hearing disabilities. ECO sMOOCs (and its platforms) are multilingual (at least Spanish, English, Italian, French and Portuguese), should include subtitled educational materials, such as materials with audio descriptions, support local case studies, geo-localization

ECO sMOOCs should take into consideration that all learners are different and that a monolithic course design that is not able to appeal to different kinds of learner needs and abilities is going to alienate a large percentage of them. Contents and activities should guarantee that learners can access and build knowledge by different means, in various formats and with different learning strategies. This is especially relevant when approaching people with different professional training backgrounds.

As such ECO sMOOCs should support autonomy both from institutions, teachers and participants/learners. So acting against the tendency towards dominance / uniformity and handover of courses to centralized bodies. And acting to reduce the risk that teachers are largely becoming 'followers' / 'operators'. That the pedagogics supports independent learning and have a learner centred approach. That teachers are the key in navigating/guiding/developing role and that institutions are identifying their profile, playing their own part.

★ Additional criteria: ECO sMOOCs pro-actively supports diversity and the autonomy from institutions, teachers and learners. The pedagogics supports independent learning and have a learner centred approach. Some ECO sMOOCs may even apply open pedagogics-didactics to include as many as possible (Paul Stacey, Martin Weller). Leverage massive participation, for example: have all learners contribute something that adds to or improves the course overall. Or may be related to 'open creation' or 'crowdsourcing environments'

Examples of the latter are related to massive learning networks or 'open creation' or 'crowdsourcing environments'. The MOOC is called a MOOR (Massive Open Online Research) participants may be offered the opportunity to contribute to ongoing research projects during the course

Openness is seen as an important business driver, enhancing the circulation of knowledge and increasing the pace of innovation. Open access in scientific output is just a start, open education is seen as the next essential step. We feel that MOOCs must be connected to the many open development movements (Smith and Reilly, 2013).

★ Additional criteria: To support this at a maximum level ECO partners offer MOOCs with an open licensing policy (reuse – remix – rework – redistribute). All content in ECO MOOCs do have an open content license like creative commons (and are as such open educational resources OER). Open licensing policy is also preferred for educational software in the MOOCs platforms (open source) and for the data produced in MOOCs (open data) to improve learning and the educational offer.

More ideally ECO sMOOCs are seen as part of open education. The MOOCs offered by partners are intended to remove all unnecessary barriers to learning and provide learners with a reasonable chance of success in education. This implies 'openness' in the sense not only of no financial cost, but also open accessibility, open licensing policy, freedom of place, pace and time of study, open entry, and open pedagogy (Weller, 2013b). As such ECO sMOOCs support the vision and features of OpenupEd. OpenupEd partners have a commitment to opening up education to the benefit both of learners and of wider society, while reflecting "European values such as equity, quality and diversity" (Commissioner Vassiliou in European Commission, 2013). The vision is to reach out to all those learners who wish to take part in online

higher education in a way that meets their needs and accommodates their situation. As such it might be recommendable if ECO (partners) will join OpenupEd.

As an overall approach, we favour "open" as much as possible, also connected with "transparency". The more "open", the better. However, no open model is ever universally open, nor can it ever be. "*The constraints of people, existing social systems, and the contours of the open model all provide limitations to who can participate, and how. Time, distance, language, culture, past experiences, and so on, affect individuals' ability to access and participate meaningfully.*" (Open Development, 2013)

As such we can use resources other than OER if they are valuable and freely available on the web, even if they don't have an open license. And we believe that the user-generated content – content contributed by participants to the course through the creation and sharing of a variety of artifacts – should be licensed according to the personal preferences of the authors, not imposed by the course organizers. So, we believe that "open" isn't necessarily compromised if some of the resources made available or contributed by participants aren't OER, as long as they are freely available on the web.

2.3.2   ECO sMOOCs: focus on quality

ECO sMOOCs could also distinguish themselves by the focus on quality. Stimulating and ensuring high quality, offering public insight into the quality provided. Aspects related to quality culture (stimulus by visibility, peer sharing, learner feedback, learning analytics), QA including accreditation (main challenge, part of it could be by connection to certificate services), quality scores, etc.

Questions about the quality of the MOOC experience were beginning to be asked in 2013, for example in reports by Yuan & Powell (2013) and Haggard (2013).The concern over quality in MOOCs was coupled with a concern over high drop-out rates. The conspicuous success of MOOCs in enrolling massive numbers of participants had to be tempered by low completion rates. Ehlers, Ossiannilsson & Creelman (2013) posed a question at the start of the EFQUEL MOOC project (http://mooc.efquel.org): 'Can the quality of MOOCs be assessed in the same way as any defined university course with traditional degree awarding processes?'

Rosewell and Jansen (2014) propose OpenupEd Quality Label for MOOCs, intended to encourage quality enhancement for MOOCs and their providers. It does this by adopting a quality enhancement approach, based on initial self-assessment against benchmark indicators, followed by external review leading to an improvement action plan. This process is designed to complement both an institutional course approval process, and ongoing evaluation and monitoring of courses in presentation. Read & Rodrigo (2014) report on the quality model for UNED MOOCs. Although they later considered a draft version of the OpenupEd benchmarks, their MOOC quality process began earlier with approval and planning of a MOOC programme in 2012.

Both papers state that MOOCs has some relation to existing institutional QA processes.
This is linked to the distinctive feature that a MOOC is, by definition, a course, even if non-formal education rather than formal. Further, current higher education MOOCs are usually closely aligned to more conventional university courses. MOOCs are usually branded by an HE institution, and so the institution takes on a reputational risk unless quality is maintained. MOOCs are authored and taught by HE staff. Material is often derived from existing credit-bearing courses. MOOCs are positioned as providing an access

route to credit-bearing curriculum. I.e. MOOCs started as non-formal but more providers are offering different kind of possibilities for certificates. Even with the possibility the get that certificate recognised in a formal accredited curriculum. As a consequence MOOCs are becoming part of formal higher educational system. Many governments are now looking at the possibilities / hindering factors to get these MOOCs recognised, include (credits of) MOOCs of other institutes in curricula (virtual mobility / credit transfer).

2.3.3 *Pedagogical characteristics of ECO sMOOCs*

Possible pedagogical models for MOOCs in general
In describing possible models for MOOCS we might refer to the use of technology in <u>where</u> learning takes place (class-room / online) and the role of technology <u>by what means</u> learning is 'delivered' (mobile, PC, books, etc.). However, when we discuss the pedagogical models of MOOCs we refer to about <u>how</u> participants learn. In that case important dimensions of learning are

- chronology (i.e., synchronous and a-synchronous intervention),
- roles each have in education (e.g., multi-disciplinary groupings of learners),
- the focus / different aims, direction (instructor-directed versus learned-directed),
- personalisation,
- the openness of education, etc.

An early distinction between MOOCs was made on the basis of pedagogy. Siemens (2012) used the terms cMOOC and xMOOC to contrast two forms of pedagogy. He labelled the early courses, rooted in principles of connectivist learning that emphasise creation, creativity, autonomy and social networked learning, as cMOOCs. The courses that had begun to appear on platforms such as Coursera and edX were based on a transmission model of teaching and learning; Siemens suggested the label xMOOCs for these. Other authors have since given other taxonomies and classifications. Clark (2013) identified eight types of MOOC based on different pedagogies. This taxonomy does not include the gMOOC (Game-based learning MOOC) or rgMOOC (Rhetoric game-based MOOC). These can be found at: <u>www.slideshare.net/autnes/gmooc-and-rgmooc-theory-and-design</u> .

Conole (2013) highlighted around dozen dimensions on which a course could vary, for example its scale of participation, use of multimedia, and amount of communication. Mulder & Janssen (2013) take a broader view still of open education by suggesting a model with five dimensions: open educational resources, open learning services, open teaching efforts, open to learner needs, and open to employability and capabilities. MOOCs as currently understood may inhabit only part of this space. Another web resource discussing pedagogical approaches can be found at <u>http://www.slideshare.net/tbirdcymru/the-pedagogy-of-moocs</u>

These are all important dimensions but it eventually comes down to four basic approaches how to teach. These 4 approaches can be coupled to 4 different kinds of MOOCs.

1. People learn by association, building ideas or skills step-by-step. For example by mnemonics, training drills, imitation, instruction. Associative learning leads to accurate reproduction or recall.

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The dominant approach in Content-MOOCs (and xMOOCs) is associative learning.

2. People learn by constructing ideas and skills through active discovery. For example by exploration, experimentation, guided discovery, problem-solving, reflection, etc. Constructive learning leads to integrated skills and deep understanding. The task-based MOOCs lay emphasis on active discovery by learners. Some assignments are still based on associative learning but most are based on the approach of Constructive learning. But perhaps we should not use term Task-based MOOCs because in all approaches the learners have tasks and assignments. The difference depends how open, how complex and authentic such a task is.

3. People learn by constructing ideas and skills through dialogue. For example by discussion, debate, collaboration, shared knowledge-building, etc. Social constructive learning also leads to integrated skills and deep understanding. The main approach of the original MOOCs is Social constructive learning although elements of constructive learning are also present (i.e., exploration is more important than any particular content).

