Language Massive
Open Online Courses
Research report on MOOCs Pedagogical framework
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Foreword

Language literacy is an essential life skill in the 21st century. It is a fact that learning a foreign language is a good way to improve brain function and acquire social skills. Moreover, it is an effective way to explore other languages and cultures and to enhance professional skills needed to enter the labour market. These are some of the reasons why multilingualism was and continues to be one of the cornerstones of EU projects.

The aim of the LangMOOCs – Language Massive Open Online Courses project is to research the potential of MOOCs in Language Learning, to explore the pedagogical framework of Language MOOCs, to develop a toolkit for the creation and management of Language MOOCs and OERs and to test the use of OERs in language MOOCs in a pilot course. The project focus is to step up support for language learning and promote multilingualism via the implementation of Massive Open Online Courses for Language Learning.

The Research report on MOOCs Pedagogical framework is the first intellectual output envisaged by the project. The research aims to analyse MOOCs experiences, including benchmarking of pedagogical models & instructional technologies.

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## Table of content

Executive summary...........................................................................................................6

**Part One – Review of MOOC experience** .................................................................10

I. Introduction ..................................................................................................................10
   1. General overview of MOOCs experiences ...............................................................10
   2. History and developments .......................................................................................10
   3. Focus on: European MOOCs ..................................................................................11
   4. Types of MOOCs .....................................................................................................14
   5. The vision behind MOOCs .....................................................................................15

II. Pedagogical models ..................................................................................................15
   1. Key pedagogic features and learning modes ..........................................................15
   2. Course components and their impact on achievements ...........................................17
   3. Benchmarking of pedagogical models .....................................................................19
   4. Didactical approach ...............................................................................................24

III. An overview of instructional technologies ..............................................................27
   1. MOOCs basic features ............................................................................................29
   2. Duration and phases ...............................................................................................29
   3. The “social” dimension .........................................................................................30

IV. Challenges and future developments ......................................................................30

V. Conclusion & recommendations ................................................................................32

**Part Two - MOOCs insights** .....................................................................................31

I. Introduction ..................................................................................................................33

II. MOOCs: Stakeholder’s main goals ...........................................................................33
   1. MOOC participants and their motivation .................................................................33
      a. MOOC participant’s profile ....................................................................................33
      b. MOOC participant’s motivation ............................................................................34
   2. Motivation to develop, deliver or take a MOOC ....................................................34
      a. Who is developing, delivering or taking MOOCs? ..............................................34
      b. The motivation behind developing, delivering or taking MOOCs .......................35
      c. Reasons not to embrace MOOC initiatives ..........................................................36
      d. Business models for MOOCs ..............................................................................36
III. Innovative methodologies and MOOC platforms ................................................................. 36
  1. From Learning Management Systems (LMS) to MOOC platforms ...................................... 37
  2. MOOC platforms and innovative learning methodologies.................................................. 38
  3. Scaffolding MOOC learners .................................................................................................. 39

IV. ASSESSMENT IN MOOCS ........................................................................................................... 40
  1. Introduction on MOOC assessment ...................................................................................... 40
  2. Multiple choice/ quizzes ......................................................................................................... 41
  3. Computer generated feedback .................................................................................................. 42
  4. Automated Essay Scoring (AES) – edX .................................................................................. 42
  5. Calibrated Peer Review/ peer evaluation – Coursera .............................................................. 43
  6. Peer assessment vs. tutor feedback ........................................................................................ 44
  7. Peer and self-assessment ......................................................................................................... 44

V. Challenges and conclusions ....................................................................................................... 45
  1. Credit Recognition, Accreditation and Specification .............................................................. 45
     a. Credit Recognition ................................................................................................................. 46
     b. Course Accreditation ............................................................................................................ 48
     c. MOOCs for credit? .................................................................................................................. 49
     d. MOOCs and Academic Accreditation in the UK ................................................................. 49

List of figures .................................................................................................................................. 52
List of tables .................................................................................................................................... 52
Glossary .......................................................................................................................................... 53
References ..................................................................................................................................... 56
Project Partners ............................................................................................................................... 63
Executive summary

What is a MOOC? A Massive Open Online Course is a free, open, online, non-credit course made available on the internet where large numbers of participants engage in weekly activities with the objective of learning something new. People who are interested in learning using innovative and technological tools, take a MOOC simply logging into the platform and signing up. The participants will be able to improve their skills while they also have a chance to get a certificate, keep in touch with other participants and teachers.

MOOC is an acronym which describes the key features of this type of courses. Massive: these courses are meant to be accessible by an extremely large number of people. Open: there is no need to pay any fees or any specific requirement to entry. Online: they are based on an e-learning pattern to be accessed on the web. Therefore, MOOCs can be seen as a development of Open Educational Resources, but they bring some new characteristics.

One of the defining features of MOOCs is that their learning approach is based on participants’ learning goals, interest and skills. MOOCs participant's profile ranges across various groups of people of different age, gender and educational background, whose motivation is based on: their interest in lifelong learning or in the subject matter, entertainment, social experience and intellectual stimulation, barriers to traditional education options or just a desire to experience or explore online education.

The first MOOC called “Connectivism and Connective Knowledge” was run in 2008 by Canadian scholars George Siemens and Stephen Downes1. Then, another Canadian educator, Dave Cormier from the University of Prince Edward Island, coined the term MOOC in order to describe the new features of this type of course. The first international MOOC initiators were US MOOC providers such as edX, Coursera and Udacity. Before MOOCs, other types of web-based learning courses existed, such as Open University2 in the United Kingdom, which contributed to open academic education to a wider public.

The first European MOOC was launched in January 2012 by the University of Helsinki, Finland, but most European MOOCs were developed later on in Western Europe, Spain being the country with the highest interest in MOOCs. However, Higher Education Institutions (HEIs) in Europe seem to have some doubts in engaging with MOOCs because of pedagogical, strategic and cost issues. In September 2013, the European Commission launched the Opening Up Education Initiative3. A number of MOOC projects are being funded by the European Commission4 in order to support research in this educational field. MOOCs in Europe are usually available in the language of the country where they are hosted and created. Recently, many MOOC courses were developed in Europe, such as: Future Learn (September 2013, UK), FUN (2013, France), Miriada X (2013, Spain), Alison (2007, Ireland), OpenHPI-Opencourseworld-Iversity (Germany), Federica (2007, Italy). Since the beginning of 2014, the number of MOOCs has been increasing every month, both at international and European level, but according to available data, at present, European MOOCs represent one third of the MOOCs existing worldwide.
There are different types of MOOCs: the two main types are known as cMOOCs and xMOOCs. cMOOCs stands for connectivist MOOCs, associated to the theory of Connectivism which was developed by George Siemens. cMOOCs allow learners to share their knowledge, while building their own networks. Participation is strongly encouraged. Usually this type of MOOCs is not linked to any academic institution and depends on the contribution of individuals, it is less structured and relies more on learners self-organisation and participation. xMOOCs stands for extensive MOOCs, and it is to be used as a complement to other learning resources. These MOOCs are more structured and less focused on content. The learning approach in xMOOCs is traditional and teacher-centered. In xMOOCs, learning objectives are fixed by teachers, and communication among participants is limited. There are also other types of MOOCs such as vMOOCs (vocational MOOCs), sMOOCs (small open online courses), bMOOCs (blended MOOCs), hybrid MOOCs. The first cMOOCs used a traditional Learning Management System (LMS), such as Moodle, in combination with other technologies such as wikis, blogs, Twitter, gRSShopper, or Wordpress.

Learning-management systems (LMS) were developed with the aim of advancing online education providing the IT structure and platform upon which faculty members could build their pedagogy. There is no specific general format for MOOCs. From a pedagogical point of view, c-MOOCs are based on open source learning platforms, and are led by academics within their university activity. Their pedagogical model supports the explicit principles of Connectivism, autonomy, peer-to-peer learning, social networking diversity, openness, emergent knowledge and interactivity. This pedagogical model is based on four major types of activities that are described as: 1. Aggregate, 2. Remix, 3. Repurpose, 4. Feed Forward. xMOOCs focus on learning by doing, and their structure is more similar to university teacher-led courses, built on lectures and assessment. MOOC pedagogy is based on an innovative learning approach. The course period depends on students’ availability and time. MOOCs were created to be attended by a large audience as a way to open academic education to low-income students. In spite of this, MOOC providers have developed new patterns and started to offer free courses, sometimes charging students for exams or certifications.

The main purpose of MOOCs is to provide lifelong learning, and in order to accredit students the course needs to exploit a summative assessment which is the only plausible way to assess student performance. Even though there are several different MOOC formats, they all seem to share some common characteristics when it comes to assessment. The most common assessment methods that have been adopted by MOOC providers like Udacity, edX and Coursera are the following: formative quizzes, automated assessment and/or peer and self–assessment and peer support and discussion. The students can comment material they find in the course, and ask questions. Also reading exercise with multiple choice tests can be given to students at the end of some courses, and a list of FAQs and related answers can be included. In some courses students can even access a live chat. Some MOOCs also include tasks for students, providing them with an opportunity to learn without time-space limits. The most common ways of assessing the students’ performance in MOOCs include: multiple choice/quizzes, computer-generated feedback, automated essay scoring, calibrated peer-review/peer-evaluation, peer-assessment vs. tutor feedback, peer and self-assessment.

Two examples of computer-generated methods of providing feedback on students’ essays are Automated Essay Scoring (AES) and Calibrated Peer Review. The two approaches are adopted by different platforms: for instance, edX has adopted Automated Essay Scoring (AES) in its courses,
which is based on statistical models able to predict human-assigned scoring. Based on samples from essays delivered earlier, the model includes variables like length, grammar, structure and more to predict how a human assessor would grade the essay. On the other hand, Coursera uses a calibrated peer review, including students in the assessment of their peers. The students hand in their essays, and get scored by their peers.

Peer assessment can improve the workload, but it increases challenges as it requires to motivate the student group and to clearly show the benefits. Another challenge is represented by certification and accreditation, as the grades/scores must reflect the level of students’ performance.

MOOCs are affected by many challenges. The main challenge is represented by the amount of users and the high drop-out rate recorded within the courses. As a matter of fact, many people decide to take a MOOCs because they are curious or they are keen on discovering and trying online education. This is also the reason why people drop out so quickly. In this respect, four main profiles of participants taking a MOOC have been identified: Lurkers enrol but just observe or sample a few items; Drop-Ins are active participants for a selected topic within the course, but not planning to complete the entire course; Passive Participants view a course as content to access, and expect to be taught; Active Participants fully intend to participate in MOOCs.

As for the duration, MOOCs should be two or three months long, as it is hard for a user to spend more time in taking the course. In order to keep high users’ interest in the course and motivation, many tools shall be used. It is advisable to organise activities in two main categories: individual activities and group or team activities with other participants. Students often need to pay a fee if they are willing to take a final exam which allows them to get a certificate. This is the way in which some platforms finance themselves.

One of the new characteristics brought by MOOCs is that students can revise others’ outputs and give feedback to each other. Many different learning tools and practices can be adopted within a MOOC, such as: videos, collaborative tools, audio/podcast. The course starts with an overview. Most of the work is done online but sometimes students also have the option to download extra materials. Usually some links are provided at the end of a session to other webpages relevant to the course content. A good MOOC should include a variety of exercises and should provide for clear instructions.

MOOCs are not a traditional learning course. Technology–enhanced learning is one of the main features of MOOCs, and it is based on a variety of technologies which may be used for instructional purposes, such as: social networking and micro-blogging, media, virtual communication, social bookmarking, sharing presentations and other information, discussion forums.

Research shows that there are still many issues about MOOCs related to pedagogy, access-related weaknesses, poor engagement of learners, exclusion of learners without specific networking skills, sustainability, quality of learning, equality, equity, financial viability and accreditation. Most MOOCs are based on a top-down approach, rather than bottom-up involvement of participants.

However, there is still much to investigate around MOOCs in the field of pedagogy. For instance, teachers’ tasks within MOOCs must be fixed and new ways must be explored to ensure their presence.
Also, given that MOOCs are a relatively “young” phenomenon, a comprehensive comparison of pedagogical models needs to be carried out, so as to identify the most useful approaches.

