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How digital innovation can transform higher education – qualitative analysis of adopted practices in Italian Higher Education

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Table of contents

Index of figures

Index of tables

Abstract

The world is changing, every aspect of everyday life is hit by digitalization: computers, Internet and smartphones are massively produced and widespread.

Digital revolution is also changing education context, with the ever-increasing development of technology, changes in educational practices are inevitable. Digital technologies are becoming a valid and one of the most popular alternative to the current challenges affecting traditional universities, through blended or fully online study courses and Massive Open Online Course (MOOC). The opportunity to plan the study time according to personal exigencies is the first factor able to attract millions of students all around the world.

Therefore, universities had started developing these courses to be competitive in this changing context.

What about Italy? This work has the objective of understanding how digital innovation is hitting also the Italian Higher Education, *measuring the extent of online education and mapping the characteristics of the online courses, both study courses and MOOCs, in Italian Higher Education sector*.

Digital innovation is entering the Italian Higher Education system, it does not represent a revolution, it is a slow process; anyways few universities have already developed and implemented these online courses or MOOCs. The results show that different features characterize these courses, not presenting a particular guideline at the base of them.

In conclusion, digital technologies are seen as means to improve the teaching process, the courses, mainly MOOCs, are integrative means to teaching activities, not substitutes for the traditional way, but facilitators, tools that further help students.

Keywords: *Online courses*, *MOOC*, *Digital learning*, *Distance education*, *Higher education*, *Digital innovation*

Abstract (italiano)

Il mondo sta cambiando, ogni aspetto della vita di tutti i giorni viene colpito dalla digitalizzazione: computer, Internet e smartphone sono massicciamente prodotti e diffusi.

La rivoluzione digitale sta cambiando anche il contesto educativo, con il sempre più crescente sviluppo della tecnologia, i cambiamenti nelle pratiche educative sono inevitabili. Le tecnologie digitali stanno diventando una valida e popolare alternativa alle sfide attuali che riguardano le università tradizionali, attraverso corsi di studio blended o completamente online e i Massive Open Online Course (MOOC). L'opportunità di pianificare il tempo di studio in base alle esigenze personali è il primo fattore in grado di attrarre milioni di studenti in tutto il mondo.

Pertanto, le università hanno iniziato a sviluppare questi corsi per essere competitivi in questo contesto in evoluzione.

E l'Italia? Questo lavoro ha l'obiettivo di comprendere come l'innovazione digitale sta colpendo anche l'istruzione superiore italiana, misurando l'estensione della formazione online e mappando le caratteristiche dei corsi online, sia i corsi di studio che i MOOC, nel settore universitario italiano.

L'innovazione digitale sta entrando nel sistema universitario italiano, non rappresenta una rivoluzione, è un processo lento; comunque poche università hanno già sviluppato e implementato questi corsi online o MOOC. I risultati mostrano che caratteristiche diverse caratterizzano questi corsi, non presentando una particolare linea guida alla base di questi.

In conclusione, le tecnologie digitali sono viste come mezzi per migliorare il processo di insegnamento, i corsi, principalmente i MOOC, sono mezzi integrativi alle attività di insegnamento, non sostituti per il modo tradizionale, ma facilitatori, strumenti che aiutano ulteriormente gli studenti.

Parole chiave: *Corsi online*, *MOOC*, *Digital learning*, *Educazione a distanza*, *Università*, *Innovazione digitale*

Chapter 1

Introduction

Digital innovation is hitting the whole world, in every aspect: it is possible to talk about digital revolution.

From the late 1950s to the late 1970s, the mechanical and analogue electronic technology moved to digital electronics with the adoption and the rapid spread of digital computers and digital record that continues nowadays. With the birth of binary language common to all media, the term "digital revolution" is also referring the broader socio-economic changes brought by digital computing and communication technology from the 20th century: digital logic circuit and their derived technologies, as computers, Internet and smartphone, are massively produced and widespread. All these products have become central points of everyday life, changing enormously the approach to culture, work and free time: in all areas of social life, digitalization has become indispensable, it guides the transformation of society in all its forms. It changes the relationship between people, changes communication between the state and the people and brings great transformations into the world of work. It has partly changed the labor market by creating the so-called advanced tertiary sector.

The tertiary sector includes also education: is also this particular branch interested by digital revolution? For sure! The traditional sector of education is seeing a transformation: from the simple introduction of technologies to facilitate everyday aspects of education, as multimedia interactive whiteboards or access to Internet in schools, to more revolutionary Digital Learning. It is diffused worldwide and it is about learning facilitated by technology that gives students freedom on time, place, path and/or pace.

Davis and Botkin in 1994 wrote:

> "[w]ith the move from an agrarian to an industrial economy, the small rural schoolhouse was supplanted by the big brick schoolhouse. Four decades ago we began to move to another economy but we have yet to develop a new educational paradigm, let alone create the 'schoolhouse' of the future, which may be neither school nor house."

Today, it seems to be along the road of creating that new schoolhouse and, as Davis and Botkin predicted, it is not constructed exclusively of bricks and mortar.

With the ever-increasing development of technology, changes in educational practices are inevitable. These changes are most apparent in the Higher Education context with online education.

Higher Education can use technology to develop two main kinds of online courses:

1. blended or fully online study course;
2. Massive Open Online Course (MOOC).

Digital technologies are becoming a valid and one of the most popular alternative to the current challenges affecting traditional universities, as high tuition and budget cuts. The opportunity to plan the study time according to personal exigencies is the first factor able to attract millions of students all around the world.

Universities had started developing these courses to be competitive in this changing context.

Allen and Seaman (2013) revealed that the number of students taking at least one online course had surpassed 6.7 million and that 69.1% of chief academic leaders saw online education as a critical component of their long-term strategy. Therefore, it is possible to affirm that in US the importance is recognized and digital learning is appreciated also by users.

1.1 Objective of the study

Given the above, what about Italy?

This work has the objective of understanding how digital innovation is hitting also the Italian Higher Education, *measuring the extent of online education and mapping the characteristics of the online courses, both study courses and MOOCs, in Italian Higher Education sector*.

1.2 Structure of the study

This work has been developed starting with a literature review of past contributions about online education, recognized as an evolution of distance education born, for the first time, in the far 1728. The invention of technologies and their introduction transformed distance education in the years, till the birth of terms as *E-Learning*, *digital learning*, *online education*, characterizing the new way of learning and teaching thanks to the Internet.

After a brief historical introduction, this work analyses the literature in different aspects of online education: the changing roles of students and professors, strategies adopted in other countries and good practices to develop an effective online course. Moreover, it has been analyzed student performances comparing online, blended and traditional courses results; then

it has been highlighted the importance of sense of community among online users to not make students feel isolated as it turns out to be a reason for abandoning the courses.

Instead, for what concern MOOCs, the recent birth of these courses makes the literature and the conducted studies more limited than online study courses. The literature shows common traits of MOOCs design, comparing then practices in Europe and US, highlighting in particular the reasons that led European universities to develop MOOC. Finally, it has been analyzed how to make the production of these courses sustainable since students can access them free of charge.

From the literature, it emerged a gap for what concerns the strategy of implementation of digital learning in Italian universities. This research aims at filling part of this gap, mapping the characteristics of the developed courses chapter 3, through the theoretical framework, presents research hypotheses, what is expected to have at the end of the study, outcome of literature analysis.

Chapter 4 analyzes Italian background, to better understand the context in which these digital courses enter, disclosing main organs of university system and the Italian university system itself; showing then some data about Higher Education and online education in Italian Higher Education.

Finally, the last chapters are about the innovative part of the study. The approach used to conduct the study has been described: questionnaires and interviews for the universities' actors involved; then the results have been analyzed to finish with the conclusion of the study.

Chapter 2

Literature review

2.1 History of Online Learning

2.1.1 From correspondence education

Online education is considered an evolution of distance education. One of the earliest distance education courses dates to far 1728 when Caleb Phillips advertised in the Boston Gazette to offer private correspondence courses in shorthand. So, correspondence education is the earliest version of distance education: it basically involves the use of print-based course materials and the postal service; it was designed to provide educational opportunities for those who were not among the elite and who could not afford full-time residence at an educational institution going to meet the need to provide equal access to educational opportunities. In 1840, in England, Sir Isaac Pitman introduced a great innovative element in correspondence education, becoming the pioneer of distance education. Sir Pitman offered correspondence courses in shorthand to aid in business administration. Innovation is due to the fact that he sent by mail texts transcribed into shorthand on postcards and he could receive transcriptions from his students in return for correction. Later in the 19th century, private correspondence schools in Europe began to offer lessons in different subjects and preparation for university entrance examinations, which helped people rise up the social ladder (Sumner, 2000).

In 1873, Anna Eliot Ticknor, daughter of Harvard professor George Ticknor, founded the Society to Encourage Studies at Home, the first correspondence school in the United States. This society was named also the "silent university" and established one of the first American correspondence schools. It was aimed at the education of women and enrolled more than seven thousand women. Students could select one of the following disciplines in which to study: English, History, Science, French, German and Art. Educators mailed the materials to the students and they had to submit assignments to instructor through the mail. It was favorable for women whose leisure time was limited by housework since all learning was self-paced. A woman, to access the course, had to be at least 17 years old and pay a fee of two dollars that covered the costs of printing, postage and overheads. The period of correspondence was from October 1st to June 1st. There were exams, but grades were not communicated to the students, they were used to evaluate the effectiveness of instruction (Bergman, 2001).

A memorial of the Society, printed after the death of Ticknor, stated that the Society's purpose was to encourage ladies to develop the habit of devoting time every day to study. It is difficult

to assess the impact of Ticknor's Society, but personal testimonies provided indications of how women's lives were transformed as a result of their involvement in distance learning (Caruth, 2013).

2.1.2 University correspondence courses

In 1858, the University of London becomes the first university to offer distance learning degrees worldwide to people who could not study full-time on campus. It established its External Programme chartered by Queen Victoria. Charles Dickens calls it the "People's University" and over 100 years later, Nelson Mandela studied law as a University of London student while imprisoned on Robben Island.

By the end of the 19th century, Canadian, American and European universities offered distance education courses, reflecting the growing public thirst for education (Sumner, 2000). In the United States, William Rainey Harper, the first president of University of Chicago, founded, for the first time in the U.S., the first correspondence university. He developed a department of Home-Study that was a vital part of the University. Students were allowed to take as much as one-third of their course load by mail. This project was partly related to the responsibility of universities to reach all the society and to provide education for all (Caruth, 2013).

The correspondence study model was spread around the globe by colonialism and adapted to local needs. For example, countries with large immigrant populations, like Canada and the United States, developed forms of education to inculcate newcomers into the social, cultural and economic norms (Sumner, 2000).

The two World Wars promoted the growth of distance education. The armed services demanded correspondence education for soldiers during World War I (Holmberg, 1986), and soldiers returning from World War II looked at education, including correspondence study, as a way to change society after the horrors of the two World Wars and the Depression.

2.1.3 Distance education

As time went on, technological advances played a fundamental role in this kind of education. Between the end of the 19th century and the beginning of the 20th century, there was a change in used terms: from correspondence education to distance education, term used for the first time in a pamphlet by the University of Wisconsin-Madison in the USA.