4. People learn by participating in a working community. For example by apprenticeship, work-based learning, legitimate peripheral participation, learning networks, etc. Situated practice leads to the development of habits, values and identities. Hence MOOCs using the approach of situated practice are missing. MOOCs to be developed under this approach can be linked to massive simulation and/or games (MMO and MMORPG?), to networked learning i.e. learning in massive online learning networks or to concepts like VirtualInternship and VirtualBusinessLearning (Jansen et al., 2003)

All approaches listed above emphasise the importance of learner activity, constructive alignment of activities with desired outcomes, the importance of feedback opportunities for consolidation (practice) and integration. However, they differ in the role and importance of other people, the authenticity of the learning activity, the formality of activity structures and sequences, the emphasis on retention/reproduction or reflection/internalisation and the locus of control. When defining the possible pedagogical models for ECO sMOOCs we must describe these elements.

Based on the fora discussion it is mentioned that we in ECO should not focus on the first approach. Already in the DOW it is stated that "*While cMOOCs are mainly building on the emerging effects of social media (wisdom of the crowds), xMOOCs are currently not using advantages of social networks. For the sMOOC design and implementation, we will take a middle position which assumes a sound educational design in combination with the power of social media.*". So, by ECO sMOOCs we are NOT ONLY using the pedagogical model of Associative learning as in Content-MOOCs / xMOOCs.

Pedagogical characteristics of ECO sMOOCs according to DOW

DOW WP2:
● "*The core assumption of this new educational design model for MOOCs is that mobile and pervasive MOOCs (sMOOCs) will on the one hand be better suited for the large diversity of students in Europe.*

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> *On the other hand, teachers will have more options to design MOOCs according to these innovative educational principles.*"

- "*apply learning analytics that are supportive for the applied pedagogics within ECO both for students and teachers*"

Project profile

- "*(MOOCs) will be developed in order to train teachers / and trainers of all educational levels to design and develop such courses through mobile technology*"
- "*ECO understands the importance of the social and entertainment aspects, as well as networking, motivation and commitment whilst learning. Integration of all these aspects will also set ECO apart from traditional educational projects*"
- "*ECO is based on constructivist learning theories...* "
- "*ECO will be based on interactive multimedia materials and other media enabling social learning opportunities with other people who are studying the same course.*"
- "*...mobile front-end that will allow users to access the content and services from mobile handheld devices*"...
- "*Combining the didactic content of the platform with the participation, debate and dialogue through social networks (Facebook, Twitter, YouTube etc.) and extending the debate into the network*"

B1.4. Innovative aspects of the project

- "*This project contemplates the integration of mobile context in MOOCs*"

Based on conceptual values the pedagogical model of ECO sMOOCs

- has a dedicated design such that the courses are do-able and stimulating
- enables reuse – remix – rework – redistribute to other languages, cultures, etc.
- enables diversity by languages including possibilities of local case studies / different cultures
- supports independent learning and have a learner centered approach
- creates collaborative learning opportunities and for that applies, for example, connectivist, networked learning or social learning strategies
- supports adaptive learning strategies using learning analytics

ECO sMOOCs refer to learning and it is the learner who is put central. The learner decides what to learn, when, how and what pace. Here the non-formal and informal networked learning and social learning have a place, as the learning has to be organised bottom-up. Learners need to be involved in the whole process and also take on the role of teachers/tutors.

Next from a more technological point of view it enables

- mobile access,
- ubiquitous, pervasive and contextualized learning,
- using the enrichment from games and interactivity

The learner can apply or adopt the taks / assignments / content to his/her own view. ECO sMOOCs will offer contextualized content. OERs can be authored and/or delivered based on the context information supplied by the sensors of mobile devices taking into account location, time, identification, environment, social aspects. Moreover users can, not only access contents through mobile but, also, without cost, create content and deploy this content to mobile devices.

In addition, the potential of mobile apps and games, like the opportunities that ARLearn offers us, allow us to create richer, more interactive MOOCs that should enhance user interactivity and effectiveness.

3. Pedagogical Model

ECO sMOOCs can vary considerably depending on the purpose and scientific field (e.g. more theoretical versus more practical subjects, humanities and social sciences versus natural/hard sciences, etc.). Because of this diversity, the principles, characteristics and features presented in this model provide a flexible framework within which ECO sMOOCs should be designed and deployed, with plenty of room for local decisions and choices at the moment of implementation, to guarantee an effective course design that meets the needs of each particular course. Examples of such decisions are related to resources, type of tasks/activities, collaboration strategies, assessment strategies (formative or for obtaining a certification of completion) and the offer, or not, of a path to paid formal accreditation, through a formal assessment process, with the consequent technological and human resources necessary to support these choices.

More detailed scenarios for possible implementations of this pedagogical model are included further in this document.

3.1. Assumptions

3.1.1. ECO sMOOC Concept

The pedagogical model and the pedagogical principles that guide it are aligned with the definition of ECO sMOOCs agreed upon and presented in chapter 2. They are Massive, and Open, and Online Courses, as characterized in the definition aforementioned.

They are a non-formal learning experience, although they will always have some kind of certification based on peer-assessment. Further formal accreditation (in ICTS, for example) that recognizes this learning experience may be obtained for a fee, but is not a part of the course itself.

3.1.2. Pedagogical Model as a Framework

Because these courses can have a wide variety of target populations, purposes and local, contextual implementations, it is not possible to design a one-solution-fits-all model. It needs to be designed as a framework model within which local and contextual choices are made and specified to make the courses effective. Some or many of these local/contextual specified solutions can be subsequently integrated back in the framework model when they reveal themselves generalizable and innovative, i.e. when they seem

applicable to a variety of other contexts and found to enrich the pedagogical practices of these ECO sMOOCs.

3.1.3. Pedagogical approach

Broadly speaking, the pedagogical approach draws on connectivism, situated learning and the general social-constructivist perspective that has always characterized online learning.

3.1.4. Participants

Participants in these ECO sMOOCs are not students. We may refer to them as participants, individuals or learners, but not as students, since this is a term that defines a status/role in the context of formal education. People participate in this learning event becoming part of a learning community which, to some extent, is also a community of interests or a community of practice.

These courses are meant for adults, not for children or teenagers.

3.1.5. Not a Classroom Approach

We are not designing a model for online learning in the context of formal education, nor for blended or technology enhanced learning in the same context. We are designing a model for an open course, delivered online, that can theoretically have an unlimited number of participants. The context of reference is not the classroom, or the virtual class, but how people develop their learning by being part of online communities and networks.

3.2. Pedagogical Principles

The main pedagogical principles of the model are:

3.2.1. Learner-centeredness

Due to the high heterogeneity characteristic of MOOC participants in terms of competences, prior knowledge, personal motivation and goals, and also because of the non-formal, community-like nature of these courses, the learner/participant needs to take a center role in the process. Participants/learners are expected to take an active role in and be responsible for their own learning, but also to actively engage in helping build a supporting learning community. Knowledge is built through reflection and practice (creation, production) and dialogue in a social collaborative context.

Success in this type of courses needs to be measured against participants' goals and intentions, and not against a rigid set of predefined learning outcomes. These may be defined to serve as a guide for participants in terms of knowledge or competences that can be acquired/developed in the course, but should not be the measure for success for everyone. ECO sMOOCs should also enable the possibility to adapt to the changing intentions of participants during the course.

3.2.2. Interaction

Interaction takes place at various levels:

- with the materials and resources provided and those contributed and produced by participants (digital artifacts);

- with other participants (in the learning community/network and/or in a group);

- with community facilitators.

Through these various types of interaction participants re-appropriate and recreate content, produce their own content, establish interconnections and interpersonal relationships, get and receive feedback, experience different perspectives and engage in the dialogue with others, which fosters real individual knowledge acquisition but also a shared construction of knowledge in a social context.

3.2.3. Flexibility

There need to be an articulation between autonomous and self-directed learning with a strong social dimension (collaborative learning) and also between the flexibility that online learners need with the pacing necessary to help them get things done.

Very fixed/rigid learning paths; highly structured tasks with very fixed sequences (including rigid suggestions for time allotment); heavy interdependency of sequential tasks/activities; or overuse of synchronous communication strongly reduce flexibility and increase transactional distance. Especially in the case of MOOCs, this can contribute significantly to the drop-out rate. Therefore, whenever possible, or to the extent to which it may be possible, an effort should be made to offer an alternate learning path (more focused on the interaction with the materials/contents, for example, for those who cannot keep the pace of ongoing interaction and dialogue around the current topic), reduce the dependency between different topics/activities, allow for choice in the way participants demonstrate their knowledge, allow for different ways of completing a task (individual, group, different formats, open ended tasks, etc.), offer optional challenges to be completed at participants' will, and include synchronous events moderately, and only when they are relevant.

3.2.4. Digital Inclusion

One of the challenges of 21st century learning and of providing a solid base for lifelong learning is to make learning available to as many people as possible, bringing these people into the digital online environment, where a crucial part of modern life happens, thus helping curb the digital divide.

3.2.5. Ubiquitous learning

Whenever possible or adequate, courses should support context information and tasks by ubiquitous, pervasive and contextualized learning through mobile technologies. This will reinforce learner-centredness and flexibility, as well as increase the possibilities for interaction, creating a richer and more diversified

learning environment whereby participants can resort to a wider variety of resources, contexts and situations to engage in the course experience.

3.3. Characteristics

3.3.1. Access and registration

Courses are open to everyone who wants to participate.

Registration is required for publishing in the institutional spaces but all course contents are accessible to anyone.