Literature reviews and research studies already available need to be expanded in order to get a complete mapping of MOOC approach and share detailed information on the matter, providing the way to further spreading innovative forms of learning. In spite of this, MOOCs have already brought new features to education which go beyond limits. Anyone who is interested can enter without pre-requisites or fees. Such an innovative type of education takes people closer to the use of technology for didactic purposes and gives willing people an opportunity to certify their learning.

With a view to keep enhancing MOOCs’ effectiveness in the learning field, a further effort needs to be made to motivate the target groups and decrease drop-out rate, as well as to allow for an easier access to available information and case studies, fixing universal criteria to assess MOOCs’ effectiveness and exploring the potential of this new technology-enhanced learning tool.
PART ONE - Review of MOOC experience

I. Introduction

1. General overview of MOOCs experiences

Definition: “A MOOC is a course of study made available over the Internet without charge to a very large number of people: anyone who decides to take a MOOC simply logs on to the website and signs up.”

The acronym MOOC stands for Massive Open Online Courses, representing the key elements describing this new type of course:

- Massive: the term “massive” refers to the number of participants taking part in MOOCs, which is supposed to be significantly large.
- Open: the term “open” refers to a course which is offered without any fees or any specific requirements or barriers to entry.
- Online: MOOCs were created as an e-learning pattern to be accessed on the web, based on the idea of distributed content freely accessible on the web rather than from textbooks. Later on, this trend slightly changed, as there are now many blended MOOCs combining both face-to-face and online modules.

MOOCs can be considered as an evolution of Open Educational resources (OERs), which are free web-based learning resources. MOOCs combine different features from social networking and free online resources. The main distinctive element of MOOCs is represented by its participants, and their need to autonomously organise their learning approach according to learning goals, interest and skills. Some MOOCs features are similar to those of ordinary face-to-face or web-based courses, such as a fixed timeline, homework and tests to take, specific subject matters to be addressed each week, materials and activities. However, MOOCs also bring some new characteristics, such as the lack of definite prerequisites to access the course and of a formal accreditation system, as well as the unrestricted and potentially unlimited participation of people sharing the same interest towards a specific subject.

The first MOOCs were very successful in attracting a great number of people, evidencing the potential of this new web-based phenomenon. Following the first positive experiences, promoted by different Universities mostly based in the USA (such as the Massachusetts Institute of Technology, Stanford and Harvard), a number of new platforms were established, providing different types of MOOCs. Some examples include: Coursera, edX and Udacity in the United States. Most of the providers, which were either profit or non-profit institutions, worked in synergy with academic institutions.

2. History and developments

The first massive open online course called "Connectivism and Connective Knowledge" was run in 2008 by Canadian scholars George Siemens and Stephen Downes. Then, another Canadian educator,
Dave Cormier from the University of Prince Edward Island, coined the term MOOC in order to describe this new type of course, which was at first delivered by means of RSS feeds and collaborative tools, such as blogs, or Moodle.

MOOCs soon became a valuable tool to democratise higher education, and many academic institutions decided to offer new courses creating new business models. This is evidenced by the rise of many web-based providers, such as Coursera, working in partnerships with universities.

Before the creation of MOOCs, other courses already existed. For instance, in 1969, the Open University courses was launched in the United Kingdom, which contributed to open academic education to a wider public. The Open University was based on the idea that communication technologies are suitable to provide high-quality degrees. Much of the MOOC philosophy is based on this approach to higher education.

The above-mentioned MOOC was the first course explicitly referred to as a MOOC. The course exploited many platforms to share materials and knowledge, including Facebook, Wikis, Blog etc., and reached as many as 2200 people.

Following the first MOOC experiences, the phenomenon gained deeper acknowledgement: New York Times identified 2012 as the "MOOC's year", while ‘Coursera’, the largest ‘MOOC’ provider, reported registering 2.8 million students in March 2013, partnerships with 62 high prestige Universities and hundreds of courses in several languages.

The Horizon Report 2013 identified the MOOCs development as the most significant trend in education, allowing students to complement their education and their already-acquired skills.

3. Focus on: European MOOCs

European MOOCs appear in Europe at a later stage. The first European MOOC was launched in January 2012 by the University of Helsinki, Finland, followed by MOOC experiences in Germany (University of Potsdam) and Scotland (University of Edinburgh).

Following the above-mentioned examples, other significant MOOCs in Europe were launched in 2013, with the European courses OpenupEd and different (regional) MOOC platforms such as FutureLearn, Iversity, FUN, UNEDcoma, Miráda X.

Generally, European MOOC activities are concentrated in Western Europe, serve a limited number of language communities, and have been mainly driven by individual ambitious players from the Higher Education sector. The first MOOC courses were launched in Europe in Spain, Portugal, UK, France, Germany, Austria, Finland, Ireland. Spain is the country which seems to have a strongest interest in MOOCs. So far, 20 institutions have joined the Spanish platform Miráda X, 17 of them from Spain and three from Puerto Rico and the Dominican Republic.

Even if European Higher Education institutions are aware that MOOCs are an important global movement and an instrument for educational policy, many seem to be hesitant to adopt or engage with
MOOCs. According to available research, pedagogical issues, strategic and cost questions are among the major concerns that delayed European HEIs from entering this movement.

In September 2013, the European Commission launched the courses Opening Up Education to further enhance the uptake of Open Education in Europe. Additionally, a number of MOOC projects are being funded by the EC.

The portal Open Education Europa, launched by the Commission in the framework of the Opening Up Education courses, is to offer access to all existing European Open Educational Resources in different languages in order to be able to present them to learners, teachers and researchers. Few months after its launching, it already included 345 courses, as shown in Figure 1 below:

![Figure 1: Distribution of MOOCs by subject / Growth rate of European versus non-European MOOCs (Source: http://openeducationeuropa.eu/)](link)

MOOCs in Europe are usually available in the language of the country where they are hosted and created. Europe is diverse, and its strength lies in its decentralised approaches and mutual cooperation. In order to enhance this perspective, platforms that have been established in Europe so far, and others which may still emerge, should develop a clear profile so as to be attractive for both European and international institutions.

Many MOOC courses have recently emerged across Europe, such as:

- FutureLearn, launched in September 2013 in the UK. It offers courses from many institutions and universities,
- FUN, launched in France in 2013, is the first French MOOC portal, using edX’s open source learning platform,
- Miriada X, launched in 2013 in Spain from a cooperation between the Spanish company Telefonica and Universia,
- Alison, a social enterprise established in 2007 in Ireland, providing distance learning in many fields: Financial & Economic Literacy, Business & Enterprise Skills, Digital Literacy & IT Skills, Health Literacy, Personal Development & Soft Skills, Schools Curriculum, Languages, Health & Safety & Compliance. Course participation is free, but users are charged for specific services and support.
- Germany was among the first countries where MOOCs were developed, here are some examples:
  - openHPI, developed by the Hasso Plattner Institute and began in September 2012 with the online course In-Memory Data Management (English).
  - Opencourseworld, established by IMC AG, a spin-off company of the University of Saarland offering ICT solutions.
  - iversity, launched in 2011 as an international think-tank, has the goal to make education gain a more digital approach.

- In Italy, the University of Naples Federico II has been the first Italian State University to offer open access courses, such as Federica (http://www.federica.eu/mooc/), an Italian learning platform which was launched in 2007, and a MOOC platform which was launched in 2015, also supporting EMMA, the European Multi MOOCs Aggregator (#eumoocs).

So far there is not much information about MOOCs developments in Eastern Europe, with the exception of Kaunas University in Lithuania, some courses available in Estonia and Finland.

Since the beginning of 2014, the number of MOOCs has been increasing every month, both at International and European level. For instance, in April 2014, there was a total of 510 European MOOCs, and one year later, in March 2015, the number of European MOOCs reached 1,139, accounting for 1/3 of the total number of MOOCs in the world. The number of MOOCs seems to be undergoing a rapid increase. The most recent available data, collected in May 2015, report a total number of 1,381 MOOCs, with 157 new MOOCs starting in May, as described in Figure 2.

According to the scoreboard, Spain is the country with the highest number of MOOCs (364). United Kingdom, France and Germany follow, with more than 100 MOOCs. Comparatively, there are some countries which have very few MOOCs (less than 10) as Ireland, Norway, Lithuania, Finland, Estonia and Cyprus, and others countries in Eastern and Southern Europe as Greece where no MOOCs are recorded.
As shown in Figure 3, the main subject of these MOOCs is Science and technology, with a total of 353 MOOCs in Europe. The main countries which provide these MOOCs are Spain with 89 MOOCs, Germany with 62 and France with 59. The second most popular subject is Social sciences with 337 MOOCs overall (115 MOOCs in the United Kingdom, 61 in Spain and 54 in France). The database includes MOOCs dealing with Humanities (229), Applied Sciences (200), Business (192), Natural sciences (134), Mathematics and statistics (127), and Arts (42).

In Italy, most MOOCs are related to Social sciences (9). This is also the case in United Kingdom (115 MOOCs), while in Germany and France most MOOCs are related to science and technology (62 and 59). Norway and Greece have only very few or no MOOCs at all.

At present, a significant effort is being made to better shape MOOCs environment, as well as to create a network between major stakeholders, as shown by the first and second European MOOCs Stakeholder Summit, organised and hosted in 2013 and 2014 by the Ecole Polytechnique Fédérale Lausanne (EPFL), Switzerland. In 2015, another summit was held at Université catholique de Louvain campus in Mons (Belgium), organised by Université catholique de Louvain and P.A.U. Education. There is a constant increase in European MOOCs, as shown in Figure 4 and according to recent statistics, the phenomenon has become significant also in Europe, European MOOCs being reported to account for one third of MOOCs worldwide.

4. Types of MOOCs
According to current literature on this subject matter, MOOCs can be classified in different types. The two main types of MOOCs are known as cMOOCs and xMOOCs.

cMOOCs stands for connectivist MOOCs, and is based on the learning theory of Connectivism, which was developed by George Siemens. cMOOCs allow learners to create and share their knowledge, establishing their own network, and to interact using several tools which do not necessarily belong to the same platform, such as social networks, Wikis and Google groups. Within cMOOCs, learners’ participation is strongly encouraged. Usually, this type of MOOCs is not linked to any academic institution, but depends on the contribution of individuals. Its focus on interaction is one of its defining features.

xMOOCs stands for extensive MOOCs, designed to be used as a complement to other learning resources (e.g. university courses). xMOOCs are more structured, and less focused on distributed content: most contents are posted on the course page, without any need to access contents outside the platform. To recap, as described on Figure 5 and Figure 6:
- cMOOCs: this type of MOOCs focus on the establishment of networks among learners. cMOOCs are less structured and rely more on learners’ self-organisation and participation, in terms of content provision and peer evaluation, with a view to create new knowledge.

- xMOOCs: the learning approach in xMOOCs is traditional and teacher-centered. Tools used within this MOOC type include videotaped classes, learning activities, and tests, with a view to ease knowledge transfer. In xMOOCs, learning objectives are fixed by teachers, and communication is limited among participants.

Apart from the above-mentioned types of MOOCs, new forms of MOOCs have emerged from xMOOCs, such as vMOOCs (vocational MOOC), “smOOCs” (small open online courses with a lower number of participants) and “bMOOCs” (blended MOOCs), hybrid MOOCs which combine in-class and online activities allowing learners to interact in real-time, feeding their motivation and commitment to the courses.

5. The vision behind MOOCs

Originally, MOOCs were created to be attended by a large audience from different parts of the world, namely from the developing countries, as a way to open academic education to low-income students. In spite of this, new patterns were developed, going beyond the idea of offering affordable academic-level education. More and more MOOC providers, therefore, started to offer free courses, sometimes charging students for exams or certifications.

Ultimately, the idea of MOOCs is based on the idea of promoting learners’ empowerment, while encouraging an interaction and active engagement among learners, and enhancing their critical thinking.

II. Pedagogical models

A conspicuous amount of information is nowadays easily accessible through the internet and the development of the new technologies. However, given the great amount of data and sources available, users may be overwhelmed and confused, and may not be able to filter reliable information. In such a
context, MOOCs represent a tool to overcome this obstacle, as they offer free unrestricted access with the benefits of structured courses. In order to effectively use MOOCs, it is capital to define precise learning objectives and the best way to achieve them.