Throughout the first half of the 20th century, numerous new technologies were coming to the fore and this led to considerable innovations in distance education: for example, in 1906 the

University of Wisconsin began recording lectures and sending them to students in phonograph form.

By 1922, the technology of radio broadcasting had become a viable means of transmitting information and educational radio is the first electronic medium educators used to teach at a distance in a synchronous way. Synchronous learning means that all students are "present" at the same time, but in this case in different locations and this is the innovative way of doing distance education. Pennsylvania State College started broadcasting courses over the radio. Following this example, other universities began to deliver courses via radio: The State University of Iowa began offering course credit for five radio broadcast courses, the University of Wisconsin and the University of Minnesota also received licenses to establish educational radio stations in 1922 (Saettler, 1990).

Levenson in 1945 listed a series of evaluation studies conducted by Ohio State University and The University of Wisconsin demonstrating the effectiveness of radio in learning. The number of studies listed and the variety of research questions are indicative of the ubiquity and popularity of the use of radio in education (Saba, 2013).

An important aspect of early educational radio was the support brought to the farmers: radio became an important medium to educate farmers in many states that had vast amounts of land dedicated to farming. There was also the involvement of the government: in fact, by 1925, the federal government recognized the importance of spreading education through radio to farmers and called for providing specific frequencies within the broadcast band for radio stations serving agricultural communities. Kansas State Agricultural College became the first educational radio station in Kansas pioneering the broadcast of spoken words and music in the state (Saba, 2013). The U.S. Department of Education also had an active role in educational radio sponsoring and supporting different programs; the subjects ranged from science and history to issues related to civil rights. In addition, the U.S. Department of Education made agreements with the National Broadcasting Company (NBC) and The Columbia Broadcasting System (CBS) for producing and broadcasting a variety of programs with educational content (Saba, 2013). Therefore, this new technology changed and improved the way of delivering education also at higher level thanks to the involvement of different universities, which employed resources to develop these courses, and the government, which encouraged it.

Wiley and Young (1948) analyzed the use of the radio in education and some issues came up. They could be summarized below:

- listening to radio develops "intellectual passivity";

- radio is a one-way means of communication;
- it is hard to adjust instruction by radio to the "capacity of the individual pupil";
- listening to radio is less effective than face-to-face communication due to lack of the speaker's "facial expressions and gestures";
- programs are produced by radio artist and financiers, and not by educators;
- "Too many teachers have had to work too many hours at too many chores. We cannot expect them to assume the labor of producing or using radio broadcasts without time allowance and without proper training."

As electronic communication merged into the daily routine of life as a primary source of information, distance learning tried each new type of information technology and adopted what proved useful and effective. Recorded lectures proved to be stimulating audiovisual aids that made instruction more appealing than textbooks alone. The rapid development of technology resulted in systems that were powerful, flexible and increasingly affordable. The base of available technology was increasing. In those years, much had been learned about connecting various forms of technology into systems, so that the ability to link systems one to another was growing (Office of Technology Assessment, 1989).

In 1932, when television was a novelty, Iowa State University conducted tests using television as an instructional medium. By 1953, broadcast television was becoming more prevalent, and the University of Houston began offering televised college classes for credit.

In 1965, the University of Wisconsin began a statewide educational program for physicians using a phone-based format, although the telephone was a long-established technology.

2.1.4 The use of Internet for distance learning

Courses broadcasted through television started fading during the 1960s, when personal computer became a household appliance and internet began to spread. Though the groundwork of the internet was already established in 1969, only in the 1980s this technology began to revolutionize distance education delivering education easier and faster. The innovative feature brought by the internet is represented by its ability to support voice, video and text.

In 1981, the Western Behavioral Sciences Institute's School of Management and Strategic Studies started an online program. Instead, the pioneering online education organization was Connected Education founded and administered from 1985 to 1997. Matriculated students can earn the degree of Master of Arts in Media Studies partly or totally through on-line study, attending classes via modem and personal computer from virtually anywhere in the world with

international telephone connections (Gail, 1988). The organization also worked with other universities, for example, with Polytechnic University of New York planned to launch an online Ph.D. in Philosophy of Technology. Every two months, except in August and September, new courses started. The number of students in each course range from five to fifteen. The subjects varied very much from popular culture and journalism to management and telecommunications law. The courses took place in electronic conferences restricted to the instructor, registered students and designated staff members. Generally, the instructor began the seminar with an introduction on the topic; the students respond to the instructor's initial remarks by introducing themselves and commenting on the topics and course contents. Participants could give their contributions online or using word processing software to formulate their thoughts off-line and then upload the completed contribution to the conference. The system added each participant's finished contribution to the conference as an electronic comment forming an ongoing discussion archived in electronic form and students could print out the accumulated comments or store them on floppy discs (Gail, 1988).

Throughout the 1990s, there was a rapid growth in distance learning universities thanks to the possibility to use a variety of both real-time and asynchronous online technologies.

In 1994, the Jones International University became the first accredited fully web-based university. The founder, Glenn Jones, was not a newcomer in education field: in 1987, he created Mind Extension University, a system where telecourses could be provided across a network to various colleges, while at the same time, students could interact with the instructors and each other using email sent over the internet (Miller, 2014).

In 1995, at Penn State University in the U.S., Jerrold Maddox teaches the first course delivered over distance via the web and it was called "Commentary on Art" (Pappas, 2013).

In 1997, several institutions adopted the Interactive Learning Network, an E-Learning system that used a relational database as its foundation. In the same year, Blackboard Inc., an educational technology company that provides services linked to education, mobile and software, developed a standardized platform, Blackboard Learn, for course management and delivery that enabled many more institutions to come online. The platform's aim was to provide a user-friendly means through which college professors could put information and materials of the course on the Web. In 1998, Blackboard merged with CourseInfo LLC, a course management software provider and startup company at Cornell University, and the merged company released their first software product for online learning (Bradford, Porciello, Balkon, Backus, 2007).

The 2000s saw an explosion in the development and the use of online technologies to deliver educational content. The possibility to access to the Internet was becoming more and more wide and, as a result, it was growing the number of distance learning courses and the number of traditional universities making use of online technology.

In the first 10 years of 2000, enrollment in distance education courses increased rapidly in almost every country in both developed and developing countries. The U.S. Department of Education stated that, from 2000 to 2008, the percentage of undergraduates enrolled in at least one distance education class expanded from 8% to 20%, and the percentage e enrolled in a distance education degree program increased from 2% to 4%. There was a difference between the participation in distance education course and distance education degree program: in the first case, it was most common among the undergraduates attending public 2-year colleges, instead, in the second case, it was most common among undergraduates attending for-profit institutions. From the same study, it also emerged that older undergraduates or those with a full-time employment participated in both distance education classes and degree programs relatively more often than their counterparts. Moreover, students with mobility disabilities enrolled in a distance education course more often than students with no disabilities (26% compared with 20%).

In 2002, Moodle.com released the first version of Moodle, a free open source learning platform allowing educators, administrators and learners to create and deliver effective online learning. This learning platform is still used to provide people personalized learning environments through a single robust, secure and integrated system.

As said before, several technologies developed in those years were used to deliver education, as the platform of video sharing YouTube that was launched in 2005 and 4 years later YouTube EDU was launched, offering thousands of free lectures online. In 2006, also Apple, through iTunes U, began offering online lectures. Users could download free content regarding lessons and academic material provided by American universities including Stanford University, Duke University and MIT. The Dean of Stanford stated that the partnership had the aim of offering a creative and innovative way to involve millions of people and to share the experience of research and intellectual discovery that characterize their university.

In 2006, 89% of 4-years public colleges in the U.S. offer classes online, along with 60% of private institutions (Gensler, 2014).

In 2007, Khan Academy is founded: it is a non-profit education website offering free online collection of micro lectures via video tutorial.

Babson Research Survey Group and College Board estimated that in the fall 2010 6.1 million students took at least one online education course and that 65% of higher education institutions considered online education a critical part of their long-term strategy.

2.1.5 MOOCs' birth

The introduction of Massive Open Online Courses (MOOCs) in 2011 increased the online education numbers. In the fall of 2011, the Professor of Stanford University, Sebastian Thrun, launched a Massive Open Online Course (MOOC) on artificial intelligence that attracted more than 160.000 students (Crotty, 2012). Thrun analyzed some data from the enrolled students: there were students from Lithuania, from Afghanistan and from Stanford University. About 248 of them got a perfect score, they never got a single question wrong during the entire course and not one of these 248 students were enrolled at Stanford. After that, Thrun decided to give up his tenure at Stanford and he has started a new for-profit education organization called Udacity (Salmon, 2012). It offers Massive Open Online Courses (MOOCs) and the first two courses launched were "CS 101: Building a Search Engine" taught by David Evans from the University of Virginia, and "CS 373: Programming a Robotic Car".

Subsequently, several platforms were launched to collect different MOOCs: in 2012, the Massachusetts Institute of Technology and Harvard University founded **edX** and in the same year, some professors of Stanford University, in collaboration with the universities of Princeton, Michigan and Pennsylvania, founded **Coursera**.

A new research of Babson Research Survey Group and College Board conducted in 2013 stated that only a very small segment of higher education institutions was experimenting with MOOCs; most institutions remain undecided. Only 2.6% of higher education institutions had a MOOC and 9.4% reported MOOCs were in the planning stages. Most of institutions (55.4%) reported they were still undecided about MOOCs. Academic leaders were not sure that MOOCs could represent a sustainable method for offering online courses, but MOOCs could represent an important means for institutions to learn about online pedagogy. Therefore, it is possible to conclude by stating that in the first year of MOOCs, academics were skeptical of this new means of teaching, also because they had concerns that credentials for MOOC completion would cause confusion about higher education degrees.

Europe embraces with enthusiasm this innovation in education field and in April 2013 OpenupEd, the first pan-European MOOC initiative, is launched by EADTU and communicated in collaboration with the European Commission. The first partners are 11 and based in 8 EU countries (France, Italy, Lithuania, the Netherlands, Portugal, Slovakia, Spain, and the UK), and

in 3 countries outside the EU (Russia, Turkey and Israel). Even if the platform is emerged in Europe, its mission has a global relevance and scope promoting the creation of similar initiatives in other countries around the world. Currently, learners can choose from over 200 MOOCs in the 13 languages of the partners, plus Arabic (OpenupEd.eu).