3.3.2. Course duration/structure

The course should run for about six weeks, a duration which seems, from empirical data, to work well. In some circumstances, the duration can be shorter or longer if course organizers have sound reasons for that.

The first week should be dedicated to the familiarization process – a sort of "boot camp" to get participants acquainted and familiar with the environment, technologies and work and communication processes to be used throughout the course. This is a key phase in the process and may contribute significantly to a better retention rate, not only because it gives participants enough time to become sufficiently proficient to be able to work and communicate before starting to engage with course contents, but also because it fosters the development of the learning community that is paramount in this approach.

The remaining weeks should be organized around topics, with suggested activities/tasks to explore these topics and support learning, accompanied by resources tied to these activities/tasks.

3.3.3. Technological environment

The learning environment should be intuitive and require only short adjustment period, that can be achieved in the introductory, boot camp week.

If a Virtual Learning Environment [VLE] or Learning Management System [LMS] is used – typical examples are Moodle and Blackboard - it needs to be enhanced with social features, or combined with a community/network-like environment to foster relationships and interactions. Examples of this environment are Elgg and Drupal.

It is imperative to avoid "school-like"/"classroom-like" environments as the main space where activities take place and participants publish and interact. In the impossibility of providing such an environment, then participants should use their own *Personal Learning Environments* [PLEs] - their own blog or website, Twitter/Facebook/Google+ account, etc. - to perform most of the tasks, engage in the interaction and publish their artifacts. Tags and hashtags need to be used so that course-related content, resources and interaction can be found. Ideally, some sort of aggregation should be put in place to make it easier for participants to follow the course activity.

Some key features (when an integrated environment/platform is used) are:

- Activity Stream

- Rich Profiles

- Personal writing space (blog or equivalent)

- User dashboard to aggregate their publications or those of the people that they follow. Own content published could also be aggregated in the profile page

- Microblogging (like Twitter) or updates (like Facebook or Google plus); if not possible, a good integration with at least one of these networks is desirable

- Possibility for group creation by participants or by course organizers to support group tasks.

- Social connections - follow (like Twitter), OR friend (like Facebook), OR circle (like Google+)

3.3.4. Learning Process

Learning is **learner-centred** and based on the realization of e-tivities.

Learning should be evidenced through the creation of artifacts (texts, videos, presentations, audio podcasts, slidecasts, mind maps, mash-ups, etc.), published online and freely accessible, that demonstrate the learner's reflection, knowledge or competencies regarding the material studied and the topics being addressed. These artifacts are the output of the suggested tasks or result from participants' own initiative, and constitute a key factor in supporting and fostering collaboration and dialogue in the learning community.

The learning process combines autonomous self-study and reflection with interaction with other participants in an open social context. Participants are expected to take an active role in and be responsible for their own learning, but also to actively engage in helping build a supporting learning community.

In a networked/community learning setting, collaboration does not mean "to work in a group". Collaborative learning results from people sharing artifacts (posts, articles, videos, presentations, audio podcasts, mindmaps, infographics, etc.), either created by them or by others, providing links to relevant resources, aggregating useful information and taking part in the dialogue and interactions that develop within the network/community. However, group-based tasks can/should be suggested when they are considered adequate and effective for some learning purposes.

3.3.5. Teacher's Role

A non-formal, free course cannot rely heavily on teacher time and presence. Teacher participation in the course needs to be very well thought through – a bit here and there, strategically – but in a massive course participants cannot have the expectation of interacting directly with teachers or seeing a lot of presence on their part.

Learning support cannot be assured through direct and ongoing teacher intervention, nor through direct and systematic intervention of the facilitators. It has to rest on the documentation and resources provided, on strategically scheduled communications from the teacher and on an active and engaged learning community, through collaboration, dialogue, peer feedback and active engagement from participants in the learning process, making it also a community of practice.

Teacher/teaching presence is created through the Learning Guide, the detailed instructions for the tasks, some resources (video and/or audio presentations) and a weekly feedback message, based on the information prepared by the facilitators' team. One or two synchronous sessions (Google Hangout, web conference, etc.) during the course (third and fifth week, for example), preferably with one or several relevant guests, should be used to increase teacher/teaching presence, strengthen the social ties in the learning community and serve as "magnets" for retention.

3.3.6. Participant/Learner's Role

Because MOOCs are not formal learning, we need to accept that there will be very different motivations, that people will work many different hours, put in different levels of effort, etc. We also need to be aware that there will be times when people won't find the time to keep up with the course (family, work, all the responsibilities they need to juggle). Since it's not something they "have to do", it will sink in their priority list when daily life gets tough.

Participants/learners are expected to take an active role in and be responsible for their own learning, but also to actively engage in helping build a supporting learning community. Success in a MOOC needs to be measured against participants own goals, interests and satisfaction level, not against predefined learning outcomes.

Given that the learning process lies on the participants and that they have a responsibility to sustain a learning community, it is important to maximize and recognize/reward the effort and contribution of the most interested and motivated users, so that they can serve as role models and incentivate others to be active. Whenever possible, badges and/or a "reputation" system should be put in place to stimulate and recognize/reward engagement by participants.

3.3.7. Facilitators' Team

A small team of volunteers (Master's and/or PhD students, enthusiasts, etc.) should be recruited in order to collaborate with the teacher or teachers leading the course. This support team will gather information that may be relevant to better run the course and substantiate the teacher's weekly feedback, act as "community facilitators", monitor social or information networks for course related content and help out in setting and deploying the synchronous sessions, polls, peer assessment and other tasks considered necessary.

3.3.8. Activities

Typically, activities/tasks have a weekly schedule, although in some circumstances, when they are more complex or integrate several steps that require more time, they could span for two weeks.

Whenever possible, activites/tasks in ECO sMOOCs shouldn't be too rigid, with heavy dependencies between tasks and very structured paths, which makes it impossible for people to recover or come back in the course if they lag behind at some point. Flexibility is very important in making room for the differences mentioned.

A variety of suggested tasks should be made available, supporting and scaffolding participants' exploration, reflection, production and dialogue. As far as possible, these tasks should be authentic, i.e. emulating or mobilizing real life settings, drawing on participants' personal and professional experience, flexible and open ended, which means participants should ideally have a fair amount of choice concerning the process of performing the task and its output – the artifact they will produce to demonstrate their understanding of the topic and their competences in applying that knowledge. At least some of the tasks should also be designed in such a way that they can be performed at different levels of difficulty or complexity, to account for the expected broad spectrum in participants' knowledge and skills.

Group-based tasks can be an interesting and valuable strategy for some learning situations. When such tasks are present, a system needs to be set in place that makes it easy for participants to join a group and perform the task effectively.

3.3.9. Bank of Challenges

Besides the designed weekly activities/tasks, a collection of "challenges" should be made available. Participants can choose some challenges from the bank to complete if they have the time or want to do some extra work. They can obtain badges for successfully completing these challenges and later include them in their e-portfolios. This adds flexibility and diversity to the learning experience, creates more objects/"events" around which dialogue can develop, and provides an interesting focus / common ground for people participating in courses without a fixed start and end date.

Suggestions for challenges can be contributed by participants and those reaching a defined point of agreement by the community – either using polls or other voting systems – should be included in the bank.

3.3.10. Learning Materials / Resources

Resources provided as support for learning are tied to the topic/activities/tasks, i.e. presented in the context of a learning activity/task, not as items in a repository. They can take a wide variety of formats, just as in any learning context. Any digital object (text, image, video, audio, presentation, mind-map, mash-up, etc.) can be relevant for a given learning experience, and there should be a selection of different formats and types to accommodate for the diversity in participants' personal characteristics and preferences.

All resources and materials are licensed as Open Educational Resources or freely available on the Internet. These can be already available OERs or, in their absence, OERs produced by the institution offering the course. In this case, course organizers should consider the need for a support team that can assist in the production of resources that require technical expertise (video, audio, simulations, etc.).

Ideally, the video and audio resources provided, besides being available through streaming, should also be made available for download in formats compatible with most platforms - Windows, MacOSX and Linux (desktop and portable); iOS, Android and Windows (mobile devices). These resources should not be made

too long – up to 10 minutes for videos and five to six minutes for audio – and avoid traditional, instructional communicational strategies. They can be used to introduce the weekly topic, motivate participants for the suggested tasks and the learning involved, present or clarify concepts, demonstrate procedures, offer problems to be solved, or invite experts to share their views and experience, to give some examples, but they should distance themselves from traditional lectures and adopt a more conversational, dialogue-inviting style typical of web 2.0 communication and culture.

Artifacts produced by participants as evidence of their reflection and learning become part of the course materials, i.e. they are available for other participants to learn from.

Participants should be encouraged to use an open license for their artifacts, but ultimately they will be licensed according to their authors' preferences.

3.3.11. Communication and Documentation

Communication from course organizers, typically teachers, throughout the course and the documentation to scaffold learning need to be carefully planned. Regular messages (Opening message, weekly feedback, course announcements, reminders, etc.) help maintain the focus and the "teaching presence". Some of these messages can be presented in video (opening message, for example) or audio (some of the weekly feedbacks, for example) to increase the perception of "teacher presence" by participants.