The goal of this section of the report is therefore to analyse the pedagogical approach and structure of MOOC courses.

1. Key pedagogical features and learning modes

MOOCs are a new educational phenomenon and their nature is constantly changing, with new types and variants of courses appearing all the time. As a matter of fact, given the wide range of educational scenarios and experiences that are included under the MOOC umbrella, it is difficult to identify a general format for MOOCs.

To get a general idea of the learning philosophy and pedagogical approaches behind MOOCs, we can build on the previously mentioned distinction between cMOOCs and xMOOCs, which was proposed by Stephen Downes. From a pedagogical point of view, c-MOOCs run on open source learning platforms and are led by academics as part of their university activity. Their pedagogical model supports the explicit principles of Connectivism autonomy, peer-to-peer learning, social networking diversity, openness, emergent knowledge and interactivity.

Theories connected to this type of MOOCs include: Connectivism, autonomous learning, social learning, self-directed learning, Personal Learning Environments, etc.

This pedagogical model is based on four major types of activities that are described as: 1. Aggregate, 2. Remix, 3. Repurpose, 4. Feed Forward.

On the other hand x-MOOCs (offered by MITx, edX etc.) are online versions of traditional learning formats on proprietary specialist software platforms owned by private enterprises. Those are based on the cognitive-behaviorist pedagogy and support a tutor-centric model that establishes a one-to-many relationship to reach massive numbers category. xMOOCs focus on learning by doing, and their structure is more similar to university teacher-led courses, built on lectures and assessment.

The MOOC pedagogy is mainly based on a change of the general learning approach. Many MOOCs are offered to students at universities, and they are mostly prepared by professors, teachers or other university staff. Many of them are structured as 4 to 6 week courses with one or more sessions a week. The course period and time needed for one session may vary based on students’ availability and time. Some sessions only consist of one short video lecture, others offer a lot of different additional exercises, quizzes etc.

Most of the courses include videos showing lectures of professors or explaining some contents. The students can comment the videos and other material they find in the course, and ask questions. Also reading exercises with multiple choice tests can be given to students at the end, and some courses include a list of FAQs and related answers. In some cases, courses include a live chat - sometimes with a defined schedule notifying when a teacher is available online. Some MOOCs also include tasks for students, such as uploading their own material or videos, or doing homework.

In order to get a clearer idea of the pedagogical approach adopted within MOOCs, it may be useful to probe whether MOOCs support a formal or informal learning approach. Even if, from an educational perspective, MOOCs may be considered more relevant to informal learning, the new approach adopted
within MOOCs can be positioned on the border between formal and informal learning, which means that MOOCs combine a mix of both educational areas. From the formal learning perspective, many replicate traditional face-to-face courses used in Higher Education curricula, but distributing the content online, generally in a video format. Many times, learners can get credits in formal education by participating in a MOOC. From an informal perspective, many of the MOOC participants don’t want credits, but their aim is to acquire knowledge in subjects of their interests as part of their life-long learning. Furthermore, another informal learning's key feature is that MOOC participants have the opportunity to learn with no time and space limits with the support of a large community of peers.

As for the learning modes identified within MOOCs, according to a study conducted by the Department for Business, the main reason why learners decide to take a MOOC is to learn more about a specific subject. Nonetheless, many people decide to take a MOOC because they are curious, they are keen on discovering and trying online education. This also explains the high number of people who drop-out after one or two weeks. For instance, Phil Hill, a consultant and industry analyst covering the educational technology market primarily for higher education, has defined four patterns to identify the profile of MOOCs users:

- Lurkers: people enrol but just observe or sample a few items. Many of these users do not even get beyond registering for the MOOC or maybe watching part of a video.
- Drop-Ins: partially or fully active participants for a selected topic within the course, but not planning to complete the entire course. Some of these users are participants who use MOOCs informally to find content helping them meet other learning goals.
- Passive Participants: these are users who view a course as content to access, and expect to be taught. They typically watch videos, perhaps take quizzes, but tend not to participate in activities or class discussions.
- Active Participants: fully intend to participate in the MOOCs, including consuming content, taking quizzes and exams, taking part in activities such as writing assignments and peer grading, and actively participate in discussions via discussion forums, blogs, twitter, Google+, or other forms of social media.

It needs to be highlighted that some users change across patterns – for instance, a passive participant may decide to fully jump in and become an active participant, or even an active participant may become frustrated or a lurker.

2. Course components and their impact on achievements

The distribution of the learning sessions within a MOOC varies depending on learners’ needs. For this reason, some sessions only consist of one short video lecture, others offer a variety of additional exercises, quizzes etc.

Usually, to be more attractive and effective for users, a MOOC should be two or three month-long. It is important to keep in mind that users can’t spend too many hours per day on a MOOC.

The control of the learning progress in many cases works through multiple choice exercises with direct feedback from the computer or through final exams participants can take. In many cases, students are required to pay a fee if they are willing to take a final exam allowing them to get a certificate of
completion of the course - that’s how many platforms finance themselves. Some courses are recognised as part of the studies at universities and offer their participants credit points.

Many courses also provide for a forum for teachers and students through which questions can be answered or topics can be discussed. One of the basic ideas of MOOCs is that students can revise other students’ outputs and give feedback to each other. The limit of this peer-review process is that a professional supervision by a teacher is missing, and students can’t be sure of the quality of the feedback expressed by their fellow students.

High drop-out rates represent one of the main challenges related to MOOCs. In this respect, many authors argue that the high drop-out rates of MOOCs are an irrelevant issue, since with no penalty for exit or specific requirements for entry beyond personal interest, lapsing from MOOC enrolments is simply not a significant decision. However, there is a direct connection between drop-out and didactical offer of the MOOC, so, in order to keep high users’ interest in the course and motivation, many tools shall be used. Indeed, MOOCs have to be interactive, and it is recommended to use for example a gamification approach in order to motivate the users. 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 with the ability to experience tasks within a meaningful and story-like safe environment to be explored, stimulating motivation and progress, allowing for non-coercive failing and encouraging out-of-the-box thinking. Additionally, it is advisable to organise the course dividing its activities in two main categories: individual activities and group or team activities with others participants.

Many different learning tools and practices can be adopted within a MOOC. Here are some examples:

- **Video**
  - each video has to have a specific and clear objective;
  - video should last about 2-10 mins;
  - it may be associated to writing content to be downloaded;
  - every 7-8 seconds of video something should happen in order to keep high users’ attention (e.g. let an image, an animation, a tag appear on the screen; let an object appear in the video; etc.)

- **Collaborative tools:**
  - editable and collaborative hypertext documents (Google Drive or EtherPad / Wiki).
  - chat
  - internal group forum
  - videoconference tool
  - social networks (Facebook, Twitter etc.)

- **Audio/podcast:**
  - not exceeding five or six minutes
  - clear voice, lively and suitable music and relevant testimonies, as well as a restricted number of sound effects.
  - begin with Course Name /Subject /Lesson /Content or Activity (according to the context of the course)
Normally, the course starts with an overview of the course content and structure and information regarding seminars at university, if relevant. The courses are often divided into different sessions, and each session often begins with a video lecture. Then, students can do exercises, quizzes or a test to verify their understanding of the video content or text on which the session is based. Most of the MOOCs work is done online, but sometimes students also have the option to download extra material as texts, notes from teachers etc. and learn through this material offline. Usually some links are provided at the end of a session to other webpages relevant to the course content. Many courses offer a general forum as well.

The course syllabus can be distributed into 4 to 8 modules, which may include the following items, depending on duration and objectives:

• a short introductory video in each module. So, each module would typically provide for 4 to 8 videos with associated activities and evaluations. A standard class in a MOOC, starts with a video of 5-10 minutes.
• the use of a self-paced methodology.
• the establishment of interactive user forums to help the students, professors, and teaching assistants develop a community.
• the application of peer-review and group collaboration. Users can evaluate and grade themselves.
• the presence of automated feedback through objectives and online assessments, e.g. quizzes and exams.

The combination of videos and other materials facilitates the learning proposed by the course team and the achievement of the course objectives.

To successfully use MOOCs, learners need to be enthusiastic and self-motivated. Some learners find motivation and show their talents in self-directing learning. Also, trying to meet job and career requirements is a motivating factor for learning in MOOCs. The users of MOOCs can have different education levels and different backgrounds, they can be motivated by their need to enhance their professional skills. In some MOOCs, it is possible to get a certificate at the end, helping users to keep their attention high while they work on the MOOC.

Generally, most of the success or failure factors are purely individual as most learners are genuinely interested in completing the course, and most of such learners are fascinated by the reputation of universities, the quality of courses, and have fun in solving challenging assignments.

Moreover, there are issues that MOOCs have to deal with nowadays and improve such as:

• Lack of openness of the contents (all rights reserved);
• Funding, as it can cost for universities. An important question today is for how long will MOOCs remain free and for whom;
• Lack of interactivity between students;
- Lack of student centered and really open/distributed forms of MOOCs (pedagogy);
- Quality issues of courses, contents, accreditation etc.;
- Motivation for teachers, how easy is for the teacher to create the conditions for a learner to “learn”?
- Participants’ diversity, who are the participants interested by doing a MOOC.

3. Benchmarking of pedagogical models
Comparing the different platforms and courses, it becomes clear that there are many different kinds of pedagogical models adopted in MOOCs. A good MOOC should include a variety of exercises to be able to target different types of learners. It is also very important that it is clearly laid out and presented, and that instructions are easily understandable. A very positive aspect of a good MOOC would also be encouraging students to become creative themselves and upload their own material.

Pedagogical framework: an example of MOOC

“Advanced Spanish Language and Culture”, delivered by St Margaret's Episcopal School:

The platform edX offers a wide range of courses that are classified in subjects such as Architecture, Art & culture, Humanities, Computer Science, Chemistry, etc. Its courses are designed not only for High School but for Students and all users who are interested.

An example is represented by the course titled “Advanced Spanish Language and Culture”, with Marta E. Moore-Austin as teacher, a non-native Spanish instructor with 10 years of teaching experience in the US. The course started on February 19th 2015 and its length is 6 weeks. The estimated effort is 6-hours per week. The course and resources are in Spanish.

“Advanced Spanish Language and Culture” is an advanced language course. Prerequisites are to have a good level of knowledge of Spanish language or have taken at least three years of Spanish lessons in high school, and to have a high proficiency in spoken and written Spanish.

It is possible to take an exam and earn credits or a certificate for this course. A “General forum” is also available, where users and visitors can give their feedback about the course. On the Course main page, on the top, the different parts making up the course are listed, and can be

![Figure 7: View of the Introduction page](https://www.edx.org/course/apr-spanish-language-culture-st-margarets-episcopal-school-aslcx#!)
accessed by the different buttons:
Courseware (Lessons, their content, Homework and Quizzes), course information (course updates and news), resources (guidelines), discussion (Forum to comment lessons and homework), wiki (Links to online infos to Spanish grammar), progress (where each student can see graphically his own progress) and textbook (Wiki-book of Spanish Grammar). On the right there is a course hand-out with links to a grammar syllabus.

<table>
<thead>
<tr>
<th>Courseware</th>
<th>Course Info</th>
<th>Resources</th>
<th>Discussion</th>
<th>Wiki</th>
<th>Progress</th>
<th>Textbook</th>
</tr>
</thead>
</table>

The main part (cf. Figure 8) of the course is the courseware, which is divided in 6 lessons, 5 of them describing different aspects related to culture such as: “La identidad pesonal y pública” (personal and private identity), “las familias y las comunidades” (families and communities) etc. The last one (lesson 6) contains the preparations to the exams and the final exam.

Structure of the lessons:

Each lesson introduces its content with a short video (with Spanish transcriptions), where the instructor describes approximately in 2-3 minutes the aspects that will be dealt with, put some questions and give participants an input about the subject in order for them to reflect on all aspects and write about their own opinions after watching or reading about the content.