The European Commission is favorable to MOOCs considering them as a means to open to thousands of students and to encourage schools and universities to adopt more innovative and flexible teaching methods, harmonizing with European values as equity, quality and diversity (Lavalle, 2013).
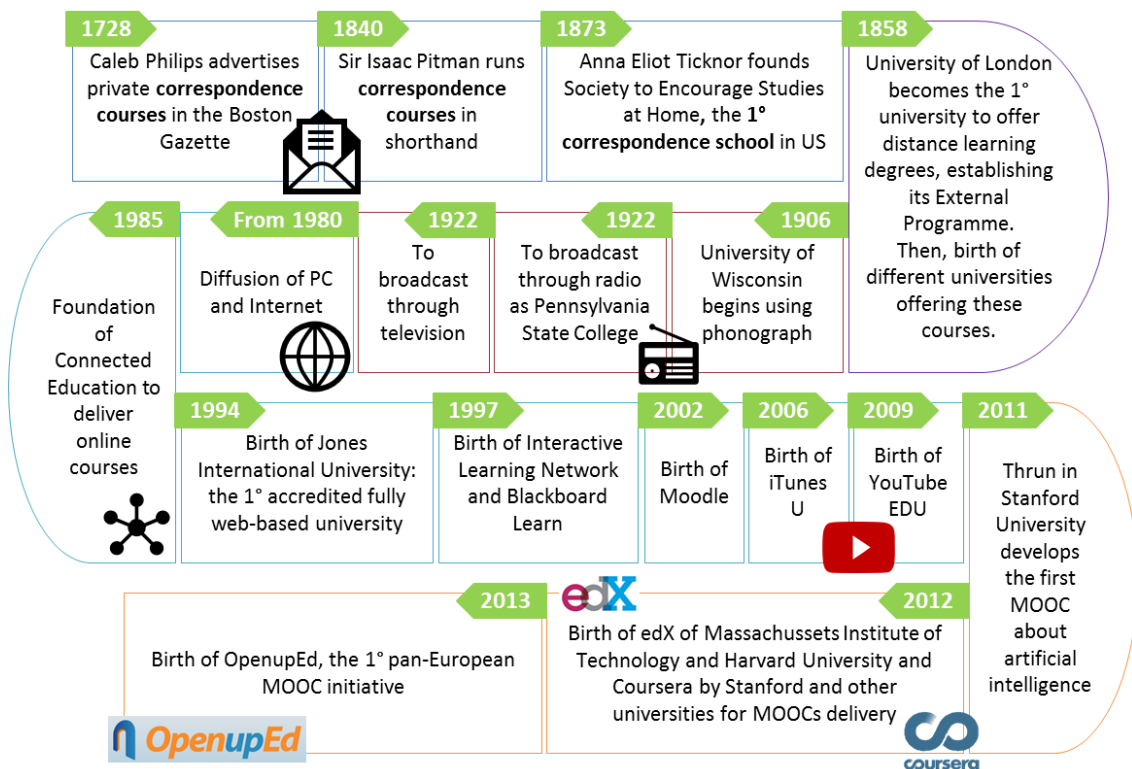
Figure 1 Infographic about History of Distance Learning

2.2 Online courses

2.2.1 Strategies/what to do

The literature argued a lot about strategies and good manners to have success in online education.

The first point is about the possibility to improve the learning through a particular technology. There are two schools of thought: one considers technology only as a mean to convey education, the other one thinks that technology is a fundamental part of the learning activity. According to Clark (1983), technologies are merely vehicles that deliver instruction and are not able to influence student achievement. Clark notes that, even if students gain significant benefits from

audiovisual or computer media, the reason for those benefits is not the medium, but the instructional strategies built into the learning materials. On the other hand, Kozma (1991) affirms that while some students will learn a particular task regardless of delivery device, others will be able to take advantage of a particular medium's characteristics to help construct knowledge. Moreover, Kozma does not differentiate the medium and the method as Clark: Kozma states that Clark creates an unnecessary schism between medium and method, but both are part of the design. "Within a particular design, the medium enables and constrains the method; the method draws on and instantiates the capabilities of the medium." So, according to Kozma, there is a more integral relationship between them: even if some attributions of effect can be made to medium or method, there is much shared variance between them. At the end, Kozma affirms that the creativity of the designers is essential to take advantage of technologies, so technologies themselves are not able to exploit their capabilities of media, but there is the need of an active role that understands the relationship between these capabilities and learning.

Similarly to this idea, Rossett (2002) states that online learning has great potential, but it requires investment in terms of commitment and resources in order to design properly materials with the learners and learning in focus, with an adequate support.

Developing and delivering online courses requires different competencies and methodologies of teaching and learning are changed by a course delivered online. Courses must be learner-centered with a learning environment that addresses the new roles of the student and instructor. The **instructor** takes the role of a **facilitator** of learning and *students* must take a *more active role* in the learning process and they must be self-motivated, self-disciplined and willing to take ownership of their learning (Considine et al., 2014).

Also Rovai and Jordan (2004) affirm that "While technology has the great potential to enhance student's active learning, the use of technology requires a compatible pedagogy to achieve its benefits." A designated university-wide faculty development center with a learner-centered philosophy is essential to the success of any technology-based distance education program (Bakutes, 1998).

Along these lines, several researchers analyzed distance education practices and tried to suggest practices to ameliorate the design of the online courses, underlying factors to consider when planning online distance learning programs and strategies for enabling success in distance education.

A team of five evaluators from Indiana University's Center for Research on Learning and Technology (CRLT), used the "Seven Principles for Good Practice in Undergraduate Education",

a popular framework for evaluating teaching in traditional, face-to-face courses, to evaluate online courses. They took the perspective of students enrolled in the course and developed a list of "lessons learned" for online instruction that correspond to the original seven principles. The principles transposed into the world of online education are:

1) *Instructors should provide clear guidelines for student-instructor interactions*.
   It is important to establish policies describing the types of communication to avoid students would feel ignored.

2) *Well-designed discussion assignments facilitate meaningful cooperation among students*.
   Instructors often required participation in the discussion forum, but it is fundamental to develop guidelines to create effective asynchronous discussions.

3) *Students should present course projects*.
   An important part of traditional courses are the projects that encourage an active learning. Professors should still provide opportunities for projects to be shared and discussed asynchronously.

4) *Instructors need to provide two types of feedback: information feedback and acknowledgment feedback*.
   The first kind of feedback provides information or evaluation, instead acknowledgement feedback confirms that some event has occurred, such as the professors informs that he or she has received a question or assignment and will respond soon. In face-to-face situations this feedback is implicit, but in online courses it is important, when professor is too busy to be able to answer all in a short time.

5) *Online courses need deadlines*.
   Even if many students need flexibility because of full-time jobs, professors should establish deadlines to encourage students to spend time on tasks and avoid procrastination.

6) *Challenging tasks, sample cases, and praise for quality work communicate high expectations*.

7) *Allowing students to choose project topics incorporates diverse views into online courses*.
   Professors should provide guidelines to help students select topics relevant, allowing students to share their unique perspective in order to respect diverse talents and ways of learning.

However, as Crawford et al. (2003) assert, "The future of technological successes at higher education institutions depends not only on the availability of technology but also on the extent

to which faculty are supported as they develop innovative ways to integrate technology into the learning and research experience''. The problems are related to the academic world, not technological.

For this reason, Howell et al. (2003) presented seven strategies for enabling faculty success in distance education, but, in this case, from the point of view of university administrators and faculty, contrary to the previous analysis. The aim of these strategies is to mitigate faculty concerns and ensure program success. The strategies discussed to be adapted and applied as needed by the institutions are the following:

1) *Enable colleges and departments to accept more responsibility for distance education activities*.

   As numerous studies show, to minimize resistance among the people involved in a change, it is important to involve them in planning, implementation and evaluation phases. In this context, once the distance education initiatives and goal are established, faculty members must be involved in the decision-making process, not only administrators. It is important to give faulty control over the material, including the possibility to modify and to update material as necessary with as few technological and policy barriers as possible.

   Administrators should encourage departments to create "distance learning plans" (University of Central Michigan SP, 2001).

   San Diego State's strategic plan states that faculty should have the ''collective responsibility to ensure the academic quality and integrity of the university's courses, programs, and degrees. This responsibility extends to those courses and programs offered through distance education'' (San Diego State University SP, 2000).

2) *Provide faculty with more information about distance education programs and activities*.

   It is fundamental to communicate between faculty and distance education staff to increase collaboration. Howell et al. emphasize the need to share data about distance education credit programs, to engender trust in faculty that distance education is legitimate and even laudable.

3) *Encourage faculty to incorporate technology into their traditional classrooms*.

   The literature (Schifter, 2000 and O'Quinn & Corry, 2002) supports that if faculty is already engaged with technology, the transition from traditional to distance learning model will be easier and faculty is more willing to participate in online education not starting from scratch. Some institutions, such as the University of Central Florida, have introduced technologies into the traditional learning process. For example, the

University of Florida has devised "enhanced classes" that include "use of the World Wide Web for content delivery and learning activities without reducing face-to-face class time" (University of Central Florida SP, 2000). Institutions can offer technical and training support to accelerate faculty's integration of technology.

4) *Provide strong incentives for faculty to participate in distance courses*.

Even in this case, the literature is consistent in reporting that administrators should provide appropriate incentives, since distance education is a priority for the institution. Brogden and Couros (2002) have also found that faculty themselves must provide evidence of benefits on student outcomes thanks to these new educational field, and, only after that, administrators of the faculty encourage to participate in innovation efforts. Consequently, incentives should reward and academic cultures should promote research and experimental efforts to foster faculty innovation.

Many administrators and faculty are not able to determine the right compensation for work in distance education. One suggested starting point is to consider measurable characteristics of the work, as the level of expertise needed, how much the activity is innovative, if the activity can be replicated and if the activity has significance and impact on the faculty.

It is important that faculty does efforts to provide incentives also to help institutions strengthen faculty support of distance education and technology integration initiatives.

5) *Improve training and instructional support for distance education faculty*.

It is fundamental that faculty know how to accomplish the academic goals established for distance education and, as Padgett and Conceicao-Runlee (2000) state, "The importance of faculty support and training to the success of any distance education or instructional technology effort has been widely acknowledged in the … distance education literature". It is essential that institutions provide "opportunities that enhance faculty members' ability to create dynamic, interactive learning communities through a variety of online instructional tools" (Roberson & Klotz, 2002). Even according to Crawford et al. (2003) distance education staff should help faculty develop and maintain the technological skills necessary to develop quality learning experiences.

However, the training has to be done not only for technological part: in fact, Schifter (2000) remarks that "faculty programs tend to be limited to how to use the technology or software, not on how to teach at a distance" and this must be improved. Lee (2001) states that "In a distance education environment, instructional support can take the forms of course redesign support, training in the use and application of distance

education technologies, training in teaching methods, and media and technical support."

Another point related to this is the problem of time. The training should be done according to the schedules of the people involved and one way to increase accessibility to this training is to provide it in a distance education format, allowing the "anytime-anywhere" access and a first experience of how the professors will teach.

6) *Build a stronger distance education faculty community*.

Howell et al. state that once the five strategies listed so far are carried out, the distance education faculty community will become stronger. This community could be formal, informal or both and will be the promoter of distance education efforts. The faculty members themselves become source of information about web-based technology for other faculty members. Administrators can capitalize on it to encourage faculty to integrate technology in their teaching.

Even annual university conference for faculty on distance education can serve to share ideas and opportunities to interact with other faculty during these conferences allow faculty to see their peers' successful strategies to face new challenges in distance education field. Sharing effective models at conferences is useful to give guidelines to improve the quality of delivered instruction. Some universities such as Penn State hold continuous distance education faculty workshops and forums.