Two key elements to support and scaffold learning are a) the **Learning Guide** and b) the **detailed guidelines** for the suggested tasks.

a) The **Learning Guide** aggregates all the necessary information participants need in one single place/document. Course goals, learning objectives (when defined), average workload per week if participants do all the suggested tasks, learning process, topics covered (contents), a summary of the suggested tasks, main resources, schedule, assessment and certification.

b) The **detailed guidelines** (typically one document per topic/week) describe in detail the learning goals (if these are defined), the average workload estimated if a participant does all the tasks/steps suggested, how the suggested tasks for that topic/week can/should be performed, the resources provided as a starting point to support learning, the expected output of the task, i.e. the characteristics of the artifact participants are expected to create/produce and share, alternative learning paths for that topic (if they exist), suggested actions for participants (search and share relevant resources, comment on other participants' posts, do a challenge, etc.), elements of diagnostic or formative assessment provided or any other aspect considered important for that topic/week.

3.3.12. Diagnostic and Formative assessment/Feedback

Formative assessment with self-correction should be made available (through tests, quizzes, etc.), that focus on relevant aspects of the topics being discussed or important elements in the resources provided. Participants must also be encouraged and are expected to discuss and give feedback to one another throughout the learning activities. A regular, more general feedback on the work done each week should be provided by the teacher, based on the information prepared by the support team. Other devices that have a formative/feedback value are the badges obtained from the completion of tasks or from completing

challenges in the "bank of challenges", and the points/status/likes/pluses etc. gained from reputation systems, when these are used.

Self-assessment quizzes: can also be used as diagnostic, to anticipate relevant content presented in a resource.

3.4. Gamification

Gamification is the use of game mechanics to enhance learning by strengthening learners' engagement in learning experiences. Research has shown that game mechanics provide learners the ability to experience tasks within a meaningful and story-like safe environment to explore, stimulating motivation, reinforcing progress, allowing for non-coercive failing and encouraging out-of-the-box thinking.

Game mechanics share some relevant structural similarities with instructional and learning design, while being able to enhance the interactive and emotional aspects of the present pedagogical model. In this sense, gamification scholar Karl M. Kapp (2012) defines game as "A system in which players engage in an abstract challenge, defined by rules, interactivity, and feedback, that results in a quantifiable outcome often eliciting an emotional reaction". Gamification, at higher or lower levels of implementation and complexity, depending on the needs and intent of course organizers, can be used to enhance communication and interaction in the learning community and provide a more rewarding and meaningful learning experience.

- **Story Mode / Challenges**: In order to do so, when basing a course on this perspective, instructional design must go beyond "structural gamification" (the superficial addition of "points" and "badges") and reach "content gamification": the stage where all course elements are conceived under game-thinking, adding story-like elements from the beginning of the course (for instance, starting with a challenge instead of a list of objectives). Under this perspective, contents and objectives are structured under a story-like narrative that encourages emotional engagement to the course material: the course's syllabus and all weekly learning materials could follow the same game-like structure, proposing meaningful challenges to the participants in order to progress through the course's story narrative.

- **Badges, Levels and Points**: Badges could be awarded to participants when completing special course actions, such as the mandatory assignments defined to obtain an informal certificate of completion. Additionally, a point system in which participants earn points with each task or activity they have completed could help them monitor their own course progress.

  - **Achievement System** (See also: Bank of challenges): "Achievements" are a very popular award and reinforcement system in computer and console gaming which has proved equally useful when motivating action in learning environments. Game designers (or instructional designers) can specify an extensive list of participant actions that will be rewarded as special accomplishments. While "Badges" are focused on special learning challenges, achievements are mainly designed to encourage interactivity and engagement in the course. For instance, posting in a forum thread, publishing a blog post or sharing an artifact could be considered some initial achievements.

- **Karma System:** Karma is intended to be a numeric indicator of the participants' level and quality of course engagement. It could be developed in two ways:

      ○ **Forum Karma:** An "upvote-downvote" system could be implemented to the forums in order to encourage interactivity and high quality submissions. Participants could be able to "upvote" (give 1 point) a good forum submission and "downvote" (-1 point) those which are not helpful. This way, helpful and rich submissions would earn karma points to those who submit them.

      ○ **General Karma**: An additional algorithm that includes forum karma, badges/points and achievements could be created to provide a user's general karma.

Karma points or the General karma gained by a participant can then be combined with other elements (peer-assessed artifacts, eportfolio, etc.) to obtain a certificate of completion, when considered adequate.

3.5. Certification

Apart from free recognition options, such as badges and/or a certificate of completion, most ECO sMOOCs will provide an access route to formal accreditation, in ECTS, to be offered as a posterior additional paid service.

3.5.1. Certificate of Completion

This is a free, non-formal recognition of the work done by the participant in the course, and will be obtained through a peer-assessment process. Participants who wish to receive a certificate of completion will have to participate in this process, assessing and grading the work of three other participants, while their own work will be assessed and graded by three different peers. Participants who do not wish to get such a certificate will do their work as usual (publish their artifacts, take part in the interactions, do the tests, when available, etc.), without getting involved in this process.

Items to be assessed as evidence of learning are, for example, some of the relevant artifacts produced by participants (typically 2 artifacts), a final project, an e-portfolio containing a relevant sample of their work in the course (at least two of the artifacts produced, the badges collected, when available, points gained from reputation systems, when available, relevant contributions not included in the tasks, etc.), summative tests, either automated or peer-assessed, a combination of these elements, etc. Other strategies and instruments can be used, depending on the needs and characteristics of a particular course, as long as they are based either on automated or peer assessment.

The scale used can be either quantitative (e.g. 0/10, 0/20, 0/100) or qualitative (e.g. 4 or 5 different levels), but the final grade will be the average obtained in the 3 grades received. If that average is positive, the participant will receive the certificate of completion.

All assessment and grading, with the exception of possible automated solutions, will be based on detailed rubrics provided by the teacher or teachers leading the course.

A system must be set in place to facilitate the peer-assessment process, guaranteeing a correct distribution of items to be assessed by the participants involved.

3.5.2. Formal accreditation by an accredited institution

ECO sMOOCs may offer participants the possibility of obtaining formal credits, for a fee, after the completion of the course. Those credits (ECTS) will be awarded following an evaluation by a teacher of the work done in the course. It can be based on the assessment of all the artifacts produced by the participant, of a relevant selection among these artifacts, of a final project, of an e-portfolio aggregating and organizing relevant evidence of learning, a combination of these elements, or any other element that the teacher and course organizers define as adequate, depending on the characteristics of a particular course.

This can be combined with a final, face to face assessment, when deemed adequate. In some cases, videoconferencing can be used for such an assessment. If an exam or other types of face-to-face (or synchronous, online) summative assessments are used, each of the two elements – work in the course and face-to-face assessment have a ponderation of 50% in the final grade. For the formal accreditation to be obtained, the final grade needs to be 10 marks or more, and cannot be lower than 8 marks in either one them, if a scale of 0/20 is used, or the equivalent if another scale is chosen.

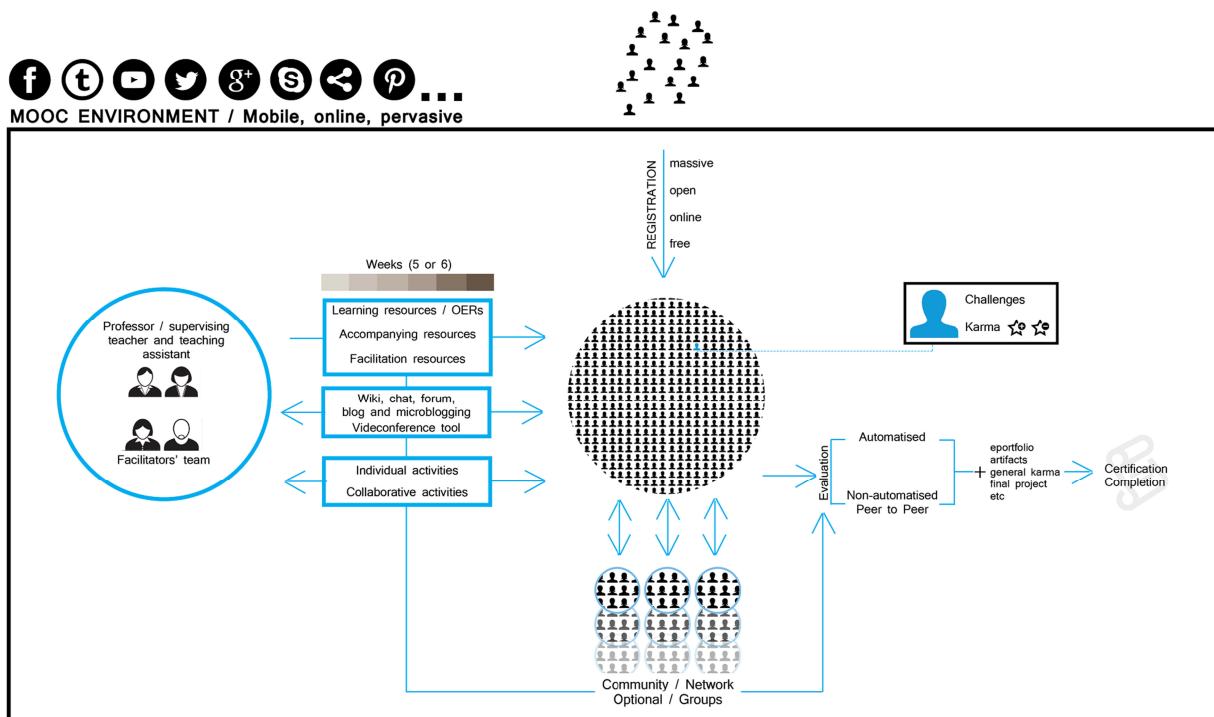# 4.   Essential pedagogical components for ECO sMOOCs

The pedagogical model provides the context for the design of ECO sMOOCs. Depending on the nature and contextual needs of each course, this model can be implemented in many different ways. However, all ECO sMOOC should incorporate the following essential components.