After the short video to introduce the content and the goal of the lesson, there are one or some Spanish sources to get in depth into the content, mainly videos or articles of online newspapers (for example BBC in Spanish, see Figure 10 and 11).
Directly after the presentation of each source (informative or thought-provoking content) students are given the possibility to do some homework related to the previous information and sources. The goal is participants’ production, in most cases by writing a composition and giving their own opinion. The compositions or texts have to be written in the forum (Discussion, see Figure 12 below).
Homework focus on oral production (Cf. Figure 13) as well as on recording videos or audios where participants express their opinions, upload and share material with other participants, so that they can exchange information and compare notes with each other. Oral production is then commented in the forum (Discussion).

- Users can also take quizzes (Multiple choice) in order to test the improvement and new knowledge about the sources (video and articles), as shows Figure 14 below.

Figure 13: View of participants' oral production: link, commentary and audio  (Source: op. cit., Figure 7)

Figure 14: View of a quiz (multiple choice)  (Source: op. cit., Figure 7)
- There is also an option to refresh or repeat grammar aspects such as “subjuntivo modus”, etc. as shows Figure 15, with the help of grammar refreshing (Video or text) and quizzes:

![Figure 15: View of a grammar activity (video and quiz) (Source: op. cit., Figure 7)](image)

Participants share their production (homework: text and oral production) in the section Discussion (Cf. Figure 16). For each homework a thread is opened on the forum:

![Figure 16: View of the section Discussion within some open forums and explanation about how to use edx discussions (Source: op. cit., Figure 7)](image)
4. Didactical approach
The didactical approach is based on providing authentic resources including online, audio, and audio-visual resources, as well as traditional printable resources that include literature, essays, and magazine and newspaper articles with the goal of providing a diverse learning process.
Class is conducted completely in Spanish and includes frequent writing and integration of skills with a grammar review.
The course requires students to improve their proficiency across three modes of communication: Interpretive, Interpersonal and Presentational.

The goal of this didactical approach is primarily the participants' production of texts and audios about cultural aspects using advanced vocabulary and linguistic structures in the Spanish language.
On the other hand, users' reception of Spanish sources is related to culture content and a review of grammar structures, and enables them to test and check their new knowledge, while monitoring their learning process and their improvements through quizzes.

The sharing of text and audio production as well as interaction and exchange of feedback between the participants is a central aspect of the course, because users have the possibility to teach and learn from each other. Users can correct grammar and vocabulary mistakes, suggest corrections and contribute to a language improvement. However, there is a need for a feedback from or interaction with a Spanish teacher or a native speaker, because users' suggestions or corrections are not always reliable.
Therefore, teachers should not be a mere deliverer of resources, but a facilitator and support for participants.

However, some problems have been identified in the Spanish language taught within this MOOC. For instance, a considerable number of course visitors (viewers) and participants have complained about the high number of mistakes in the edited spoken and written texts, in the spelling of some words and even in some quiz answers, as shown in Figure 17. This is due to the fact that the Spanish instructor is not a native speaker.
Reviews (feedback of the course) appear in the introduction page.
Another limit of this MOOC is related to the grammar review, as it appears to be a mere recapitulation of some Spanish tenses and “subjuntivo mood” (form and uses), without being presented in a context, but through examples and phrases which are not related to the course content. No specific suggestions are offered to help participants express their opinions and communicate about the content covered in this course. For that reason this grammar review is not as useful as it should be, and is not consistent with an advanced course of Spanish language.

However, in general, the course’s conception and structure and its pedagogical approach have been achieved with quite good results.
In order to help the reader get a general idea of possible ways in which a MOOC can be structured, here is a table with a comparison of MOOCs addressing a variety of subject matters. The following table identifies some basic features of these MOOCs, and namely: course title and provider, length, content, pedagogical approach, tools/media, progress monitoring/assessment.

<table>
<thead>
<tr>
<th>COURSE TITLE</th>
<th>English for teaching purposes</th>
<th>Modern Hebrew Poetry</th>
<th>Economic Growth and Distributive Justice</th>
<th>Medieval Europe</th>
<th>World Music</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROVIDER / PLATFORM</td>
<td>Universitat Autònoma de Barcelon / Coursera</td>
<td>Hebrew University Jerusalem / Coursera</td>
<td>Tel Aviv University / Coursera</td>
<td>khanacademy.org</td>
<td>open2study</td>
</tr>
<tr>
<td>LENGTH</td>
<td>4 weeks</td>
<td>14 weeks</td>
<td>6 weeks</td>
<td>not homogeneous</td>
<td>4 weeks</td>
</tr>
<tr>
<td>2-3 hours/week</td>
<td>2-4 hours per week</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DESCRIPTION OF THE COURSE AND CONTENT</td>
<td>A course on English teaching methodology aiming to support university lecturers in teaching English.</td>
<td>Course for both Hebrew University students and learners who are not affiliated to University. Contents are related to Hebrew poetry and literary culture.</td>
<td>Major issues related to economics and societies of the 21st century, such as distributive justice, namely, inequality of income or wealth, and its relationship with economic growth.</td>
<td>The course addresses Medieval European history.</td>
<td>A course aimed at discovering music traditions and exploring how music represents cultural identity.</td>
</tr>
<tr>
<td>PEDAGOGICAL APPROACH</td>
<td>Video lectures, explanations, quizzes, production activities: recording part of the lecture videos (sessions), 8 to 15 minutes long. There will be separate homework assignments at the end of each class.</td>
<td>Each class will consist of lecture videos (sessions), 8 to 15 minutes long. There will be separate homework assignments at the end of each class.</td>
<td>Syllabus: each week a different topic is addressed. The class will consist of lecture videos, quizzes, and discussions.</td>
<td>The course is divided in different topics related to Medieval Europe), texts and pictures, questions and discussions.</td>
<td>4 modules</td>
</tr>
</tbody>
</table>
class and sending videos + comments, feedbacks, discussion forums

end of each class, and a final exam.

videos 8 to 12 minutes long, two quizzes and a final exam.

answers, multiple choice (elaborated with photos and sound), feedback

TOOLS / MEDIA

Forum, video platform. Weekly video lectures and downloadable slides, readings, quizzes.

Videos (professor lecture), additional appendices (PDF documents: poems), quizzes (Multiple choice), forums and support.

Videos, quizzes and exam.

Videos / quizzes (with photos and sound, hints), info, texts, additional resources.

Videos, quizzes, forum.

PROGRESS MONITORING / ASSESSMENT

Quizzes as only assessment; free certificate signed by the MOOC instructors, giving no University credits.

Peer-to-peer assessment, ongoing tests and final automated test. Verified certificate, giving university credits, are issued under a fee. Tutors give individual feedback via chat and email.

Verified certificates are issued at the end of the course, through which the platform finances itself.

Control of learning progress through: feedback (for example: 21% of the course completed; ⅕ skills completed).

Certificate of Achievement (no formal qualification or credit).

III. An overview of instructional technologies

MOOCs are expected to offer an interactive learning environment to a big number of users. With this view, a variety of digital tools can be used, including videos, text, audio files, pictures, etc. The exploitation of a wide range of tools can help meet personal features and attitudes of learners. All these tools are usually available in streaming, in order for students to access them at specific days and times and to follow the structure of each course. However, it is advisable that the most important learning resources are made available also for download, so that users can easily access them “on-the-go”.

Figure 18: English for Teaching Purposes (Source: https://www.coursera.org/course/english)
MOOCs should not be perceived as a traditional learning course. To this aim, traditional teaching approach should be avoided, and a more “conversational” learning style should be adopted to keep learners’ interest high at all stages of the course. This approach is based on the exploitation of a number of different tools, such as simulations, problem-based and case-based learning, as well as video and audio files (6 to 10-minute long), and traditional contents as a complementary resource, as shown in Figures 19 and 20.

Technology-enhanced learning is the main MOOCs’ feature allowing to draw learners’ attention by means of interactive contents.

Web 2.0 offers a variety of tools which have a great potential to be used for educational purposes, also within MOOCs. One of the most widespread tools of this kind is represented by social media and other networking sites and tools allowing for the sharing of information and resources. Here are some of the most relevant technologies which may be used for instructional purposes:

- **Social networking and micro-blogging**: it allows to share ideas through short messaging (e.g. Twitter). Other tools are Facebook, Google + or LinkedIn, easing the interaction among people interested in the same issue. Blogs can also be created on Word-press and other tools for blogging.

- **Media**: multimedia resources can be easily shared through YouTube and Vimeo. This also allows students to share tutoring videos and their own recorded materials. Another useful tool to share media materials is represented by podcasts.

- **Virtual communication**: tools such as Skype or Flashmeetings can be used to arrange calls and video-conferences, brainstorming sessions and to practice with other students thanks to synchronous communication.

- **Social Bookmarking**: useful to share resources and links available on the web, organising contents based on specific topics addressed. An example of social bookmarking platform is Diigo.

- **Sharing presentations and other information**: Slideshare or Prezi can be used to share presentations. Editable information can be shared on the web thanks to Wikis. Information which can be shared include text, graphic materials, databases, PDF files or URLs.

- **Discussion forums**: forums allow for discussion and peer-learning among students.

1. **MOOCs basic features**

MOOCs’ features intend to support interaction, collaboration, evaluation, and self-reflection. Most MOOCs provide a collaboration work space including several tools to support learners in communicating with each other, such as forums, blogs, video podcasts, social networks, and dashboards. The use of media technology broadens communication opportunities among learners, and encourage them to express their opinion and actively participate in discussions.
In MOOCs one of the most difficult things is to provide feedback to a big number of learners. This led many MOOC providers to adopt learning analytics tools with a view to understand learning obstacles and patterns, monitor the learning process, give feedback, and encourage learners to self-reflection.

Here are some examples of MOOCs’ basic features, as it is illustrated in Figure 21:

1. Video-lectures
2. Assignment sheets—PDF files describing homework.
3. Multiple-choice quizzes – simple questions helping learners monitor their learning
4. Guidelines & tutorials – documents giving background information and information about the course as a whole and video tutorials to give details about how to use all features
5. Final exam – a PDF file to be filled in by the learner in a fixed term.

Because of massive enrolment, MOOCs require an instructional design able to facilitate large-scale feedback and interaction. The two basic approaches are:

- Peer-review and group collaboration
- Automated feedback through objective, online assessments, e.g. quizzes and exams

Often, learners participating in a MOOC are also required to do some homework. The texts produced by each learners’ could become new learning material for their peers.

In order to support the learners in getting the most out of the course, some guidelines shall be provided so as to guide them through their learning path, describing the expected learning outcomes, suggested tasks and topics, as well as assessment modes and certification.

### 2. Duration and phases

Research about the advisable duration of MOOCs is still very limited. MOOCs based on University courses often tend to mirror the duration of face-to-face courses. However, given the idea behind MOOCs as a way to offer a new educational model, the mere transfer of a face-to-face learning experience into an online system is not beneficial for the learning purposes.

MOOCs’ length usually ranges between six and seven weeks, but some of these courses go beyond ten weeks. The first week is usually used to help participants get familiar with the environment, technologies and tools they will use. This phase is critical to keep participants’ interest high, because it allows them to spend some time working and communicating online before starting to work on the course contents. Additionally, the familiarisation phase enhances the development of the learning...
community. The work is then distributed over the following weeks, with different sessions covering specific topics, each one with its introduction (a short video – 5 to 10 minutes).

Different approaches are possible in terms of time and design of MOOCs, such as:

- **Time-based approach** – the MOOC has a very precise structure and schedule following a calendar of activities and learners’ interventions.
- **Goal-oriented/competence-based approach** - the MOOC is based on the outcome learners are supposed to achieve, so each learner can arrange his own program, choosing the duration and pace, as well as how to distribute the workload over time (learner-centered approach). Learners can also work in teams, working together to reach their outcomes and organising the time according to their needs (Team-oriented approach).

The length of the MOOC is one of the most important features, together with the quality of the learning experience. However, no reliable data are available in order to understand whether a longer or shorter duration of the MOOC helps speed up the learning or not.

### 3. The “social” dimension

Digital learning environments need to be based on a social and participatory approach, where learners can learn from their peers. This explains how important it is to ensure that MOOCs have a social dimension based on a strict cooperation among users. This can be achieved in many ways, such as, for instance, the creation of working groups and teams to carry out specific tasks. In this sense, social networking and social bookmarking tools can be useful to encourage peer cooperation.