7) *Encourage more distance education scholarship and research*.

"As universities focus on improving their distance education programs, campus-wide scholarship and research on distance education will naturally follow. This scholarly productivity can increase even more if administrators provide incentives and support encouraging it" (Howell et al., 2004). Scholarship is improved if faculty undertake innovations or research experiments, also with partnerships with academic areas. A possibility is to give graduate students opportunities to have research, evaluation, and internship within distance education departments if they already exist. Otherwise a distance education research position can be created within a division that has an interest in it, or another chance is to create an academic center specialized in distance learning.

2.2.2 Changing roles of faculty and students in online course delivery

Berge & Muilenburg (2001) affirm that "The barriers impeding the development of distance education are not technological, nor even pedagogical. The major problems are associated with the **organizational change**, **change of faculty roles**, and **change in administrative structures**."

In this context, the traditional professor often takes on the role of **course manager** (Roberson & Klotz, 2002), as already seen before. In doing so, the professor is still responsible for teaching, organizing, grading, coaching and problem solving; but some roles, as facilitating, are enlarged (Howell et al., 2004).

According to Barr and Tagg (1995), universities are moving away from a faculty-centered and lecture-based paradigm to a model where students are the focus and are taught critical thinking skills. The professors should support the students pushing their intellectual growth and self-autonomy "to become more productive members of society".

Considine et al. (2014), also, recognize that one challenge is linked to the transition to a "**learner centered teaching**" methodology. Faculty need to be content experts, but must also have an understanding of instructional design, student learning styles, and the needs of online learners. Moreover, faculty should be able to adapt the content and the approaches to deliver material and should be interested in learning new ways to transfer knowledge. Flexibility is required to make changes when an instructional methodology is not working, or when students are not responding to content as expected.

According to Considine et al. (2014), the roles and competencies that faculty should take to deliver online classes are:

- ✓ *Pedagogical*, in terms of content preparation, interaction, collaboration and assessment skills and competencies;
- ✓ *Managerial*, encompassing logistics and readiness issues;
- ✓ *Social*, in terms of community building, interaction and collaboration, that will be better explained later;
- ✓ *Technical*, encompassing proficiency in computer use and course management.

To have an effective online course, the planning and the design phases of online course development are fundamental because classroom instruction needs to be translated into words, videos and learning activities continuing to provide meaningful content and to hold the students' attention. The course content and layout are critical to successful student engagement and interaction with the instructor, the material, and with other students. Weekly modules, based on course topics, replace text chapters in the course design. The text is a course resource and supports module content. Modules should use multiple resources, readings, mini-lectures, assignments, online quizzes, discussion boards and others, to achieve learning outcomes.

Anyways, if the professor should be a facilitator in this context, the online student should possess unique qualities to succeed in online courses. According to the Illinois Online Network, some of these qualities are the following:

- ✓ *Be able to communicate through writing*.

   Nearly all communication is written, so it is fundamental that student feel comfortable in expressing themselves in writing.

- ✓ *Be self-motivated and self-disciplined*.

   The online environment gives freedom and flexibility to the students, but this requires greater responsibility and real commitment to keep up with the flow of the process.

- ✓ *Be willing to "speak up" if problems arise*.

   The professors cannot understand if students have problems through non-verbal communications, as in traditional context. For this reason, students must communicate when they have trouble on any level, otherwise the instructor will never know what is wrong.

- ✓ *Be willing and able to commit to 4 to 15 hours per week per course*.

   Some think that online courses are easier than traditional ones. Actually, many students say it requires much more time and commitment.

- ✓ *Have practically unlimited access to a computer and Internet service*.

   The course content is delivered through the Internet and most online learning will be best accomplished with broadband service, so it is necessary that students have the proper equipment.

- ✓ *Feel that high quality learning can take place without going to a traditional classroom*.

Online is not for everybody. A student that wants to be on a traditional campus attending a traditional classroom is probably not going to be happy online.

2.2.3 Student performance in online, blended and traditional courses

In the literature, it is possible to find interesting researches about the effectiveness of online courses. Studies want to estimate the effects of taking an online course, instead of traditional one, on student achievement in the course.

The interesting research of Figlio et al. (2010) divided the participants in 4 groups:

- students who volunteered for the experiment and were randomly assigned to watching the lectures online;

- students who volunteered for the experiment and were randomly assigned to watching the lectures live;
- students who did not volunteer for the experiment and were registered in an online section;
- students who did not volunteer for the experiment and were registered in the live section.

There are no compelling evidences that the volunteers are markedly different than their non-volunteer classmates and all the other factors, as instruction, materials, were the same. For these reasons, they could proceed to examine the performances on the exams.

According to the evidence, students perform better in the live setting than in the online setting, though the raw differences are uneven and statistically insignificant. The average test score is higher for the set of students in traditional course versus those in online one for all racial/ethnic groups, for both male and female students, and for both high and low achievers. This difference is statistically significant in some cases, for example the average test score grade for Hispanic students is dramatically higher in the case of traditional courses, and also for low-achieving students and male students. They did not claim that their results are definitive.

Considering other researches, Bettinger et al. (2014), found similar results. They studied students and professors at DeVry University, attending online and in-person classes with the same syllabi, the same text books, and the same class sizes. They found that, on average, students perform worse in online classes, compared to how they would have performed in a traditional in-person class setting. In particular, online courses typically reduce the probability that a student gets an "A" by almost 6 percent, reduce the probability of passing by 4 percent, increase the probability of early withdrawal by 2.5 percent, and decrease the likelihood of enrolling in the next term and one year later. As Bettinger et al. (2014) explicated, there is a number of mechanisms that could lead to perform better, but also worse, in online college classes. "Online courses substantially change the nature of communication between students, their peers, and their professors. First, on a practical dimension, students can participate at any hour of the day from any place. That flexibility could allow for better allocation of students' time and effort. That same flexibility could, however, be a challenge for students who have not yet learned to manage their own time. Second, online asynchronous interactions change the implicit constraints and expectations on academic conversations." All these factors will be analyzed better later.

As in the previous case, the results of the study, even if they are in line with prior studies of online education, have some limitations: in particular, they examined online courses when they are still developing, so development and innovation could alter the results.

Lastly, there are also researches on the comparison on student performance between blended and traditional courses. A study demonstrated that performances on an assessment test in the hybrid course format were better or equivalent to the traditional course. In particular, active-learning exercises were more effective when coupled with online activities. Performance gains were greater for upperclassmen than for freshmen (Riffell & Sibley, 2004). Reasons et al. (2005) found that students in the blended sections did not perform significantly better or worse than those in traditional learning environments. However, students in fully online sections performed significantly better than those in the other two types of delivery modes.

Other studies were conducted considering also the influence of students' prior academic achievement or aptitude. Students in the blended section did not perform differently than students in the traditional section, differences were not statistically significant (Utts el al., 2003, Keller et al., 2009).

Instead Melton et al. (2009) compared the performance of students in a traditional section to that of students enrolled in three blended sections of a general health course. Prior student ability was captured by a pre-test administered to all students. While students in the blended section performed significantly better than students in the traditional section on the second exam, this finding was reversed on the fourth exam. Unlike Utts et al. (2003), the comparison of class-wide means of final course grades showed that students in the blended section significantly outperformed their traditional counterparts.

A more recent study of Asarta and Schmidt (2017), analyzed data coming from 347 students enrolled in four blended sections and 257 students enrolled in traditional sections. They divided the students in three categories according to grade point average, that is a broad measure of the students' prior academic achievement.

Significant differences in student performance between the blended and traditional versions were found within two of three zones of grade point averages. At low grade point averages, performance was higher in the traditional version of the course. At high grade point averages, performance was higher in the blended version. It is important to underline the lack of significant differences in any of the student characteristics at the beginning of the courses that indicates selection bias into course versions was avoided.

So, Asarta and Schmidt (2017) highlight the importance of early identification of low-achieving students to plan actions and to improve their performance. There are tools that provide instructors with a list of students who are not engaging sufficiently with the materials. About these students, McKenzie et al. (2013) present evidence that creating customized learning modules for students can raise performance levels on exams. The modules provide personalized study plans based on the results of a pre-test in the course subject matter, a study enhancement that might have significant benefits when used by low-achieving students. Offering a peer-learning program is another way in which low achieving students could be supported in blended courses.

Then, a further suggestion is to increase the level of student engagement in blended courses encouraging students to read and post messages on forum boards, chat rooms, and via email. This also create a stronger sense of community, another important factor that will be better explained in the next section.

So, in conclusion, the findings in these studies show that moves from traditional to blended courses do not have the same relative effects upon students across all levels of prior academic achievement.

Table 1 Summary of results of studies on performances of online, blended and online studies

	Comparison between:	Statistically significant results
Utts et al. (2003)	Blended and traditional	Students in blended outperform traditional ones
Riffell & Sibley (2004)	Blended and traditional	Better performances in blended than traditional
Reasons et al. (2005)	Online, blended and traditional	Students in fully online courses perform better than those in the other two types
Figlio et al. (2013)	Online and traditional	Avg test score grade higher in traditional courses for Hispanic students, for low-achieving students and for male students
Bettinger et al. (2014)	Online and traditional	Students perform worse in online courses
Asarta & Schmidt (2017)	Blended and traditional with prior academic achievements	At low grade point avg, performance higher in traditional; At high grade point avg, performance higher in blended

2.2.4 Sense of community

Even if the success of online courses is inconceivable, learners have also reported that they miss face-to-face contact when learning online. There is the risk that students have low sense of community and so, feeling isolated, they are at-risk of becoming dropouts.

Hara and Kling (2001), conducting a study of online courses, found that feelings of isolation were an important stress factor for online students: "students reported confusion, anxiety, and frustration due to the perceived lack of prompt or clear feedback from the instructor, and from ambiguous instructions on the course website and in e-mail messages from the instructor".

As described in one of the previous section, successful online students have certain characteristics as deep interest in the material taught, self-motivation, organization, they are independent and self-directed learner, critical thinker, accept responsibility for own learning and practical knowledge in the use of computers. If a student is deficient in any of these factors, it is possible that sense of community is weaker. This could explain the negative skew of sense of community variables among students in online course in the research conducted by Rovai and Jordan (2004). This research wanted to examine the relationship of sense of community between traditional classroom, blended and fully online higher education learning environments. "Since students in the blended course exhibited similar sense of community and variability as students in the traditional course, offering the convenience of fully online courses without the complete loss of face-to-face contact may be adequate to nurture a strong sense of community in students who would feel isolated in a fully online course."

Even the literature shows that blended courses produce a greater sense of community.

Fully online learning environments also require technological ability and frequency of usage that varies from student to student based on individual characteristics. From the survey-based research, the students made emerged a mix of negative and positive comments about the fully online course. Negative comments addressed the limitations of the text-based nature of computer mediated communication. Additionally, there were some student-professor misunderstandings. Positive comments regarding the fully online course centered on the value of reflective thinking and the extra time to process information.