- Courses are open to everyone who wants to participate. Registration is required for publishing in the institutional space but all course contents are accessible to anyone.

- The course should run for about six weeks. The first week should be dedicated to the familiarization process - boot camp week. The remaining weeks should be organized around topics.

- A small team of volunteers (Master's and/or PhD students, enthusiasts, etc.) should be recruited in order to collaborate with the teacher or teachers leading the course.

- Resources provided as a starting point for the realization of the activities are licensed as Open Educational Resources or freely available on the Internet.

- Two key elements to support and scaffold learning are the Learning Guide and the detailed guidelines for the suggested tasks.

- Bank of Challenges and Gamification are used in order to motivate, reduce drop-out rate, allow participants more freedom of choice and reward engagement and contribution.

- There will be a diversity of activities and tasks to support and scaffold participants' exploration, reflection, production and dialogues. Participants should ideally have a fair amount of choice concerning the process of performing the task and its output – the artifact they will produce to demonstrate their understanding of the topic and their competences in applying that knowledge. At least some of the tasks should also be designed in such a way that they can be performed at different levels of difficulty or complexity, to account for the expected broad spectrum in participants' knowledge and skills.

- If a Virtual Learning Environment [VLE] or Learning Management System [LMS] is used, it needs to be enhanced with social features, to make it like a network/community environment. If this is not possible, it should be complemented with another environment that provides these features and functionalities.

- ECO sMOOCs have well designed peer assessment rubrics and use AI engines for the integration of massive qualitative assessment.

- All ECO MOOCs will offer the possibility of obtaining a non formal certificate of completion according to the requirements defined for each particular course.

- ECO MOOCs may offer participants the possibility of obtaining formal credits, for a fee, after the completion of the course.

Figure 2: Essential pedagogical components for ECO sMOOCs

5.   Scenarios of ECO sMOOC users

5.1.   Characteristics based on target group in general

ECO targets teachers, tutors, learners, institutions and industrial players. One of its main target groups consist of teachers, teacher trainees and teacher trainers. On the one hand teachers need to be educated and trained in the design and use of MOOCs, in their role of learners. On the other hand, these teachers also design and provide MOOCs, in their role of teacher and tutor. The main aim is to present new forms of accreditation of knowledge concerning processes of communication, creation and utilization of MOOCs. ECO also aims to bridge the gap between social classes in their access to education and support them in particular in developing key competences such as digital skills.

Massive Open Online Courses can attract participants who might otherwise have not been able to attend traditional on-campus instruction because of work, family and other obligation. The diversity among

MOOCs participants are even higher, attracting people with different cultures, motives and intentions. Not always with strong learning goals while the personal objectives might even change during the course.
In general:

- MOOCs are positioned between informal and formal learning -> different kind of motives of people enrolled.

- The actual outcome differs largely between participants and most likely will differ from the learning outcomes from the course design beforehand.

- As such the design of the learning material and of the open courses should incorporate different student groups.

- We should measure the actual outcome of the (changing) intentions of the persons using ECO sMOOCs

- The design of an open course should incorporate these changing intentions and allow multiple outcomes.

- Special attention should be given to those potential student groups that really don't have yet access to HE for all kind of reasons.

We can define possible/expected learning outcomes as guidance for participants if they do the full course, but shouldn't put too much weight on that. Because of the very diverse objectives and motivations people have when they enrol in a MOOC, they can do only a part of the course, or invest on those aspects that are meaningful to them but not on others. The idea of success, in this context, has to do with your expectations and objectives, not so much with fulfilling the learning outcomes defined. With ECO sMOOCs we must not use the design principles to pre-define (all) learning outcomes. I.e., MOOCs must enable the possibilities to adapt to the changing intentions of participants during the course. This also refines drop-out and retention rates. For example a MOOC offers 10 possible badges, but a participant can complete a MOOC successfully with fewer badges and even some additional badges are given for complex task-completion not designed beforehand. However, at the start it should be left to contextual decision to include, or not, a definition of (possible) learning outcomes, depending on the nature and characteristics of the course.

MOOCs should take into consideration that all learners are different and that a monolithic course design that is not able to appeal to different kinds of student needs and abilities is going to alienate a large percentage of them. Contents and activities should guarantee that learners can access and build knowledge by different means, in various formats and with different learning strategies. This is especially relevant when approaching people with different professional training backgrounds.

As such we advocate that we need a thorough discussion about success of a MOOC in relation to indicators as retention and drop-out rates (as part of success criteria as promised in DOW). The conspicuous success of MOOCs in enrolling massive numbers of participants had to be tempered by low completion rates. Jordan (2014) found that the majority of 279 MOOCs analysed had completion rates of less than 10%; the median completion rate was only 6.5%. Low completion rates might indicate that the open nature of MOOCs allows participants to enrol on courses for which they are ill-prepared; however, many MOOC

participants appear well-qualified, if not over-qualified. Because of the very diverse objectives and motivations people have when they enrol in a MOOC, they can/will do only a part of the course, or invest on those aspects that are meaningful to them but not on others. The idea of success, in this context, has to do with your expectations and objectives, not so much with fulfilling the learning outcomes defined. It's quite possible that flexibility should be built in to the definition of success in a MOOC, so as to acknowledge that different contexts need different outcome. Perhaps try out a bunch of different possible definitions of success, including the experience and attitude of the learners and the teachers. As to practice good model design – we don't want to decide on our metric after the fact. A great way to do this is to document it in an open development environment. That will time-stamp our plan and working definitions and allow others to comment.

5.2. Personas

This section describes different characteristics for *personas* within these target group(s).

★ **Persona for ECO MOOC designer/teacher**

Irma works at a college in the Netherlands. One of her main classes is on digital literacy. She teaches this class to university students and teachers training. The course is very diverse, covering topics on how to use a browser and interpret search results, information retrieval, social media, use of tablets, mobile devices in classroom education. Her course is well-received and students obtain good grades. In current society digital literacy is a very important skill for all citizens as the use of ICT has invaded our life completely. Even in our personal life we no longer can avoid using ICT. Everybody uses the Internet to browse, to book holidays, to handle finances, to connect to friends, etc. However, not everybody knows how to deal with it properly and security. Therefore Irma considers it very important that her excellent course becomes available to a wider audience than just her college students, but also to youngsters, parents and the elderly. Her course is already set up to actively involve students as they need to practise using the various tools. So there are all kinds of assignments students have to complete, either individually or in a small group. This can even involve setting up f2f activities such as demonstrating the use of tablets in a lecture. Most assignments require that students react to each other's work, such as posting a comment on a blog post, replying to a question in a forum. For example when explaining the uses of a blog, students practice this and have to write a blog post, read blog posts of others and comment on the blog post. In another assignment, students need to find at least two peers, agree on a topic and jointly write a wiki page. Furthermore there are plenty resources available on the Internet that Irma can reuse in her course. Therefore it should not take a lot of effort to make her course available to a wider audience.

★ **Persona for a MOOC participant**

Peter is a teacher at a secondary school. Almost all his pupils have a mobile phone that they seem to be glued to. It is very hard to get the pupils to turn off their phones and pay attention to the teacher. Forbidding the use of the phone does not seem to help. Peter is also aware of the many apps that are being made available for smartphones and wonders whether he could turn a nuisance into good practice. Another new development is serious games. Most of his pupils spent a lot of time in playing games, but they can hardly be considered to be educational. Peter's school also participates in the 'Academic School', an initiative that brings research into school. His colleagues he participates in this research were quite enthusiastic about the opportunities of serious games. Peter decides that he wants to find out more about

serious games. However, he is a full time teacher and also trains the local football club, so he has no time to attend course. A colleague informed him about the new ECO MOOC platform that offers a MOOC about serious games, instructing how to develop your own game. This MOOC is available online and Peter can access it whenever he has a spare moment. Moreover, this ECO platform seems to be quite innovative, applying the latest in instructional design, activating and motivating student by engaging them. This particular MOOC has implemented part of the instruction in a game, creating an immersive and authentic task. Moreover, one of the assignments is to develop a small game. He decides to give it a try and signs up for this MOOC.

★ Persona for a group / subnetwork

Marco, Chiara and Marta are 18 years old and they attend the last year of high school in Brescia. They don't like to study math too much but they would like to enroll at university, next year, for studying Engineering. They know that they have to improve their STEM competences, math in particular, in order to pass the university pre-test. They are very confident with internet and with mobile tools use they use more for communicate with friends then for studying in a more effective, proactive and creative ways. They really like to find a different approach to learning able to stimulate their attention and improving their understanding of the content. They heard through Facebook about an online Italian course in math done by a good scientific university based on brief videos and online activities that seem interesting. They mention it to their teacher (Maria) who proposes them to enrolled in ECO platform and follow the course as integration of their "traditional" didactics. Students will follow video at home and participate to forum discussion launched by MOOC teacher. Then they work in class with the teacher for clarifying doubts and go deeper in particular arguments.