In order to encourage this collaborative approach, many tools (both internal and external to the MOOC) can be used, such as Google drive, Dropbox, social media and other platforms used to share resources and documents. Additionally, Skype can also be used by the students to talk (either in videoconference or in chat) and discuss about their work.

As previously mentioned, one of the most important features of MOOCs is represented by discussion forums, which are another tool easing interaction among learners.

Peer assistance, also known as “paragogy”, is another important element of MOOCs: it is based on co-creating products and providing mutual support and contributions. It is nevertheless important to fix some criteria in order to filter the information shared.

### IV. Challenges and future developments

In spite of the open nature of MOOCs, many issues risk to limit their massive potential. Nevertheless, research shows that many issues are still to be solved in the field of MOOCs, namely related to pedagogy, weaknesses around access, poor engagement of weaker learners, exclusion of learners without specific networking skills, sustainability, quality of learning, equality, equity, financial viability and accreditation.
The ultimate challenge related to MOOCs is to overcome some major issues, which include:
- Language hurdles limiting the access to courses: MOOCs should be open to everyone, but, reportedly, most of them are English-based.
- High drop-out rate: student dropout has been identified as a key problem for MOOCs. Typically, around 20,000 learners register for a MOOC, with 5-10 per cent reaching the end point (Sharples, et al. 2013). However, as already mentioned, the high drop-out rate is also linked to the fact that students decide to take a MOOC on a voluntary basis, for personal interest, and there are no real compelling factors to start or give up on a course beyond personal motivation.
- Massiveness - The quality of teaching needs to be fully ensured. In real life, small classes generally have good results, but the massive MOOC teaching methods, the number of participants up to tens or even hundreds of thousands make this type of course a different case. In order to manage such a huge community involvement while ensuring high-quality of teaching, there is a need to propose appropriate coping strategies.
- Low teacher’s involvement - While a student participates to a MOOC, there is no face-to-face interaction with the teachers. When participants attend a MOOC in order to receive a certification at the end of the course, it is difficult to cope with the risk of cheating and thus to ensure the credibility of the certification.
- Monitoring progress and assessment of student performance
- High difficulty level or lack of scaffolding
- Lack of a strong motivation and different learners’ behaviour

Among the most common challenges are individual instruction, student performance assessment, and long-term administration and oversight.
MOOCs require course delivery to a large number of learners. According to a research that assessed over a hundred known recent literature contributions on MOOCs and Open Distance Learning, there are different types of learner behaviours in MOOCs as well. As a matter of fact, MOOCs attract a wide variety of students with different learning styles from all around the world. It is a challenge for instructors to engage students, maintain their interest in the course, and tailor the learning environment to fit the need of each student.

Other related problems such as poor Internet connectivity, lack of knowledge about MOOC and level of learning potential can be mentioned as well.

Beyond these issues, many challenges exist in terms of effectiveness of the MOOCs phenomenon. First of all, most MOOCs are based on a top-down (teacher-centered) approach, rather than bottom-up involvement of participants.
Additionally, there is still much confusion about available literature, as MOOCs are a very recent phenomenon. There is a need to do an organic mapping of MOOCs, including pedagogical features, learning patterns and relationships between students and teachers, recognition of credits and certification as well as assessment methods.
V. Conclusions & recommendations

In spite of the research work carried out so far, there is still much to investigate around MOOCs in terms of pedagogical approaches. Teachers’ role within MOOCs still needs to be clarified and strengthened, and new ways need to be explored in order to ensure their online presence.

Also, given that MOOCs are a relatively “young” phenomenon, new evidence needs to be collected in order to ensure a more effective comparison and benchmarking of pedagogical models, so as to identify the most useful approaches to be adopted within MOOCs.

An effort needs to be made in order to better motivate the target groups and decrease drop-out rate, and to allow for an easier access to available information and case studies, so as to fix universal criteria to assess MOOCs’ effectiveness and explore the potential of this new technology-enhanced learning tool.

Literature reviews and research studies already available need to be expanded and compared, in order to get a complete mapping of MOOC approach and spread detailed information on the matter, paving the way for a further spreading of innovative affordable forms of learning.
PART TWO – MOOCs insights

I. Introduction

The 2nd part of the research report on MOOCs Pedagogical framework aims to address further issues related to MOOCs in order to complete the 1st part of the report “Review of MOOC experience”. More concretely, in the following paragraphs this report will briefly explore some basic MOOC issues providing some basic information first on the overall goals for participating in a MOOC or organising and delivering a MOOC based on extended literature review. Furthermore, it will give important information for the transition from Learning Management Systems (LMS) platforms to MOOC platforms presenting specific examples. Additionally, it will present to what extent the technological affordances of a MOOC platform are connected to the choice of the pedagogical model and further innovative methodologies. Following this section, two important MOOC issues will be addressed, assessment and accreditation, that seem to be two of the most crucial factors for the success of a MOOC.

II. MOOCs: STAKEHOLDERS’ MAIN GOALS

1. MOOC participants and their motivation

Research shows that little is known about the profiles of MOOC participants, about their motivation to take a MOOC or the actual benefits that derive from MOOCs.

   a. MOOC participant’s profile

Based on the following research findings, it is evident that MOOCs attract the interest of various groups of people of different age, gender, educational background and for various reasons. According to a survey conducted by MITx and HarvardX based on the data collected from the courses offered to 850,000 participants on edX in 2012 and 2013, it is shown that there are significant variations in the average demography across the courses (gender, education, age and nationality). More concretely, the profile of the most typical MOOC participant was male, 26 years or older, and had a bachelor’s degree. Data from Coursera show that course participants come from all over the world, but that the majority are located in North America, Europe and Asia, and corresponding data from edX and Canvas largely support this impression. A research study that was conducted by the European University Association has revealed that that the participation in MOOCs provided by European universities varies greatly as well. More specifically, three main groups of participants were identified; their own
students, other domestic learners and international learners, with a variation in their ratio from university to university. Moreover, based on findings of a recent research conducted in Austria on participants enrolled in courses offered by the iMOOX platform, the typical MOOC learner is a student or an adult learner, strongly interested in the course topic or just interested in learning through media and, finally, with self-contained learning competencies.

b. MOOC participants’ motivation

Data from MOOC platforms clearly indicate that MOOCs are providing educational opportunities to millions of individuals across the world for several reasons, i.e. university students who would like to learn something new, people who have an interest in lifelong learning or don’t have the opportunity or the desire to take traditional campus studies and more. An interesting research has revealed that MOOCs can attract people who have interest in technology and new course formats. Additionally, researchers at the Duke university stated that the basic reasons that drive students’ motivation to enrol into a MOOC can be grouped into the following categories:

a. To support lifelong learning or gain an understanding of the subject matter, with no particular expectations for completion or achievement,
b. For fun, entertainment, social experience and intellectual stimulation,
c. For convenience, often in conjunction with barriers to traditional education options,
d. To experience or explore online education.

Belanger and Thornton (2013) found in their research that the majority of the participants have taken a MOOC for fun and enjoyment as well as for an interest in the topic.

Another report from early 2013 also revealed that MOOC participants are a far more heterogeneous group than those who pursue a traditional degree. Many of those have already a career and want a refill of knowledge, many are researchers who want to use open educational resources (OER) in their own teaching or students in higher education, and others are just keen on learning.

However, it is worth mentioning that, according to data collected from several platforms, most MOOC participants are already well-educated and employed, and only a small fraction of them fully engages with the courses. Same findings came to light through a survey that was conducted at the University of Pennsylvania in 2013 which involved nearly 35 000 students from more than 200 countries and territories who enrolled in the 32 MOOCs offered by the university through Coursera. Results showed that most course participants were highly educated men who were taking MOOCs to develop their career.
2. Motivation to develop, deliver or take a MOOC

a. Who is developing, delivering or taking MOOCs?

There is a growing number of institutions and universities that are experimenting MOOCs at international and European level. The three US MOOC providers, such as edX and Coursera and Udacity, were the first international MOOC initiators. Other European initiatives were launched by the universities themselves, but also by private start-ups, often with support from national governments, telecommunication companies and foundations. Even though European involvement came later, there has been a continuous increase in MOOCs to the extent that about one third of MOOCs around the world involve European higher education institutions, including those who have chosen international MOOC providers. It is worth mentioning that all the European open universities have launched their own MOOCs portal, an initiative led by the European Association of Distance Teaching Universities. Furthermore, the European Commission has practically supported the MOOC research through a series of studies, provision of funding and the launch of the Open Education Europa Portal in September 2013 as part of the “Opening up Education initiative” to provide a single gateway to European Open Educational Practices. Prestigious schools in Canada, Europe, Asia, the Middle East, and Australia also are offering or planning to offer MOOCs.

b. The motivation behind developing, delivering or taking MOOCs

The motivation varies from case to case, but the common challenge for every institution is finding a viable model that allows for sustainability of MOOC provision. But which are usually the reasons that drive institutions’ motivation to develop, deliver or use a MOOC?

The motivation for some MOOCs is a philanthropic one and for others a business proposition. Interesting results regarding the different motivation in US and European MOOCs came to light during the webinar “EU MOOCs: A challenge for Europe, a benefit for all” organised in May 2015 by the Open Education Europa portal. Representatives of important European MOOCs platforms such as Future Learn, iversity, Federica and EMMA were invited to participate in this open dialogue. One of the main conclusions was that in Europe there is a commitment to collaboration and openness in contrast to the competitive marketplace that exists in the US. European MOOCs are notable for their diversity, with many different providers working in the field and they aim to build the future of European MOOCs on a foundation of collaboration rather than competition.

According to a report that was conducted by the European University Association (2014) many European institutions indeed develop MOOCs with the overall aim to contribute to raising the quality of higher education by fostering a change in existing learning and teaching practices. Furthermore, they see MOOCs as the way to bridge the distance between higher education and working life.

Another report describes the outcomes of a research conducted by the Center for Benefit-Cost Studies of Education in Columbia University, NY, involving 29 institutions (private, public universities and
community colleges) that were offering or using MOOCs in the USA. What came to light is that some of the institutions were “producers” of MOOCs, some were using MOOCs developed by others, like “consumers” and few were doing both or decided not to have any official engagement with MOOCs in future. The same research also identified six important goals of MOOC initiatives based on the sample of institutions that were already offering or using MOOCs:

1. Extending outreach and access
2. Building and maintaining brand
3. Improving economy
4. Improving educational outcomes
5. Embracing innovation
6. Conducting research on Teaching and Learning

Similar outcomes were found also in other related research studies where main institution’s goals were to increase their visibility and drive student’s recruitment but also to find new knowledge as well as to share and discuss new innovative ideas.

c. Reasons not to embrace MOOC initiatives

On the other hand, according to the study carried out by Hollands and Tirthali (2014), those who did not embrace the MOOC idea, expressed their doubts regarding the quality of learning in a larger scale, and commented that their priority was quality over quantity. Other institutions expressed their doubts regarding the fulfillment of their institution’s mandates (i.e. retention, persistence, and completion), even though they felt positive towards the innovative contribution of MOOCs. In fact they didn't want to take the risk of exploring the dynamic of MOOCs spending time and money. They preferred to be cautious and financially circumspect and adopt best practices at a later stage.

d. Business models for MOOCs

It is a fact that higher education institutions have the opportunity to market their educational programmes on a global scale. This fact can be an important driving force behind the development but also brings some considerations connected to financial issues. From the one side MOOCs companies are under pressure either to transfer costs to course participants or to generate income from other sources. That means that educational needs and quality usually are a second priority. From the other side there are options where there is no cost for the university to use a MOOC platform or to develop a MOOC course. The open MOOC platform FEDERICA is an example. It was first developed by the university Federico II di Napoli in 2007 as a Web Learning platform after five years of experimentation and research, and launched 40 MOOCs in 2015. However, institutions will need to choose if, how and why they will develop, deliver or use a MOOC.
III. Innovative methodologies and MOOC platforms

In the previous sections an analysis was carried out about the definition of MOOCs, the main types, their basic key pedagogic features, their learning philosophy and the pedagogical approaches behind them. The next step will be to analyse how we have moved from LMS towards the MOOC platforms, what is a MOOC platform and how its technical features enhance a variety of activities that support different educational methodologies and innovative pedagogical ideas.