One implication for practice noted by Stodel et. al (2006) was to explore the use of diverse technologies to enhance communication and to foster social presence. To support this stance, they noted the argument of Haythornthwaite, Kazmer, Robins, and Shoemaker (2004) in which synchronous communication fosters community building and "provides simultaneous many-to-many contact that helps stave off feelings of isolation". Also Hara and Kling (2001), already cited,

affirmed that some difficulties of online learning "were exacerbated by the weaker social cues found in asynchronous, text-based communication compared to face-to-face communications."

Tucker (2012) conducted a research which purpose was to examine innovative synchronous technology and pedagogy as a means of promoting social presence in online learning. The technology selected was Centra. Centra is a synchronous software system that incorporates real-time audio and video. Students actually see each other and talk to each other simultaneously. From the research resulted that incorporating synchronous technology such as Centra can have a positive effect on retention rates. It was evident that use of Centra had a positive effect on enhancing social presence in online learning. It also had a positive effect on student participation.

Another important fact related to online education is the increasing number of virtual communities as foreign language learning tool on the Internet. Studies stress on how vital the role of socialization is in online learning.

A group of researchers of the University of Malaysia (2013), through focus group and an analysis of discussions on forums, studied if discussion forums in distance learning is an important factor that brings students to choose a particular kind of course.

Based on the results, it is evident that language learners prefer to learn from each other more than learning from instructors. "They feel they learn more from peers compared to what they learn from language teachers." According to them "socialization factor can be considered the most vital factor in online learning and it can be fulfilled by implementing web-based discussion forums where learners can socialize with each other", since they consider that social networks as Facebook, Twitter, are the most popular website on the Internet. In conclusion, providing a platform where students can learn in groups, can socialize with each other on the Internet is not only a service, but it is also a competitive advantage able to satisfy better the students and attract more users.

Faculty must have an ability to facilitate collaboration and community in a web based environment (Considine et al., 2014) since the researches in distance learning continue to emphasize the importance of interaction for effective teaching. In the role of facilitator, faculty should address issues of community building, interaction, and collaboration. Faculty should intervene if the discussion goes in the wrong direction or if some students are not active in order to redirect the discussion or to encourage students to participate.

Considine et al. (2014) made a list of possible learning activities useful to create opportunities for interaction between students and between students and faculty in course modules:

- *collaborative problem solving* through which, establishing an online meeting room, students can log on and solve problems;
- *small group work* where it is possible to use a "process monitor" to comment on group process or progress and rotate the role of group leader and "process monitor" through the group;
- *online discussion threads* to establish minimum posting requirements, post rubric and grade on participation and monitor for compliance;
- *debates* that can be set up by the instructor or encouraged if the issues emerge spontaneously on the discussion board;
- *simulations* in which students can work thorough a real or hypothetical situation provided by the instructor in small groups to explore issues and develop skills;
- *role plays* where the instructor can assign roles or students can choose them in order to play out a case or situation assigned by the instructor or spontaneously, in response to a situation presented by a student;
- *case studies* are cases that can be presented by the instructor for student response or students can be asked to generate cases from their work or lives for peer comments;
- *collaborative group projects* as research projects, discussion of cases, simulation or role plays;
- *brainstorming sessions* in which a situation is given to students that are asked to respond quickly with their ideas, either synchronously or over a period of a day or so on the asynchronous discussion board.

In conclusion, there are some critiques about the ability of teaching team and other soft-skill in online learning. Some academics believe that some "soft" aspects as team dynamics, communications, or leadership cannot be adequately taught through distance means. The argument behind such skepticism is that what occurs in typical team training programs often involves experiential forms of human interaction and skill building for conflict resolution, goal setting, trust building, and collaborating – all difficult to imagine happening without face-to-face interaction. Hurst and Thomas (2008) presented their "experience with teaching about and developing soft team skills by exercising teaming skills within an online environment. Three examples illustrate online team training and building/practicing skills in action." They provided "concrete evidence of how one institution is providing effective soft-skill training online, through the creative use of technology and other distance tools." Their experiences in online team

teaching and working situations led them to believe that these skills are teachable and transferable to an online learning environment: "Over the 14-year history of the distance MBA programs at Athabasca University, we have witnessed similar results. Our students develop not only an explicit understanding of online team dynamics, but also tacit skills to make it happen."

2.2.5 Do online education improve access to education?

As already expressed, online education facilitates the access to education, whoever, wherever and whenever can learn from these courses.

Online programs can reach previously untapped student populations in rural areas, at military installations, and across national borders. E-learning, combined with mobile device proliferation, expands the learning environment to "anytime, anywhere" (Bichsel, 2013).

However, Goodman et al. (2016) provides the first evidence on whether online education can really improve access to education, a key question in evaluating online education's overall impact. Does online education simply substitute the traditional education or does it instead expand access to students who would not otherwise have enrolled in an educational program?

According to Deming et al. (2015), "from 2002 through 2012, the number of online bachelor's degrees awarded rose from 4,000 to 75,000, or five percent of all U.S. bachelor's degrees issued that year."

For this research, Goodman et al. (2016) studied the new Online Master of Science in Computer Science (OMSCS) offered by the Georgia Institute of Technology and developed in partnership with Udacity. The university ensures that the quality of its graduates does not differ between the traditional format and the online one, designing the online version as the traditional one, with the same courses and graded with the same standards. The degree OMSCS students earn is not labeled "online" and is in name fully equivalent to the in-person degree.

The first evidence came from the comparison between the online and in-person applicant pools: there is no overlap between the applicant pools to these programs, few individuals applied to both. "The average in-person applicant is a 24-year old non-American recently out of college, whereas the average online applicant is a 34-year old mid-career American." The mid-career population was uninterested in the traditional version of the course, so this suggests that the online program attracts a new portion of students who would not enroll elsewhere.

Moreover, they showed that "very few applicants to OMSCS enroll in other, non-OMSCS programs. Those just below the admission threshold are no more likely to enroll elsewhere than those just above it, implying that access to the online program does not substitute for other

educational options. Such access thus substantially increases the number of students enrolling at all."

Then, the completion rates are very good: in fact, 62 percent remain enrolled two years later (starting from 2014), apparently on track to complete their degrees. This means that this single program will boost annual national production of American computer science master's degrees by about 7 percent, given that nearly 1 200 Americans enroll each year in OMSCS and that roughly 11 000 Americans earn their master's degree in computer science each year.

What leads Goodman et al. (2016) to consider the enrolled as "new students"?

- Demand for the online program is large about twice as many as its traditional version;
- 80% of those admitted to the online program enroll;
- less than 0.2% of the nearly 18,000 applicants to either program applied to both programs, suggesting that students view these programs as distinct educational products;
- the applicant pools to the two programs look very different, particularly in terms of nationality and age. The online program attracts a much more American demographic than does the in-person program. About 70 percent of the online applicants are U.S. citizens, compared to 8 percent of in-person applicants. The online program attracts a substantially older demographic than does the in-person program. Online applicants are on average 34 years old, compared to an average age of 24 for in-person applicants. Whereas the in-person program attracts applicants straight out of college or early in their careers, the online program attracts an older population largely in the middle of their careers. Nearly 90% of online applicants lists a current employer, relative to under 50% of in-person applicants.

In conclusion, Goodman et al. (2016) considered that these results suggest that low-cost, high-quality online options may open opportunities for populations who would not otherwise pursue education. Thus, this model of online education has the potential to substantially increase the national stock of computer science human capital.

However, this is just the first examination and they conclude with two important questions: the first concerns external validity and the second concerns the quality of the education that this online option provides. "To what extent will the conclusions drawn from this particular online program apply to other populations and subjects? And how large are the learning and labor

market impacts of this online degree and how do they compare to that of the in-person equivalent?". For these reasons, further researches are needed.

2.2.6 Barriers and risks

Brian Hawkins (1999), President of EDUCAUSE, stated the "idea that technology is a panacea and that it is applicable across all types and sizes of institutions is an extraordinarily dangerous assumption."

As already cited, Michael Moore affirms in Berge and Muilenburg (2001):

> "The barriers impeding the development of distance education are not technological, nor even pedagogical. We have plenty of technology, and we have a fair knowledge about how to use it. The major problems are associated with the organizational change, change of faculty roles, and change in administrative structures." (Berge & Muilenburg, 2001).

During the process of digitalization of the courses, institutions must also understand the obstacles and risks associated to the online education in order to remove or mitigate them. Berge and Muilenburg (2001) demonstrated that educators perceive different barriers depending upon the maturity of their organization's capabilities in distance education and that when an organization is in the first stages of distance education, educators will face many barriers, while, as the organization's distance education competency as a whole matures, the overall number or intensity of perceived barriers to distance education is reduced.

In their survey 64 possible barriers to distance education were tested. These barriers were determined from a review of literature. Based on survey responses, the 64 barriers were clustered into the following 10 factors:

a. *administrative structure*: existing organizational structures could represent a barrier to manage distance learning programs;

b. *organizational change*: most organizations are resistant to change. Without a shared vision for distance learning, explicated in a strategic plan, and key players within the organization who are knowledgeable and supportive of distance learning, implementing a distance learning program can be a slow and difficult process;

c. *technical expertise*: the pace of technological change is fast and it is important to be able to follow these changes. Most professors do not have the appropriate knowledge and skills to design and teach distance learning courses; for this reason, the organization

needs a support staff to assist them to develop distance learning course materials, or to provide distance learning training;

d. *social interaction and quality*: as already described, participants in distance learning courses can feel isolated due to lack of person-to-person contact. Moreover, there are concerns about the quality distance learning courses, programs and student learning. Testing and assessment of student outcomes is also a concern;

e. *faculty compensation and time*: distance learning courses require a greater time commitment, so additional faculty compensation, incentives and release time are important issues;

f. *threatened by technology*: some people fear that an increase in the use of distance learning technologies may decrease the need for teachers. Feeling intimidated by technology may also threaten an instructor's sense of competence or authority. Either or both psychological factors may lead faculty to feel that their job security is threatened;

g. *legal issues*: the increasing use of the Internet to deliver distance learning raises concerns about copyright, fair use policies, piracy, intellectual property rights, and problems with hackers and viruses;

h. *evaluation/effectiveness*: there is concern over a lack of research supporting the effectiveness of distance education. A lack of effective evaluation methods for distance learning courses and programs is also a concern;

i. *access*: many students lack access or there are concerns over equal access to courses offered via newer technologies such as Web-based instruction. Sometimes instructors also lack access to the necessary equipment and courses;

j. *student support services*: provision of student services, such as advisement, library services, admissions and financial aid, at a distance is a critical aspect of any distance learning program. There are also concerns about how to monitor the identity of distance learning students.

As said before, they demonstrated a relationship between the stages of distance learning within organization and the barriers. The stages are 5:

1. no use of distance learning in the institution;
2. sporadic use of distance learning;
3. an interdisciplinary team is formed when digital events occur;
4. a stable and predictable process is in place to facilitate the identification and selection of technology to deliver distance training;

5. distance learning is part of the institution: there is a distance learning identity and conduct systematic assessment of distance training events with an organizational perspective.