★ Persona for a MOOC teacher with high risk of exclusion from technology adaptation due to special needs

Javier is a 34 year old, blind teacher of Literacy at a secondary school in Madrid. He is also part of the ONCE (Spanish National Organization for Blind People) training team related to future teachers, current teachers that could have pupils with special needs, and future teachers who are visually impaired, just as him. Related to this last one group, Javier teaches them personally in a classroom of ONCE's building in Madrid. Some of them arrive frequently late and seem very tired, because they live far away from there and it takes them a very long time to be on time with public transport. In addition, there are still subway stations which are not completely accessible. One day reading e-mail newsletter of the school where he teaches, Javier has news of a recently new platform, called ECO MOOC that would let him to create his own course on the Internet. Javier is interested in the platform and finds that its design, implementation and content do not present any barrier to users with special needs. Specifically, he is interested in the accessibility of blind or visually impaired users. Javier appreciates the benefits that the platform could provide their students with special needs. They all have a computer at home with internet connection and suitable for their needs, so they would not have to travel every day to the building of the ONCE and, therefore, their quality of life would increase considerably.

★ Persona for a MOOC teacher with high barriers to technology adaptation

Julia is 58 years old and for the last 30 has worked as a professor of Art History at the University of Seville. The University has initiated in recent years an ambitious e-learning courses plan. Due to her age and humanistic education, she doesn't feel comfortable with new technologies. Her point of view is that online

education is a step back. She considers it more individualistic and criticizes the lack of contact and interaction. "With all the students locked in their small screen, there is no possible debate." Also, she doesn't understand how she could execute her *facilitating* teacher role. She believes that her work will be limited to providing Internet contents, just like a vending machine, and to evaluate. Thanks to a paper magazine specialized in education, Julia is interested in ECO MOOC. The headline says that this online e-learning platform is based on the interaction of students in forums, chats and social networks. In ECO MOOC the students read, display and listen to the contents provided by the teacher and, then, they discuss in the forums. They also read and watch another documents and videos on the Internet. They appropriate the meaning, reinterpret it and share it back again. Julia is interested in some of the courses that are already operating in ECO MOOC and recognizes that the comments of the students present thoughtful insights and a valuable critical thinking skill. When she encourages to create her own MOOC course on Art History, she discovers that her teaching role is not limited only to upload videos and readings: the platform expects her application of teaching techniques to encourage debate and guide students. It is also important to note that she has not had any problem about uploading content: the platform is very intuitive and doesn't requires long time of adaptation. Julia finds that her knowledge has reached many more students and that their comments on forums, as well as e-practices, demonstrate the achievement of a proper learning. Some students have written Julia by e-mail that they are very satisfied with what they have learned and would like to do more courses developed by her.

5.3.   Scenarios for Possible Implementations

Scenarios for possible implementations offer more concrete and more detailed examples of how particular courses, or particular strategies and solutions, can be designed and   implemented within the framework of the pedagogical model, depending on the specific nature, needs and intents of these courses.

5.3.1. Scenario A. Focus on Groups

One of the main assets of ECO MOOCs is their ability to propose innovative strategies that allow the building of educational network practices under a true participatory culture in which participants are able to build their knowledge not only individually and in an isolated fashion but fundamentally in a collaborative and collegial learning environment. Under this proposal, groups are not to be considered isolated learning environments in which learners would only interact with other group-members, but open small communities of collaboration that are inserted in the larger learning community. This way, participants can interact and share learning experiences both individually and under the umbrella of "teams" or groups, which could informally arise (learners create their own groups) or be formally proposed by the teachers as necessary to completing some tasks. Groups or teams could have their own name-brand, logo, (open) profile page, activity feed and behave as small community-like nodes that interact with other groups and learners inside the larger network.

We present the following architecture proposal to develop specific group activities that allow for peer to peer assessment:

a) Creating groups :

In this scenario the system will use an automatic algorithm to assign the course a number of groups based on the number of participants. This number of groups will be calculated automatically and proportional to the total number *active* participants in the course. Overall, we consider that a number of participants per group inferior to 5 would not be pedagogically satisfactory.
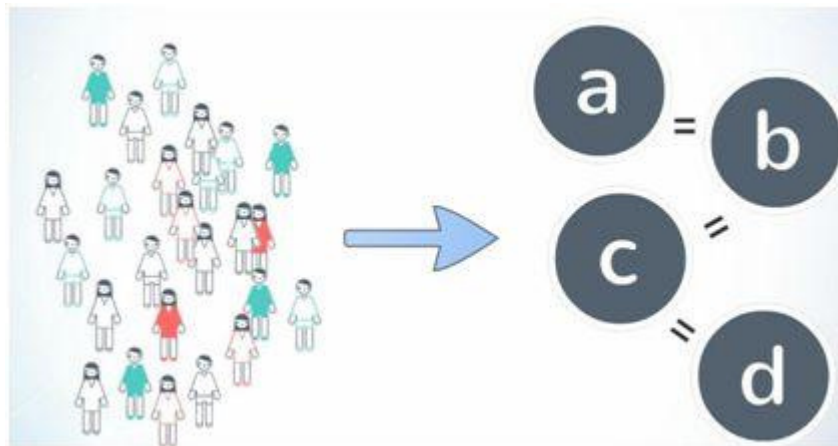
Figure 3: Creating groups

● In the case of group activities, the section "Activities and Assessments" or equivalent should show a set of tables (one per team , with a number or letter assigned to each group) which in turn will include a number of cells equal to the number of participants per group.

The learners may easily choose to join the wished group/team (e.g., by clicking on an empty box or an icon). Once the user has joined one of the groups, his name will now appear in the box that was previously empty. Along with each learner name, one or two icons would give other users access to relevant information about their professional / academic profile and their location. This way, the users will always have easy access to relevant information about team members in order to decide their attachment to each group based on the profiles and locations of their members.

Figure 4: *Group Selection Mode*

b) Group workspace and collaborative tools:

- Ideally, a truly comprehensive and collaborative-oriented learning environment must make available to the students the necessary tools for the realization of collaborative learning activities, without forcing students to use external tools (such as Google Drive, EtherPad),

- Therefore, once the groups are created, the platform should include a space in which members of the same team can interact and do their assignments collaboratively. This space should ideally include tools such as:

  - Editable and collaborative hypertext documents (alla Google Drive or EtherPad / Wiki).
  - Chat.
  - Internal Group Forum.
  - Videoconference tool.

Examples of group activities:

Forum Discussions:

It is important to begin with thoughtful questions, anecdotes, practical examples, illustrative quotes, current events, or controversial statements about the lecture videos and/or readings viewed during the course/module and setting clear expectations for participation and civility.

Practical example:

1. Ask a question, report a passage, make a statement, etc., that relates to the course content.

2. Ask learners to form groups and explain how the activity is going to be organized (deadlines, reply modalities, format of the contribution).

3. Allow learners a few days to organize and develop their work using the forum, the collaborative environment or social network.

4. Each group have to give his own response, through a forum message, to what was proposed in step one.

5. After this task, each group is allowed to talk only about other group's ideas, not expand on their own ideas.

Wiki collaborative work:

1. Present the topic: Ask a specific question that involves a key concept from lecture or propose groups to work together in developing a specific argument. Give also instructions on how to organize group spaces in the wiki.
2. Student reflection: Allow learners a few days to organize and develop their work.
3. Writing: each group have their own wiki page where they develop the argument.
4. Assessment of content: this can be organized as group-to-to assessment in a flux: group a > gives feedback to > group b > group c > group n > group a. Feedbacks will be added directly in the wiki in a different colour.

G2G - Peer to Peer (Group to Group) Assessment for collaborative activities (See "Collaborative activities")**:**

○   Once a team or group of learners (A) upload their task, the system will randomly assign to all its members the final work of another group (B) for their assessment. This way, each member of the group A will individually assess the work from group B according to a detailed assessment rubric. Once all the members of a group have completed their assessment of the other team's work, the system will provide a final note for it (by arithmetic mean).
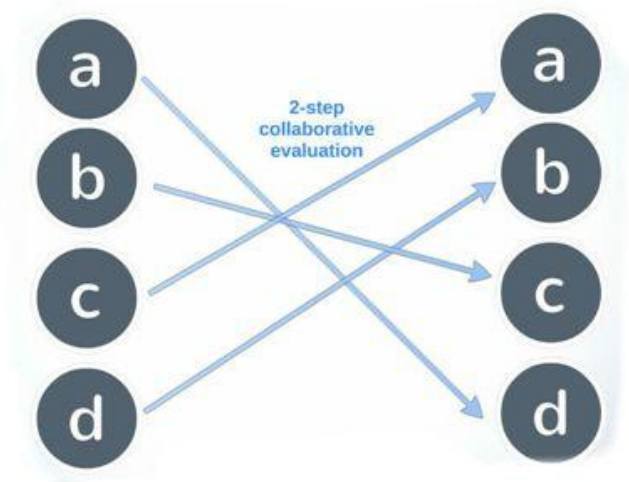
Figure 5: *Assessment for group activities*

○ However, we consider it necessary that the members of the assessing team have the ability to cooperatively discuss the assigned final grade, even by changing the automatically generated mean. For this discussion, each team will have a specific forum (or a thread on the group's own forum) and a short deadline.