1. From Learning Management Systems (LMS) to MOOC platforms

Learning-management systems (LMS) were originally developed in the 1990s with the aim to advance online education providing the IT structure and platform upon which faculty members could build their pedagogy. LMS were quite valuable in improving traditional classroom-based pedagogy and for that reason were adopted soon by higher education institutions. The LMSs gave students and teachers access to tools for content distribution, debate groups and parts of student administration. The LMS model has not changed in years and it is still based on the model of courses, lectures, distribution of syllabi and assignments.

How can we define MOOC platforms? “MOOCs use Web-based tools and environments referred to as platforms to deliver education and classes in a new paradigm without regard for geographic boundaries and time zones and to much larger audiences in fact, tens of thousands of students” (B. D. Voss, 2013).

The question is what is the best choice between a LMS or a MOOC platform in order to organise or deliver a MOOC?

The first cMOOCs (constructive MOOCs) have used a traditional LMS, such as Moodle, in combination with other technologies such as wikis, blogs, Twitter, gRSShopper, or Wordpress. Few MOOC examples:

2. Introduction to Open Education 2011 (WordPress platform),
4. mobiMOOC - Wikispaces and Google Groups [http://mobimooc.wikispaces.com/a+MobiMOOC+hello%21](http://mobimooc.wikispaces.com/a+MobiMOOC+hello%21).

Even though D2L and Moodle are LMS systems that have differences, they also provide similar tools that allow instructors to:

- Communicate with students via email and web conferencing
- Host online discussions
- Collect assignments
• Manage grades
• Customise appearance of course pages
• Share course content and multimedia with students
• Easily enrol students in credit-bearing courses
• Comment on assignments
• Create instruction and assignments in foreign languages
• Create instructions and assignments using mathematical notation

Since late 2012, the situation has changed and there was an overlap between the LMS and MOOC platform markets. While most of the educational community continues to focus on the major MOOC platforms (i.e.: Coursera, edX, etc.), each of the major LMS makers is opting to offer MOOCs as well. For example the LMS Blackboard’s CourseSites has offered “open enrolment” courses since April 2012, the same month that Coursera was founded, and the organisation started to refer to the course with the acronym MOOCs almost after a year. Moodle held a MOOC on their LMS MOOC platform called Learn Moodle in September 2013.

What is interesting about each of these efforts is that, to some degree, anyone can now teach a MOOC – even individuals with no university affiliation. In fact, LMS-based MOOC platforms offer a unique opportunity for every teacher from other non-profit organisations (i.e schools) that aim to teach open courses. Rather than having to rebuild the course content within the walls of Coursera or entering new, complex legal agreements, these platforms allow anyone to easily organise and deliver a MOOC.

In the following table (Table. 1) there is a comparison between MOOC efforts made by major LMS makers. As shown by the table below, Blackboard’s CourseSites appears to be the most common platform used to advertise universities and courses, while Moodle, surprisingly, appears to be the least. There is a growing number of individuals with no indicated university affiliation, and other organisations, including non-profit, that are using these platforms to teach open courses. Of course, some universities offer more than a MOOC on each LMS platform87.

<table>
<thead>
<tr>
<th></th>
<th>Blackboard CourseSites</th>
<th>Desire2Learn Open Courses</th>
<th>Instructure Canvas Net</th>
<th>Learn Moodle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universities</td>
<td>31</td>
<td>7</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Courses</td>
<td>56</td>
<td>10</td>
<td>37</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1: Comparing major LMS-based MOOC platforms (Source: Edutecnica, 2014)
2. MOOC platforms and innovative learning methodologies

Learning can only occur in a user-friendly environment. In order for learners to concentrate on the content and learning, they should not be stressed by the hosting information system.

With this view, it is really important to evaluate each platform checking its technological and other features. This is crucial as it can have deep implications in the learning and teaching process. In fact platform’s technology can allow a degree of personalisation and customisation of content and can enable certain pedagogical methods. That means that the platform can support either a traditional (xMOOCs-oriented) or an innovative approach (cMOOCs-oriented) of learning.

More concretely, the following technological features need to be taken into account:

- **Technological affordances:** Is the platform based on an already existing virtual learning system? Can the platform support mobile applications? Can the platform support “smart systems”? As stated by Soares (2011), the Carnegie Mellon Online Learning Initiative has been one of the first adopters in designing online environments that customise content specific to individual student needs. Based on “smart systems”, teachers could check where students were facing difficulties and then propose additional exercises and helpful resources.

- **Tech-accessibility:** Can people with visual and hearing disabilities access the platform? Does the platform provide a technology easing the adoption of a specific learning methodology for disabled people?

- **Tech-communication and interaction:** Does the platform support a variety of innovative tools that will enhance learners to communicate in a synchronous and asynchronous way with their peers and teachers? Will learners be able to organise their group or self-paced learning? Will learners have the possibility to work in collaboration on an open learning environment?

- **Tech-Assessment:** Will learners be able to assess their activities and/or assess their peers’ work? Does the platform support an automated assessment system? Does the platform give learners the opportunity to assess the educational material?

- **Tech-activities:** Will the platform support a variety of activities that could support the development of several skills? Could the learners add or propose new activities? Does the platform support the creation of collaborative and highly interactive activities?

- **Tech-Content/Resources:** What kind of resources and content does the platform offer? Is there a possibility for learners to add their own material?

- **Tech-pedagogy:** Does the platform support a more traditional (xMOOCs) or a more innovative approach (cMOOCs) of learning? Are the tools provided able to support various innovative learning models (personalised learning, adaptive learning, self-paced and social learning, etc.)?
3. Supporting MOOC learners
Regardless of the MOOC’s platform technological affordances and the tools that each teacher chooses to use, it is important for MOOC teachers to support learners while working and learning in massive online environments. This support can drive learners’ motivation, and this is a key factor in successful implementation of a course. MOOCs are different from traditional online courses, so learners need to be prepared accordingly. Learners need to be able to feel comfortable while learning in MOOCs. That can happen if they are able to use and engage with different technologies, to interact with high numbers of fellow learners and, of course, if they are able to filter in a critical way the vast amount of information91.

IV. ASSESSMENT IN MOOCs

When it comes to assessment in already existing MOOCs there is much ground to cover. In this chapter we will present some general approaches to assessment practices, and try to apply these assessment strategies to digital learning via MOOCs. A special attention will be addressed to the availability of opportunities to provide formative assessment aiming at creating self-regulated learners, an essential goal in order to increase the completion rate in the courses.

There are several ways of assessing students’ performance in MOOCs, this report will address the most common ones, and try to elaborate on different ways of usage highlighting the difference in learning strategies amongst users. In the end, differences in achievements will be analysed, and the best methods adopted in small scale MOOCs from non-academic providers will be identified.

1. Introduction on MOOC assessment
When dealing with assessment methods in MOOCs, it is useful to keep in mind the difference between summative and formative assessment. In a MOOC it is essential to train the students to become self-regulated learners. According to Pintrich & Zusho (2002)92 self-regulated learning refers to the degree to which students can access, regulate, change and modify aspects of their learning process, for example their thinking, their motivation towards the subject and the learning methods as well as their own behaviour during the learning process. MOOCs are primarily directed towards the areas of lifelong learning, which is the basis for the idea of generating ways of formative assessments.

On the other hand, in order to differentiate and eventually accredit students, the course needs some type of summative assessment. Many think of summative assessments only as standardised test and grades based on performance, but it is important to remember that summative assessment is so far the only plausible way to rearrange and align student performance levels across institutions and topics adopting the same type of lecturing. At present, academic institutions do not have any other effective assessment methods.

There are several different ways of delivering MOOCs, and the assignments and assessment vary accordingly.
In xMOOCs there are typically graded assignments, and a score based on performance in tests. The xMOOCs aim at defining knowledge while certifying students, and is therefore in a strong need for summative assessment.

The cMOOCs are based on a Connectivist pedagogical method and social interaction. The pedagogy behind cMOOCs supports to a large degree the collaboration amongst learners. The peer or self-assessment is used more often, and it is an approach that is more connected with the formative assessment methodology.

Another type of MOOCs is the quasi-MOOCs, defined as “[…]a myriad of web-based tutorials as OER that are technically not courses […]do not offer the social interaction of cMOOCs or the automated grading and tutorial-driven format of xMOOCs.”93 These courses are more eclectic, and assess students according to the subject being taught or the lecture of interest, making it more difficult to define the assessment methods.

Even though there are several different MOOC-formats, when it comes to assessment it seems that they all include some common characteristics. According to Glance, Forsey & Riley (2012)94, and based upon the study of MOOC formats, the following assessment methods adopted by well-known MOOC providers like Udacity, edX and Coursera are the most common ones: formative quizzes, automated assessment and/or peer and self-assessment and online forum for peer support and discussion. Existing formats of functional MOOCs seem to reflect the idea that it is not possible to provide feedback and grading that is not automated or peer assessed. Different ways of providing feedback in existing MOOCs will be described in the following sections.

2. Multiple choice/quizzes

Figure 1 shows an example of multiple choice (MP) questions. The student can choose one out of four different alternatives to answer a simple question. There are also several other ways of presenting these types of questions, like true/false statements or short problem sets. Most MOOC platforms offer these automated grading tools for straightforward testing.
There are several advantages in using MP questions in MOOCs (see for examples University of Minnesota, 2013)⁹⁵:

- The quiz differentiates students’ knowledge
- It is easy to compare results
- It is easy to technically set it up.
- The students can take the tests several times
- Institutions can benchmark each-other’s results and test
- It might be possible to accredit students based on results.

On the other side there are also difficulties or drawbacks with MP tests:

- It is difficult to generate an appropriate number of good questions and alternatives
- It allows for guessing
- It makes it easier to cheat/get help compared to writing and oral activities
- The students do not receive feedback other than correct/false
- Technically it is difficult to assess in depth knowledge about the subject.

In order to accredit and grade students attending MOOCs it is necessary to have some sort of differentiation. Summative assessment like MP-questions represent quite a precise way to test knowledge. However, according to recommendations contained in available literature, MP-quizzes are a good tool to keep up the pressure on the students, and should be used mainly for small scale testing and assignments.

3. Computer-generated feedback

It is when you wade into more complex territory, like assessing students’ essays or conceptual knowledge, that the discussions about and the differences in assessment methods are shown. “MOOCs use computers to score and provide feedback on student activities and assessments and thus rely heavily on multiple choice questions, formulaic problems with correct answers, logical proofs, computer code, and vocabulary activities” (Balfour, 2013)⁹⁶. This is the most cost-efficient and only plausible way of managing assessment in MOOCs with a high enrolment. In some subjects understanding, knowledge and skills also need to be tested in other ways than through MP-questions. Two computer-generated ways of providing feedback on students’ essays will be described in the following sections.


edX has adopted Automated Essay Scoring (AES) in its courses. According to Balfour, AES is based on statistical models able to predict human-assigned scoring. Based on samples from essays delivered earlier, the model includes variables like length, grammar, structure and more to predict how a human assessor would grade the essay. Some AES applications may include creativity, organisation and style,
LangMOOCs – Intellectual Output 1 – Research report on pedagogical framework

and give feedback on these elements. In the latest editions even some Natural Language Processing computational elements may be available.

The figure shows Pearson’s variety of AES, where the overall score is based on seven variables; Ideas & Content, Word Choice, Organisation, Sentence Fluency, Conventions, Voice and Length.

An AES has proven to be effective in assessing essays where instructions and aims are clear from the beginning. In some ways, AES is more reliable than human scoring, since it is more consistent, reducing the element of human subjectivity. But an AES can never completely replace a human reviewer. For example, an AES could never acknowledge creativity and engagement as a human, it cannot distinguish between typos and significant errors in essays, and it is not yet able to assess novel metaphors, humour or provincial slang.

Literature still presents some doubts on how well an AES can work on MOOCs, even though investment to prepare an AES is significantly lower than the effort a single teacher would make in order to follow-up students enrolled in the course. There are some studies showing that the students benefit more from structured computer-regulated feedback than from a simple feedback on their writing. This strongly suggests that an AES should be further explored as an assessment tool in MOOCs.