The first evidence concerns the point e: the lack of time is ranked as the greatest obstacle in all organizational stages. Instead, the organizational change is a barrier for all the stages, but not if distance education is already integrated into the mission of the organization. Finally, the factor that is less felt as a barrier is the administrative structure. In the table below there is the rank order of factors showing perceived barriers to distance education by respondents in higher education at each stage of organizational level of capability.

Table 2 Rank order of perceived barriers to distance education

STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
Faculty compensation and Time	Faculty compensation and Time	Faculty compensation and Time	Faculty compensation and Time	Faculty compensation and Time
Organizational change	Organizational change	Organizational change	Organizational change	Lack tech expertise and support
Lack tech expertise and support	Lack tech expertise and support	Lack tech expertise and support	Lack tech expertise and support	Evaluation
Student support services	Student support services	Evaluation	Evaluation	Social interaction and quality concerns
Social interaction and quality concerns	Evaluation	Student support services	Student support services	Legal Issues
Evaluation	Social interaction and quality concerns	Social interaction and quality concerns	Social interaction and quality concerns	Student support services
Access	Legal Issues	Legal Issues	Legal Issues	Organizational change
Administrative structure	Access	Threatened by technology	Threatened by technology	Access
Threatened by technology	Threatened by technology	Access	Access	Threatened by technology
Legal Issues	Administrative structure	Administrative structure	Administrative structure	Administrative structure

A more recent study (Hopewell, 2012) identified a set of risks associated with teaching online. These risks were manifested themselves throughout faculty interviews and are associated to:

- teaching;
- research;
- service.

Teaching

As underlined before, the survey revealed that distance education takes a lot more effort on the teacher's part and so more time needed than teaching face-to-face. More time is needed to do different activities:

- *to communicate*: everything you communicate is through the keyboard, but it is faster to talk to a whole class than to respond to 20 students individually. In the traditional setting, a professor can answer questions verbally and in presence of other students; the one-to-one interaction precludes other students from benefiting from hearing the answer and potentially answering a question they may have;
- *for grading*: grading in the online environment takes more time. A professor compared the process: adding comments on an assignment in the correct format that allows the student to view them and upload the assignment back to the student takes more time than the traditional process with paper and pencil;
- *for course development*: to assemble the materials and post them online for students to receive takes more time for faculty than the traditional way to prepare lectures. The entire course, with reading materials, assignments and due dates for the semester, has to be ready to go on the first day of class.

Student feedbacks are another risk associated to teaching: only 15% gives a feedback on the evaluation of the course, but it makes the results kind of invalid.

Research

"Research is a very important part of any faculty member's professional life. It represents a time intensive activity and important part of the annual review of faculty performance. When asked about research, each of the study participants indicated they had trouble finding enough time to address this area".

Service

The third primary area of responsibility for traditional faculty members is service. The idea that online faculty members have a more flexible schedule leads others to assume they can request these faculty members participate in additional service related activities. For this reason, this was mentioned as one of the disadvantages of teaching online.

2.2.7 Video

The production of videos exists as long as the online format has existed. With the introduction of free online video hosting services as YouTube, people started to disseminate instructional videos at scale. For example, Khan Academy videos have been viewed over 300 million times on YouTube. Khan Academy is a non-profit educational organization created in 2006 by educator Salman Khan with the goal of creating a set of online tools that help educate students. Its motto is "A free, world-class education for anyone, anywhere". The organization produces short lectures in the form of YouTube videos. Khan Academy offers practice exercises, instructional videos, and a personalized learning dashboard that empower learners to study at their own pace in and outside of the classroom. All resources are available to users of the website. Millions of students from all over the world learn at their own pace on Khan Academy. The website and its content are provided mainly in English, but they are being translated into more than 36 languages (khanacademy.org).

Videos are central to the student learning experience in the current generation of online courses and of MOOCs: they are organized as a mix between videos and other resources like texts and quizzes.

Despite the importance of video production and usage, there has been little study of how to best present lessons in video format.

In the literature, it is possible to note that many students engage primarily with videos while are less interested in other interactive course components (Kizilcec et al., 2013).

Given the importance of videos, university invest time and money to produce these videos, which can be registered in different styles. The typical styles, considered by Guo et al. (2014), are:

a) recording of classroom lecture;
b) "talking head" shot of an instructor at a desk;
c) digital tablet drawing format popularized by Khan Academy;
d) PowerPoint slide presentation.
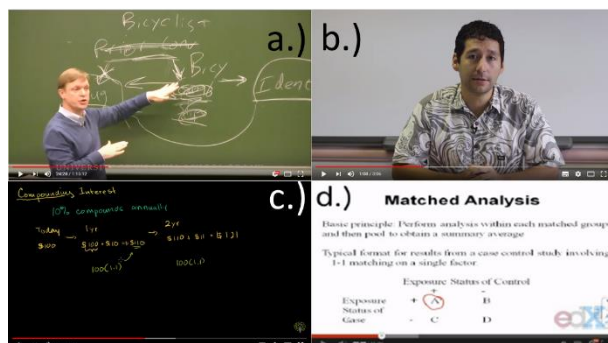
Figure 2 Typical styles of videos

Guo et al. (2014) conducted a research to investigate which kinds of videos lead to the best student learning outcomes and if there are some characteristics that make a video more engaging. The study analyzed data from 4 courses present on the edX platform and from interviews with edX staff.

Measuring the true engagement is impossible without direct observation; for this reason, they used two proxies for engagement:

- *engagement time*: how long a student spends on a video; a drawback is that is not able to understand whether a watcher is actively paying attention to the video or just playing it in the background while doing other things;
- *problem attempt*: if the students complete the problems within 30 minutes after watching a video means that the video is more engaging.

Moreover, the variables considered in the study are the following:

- *length*;
- *speaking rate*: given by the total number of spoken words on the total in-video speaking time (i.e., words per minute);
- *video type*: lecture, tutorial or other as supplemental film clip;
- *production style*: considering that a video can contain multiple production styles, the main kinds are:
  - *slides* – PowerPoint slide presentation with voice-over;
  - *code* – video screencast of the instructor writing code in a text editor, IDE, or command-line prompt;
  - *Khan-style* – full-screen video of an instructor drawing freehand on a digital tablet, which is a style popularized by Khan Academy videos;
  - *classroom* – video captured from a live classroom lecture;
  - *studio* – instructor recorded in a studio with no audience;
  - *office desk* – close-up shots of an instructor's head filmed at an office desk.

Findings

1. The first result is linked to the most significant indicator of engagement: video length. *Shorter videos are more engaging*: median engagement time is at most 6 minutes, regardless of total video length and there is less chance that problems will be solved at the end of a longer video.

2. *Talking head is more engaging* than slides alone: "they felt that a human face provided a more intimate and personal feel and broke up the monotony of PowerPoint slides and code screencasts."

3. More *informal videos* are more engaging because convey the idea of a personal one-on-one conversation and high production value might not matter. Another research supports this result: Cross et al. (2013) compared opinions about handwritten recordings (using pen and tablet) and typed presentations. Students who preferred handwriting described it as "more personal", "more natural", and "more engaging". Other comments from the survey were: "It reminds me of blackboards… written materials have more personality." "The handwriting kept my attention. It felt more authentic. I felt as if I was in a class and it made it more 'fun'".

4. For what concerns the styles, the most engaging is *Khan-style*. It requires more work in the pre-production phase and the most effective Khan-style tutorials are those with clear handwriting, good drawing skills and careful layout planning.

5. *Pre-production* improves engagement: interviewing edX video producers, they found that planning phase had the largest impact on the engagement of resulting videos. "But since the output of extensive pre-production is simply better planned videos, producers cannot easily argue for its benefits by pointing out specific video features (e.g., adding motion via tablet sketches) to suggest as best practices for instructors."

6. *Speaking rate* affects engagement: students are more engaged with videos where instructors speak faster and with high enthusiasm. Some practitioners suggest 160 words per minute as the optimum speaking rate for presentations.

2.3 MOOC

The first time that the word MOOC was used was for the course "Connectivism and Connective Knowledge" organized by George Siemens and Stephen Downes of University of Manitoba, Canada, in august 2008. The acronym MOOC (Massive Open Online Course) was given by Dave Cormier and Bryan Alexander due to the huge number of students who attended it for free (Siemens, 2012).

The first MOOC, as it is known nowadays, was the course "Introduction to Artificial Intelligence", offered in fall 2011 by Sebastian Thrun, professor of Stanford University and Peter Norvig, Director of Research at Google. Given the amazing success – 160 000 enrolled students from 190 countries – Thrun founded the for-profit MOOC service provider Udacity with David Stavens and Mike Sokolsky. Following the first course named "Building a Search Engine", several courses

were developed and loaded on the platform and from 2012, different U.S. institutions developed their platform, as MITx of Massachusetts Institute Technology (MIT) and Coursera of Stanford University.

These courses attracted millions of students, so, in 2013, MOOC activity began in Europe starting with the pan-European initiative OpenupEd (Jansen et al., 2015) and different MOOC platforms, more regional, became available: MiríadaX, an Ibero-American effort that currently hosts 57 courses from 20 universities mainly from Spain; UK's FutureLearn, with 36 courses and 26 partners, among others (Sanchez-Gordon and Luján-Mora, 2014).

2.3.1 Definition of MOOC

Given the recent birth of the MOOC term, there are several definitions of it.

Various EU-funded MOOC projects together with OpenupEd are working with the following definition:

> MOOCs are "online courses designed for large numbers of participants, that can be accessed by anyone anywhere as long as they have an internet connection, are open to everyone without entry qualifications, and offer a full/complete course experience online for free" (Jansen and Schuwer, 2014).

MOOCs can be simply defined as "online courses with no formal entry requirement, no participation limit, free of charge and without credits" (Gaebel, 2013).

Jansen and Schuwer (2014) conducted a survey to European institutions delivering these courses through which investigated the meaning of each MOOC letter.

Massive

The difference between these courses and the traditional ones is the number of participants who can attend them: huge number of people are able to participate to these single courses at the same time. This feature is very important also for the universities: in fact, according to a large majority (71.6%) of the interviewed institutions "MOOCs should provide a sustainable model for the mass". In addition, 50,1% finds it (highly) relevant for their institution that "MOOCs must be designed for massive audience".

Open

This word has many dimensions and can have many interpretations. First of all, open in sense of removal of barriers to education in terms of fee to attend the course, but also in terms of freedom of place, pace and time of study.

In particular, institutions agree on the importance of offering these courses for free, with the exception of paying a small fee to get a formal credit as part of an accredited curriculum.

As Jansen and Schuwer (2014) stated, openness is also related to open accessibility, open licensing policy, freedom of place, pace and time, open entry and open pedagogy. Most of universities is supporting the openness in MOOCs regarding all these factors just cited. On the contrary, there seems no agreement on the importance of MOOCs having a fixed start date and/or that self-paced courses can also be called a MOOC.

OpenupEd, initiative better explained below, reflects the concept of openness in 8 features of its initiative framework (Souto-Otero, 2016):

1. openness to learners;
2. digital openness;
3. learner-centred approach;
4. independent learning;
5. media-supported interaction;
6. recognition options;
7. quality focus;
8. spectrum of diversity.