5.3. 2. Scenario B. Extensive use of Video and Audio

Video

- each video has to have a specific and clear objective;
- video should last among 2-10mins;
- it may be associated to writing content to be downloaded;
- every 7-8 seconds of video something should happens in order to keep high the users' attention (e.i. let an image, an animation, a tag appear on the screen; let an object appear or used by the teacher in the video; etc…);

Figure 6: Example Video 1

-   try to record videos interchanging different formats (e.i record video in external; use interviews; change perspectives; use different supports;

Figure 7: Example Video 2

Figure 8: Example Video 3

Figure 9: Example Video 4

Figure 10: Example Video 5

Audio/ Podcast:

Advisable length should not surpass five or six minutes, in order to keep high the users' attention. Function or role of audio contents is to facilitate general ideas and not necessarily specific questions.

-   They must be composed of a clear voice, lively and suitable music and relevant testimonies, as well as a restricted number of sound effects.
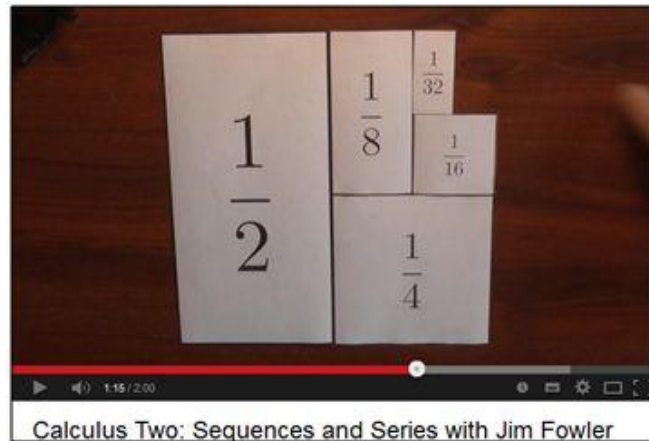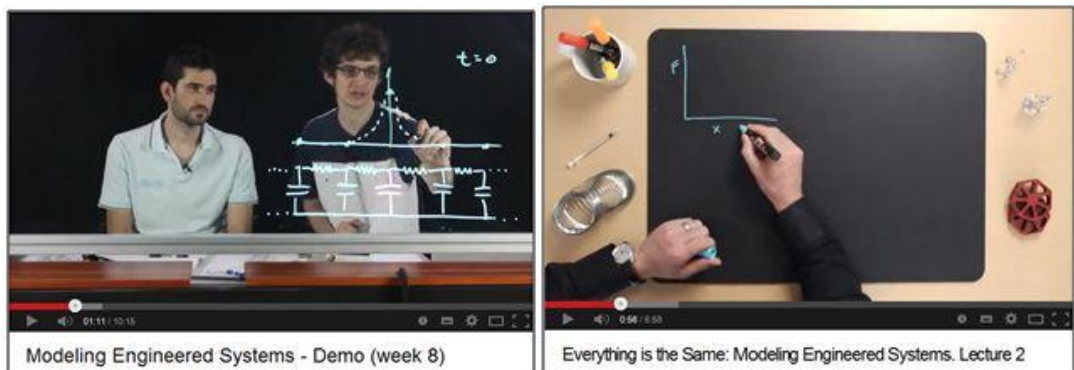-   They must begin with a voice which describes the following information: Course Name /Subject / Lesson /Content or Activity (according to the context of the course).
-   Contents to be identified by the opening audio sequence.
-   To be downloaded in MP3/MP4 or played in streaming.
-   Compatible with: Windows, MacOSX, Linux (desktop and portable); iOS, Android, Windows (mobile devices).

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Annex 1   Aligning pedagogical framework and ECO platforms

This is work in progress and functions as illustration only.

- The ECO platforms should be MOOC platforms and thus meet the requirements of a MOOC.
- The ECO pedagogical framework is based on networked learning principles, meaning that the learner is put central and that learners learn by interacting and sharing with others.
- The ECO project aims to serve those persons at risk of exclusion and therefore the platforms and the MOOC design should accommodate those.

Pedagogical requirements
   Networked learning features must haves
   Networked learning features should haves
   Peer feedback must haves
   Diversity of activities must haves
   Other pedagogical must haves
   Other pedagogical should haves
   Other pedagogical nice to have
Technical requirements
   Content requirements
   Accessibility requirements
   Mobile requirements
Platform requirements

Pedagogical requirements

These requirements are defined in chapters 3 and 4 of D2.2.

Must haves:

- networked learning
- peer feedback
- peer to peer assessment
- diversity of activities

Networked learning features must haves

Feature	priority	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Forum and Blog	1	yes	1 forum and 1 blog per course available. Permissions can be given to students at teacher's discretion to creating threads, blog entries, etc. Personal blogs can be	Yes. You can create - optional - a forum and a blog by course. A good example is how OpenMOOC is been used in https://mooc.educalab.es, Ministry of Education of	No	No	Yes	1 forum per course available (see row below), possibility of opening an additional forum for each module (not required - at teacher's discretion)

			setup in the users profile page if needed.	Spain to train teachers.				
Activity stream	1	yes	Yes, wemooc keeps track of every user activity try and is used to calculate users progress.	No but it's an important thing to develop in the OpenMOOC roadmap.	Yes, ARLearn keeps track of a user's activities. These actions can be exported to a stream.		Yes, on social interaction module	each course has its own schedule page
Microblogging	1	yes	No out of the box, but can be installed through Social Office features (open-source and free).	Yes. You can use blogs (wordpress) integrated in each course and you can install a microblogg/share modiule on it.	No		Yes	not integrated into EdX. In case needed, effective microblogging tools such as Twitter will be used
Chat		yes	Yes and can be improveed with a Jabber server on the	It's really easy to integrate a chat tool in OpenMOOC.	Yes	No	Yes	no

			hub side.	The open source architecture had been designed to integrate elements, reuse, federating services and enabling unified registration, login / logout and integrated with other like ECO, using open standards.				
Collaboration tools		yes	On separate pages, not integrated into course content, integrated into the course environment.	Yes. Forum and Blogs are the tools to get it sharing works, peer reviews..., like I can read in D2.2-4.1.4.	No	No	Yes, both in the course and in a more open	basically teachers are required to use forum also for collaboration, but they can activate a wiki / an additional forum at their

									discretion
Wiki		yes		There is a course wiki on separate page, but not for individual learning activities.	It's really easy to integrate a chat tool in OpenMOOC, like I explained about Chat.	No	No		yes (not required - at teacher's discretion)
Rating		yes		Yes, can be enabled at hub manager discretion.	?	No	No		"like" feature is available for forum messages only.
Sharing		yes		Yes, can share the course profile. Twitter and/or FB sharing can be installed in course pages at teachers/hub	Yes. Forum and Blogs are the tools to get it sharing works, peer reviews..., like I can read in D2.2-4.1.4.	Yes, users can share their ARLearn courses with other members.	No		Share on twitter and facebook just subscription to course X

			s manager discretion.					
Annotating		yes	Yes, can be enabled at hub manager discretion.	?. Yes, following the description added by Santi Fano, this requirement OpenMOOC complies with forum tool. We can add a wiki tool, in fact, it's a thing to do in our roadmap.	No	N		both on the forum and on the wiki: each participant is able to annotate messages / assignments / contributions of other participants
moved to top								
Content syndication			?	Yes. Feeds allowed on each course to share info.	Content can be syndicated via OAI-PMH			
Group formation by		yes	No	?. Is about what is	Yes. One can define teams	No		no. In our personal point

system					explained in D2.2-6.3.1?. If this requirement is like Santi Fano says, is a "not". But, OpenMOOC is a well known MOOC platforms, we developed from scratch the main parts an all the integration and reguistration system, we can develop this requirement and publish it open source, of course.	of users for each "course play"			of view, this feature should not be a compulsory one, but a "should have". In some situations group formation according to teacher guidelines + participants' initiative allows for more flexibility. Multilpe "Course Run" can be created for the same couse contents but completely partitioned : different registrations, different forums, different staff/TA participateion,

								etc.
Group formation by learners		yes	No	?. Is about what is explained in D2.2-6.3.1?. Same as above about "Group formation by system"	Yes. Although only the owner of a run can create groups, students could receive these grants.	No		NO see above
Artifact creation by learners		yes	No	Yes	No. Depends on the setup. Learners can create their own ARLearn games. If they are added as editor to a course, they can create content.	No		not integrated into EdX. As PLEs meet a wider range of needs in artefact creation, shall we put this feature among the "should haves"?
Artifact creation by learners in		yes	No	?. What is the difference	No. Not applicable.	No		

personal learning environment and include in MOOC				between this requeriment and the previous one?.				
Reputation system/karma		yes	Yes, through forum activity. Complete karma system is available under licence.	Yes, through forum activity.	Yes. ARLearn has an integration with mozilla open badges.	No		no (see above)
Information about teachers		yes	Yes, in their own user profile.	Not yet but, a really silly thing to develop :-)	No	No		yes

Networked learning features should haves

Feature	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Integrating profile information from existing social media sites		Yes, Social login with Facebook can be enabled at hub manager discretion.	Not yet but, is possible to integrate the social id (FB, Twitter, … whatever) in the OpenMOOC registration system because we're using an open standard like SAML.	Yes. With ARLearn, one can authenticate via twitter, facebook, linked or google. After authentication user attributes (like name, picture and email) are used by ARLearn to describe the user.	No		Thrid party authentication system just released.
Linking to social media		No	Not yet. It's the other side of the previous requirement so it's the same answer.	No	No		no
Bookmarking		No	No	No	No		no

Peer feedback must haves

WeMOOC and OpenMOOC have some form of peer feedback assignments. These have not been looked at into detail, because it was not possible to evaluate the student side of it.