5. Calibrated Peer Review/peer evaluation – Coursera

Another well-known platform, Coursera, is directing its efforts in a slightly different direction. Coursera uses a calibrated peer review, including students in the assessment of their peers. The students hand in their essays, and get scored by their peers. The students are all trained in assessing essays, similar to those delivered by themselves. They use a multiple choice rubric, where they choose the alternatives corresponding to their opinion on that specific area of the essay. At the end, the teacher gets several assessments on the same essays, and the performances are sorted in high to low categories.

The figure shows a screenshot of the commercial UCLA product Calibrated Peer Review (CPR). Coursera has claimed that there are several differences between their calibrated peer review and UCLAs, but for the purpose of this report they can be used the same way.

There are several beneficial aspects of using CPR. According to Balfour (2013), it allows large numbers of students to submit essays and better learn what the instructor considers as important in the assignment. Performing a peer review of fellow students allows for a higher level of social interaction and increases self-evaluation. Balfour also claims that CPR can enhance the aspect of self-regulated learning, especially through receiving feedbacks from all reviewers of their text.

On the other hand, some problems also exist in using CPR, especially in courses with 100,000 students enrolled. Technically it is difficult to program groups or categories for reviewers to classify the essays. It is also difficult to make scoring calculation when the submissions exceeds 1000 essays.

CPR relies heavily on students’ active participation. They need training (almost as an ordinary teacher) and they need motivation. The students have to rely on their own abilities, since a peer assessment is carried out on all reading assignments and the feedback might be hard sometimes.
Despite the obstacles, some studies have shown that CPR can be the most effective assessment tool in large online classes, and should be considered in every MOOC. Balfour (2013) provides an overview of advantages and disadvantages with AES and CPR (Table 2).

<table>
<thead>
<tr>
<th>Factor</th>
<th>AES</th>
<th>CPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of papers scored</td>
<td>Levelled or topical essays. Focused essays. Structured is better. More literal than figurative.</td>
<td>Single topic from common sources. Short essays. May be a little less structured. May be used for some figurative texts.</td>
</tr>
<tr>
<td>Consistency of scoring</td>
<td>Highly consistent</td>
<td>3 students (raters) provide feedback with visible disparities to the writer. Quality of calibrations and rubric partially determine consistency of score.</td>
</tr>
<tr>
<td>Comments provided</td>
<td>Major element such as creativity, style and organisation. Based on statistical analysis or lookup. Likely to miss subtle elements.</td>
<td>May be enabled on every rubric element. Messy, human-based comments. Vary by reviewer ability and helpfulness.</td>
</tr>
<tr>
<td>Instructor/TA Intervention</td>
<td>Requires training essays: 100+</td>
<td>CPR problem list may not scale up to tens of thousands of students. Students often doubt peer assessment.</td>
</tr>
<tr>
<td>Advantages for Student Learning</td>
<td>Rapid feedback. Categorical and overall review.</td>
<td>7 uses of instructor rubric on content. Teaches evaluation skills. Self-evaluation after peer review. Required repetition/time on task.</td>
</tr>
</tbody>
</table>

Table 2: A comparison of AES and CPR in MOOCs (Balfour, 2013)

6. Peer assessment vs. tutor feedback

Sticking to the idea of creating self-regulated learners, it is clear that MOOCs need to include some form of formative assessment. Looking at the drop-out rate from existing MOOCs, where the literature shows that as much as 85-90% of the attendees leave the courses without completing it, it is obvious that something is draining the motivation, involvement and engagement in the students’ groups. There are studies pointing at assessment as one of the most influential elements that can drive motivation amongst students. And “[…] computer-based grading is many times limited, disappointing and insufficient, with no partial marks and detailed explanations of answers.” This shows the need for some form of peer assessment, either by fellow students or by the instructor.
7. Peer and self-assessment

According to Glance, Forsey and Riley (2012), most of the literature shows additional learning benefits in groups where peer assessment is included in the process. It is obvious that the accurate and constructive feedback provided by peers is not as good as the one students retrieve from an instructor. Two major benefits have been identified in including peer assessment in courses like MOOCs; 1) Every learner acting as peer-reviewer learns to correctly produce his own essays through the peer-assessment process and the predefined assessment criteria and 2) through self-assessment he/she becomes more autonomous during the learning process. This is particularly effective in developing the self-learning skills needed to create self-regulated learning and to manage a MOOC depending on your own abilities: “The ability to self-assess is considered one of the most important skills that students require for effective and lifelong learning and for future professional development”.

Peer assessment and grading could provide a solution to two important barriers in MOOCs. Firstly, it is not possible for a teacher to score and grade a large course, even when the teacher is the one creating the rubrics and training the students enrolled in the course. Secondly, peer-assessment meets students’ need to receive additional comments and constructive feedback not accessible from an AES or CPR. There is still a question regarding reliability in peer-assessments that needs to be investigated, especially regarding feedback from individuals or groups.

V. Challenges and conclusions

Assessment is an important challenge in a MOOC. First of all, one has to think of instructor’s workload during the courses. No matter what kind of assessment a MOOC contains, the teacher is still the one who creates the course and needs to guarantee for the knowledge students obtain through it. In this respect, computer-generated assessment is the preferred method, including MC/MP-questions and AES.

Peer assessment will enhance the workload, but this raises a couple of other challenges. In order to include peer assessment you need to motivate the students’ group, and make them see the benefits of the additional work. Another challenge is to find a valuable way of certification and accreditation of the attendees. It is important for the grades/scores to reflect the accurate level of students’ performance. This is difficult to be achieved with peer assessment, and even with AES or CPR. Peer assessment raises the issue of cheating, in case several students collaborate and provide better assessment scores compared to what the performance indicates.

If MOOCs depend on computer-generated feedback and assessments, the quality of the automated tool is essential. It has to be stable, calibrated for large-scale usage and easy to use for teachers and students. Several of the new tools, like Pearson’s AES and UCLAs CPR, have proved to be functional and accessible for MOOCs.

If the course aims at creating self-regulated learners and providing formative assessment, peer-assessment needs to be carried out. In order to achieve this, the course needs to overcome the problem with limited peer interaction. One solution would be to create a functional and interesting forum and to
enhance social interaction between users. With this view, the instructor needs to act as a facilitator and be active.

Many of the challenges connected to MOOCs are due to the expected amount of users. In MOOCs involving less than 200 students, the teacher will be able to monitor and facilitate the assessment process too.

When it comes to languages, an important part is to actually produce paragraphs or short essays. This means that MP-questions will not be sufficient in order to assess the students’ knowledge and abilities. We therefore recommend some kind of AES combined with peer-assessment to measure students’ performance in the course.

1. Credit Recognition, Accreditation and Specification

In spite of being a relatively new methodology of learning, MOOCs are evolving in terms of their scope, subject and delivery. Being at the initial stage of development, this style of learning is subject to innovation, both in terms of academic thinking and the possibilities that arise from ICT.

Whilst recognising the above issue, it is useful to look at the idea behind the creation of MOOCs. One of the leading figures in this field, Stephen Downes of the National Research Council, Canada, views MOOCs as being a web rather than a website, and being Massive (by design), Open (free access in terms of scope and cost), Online (not blended or wrapped) and Courses (not communities, websites or videos). His thinking as a creator of one of the first MOOCs in 2008 was expressed in the keynote speech at the International Academy of Technology, Education and Development Conference in Valencia, Spain in 2014.

Stephen Downes advocates an informal approach to learning through MOOCs. This is a valid approach in terms of supporting learners to adapt their pace and time for learning to fit their work and family life, as well as ensuring learners can discover in a creative manner new skills and levels of understanding.

Maintaining a learner-friendly approach to any form of learning is important and in essence a vital component of engaging learner active participation. However an over emphasis of informality has weaknesses when it comes to the recognition of learning. Lifelong Learning is an important principle for every individual to embrace. It is therefore important for any learners in their progression to their next level of learning to have a sort of achievement recognition.

a. Credit Recognition

The origins of MOOCs lie in North America, the phenomenon started as an informal method of learning and then spread across Europe. However, in order to link MOOCs to the world of work and further academic study, there has been growing recognition of the need to have a system or systems of credit recognition to enable the level and value of the learning to be transferred between settings,
including counting towards the achievement of a degree.

In the Financial Times Feature of the Week (November, 2013) the UK paper poses the question whether MOOCs are on course to become a credit-worthy qualification. Within any new market scenario, the article highlights embryonic ideas and a variety of organisations and entities testing new approaches. In North America, new connections arose between the creators of MOOCs and Universities, and this is also the case in Europe.

In the above-mentioned article, Hannes Klopper, co-founder and chief academic officer at Iversity, a MOOC platform based in Berlin, acknowledges that the existence of strong European networks, such as the European Credit Transfer and Accumulation System, provides the opportunity for the recognition of MOOCs. If such a synergy can be achieved, it could provide the environment for the next step forward in the development of this form of learning.

Looking at the potential for a Europe-wide approach to credit recognition, it can be evidenced as having a parallel with the development of computers as a tool for learning and work-based activities.

In early development there were a number of competing ideas on having a standard and recognised system to measure individual competency and abilities. Funded through the European Commission Lifelong Learning Programme, a group of learning partners drawn from a range of European countries co-operated in a project to develop the European Computer Driving Licence (ECDL). This enabled them to create a standard product, recognised across the EU and supporting EU Policy on freedom of movement. Someone living in one country could demonstrate competency in using a computer which could be recognised by employers and learning providers in other countries.

The parallels with the increase in the use of computers is also recognised by Matthew Poyiadgi in an article published on Financial Times where he highlighted the approach of IT vendors such as Microsoft in developing certification pathways to validate competence and provide employers with a hiring standard they can recognise in hiring and developing their staff.

The current growth curve of MOOCs can be viewed as waiting for that “certification moment”, in order to adopt a common rather than competing market approach.

At present, the creators of MOOCs and Universities recognise the potential of partnership and collaboration. There are many good examples of this, with benefits for all parties. However, there are strengths and weaknesses when establishing a relationship. Some of the weaknesses are listed below:

- The difference in course length between Universities (3 to 4 years) and MOOCs (to date short bite-sized learning of a few weeks per course). The depth of learning will be different and a different approach should be used to measure the respective values.
- If a MOOC is a component to earn credits within a larger course such as a degree, how much
should it weight within the course.

- With learning assessment based on different levels of attainment, how is each MOOC measured in terms of quality and complexity at individual level.

MOOCs strengths include the ability to reach out to a wide cohort of learners. As a method of learning it is living up to the Massive tag, with more than 10m MOOC learners and 432 MOOCs running across Europe alone (1,533 globally) from a few hundred different providers, according to data provided by Open Education Europa). However the completion rate for some MOOCs programmes is lower, and there is a challenge to ensure MOOCs capture and retain learners’ imagination. Achieving the latter is an important goal, so courses need to be underpinned with quality to build the candidates perception. The option of credit recognition provides a positive incentive for learners’ engagement.

The need for learner retention and recognition has been prompted as the number of MOOC participants has dramatically increased over the recent years. Learners’ expectations have increased, and in response top universities and institutions, in the US and around the world, are either offering or exploring the option to offer MOOCs for a certification or credit.

Recently, the American Council on Education (ACE) also recommended offering credit for five courses, on the popular MOOC platform Coursera. This is an important step in the formal acceptance and approval of MOOCs for learning and assessment. A bill in California Law system also aims to offer credit for online courses that have been approved by the faculty.

Whilst current research and development of MOOCs are related to Universities, there are other levels of learning provision and new relationships are being developed with further education colleges, community Learning providers and schools. This is an area of future development for MOOCs and can include the opportunity at course planning stage to consider credit recognition.

b. Course Accreditation

Learner outcomes in MOOCs can really be successfully measured with a test, whether as a single or series of formative and/or summative tests. The current trend with informal testing and quizzes may be suitable for some very low-stakes courses, but real credibility comes from both what and how you test along with student’s outcomes.

A test needs to be proportionate to the length of the course. The current trend with MOOCs is for short length bite-size courses, and this limits the scope and depth of any test set for the learner. As for credit recognition, and even more so course accreditation, there will be a need to look at the length and scope of the course to ensure that it is suitable to be part of an accreditation process.