Online

82,1% of all the institutions consider (highly) relevant that a MOOC should be offered completely online. The majority even support the idea that an exam for a formal credit should be offered online. There is in general less support for the suggestion to support participants who have a weak internet connection.

Course

A MOOC should offer a full course experience, so, the total study time of a MOOC should be minimal 1 ECTS and should include:

- educational content;
- facilitation interaction among peers (including some but limited interaction with academic staff);
- activities/tasks, tests, including feedback;
- a study guide / syllabus.

In the table below there are some alternatives for the different dimensions of MOOCs.

Table 3 MOOCs dimensions

		Dimension definition of MOOC	Criteria deciding for a MOOC
M	**Massive**	An online course designed for large number of participants	- Number of participants is larger than can be taught in a 'normal' campus classroom/college situation (>148 = Dunbar's number) - The (pedagogical model of the) course is such that the efforts of all services (including of academic staff on tutoring, tests, etc.) does not increase significantly as the number of participants increases.
O	**Open**	Course can be accessed by (almost) anyone anywhere as long as they have an internet connection.	- Course accessible to (almost) all people without limitations. - At least the course content is always accessible - Course can be accessed anywhere as long as they have an internet connection
		Open as in freedom of place, pace and time.	Most MOOCs nowadays have a fixed start and end date and as such are not open in pace or in time. Next, a pre-defined pace and/or a fixed starting date and end date is not considered explicit criteria to distinguish between MOOCs and other types of courses.
		Open to everyone without entry qualifications.	No qualifications / diplomas needed to participate in the online course.
		Course can be completed for free	Full course experience without any costs for participants
O	**Online**	Complete course online	All aspects of course are delivered online
C	**Course**	Unit of study	The total study time of a MOOC is minimal 1 ECTS (typically between 1 and 4 ECTS)
		The course offers a full course experience including: 1. educational content; 2. facilitation interaction among peers (including some but limited interaction with academic staff); 3. activities/tasks, tests, including feedback; 4. some kind of (non-formal) recognition options; 5. a study guide/syllabus;	1. educational content may include Video – Audio - Text – Games (incl. simulation) – Social Media – Animation; 2. offers possibilities for interaction, such as social media channels, forums, blogs or RSS readers to build a learning community; 3. participants are provided with some feedback mechanism. Can be automatically generated (e.g., quizzes), only by peers (peer feedback) and/or general feedback from academic staff, etc.; 4. always includes some kind of recognition like badges or a certificate of completion. A formal certificate is optional and most likely has to be paid for; 5. study guide/syllabus includes instructions as to how you may learn from the presented materials and interactions.

2.3.2 MOOCs design

The courses are typically paced around a weekly structure, and the content are accessible by the students whenever they would like. Some of the activities are automated multiple-choice quizzes, short videos, document sharing and forums. Courses are based on peer-learning model, but there is also an expert running the course. There could be also synchronous learning opportunities (e.g. live seminars) besides asynchronous learning events. MOOCs concern different activities for student engagement (Baturay, 2014):

- *video lectures*: MOOCs have various presentation styles, from talking heads to lecturing instructors. The running time for the lecture videos is usually 5-10 minutes each with in video quizzes embedded (as seen in "Video" section);
- *assessment*: assignments are primarily evaluated through the use of:
  - auto-graded multiple-choice questions or auto-graded programming assignments,
  - peer review assessment where students themselves evaluate and grade assignments based on a defined rubric set;
- *forums*: forums are where students post questions and other students reply, and are the main method of interaction between students and instructors. Forums usually consist of general discussion, subject-specific discussion, course feedback, and technical feedback threads;
- *readings*: most MOOCs do not require students to buy books, and most readings are available online or provided by course instructors;
- *live video sessions*: in addition to the weekly lectures, there are live video sessions with the course instructor, in case of programmed synchronous activities;
- *activities*: a range of instructional activities are offered, with the aim of allowing students to further test their understanding of the course concepts;
- *additional video resources*: these were scripted videos to help comprehension of scenes;
- *social media*: students are encouraged to continue their discussions on dedicated pages on other social media platforms, such as Facebook and Google+.

2.3.3 European MOOCs

Europe strongly believe in the power and in the potential of MOOCs.

MOOCs are part of the broadest incentive project for innovation and digital competences in schools and, in particular, in universities.

To push the adoption and the use of MOOCs, different organizations and initiatives have been started.

In 2013, EADTU, with the support of the European Commission, launched the non-profit initiative **Opening Up Education** to further enhance the adoption of open education in Europe. This initiative works as a central node of a network of decentralized MOOCs providers that commits with a common philosophy of openness (Souto-Otero et al., 2016). In "Opening up Education" report (2016), the aim of the project is well explained: to widen access and participation to everyone by removing barriers and making learning accessible, abundant, and customizable for all. OpenupEd increases the visibility of the members and guarantees the quality of the MOOCs under its umbrella. It was born as a response of the need of quick and common action to the extension of the MOOC phenomena at European level identified in a 2012 survey.

In November 2014, the **Porto Declaration** has been drawn: "Porto Declaration calls upon all to embrace the possibilities the open and online education movement offers the Knowledge Society and stresses the need for stronger collaboration in Europe, based in the principles of transparent cooperation, mutual benefit and collective incremental advantage".

MOOCS are considered to have the potential to educate the many in a flexible way that is needed today. Moreover, MOOCs are considered consistent with European values of equity, quality, diversity, inclusion and social justice and able to increase life-long learning and social mobility. "Beyond the goal of social inclusion, we see openness as an important driver for promoting development of skills, enhancing knowledge transfer and increasing the pace of innovation."

However, the MOOC movement is dominated by the United States for the number of course offerings and leading service providers, such as EdX, Coursera, etc. From available data (Open Education Europa, 2015), it is possible to observe that European MOOC activities are mainly 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 (Jansen et al., 2015). Moreover, they do not fully reflect the cultural diversity of Europe, except for OpenupEd.

Jansen et al. (2015) affirmed that European higher education institutions are aware of the potentiality of MOOCs as a global movement and an instrument for educational policy; but many have been hesitant to adopt or engage with MOOCs. The concerns that have delayed European

higher education institutions from entering this movement are different: for example, pedagogical issues, strategic and cost questions.

For all these reasons, there is the need of a strong support to drive and increase this phenomenon. Porto Declaration calls upon the European Commission and individual member governments to strategically invest in digital infrastructure and capacity development in order to harness the potential of MOOCs for European society and consider MOOCs as a lever to advance the European Digital Agenda and to promote modernization of the higher education system.

Porto declaration claims the need of a collective European response to minimize the risks of the MOOC movement and to maximize the opportunities for both society and business.

Different projects and initiatives related to MOOCs, as HOME – better described later – and EMMA – European Multiple MOOC Aggregator –, support the Porto Declaration, but also associations, as EDEN (European Distance and E-Learning Network) or ICORE (International Community for Open Research and Education), and educational institutions, among which there is also Politecnico di Milano and Università degli Studi di Napoli Federico II.

EADTU (from EADTU.eu)

One association that support MOOCs development is EADTU. The acronym stands for European Association of Distance Teaching Universities and is Europe's leading institutional association in online, open and flexible higher education, and is at the heart of the modernization agenda of European universities. EADTU is regarded as a key partner of the European Commission as far as lifelong open and flexible learning in distance higher education is concerned.

The association is growing: at the beginning, there were 11 founding members in 10 European nations, and now there are members of 15 institutions and 14 national associations across 25 nations. "Its membership covers over 200 universities and around 3 million students."

They promote three fundamental features at the base of European open and distance higher education:

- student-centered learning based on high quality online learning environments;
- openness to learners achieved through flexible, inclusive structures and methods that take higher education to students when and where they need it;
- networked education and mobility, where students can learn across national, sectoral and institutional boundaries.

EADTU operates in the field of 6 policy areas: Lifelong Learning, Research & Innovation, Open Education & **MOOCs**. Virtual Mobility, Skills & Employability and Quality Assurance

HOME

HOME, that stands for Higher education Online: MOOCs the European way, is a European funded project, initiated and coordinated by EADTU, which started in January 2014 (home.eadtu.eu, 2017).

In their website, their goal is explained: to develop and strengthen an open network for European cooperation on open education, in general, and MOOCs, in particular. The specific objectives of this project of HOME are to:

- determine the opportunities and characteristics for a European cooperation on MOOCs and to further develop these characteristics based on European values like openness, equity, quality and diversity;
- explicate and develop the didactic and pedagogic models for MOOCs on a European scale;
- develop the conditions for shared educational services in offering and monitoring European MOOCs;
- develop sustainable business models for joint efforts on these European MOOCs at a global, European, national and institutional level;
- build up a sustainable open knowledge network for these types of MOOCs which is open to the whole world;
- initiate activities in different learning communities to enhance European-wide competence development on main topics related to developing and offering MOOCs;
- create guidelines and the policy incentives on a local, national and European level for an open knowledge network in MOOC offerings.

As it will be better shown in the 2.3.5 paragraph, HOME project contributes in developing the literature about European MOOCs through survey studies. They are very important studies since the literature on MOOCs in Europe is still developing and lacks comprehensive studies (Jansen et al., 2015).

EduOpen

EduOpen is an Italian consortium born from the need to create high quality MOOC courses through the joint effort by a group of more than 10 Italian public Universities (Limone, 2016). Its aim is present in the project document submitted to the Italian Ministry. They want to create:

- Teaching innovation through the creation of an Italian ecosystem of MOOCs which, among other things, gives the right to ECTS through the participation of several Universities, already active within distance learning.

- A strategy of internationalization based on the offering of MOOCs in English, with the interchanging of ECTS through specific agreements with other European Universities which offer MOOCs, and through the participation of important international MOOC consortia.

- An extended action-research strategy, the first one of its size in Italy, useful for the "evidence-based" development of an Italian plan aimed at the spreading of open educational resources. In particular, it will investigate formats, interaction models, assessing techniques and the existing practices used by students, through the tools of learning analytics.

- A training opportunity for teachers and technical/administrative staff of the Universities involved, aimed at promoting the use of technology in teaching and learning processes.

EduOpen portal offers courses hold by experts of the Italian academic world on several discipline areas, as Arts, Mathematics and so on. Some courses can provide certifications.

2.3.4 MOOC platforms

On the Internet, you can find a lot of MOOCs providers, the website "Class Central", specialized in MOOCs, counts 40 providers with courses of 761 universities all over the world.

The most active platforms, for the number of offered courses, and the most relevant for this analysis are listed in the table 4.