(I think that a geolocalization utility is essential for making groups and peer feedback. It's important that our students can make groups basing on proximity, cultural features, customs… And geolocalization makes it possible in the platforms)

Feature	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Group formation by system		No	No	Yes, ARLearn supports teams.			no see table above
Group formation by learners		No	No	Yes. If users get the access to the ARLearn run.			no see table above
Distributing products to peers		Yes	Yes	Not applicable			
Guidelines on peer feedback	Yes	Yes.	Yes	Not applicable			

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Rubrics	Yes	Yes. We can create a webpage or link. New P2P version will include it (should be released on the 2th semester 2014).	Yes. We can create a webpage or link with the description. Is this like https://blogs.mooc.educalab.es/b/aprendizaje_basado_en_proyectos_abp/evaluacion/ (in spanish).	Not applicable			Yes, a page with these info can be created (according to the learning objectives of the MOOC
Learners can provide feedback		No. Can contact every student by its own discretion.	? (I added "Yes" on May 19)	Yes. Depends on the design of the ARLearn game.			yes in the forum. A discussion forum can be "attached" also for a single course content where feedback is needed
Learners can grade (peer to peer grading)	Yes	Yes.	? (I added "Yes" on May 19)	Not applicable			Yes in the peer-assessment object if added in the course contents

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Diversity of activities must haves

Feature	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Learning activities/tasks that can be sequenced	Yes	9 'activity types' can be sequenced, can be made conditional upon completion of other activities, can set start and end time. Completion is either looking at page, or submitting file, submitting self-test	Yes, you can model learning steps and badget of completion by groups of units/taks, like https://blogs.mooc.educalab.es/b/aprendizaje_basado_en_proyectos_abp/evaluacion/ (in spanish), which is used by Ministry of Education of Spain to train teachers on Project-Based Learning	Yes, through the messages Messages can be sequenced and can be conditional. Completion is having accessed or linked to badges	No		Activties can be sequenced, can be made condition upon completion of other activities, can set start and end timei
Learning activities can be completed	Yes	Yes but, activities cannot be ticked as	Yes but, activities cannot be ticked as	Completion is having accessed or linked to			only according to the tracking

(either indicated by learner as completed, or ticked as completed by system or by teacher)		completed by teacher, only by learner and system.	completed by teacher, only by learner and system.	badges			system of edX
Learning activities can be made conditional		Yes, they can be secuenced (A must be completed before student can start B).	No. That requires a workflow engine. We'd analized this requirement some time ago and is not complex to develop.	Yes, via the dependency infrastructure of ARLearn			Yes , see above
A bank of optional activities to choose from	yes (the Bank of Challenges).	No. Teacher can setup optional activities but is not a bank of challenges.	No, in the same way that the previous requirement.	Yes, ARLearn features a searchable store of CC licensed materials.			there are no ad-hoc features to this end, but each teacher can propose optional activities. In our personal point of view, this feature should

							not be a compulsory one, but a "should have".
Resources shown in context of learning activity		Yes, depening on the type of activity, complementary resources can be linked.	Yes, like instructor's comments and complementary material in each pill or nugget	Yes, ARLearn is all about showin resources in context (location, time, ..)			yes, each teacher can add additional resources according to the learning need of the MOOC
Rich content: textual and multimedia resources, video lectures		Yes, any multimedia resource.	Yes, video is the center.	Yes. Video, audio, ...			yes, multimedia content is provided according to the learning needs and the peculiarities of each subject
Assignments, graded		Yes, graded by teacher. In any case is not recommended to massive courses.	Yes. A unit can be labelled normal, homework or exam. Homework and exam are timed. Each unit can	Yes, not graded by score but by completion	No		Yes. You can grade some specific activities

			contain nuggets to which either a single question, a peer assessment or an asset can be linked. There is some grading, teacher can set only weights on units and nuggets, evaluation is calculated automatically (see help page Evaluation criteria)				
Assignments, non-graded		P2P assignment evaluated by students	Yes	Yes. Depends on design of the course.			yes
Assigments, timed,		Deadlines: start and end time	Yes. Homework unit	Timed activities are possible	No		yes

deadlines							
Assessment, graded, summative, including		Test automatically graded P2P assignment, upload file, peer feedback	No	No tests, but individual multiple choice and multiple response questions. These are scored correct/incorrect, no grade. Correct completion can result in badge	Graded tests with three types of questions. Ungraded surveys No peer- or group assessment		at teacher's discretion, a MOOC can include (some or all) the following: self-assessment quizzes, evaluation quizzes (tests), peer assessment on the forum
Assessment - detailed feedback on questions - detailed feedback on assessment		Yes.	Yes	No			yes

			Yes	No			yes
Assessments, formative, self-assessment, graded, including detailed feedback			Yes	No			yes
Assessment, group			Not yet.	No			no
Assessment timed, deadlines			Yes	Yes. All activities in ARLearn can be timed.			yes
Gamification	Yes		?	Yes. ARLearn is all about gamification			

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Other pedagogical must haves

Feature	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Course description	yes		Yes	Yes			yes
Course schedule	yes, when applicable		Yes	No			yes
Progress monitor			Yes	Yes			yes
Performance monitor			Yes	No			yes
Certificate of completion			Yes	No			yes, if foreseen
~~Syllabus~~ Learning guide	must have		Yes	No			yes
Announcements	must have		Yes	No			yes

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Other pedagogical should haves

Feature	Should haves/Must haves	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Welcome page	should have		Yes	Yes. But is part of the course design			yes
FAQ			Yes	Yes. But is part of the course design			yes
Badges		Commercial add-on Have not been able to configure this in the authoring environment	Yes	Yes			Just started an integration with Mozilla Open Badges
Achievement system (Gamification)			Yes, If you participate in the forums you can get karma points, ...	Yes, via badges			

| Story mode (Gamification) | | | Yes, It depends on how you build content, use the tools (media, forums, blogs) and you guide the students.

A really good example in https://mooc.educalab.es/course/aprendizaje-basado-en-proyectos-abp/ More than 5.000 teachers learning. | Yes. But is part of course design. | | | |

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Other pedagogical nice to have

Feature	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
AI engines for the integration of massive qualitative assessment		No	No. You can add what you want on OpenMOOC like the AI engine from edX.	No	No		no
Videoconference system.			No	No			
Integrated geolocation tool (such as Meetup.com)			No but, is easy to do.	Yes			

Technical requirements

Content requirements

These requirements are defined in chapter 2 of D2.2.

Feature	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Open access to course content	Yes	No	Yes, need to be registered. Even then cannot access when dates are set	Yes. Content can be assigned a creative commons license.	No		yes to course description and syllabus. To be registered for going through the contents
Course content always available	Yes	No	Yes, while the course is open in the call up and running.	yes	No		it depends on Politecnico's overall policy and on teacher's preferences

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Accessibility requirements

These requirements are given in Task 2.1, and chapter 6 of D2.2.

Feature	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Rich content			Too general	Yes			yes
Alternative content for audio/video			It's depends on the video player you use. Youtube has that feature.	Yes			It depends on course creators contents
WACG conformity			Yes on moocng and idp, not yet on askbot (forum tool), we're working hard to get OpenMOOC AA compliant.	No			yes
Subtitles shown with video			It's depends on the video player you use and generate subtitles. Youtube has	Youtube support for videos, so yes			yes

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			that feature.				
Subtitles for download			It's depends on the video player you use and generate subtitles. Youtube has that feature. Here a howto to do it, like a best practises guide.	Depends...			yes
Transcript of audio/video in downloadable document			Is the same as above requirement, is it not?.	No			yes
Alternative text (alt attribute) for images			Yes	Not applicable. (ARLearn is not a web application)			It depends on course creators contents
Alternative text and description for video and audio objects (alt, desc			You have to add it in the external objects like youtube video/description, gravatar	Not applicable. (ARLearn is not a web application)			

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attributes)			image, and son on.				
User interface can be navigated using the keyboard			Yes, using tab key and shift+tab to access to previous link	Not applicable. (ARLearn does not feature a traditional keyboard-> mobile app)			yes
Multilingual UI of platform			Yes, UI actually supports EN and ES. You can add the translation for the language you want.	Yes			Incomplete

Mobile requirements

Feature	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Mobile access through browsers on tablets and smartphone		No	Yes for tablets. For smartphones you can access with a web browser but is not comfortable.	No. Not applicable. ARLearn is a native app			Yes (tablets), not yet (smartphones). It's possibile with a RWD approach
Mobile apps for tablets and smartphones		No	No	Yes	Should be, but not seen		no

Platform requirements

Feature	Must have	WeMOOC	OpenMOOC	ARLearn	LogiAssist	iMOOC	edX
Course catalogue		Not available in the demo site, but according to TLS website there should be a catalogue	No, the home page contains a list of courses. No way to search or sort	Yes via Game library.	Not clear		yes