However learner expectations are a barrier which needs to be addressed in developing this concept. In 2015, Times Higher Education published the statistics of an experimental MOOC. Of the 1,000 enrolled students, 31 students finished the course and not a single one opted to pay for academic
accreditation. Whilst the level of drop outs is not scientifically significant, it highlights the need for MOOCs to capture students’ interest.

In his paper, Phil Hill\textsuperscript{108} identified that MOOCs need to overcome four barriers as part of their further growth and sustainability. The four barriers are detailed below:

- Developing revenue models to make the concept self-sustaining;
- Delivering valuable signifiers of completion such as credentials, badges or acceptance into accredited programs;
- Providing an experience and perceived value able to boost higher course completion rates (most today have less than 10\% of registered students actually completing the course);
- Authenticating students in a manner to satisfy accrediting institutions or hiring companies that the students identify.

The principle behind open online courses is that courses are accessible without charge. However, there are costs associated to the development and support of such courses. This creates a conundrum of how to cover the expenditure costs incurred in the provision of MOOCs. Without an income source, the absence of financial sustainability will inhibit the development of MOOCs and cause a potential loss of momentum. There is a natural limit in terms of how far willing individuals and institutions can go to subsidise new learning tools and courses.

A possible way to overcome the barriers, as identified by M. Feldstein, is the offer of accreditation to learners within a fee structure model. Such income generation could also be used for tutor support and mentoring.

In the USA, possible ways for charging learners for accreditation are being piloted. How students will view and engage with paying for some added packages is still at an experimental stage. Many learning institutions and developers of MOOCs are monitoring these pilots with interest to see how the results will shape future thinking on provision. In order for the pilots to succeed, it is important to make learners understand the idea of value for money, and to ensure that the additional packages provide a quality experience in terms of customer service and knowledge acquisition.

Whilst there is a natural move towards ensuring sustainability, it is equally important to recognise that credit recognition and accreditation is not suitable for every learner. The value of access to free education is an important principle in the academic world and wider community. There are many who view learning as an on-going accumulation of knowledge for the pure sake of learning rather than as a step in the journey of academic attainment or career progression. For such an audience, MOOCs provide a convenient and effective method for learning in the current structure, though improvements in quality and technology will naturally enhance students’ level of satisfaction.

Learners who believe accreditation is important and the wider MOOCs community have therefore to deal with the challenge of understanding how to achieve effective course accreditation which is proportionate to the course, has value whilst not soaking up significant resources and is able to be recognised by employers and other academic providers.
At this stage, course accreditation is as a work in progress. New ideas are developing and approaches evolving. There is a general recognition of the level MOOCs students need to reach, but at this stage it is still not clear how they should undertake the journey.

Below some excerpts of two approaches on the topic from either side of the Atlantic are describer, as they are particularly interesting. However, as already mentioned, the progress and development of these approaches is still at a preliminary stage.

c. MOOCs for credit?

One of the most debated issues related to MOOCs concerns how disruptive MOOCs will turn out to be with regards to traditional learning system. However, this will depend on the extent to which they are recognised and accepted by students, employers and institutions. In light of this, an interesting development is represented by some Coursera courses which are now being recognised as a part of the American Council for Education’s (ACE) CREDIT programme.

The CREDIT programme assesses and recommends different types of courses addressed to members of universities and colleges. They can also potentially count as credit cutting the distance to a higher education qualification.\(^{109}\)

d. MOOCs and Academic Accreditation in the UK

In a survey about MOOCs in the UK, the Higher Education Academy, an independent HE support body, outlined a set of policy recommendations which included a push towards academic accreditation. Presently, only two British MOOCs have been offered for credit: First Steps in Teaching and Learning (Oxford Brookes University) and Vampire Fictions (Edge Hill University). The Vampire Fictions MOOC enabled participants to attend the course for free, with the option to acquire 20 credits in return for £200, provided that passable results were achieved.\(^{110}\)
List of figures

Figure 1: Distribution of MOOCs by subject / Growth rate of european versus non-european MOOCs .................................................................................................................................................................................12
Figure 2: The European MOOCs scoreboard.................................................................................................................................................................................13
Figure 3: Distribution of MOOCs by subject .................................................................................................................................................................................13
Figure 4: Growth over time of european versus non-european MOOCs .................................................................................................................................................................................14
Figure 5: cMOOC - A Review of the State-of-the-Art .................................................................................................................................................................................15
Figure 6: xMOOC- A Review of the State-of-the-Art .................................................................................................................................................................................15
Figure 7: View of the Introduction page .................................................................................................................................................................................20
Figure 8: View of the main page .................................................................................................................................................................................21
Figure 9: View of the lessons-tabs (Courseware) .................................................................................................................................................................................21
Figure 10: Link to an informative text (article) and questions to reflect about it .................................................................................................................................................................................22
Figure 11: View of different links to short-films and videos .................................................................................................................................................................................22
Figure 12: View of a discussion (text production) related to the article: “Oficinas más alegres o familias más alegres?” .................................................................................................................................................................................22
Figure 13: View of participants’ oral production: link, commentary and audio .................................................................................................................................................................................23
Figure 14: View of a quiz (multiple choice) .................................................................................................................................................................................23
Figure 15: View of a grammar activity (video and quiz) .................................................................................................................................................................................24
Figure 16: View of the section Discussion within some open forums and explanation about how to use edx discussions .................................................................................................................................................................................24
Figure 17: Examples of reviews that refer to some grammar and spelling incorrectness .................................................................................................................................................................................26
Figure 18: English for Teaching Purposes .................................................................................................................................................................................28
Figure 19: Art of Medieval Europe .................................................................................................................................................................................29
Figure 20: Open 2 study .................................................................................................................................................................................30
Figure 21: Sample question from a Coursera course on Genetics and Evolution .................................................................................................................................................................................42
List of tables

Table 1: Comparing major LMS-based MOOC platforms...............................................................39
Table 2: A comparison of AES and CPR in MOOCs .................................................................42
## Glossary

<table>
<thead>
<tr>
<th>Subject</th>
<th>Explanation</th>
</tr>
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<tbody>
<tr>
<td>Case-based learning (CBL)</td>
<td>CBL is an instructional design model that is a variant of project-oriented learning. It is popular in business and law schools. CBL in a narrow sense is quite similar to problem-based learning, but it may also be more open ended as in our definition of project-based learning.  (<a href="http://edutechwiki.unige.ch/en/Case-based_learning">http://edutechwiki.unige.ch/en/Case-based_learning</a> )</td>
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<tr>
<td>Computer-generated feedback</td>
<td>Test and essays are automatically corrected/assessed by a computer, based on present indicators provided by lecturers.</td>
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<tr>
<td>Connectivism</td>
<td>is a learning theory created by George Siemens which describes a network-based pedagogy. Connectivism is the thesis that knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks. It represents one of the core principles used for designing the first MOOCs. (<a href="http://www.huffingtonpost.com/stephen-downes/connectivism-and-connecti_b_804653.html">http://www.huffingtonpost.com/stephen-downes/connectivism-and-connecti_b_804653.html</a> )</td>
</tr>
<tr>
<td>Courseware</td>
<td>Computer programs or other material designed for use in an educational or training course.  (<a href="http://www.oxforddictionaries.com/definition/english/courseware">http://www.oxforddictionaries.com/definition/english/courseware</a> )</td>
</tr>
<tr>
<td>Didactic</td>
<td>Intended to teach, particularly in having moral instruction as an ulterior motive. (<a href="http://www.oxforddictionaries.com/definition">www.oxforddictionaries.com/definition</a> )</td>
</tr>
<tr>
<td>Drop-in</td>
<td>a person who casually drops in, as to visit or obtain an appointment.  (<a href="http://www.thefreedictionary.com/drop-ins">http://www.thefreedictionary.com/drop-ins</a> )</td>
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<td>Formative assessment</td>
<td>D.R. Sadler claims that formative assessment refers to assessment that is specifically intended to generate feedback on performance to improve and accelerate learning, no matter grades, regularity of tests or specific times of the educational year/semester. (Sadler, D.R. (1998) Formative assessment: revisiting the territory, Assessment in Education, 5 (1), pp. 77-84)</td>
</tr>
<tr>
<td>Gamification</td>
<td>The application of typical elements of game playing (e.g. point scoring, competition with others, rules of play) to other areas of activity, typically as an online marketing technique to encourage engagement with a product or service. (<a href="http://www.oxforddictionaries.com/definition/english/gamification">http://www.oxforddictionaries.com/definition/english/gamification</a> )</td>
</tr>
<tr>
<td>Lurker</td>
<td>A person who regularly visits a chat room, forum, or blog but never contributes comments.  (<a href="http://www.thefreedictionary.com/lurker">http://www.thefreedictionary.com/lurker</a> )</td>
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<tr>
<td>Microblogging</td>
<td>blogging done with severe space or size constraints typically by posting frequent brief messages about personal activities. (<a href="http://www.merriam-webster.com/dictionary/microblogging">http://www.merriam-webster.com/dictionary/microblogging</a> )</td>
</tr>
<tr>
<td>Moodle</td>
<td>a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalised learning environments. (<a href="https://docs.moodle.org/29/en/About_Moodle">https://docs.moodle.org/29/en/About_Moodle</a>)</td>
</tr>
<tr>
<td>MOOCs</td>
<td>Massive open Online Courses made available over the Internet without charge to a very large number of people. (<a href="http://www.oxforddictionaries.com/definition/english/MOOC">http://www.oxforddictionaries.com/definition/english/MOOC</a>)</td>
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<td>---</td>
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<tr>
<td>Multiple choice (MP)</td>
<td>A question or a case with several alternatives for the student to choose. One or several alternatives is/are correct.</td>
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<td>Paragogy</td>
<td>also referred to as peeragogy, the notion of ‘paragogy’ (Corneli and Danoff, 2011) relates to the peer production of learning. (<a href="http://steve-wheeler.blogspot.it/2012/11/theories-for-digital-age-paragogy.html">http://steve-wheeler.blogspot.it/2012/11/theories-for-digital-age-paragogy.html</a>)</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>The method and practice of teaching, especially as an academic subject or theoretical concept. (<a href="www.oxforddictionaries.com/definition">www.oxforddictionaries.com/definition</a>)</td>
</tr>
<tr>
<td>Peer assessment</td>
<td>Assessments where the scores and outcomes are based on feedback from somebody else then yourself or a computer. This can be either fellow students, a group of students or the lecturer, or a combination.</td>
</tr>
<tr>
<td>Problem-based learning (PBL)</td>
<td>It is defined by Finkle and Torp (1995) as, “a curriculum development and instructional system that simultaneously develops both problem solving strategies and disciplinary knowledge bases and skills by placing students in the active role of problem solvers confronted with an ill-structured problem that mirrors real-world problems”. (<a href="http://edutechwiki.unige.ch/en/Problem-based_learning">http://edutechwiki.unige.ch/en/Problem-based_learning</a>)</td>
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<tr>
<td>RSS feed</td>
<td>Rich Site Summary: a way of allowing web users to receive news headlines and updates on their browser from selected websites as soon as they are published (<a href="http://dictionary.reference.com/browse/rss">http://dictionary.reference.com/browse/rss</a>)</td>
</tr>
<tr>
<td>Social bookmarking</td>
<td>a way of bookmarking (= storing and labelling) the addresses of pages on the Internet, using a special service that enables you to make them available to other Internet users (<a href="http://www.oxfordlearnersdictionaries.com/definition/english/social-bookmarking">http://www.oxfordlearnersdictionaries.com/definition/english/social-bookmarking</a>)</td>
</tr>
<tr>
<td>Wiki</td>
<td>A wiki is a Web site that allows users to add and update content on the site using their own Web browser. This is made possible by Wiki software that runs on the Web server. Wikis end up being created mainly by a collaborative effort of the site visitors. (<a href="http://techterms.com/definition/wiki">http://techterms.com/definition/wiki</a>)</td>
</tr>
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</table>
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Project Partners

Active Citizens Partnership, Greece (Project coordination)

CESIE, Italy

Iberika, Germany

Hist, Norway

Community Action Dacorum, UK

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Twitter: https://twitter.com/LangMOOC
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