Table 4 MOOC platforms. Source: Class-Central and The Best MOOC Platforms of 2017 (Reviews.com)

Name	#Courses	Description
Coursera	2999	Coursera is a for-profit company that was started by two Stanford computer science professors. The platform currently has 25 million registered learners and partners with 149 universities across 29 countries. It is always listed among the best MOOC platforms for its wide variety of learning pathways. You can "explore the course material" for free, but may not have full access to certain course features like graded assignments.
edX	1847	EdX is a non-profit online initiative created by founding partners Harvard and MIT, and it currently partners with top institutions all over the world. One aspect of edX that makes the platform stand out is that its technology is open-source – this means that partner institutions can improve and add features that benefit the audience they are trying to reach. It offers the widest variety of topics through free courses, but you will not have access to the whole experience. You do not get any sort of certificate for finishing a course you audit, so you will have to pay a fee if you want to show off your progress to your peers or employer.
FutureLearn	686	FutureLearn is a private company wholly owned by The Open University, with the benefit of over 40 years of their experience in distance learning and online education. Their partners include over 20 of the best UK and international universities, as well as institutions with a huge archive of cultural and educational material, including the British Council, the British Library, and the British Museum.
Udacity	202	Udacity was started by Stanford Professor Sebastian Thrun. Its primary partner institutions aren't universities, but corporations like Google, Amazon, and IBM Watson. Most courses are free, but you have to pay for Nanodegrees. Udacity only offers MOOCs that relate to the tech field. Udacity's Nanodegree programs are not designed solely to educate, but instead, they aim to launch students into a career. Udacity even guarantees that those who purchase a Nanodegree Plus program will find a job within six months or the cost of tuition (one Nanodegree costs about $1,200) will be refunded.
Iversity	110	It is a for-profit European platform. Iversity is able to take advantage of the European Credit Transfer System. Partnered institutions have the opportunity to offer exams that award ECTS credits.
EduOpen	67	It is the Italian platform, well explained in the previous paragraph.
Federica	62	It is the Italian platform made by the University of Napoli "Federico II". It will be better described in the paragraph 4.4.
EMMA	54	EMMA is the European Multiple MOOC Aggregator. It is a 30-month pilot project supported by the European Union. It aims to show excellence in innovative teaching methodologies through the experimentation of MOOCs on several topics. EMMA provides a system for providing open and free courses - in multilingual mode - produced by European universities and cultural institutions to help preserve and promote the cultural, educational and linguistic wealth of Europe.
Polimi Open Knowledge	27	Polimi Open Knowledge is the MOOC program of Politecnico di Milano. It is built on OpenEdX. As Federica, it will be better described in the paragraph 4.4.

2.3.5 Comparison between MOOCs in Europe and in U.S.

A part of the literature is provided by the survey study conducted by the HOME project. This study is useful to get an insight about European perspectives on MOOCs and a better understanding of the strategic reasons that push higher education institutions to be involved or not in MOOCs. All the findings are compared with the results of similar studies in U.S. (Jansen et al., 2015).

The first important conclusion of the survey is that European higher education institutions are clearly confident regarding MOOC development and implementation: in fact, 71.7% of the institutions in Europe has a MOOC or is planning to develop one. Moreover, they are more involved and interested than U.S. in this theme: while in the US the number of institutions having a MOOC, or planning to introduce them has decreased from 14,3% to 13,6%, in Europe it has increased from about 58% in EUA study to 71,7% in this study (Jansen and Schuwer, 2015).

In addition, from the survey, MOOCs are perceived more as a sustainable method for offering courses in Europe than in U.S. and the European institutions are increasingly developing a positive attitude to MOOCs. All conditions indicating that MOOCs are becoming mainstream in Europe.

The difference between the European and U.S. feelings can be due to the funding: EU has more government and European funding for higher education than U.S. Next, Europe seem more experimenting with online pedagogy and with different types of MOOCs, each with a specific rationale. Then, the presence of the ECTS framework in Europe, which provides a sound base for recognition of credentials across institutions, can be seen as a further possible explanation.

The comparisons were made also concerning the institutional objectives on MOOCs. Firstly, in the survey, it is requested if MOOCs are meeting institution's objectives. Most of the EU universities affirmed that MOOCs are already meeting some or most institution's objectives, instead a great number of U.S. universities stated that it is "Too early to tell".

Moreover, there were indicated the different primary objectives to offer a MOOC (objectives that are similar to those listed by Hollands & Tirthali, better explained and shown in next sections):

- generate income;
- increase institution visibility;
- drive student recruitment;
- innovative pedagogy;

- flexible learning opportunities;

- reach new students;

- supplement on-campus;

- explore cost reductions;

- learn about scaling.

The most interesting differences among the answers given by the EU and U.S. universities, in the figure 3, concern, firstly, the focus on "drive student recruitment" in US compared to Europe and, vice versa, the importance of "reach new students" in Europe compared to US.
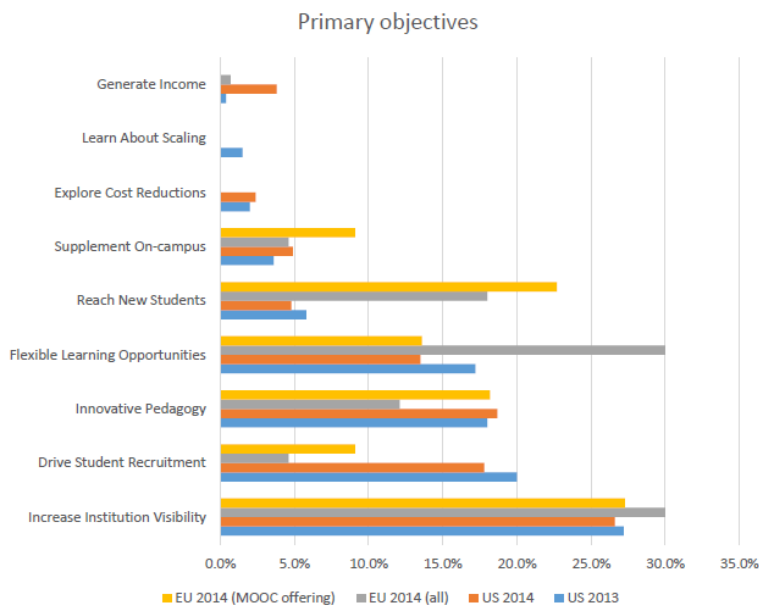
Figure 3 Primary objectives to offer a MOOC compared between that of the US surveys and of Europe. Source: EADTU.

So, in Europe, using MOOCs for student recruitment is not seen as the most important objective, but rather to reach new students and creating flexible learning opportunities (for those new students). At the same time, it is also interesting to note the relative low importance of "flexible learning opportunities" with institutions who are offering MOOCs compared to those in Europe who are planning to do so.

In both surveys, the objectives related to finance (explore cost reduction, generate income) and scalability dimension of MOOCs are not seen as primary objective. This is somewhat strange since MOOCs are essentially for free and for massive audience.

Table 5 Main differences between European and US MOOCs

Europe	US
# institutions having a MOOC or planning to develop one	
It increased from 58% to 71.7%	It decreased from 14.3% to 13.6%
Europe has government and European funding	No government funding
Are MOOCs meeting institutional objectives?	
MOOCs are already meeting some or most goals	It is too early to tell
Main objective	
Reach new students	Drive student recruitment

2.3.6 MOOCs strategies in Europe

Different studies had been carried out to understand why institutions decide to develop MOOCs, as already anticipated in the previous paragraph.

Hollands & Tirthali (2014) investigated the goals of institutions of higher education that are currently developing and delivering such courses. They classified the different institutional goals into 6 categories.

- *Extending the reach of the institution and access to education*
  This is the most commonly identified goal for offering a MOOC. Some of the ways in which MOOCs are expected to increase access to education are "broadcasting" to global audiences, providing flexibility in time and place of study for nontraditional students, increasing access to instructors skilled in specialized domains and niche subjects and giving flexibility for students to create their own programs using courses from various institutions.

- *Building and maintaining brand*
  For IHEs, building and maintaining brand serves to attract and retain students, faculty members, and partnership opportunities with other institutions, funders, and alumni networks. While many institutions have received significant media attention as a result of their MOOC activities, isolating and measuring the impact of any new initiative on brand is a difficult exercise.

- *Improving economics by lowering costs or increasing revenues*
  Interviewees offered several possibilities for eventual cost savings as, for example, reusing MOOC materials multiple times, sharing MOOC materials across instructors and campuses, developing common courses to offer across institutions and replacing on-

campus courses with MOOCs. Given the recent birth of MOOCs, it is difficult to find examples of actual costs savings realized. On the other hand, few universities explicitly stated revenue generation as a goal or are pursuing MOOCs as a potential source of revenue. Potential sources of revenue are, for example, offering credit for MOOC completion and charging tuition, creating new for-fee courses and programs, licensing fees for use of MOOC materials or data by other institutions and fees for additional services offered to MOOC participants, as online tutoring or face-to-face instruction with a local instructor. About it, there is an example: San José State University piloted online courses that were offered free and without credit to the public, but a smaller number of formally enrolled students paid $150 each to earn three to five credits per course. Instead, there are less evidences supporting the other ways to increase revenues.

- *Improving educational outcomes for MOOC participants and on-campus students*

  There are different ways in which MOOCs were expected to lead to improvements in educational outcomes, as providing instant feedback to course participants, gamification and badging to increase motivation, encouraging persistence, motivating instructors to rethink pedagogy, redesigning regular courses to incorporate MOOC strategies, such as "chunking" lectures and interspersing questions, and increasing opportunities for peer-to-peer learning. According to the interviewees, the most significant impact of MOOCs has been on the motivation they have created for instructors to rethink the way they teach. Several interviewees reported that MOOCs have prompted even typically intransigent faculty members to reconsider their teaching styles. Even if the interviewees suggested several ways to use MOOCs for changing instructions, the actual impact on educational outcomes has not been documented in any rigorous way. For this reason, it is difficult to affirm whether the goal of improving educational outcomes has been achieved.

- *Innovation in teaching and learning*

  MOOCs are seen as a means to experiment with and to innovate pedagogy and models of higher education. They were also presented as a disruptive innovation within the higher education business model that could help universities become more competitive simply by forcing them to reconsider the status quo: for example, one university asserted that MOOCs have pushed college personnel to open up to the research about how people learn.

- *Conducting research on teaching and learning*

   A great deal of effort has been expended on trying to improve participant engagement and completion of MOOCs and less effort on determining whether participants actually gain skills or knowledge from the courses.

Yuan et al. (2014) lists possible strategic choices behind the development of a MOOC or other online programs:

- *defensive* – to be ready if/when MOOCs (online learning) take off.
- *offensive* – to become a leader in online learning;
- *marketing* – to market the university, e.g. to translate free access MOOC students into paying students, or to reach international students;
- *enhance existing provision* – to provide blended learning for existing students, e.g. to develop online components for existing courses;
- *change existing provision* – to focus more teaching time on two-way learning conversations with students rather than one-way lecturing the so-called "flipped classroom";
- *financial* – to reduce teaching costs and hence the price to students;
- *research* – to explore MOOCs/online learning in practice and in greater depth and become a leader in MOOC research.

Based on the previous classifications of Hollands & Tirthali, Yuan et al. (2014) and on the survey conducted in US by Allen & Seaman (2014), EADTU clusters the objectives in 4 main groups:

- using MOOCS for financial reasons (e.g., reduce costs, generate additional income);
- using MOOCs for reputation/visibility reasons (e.g., student recruitment, marketing potential/reach new student);
- MOOCs as innovation area (e.g., improve quality of on campus offering, contribute to the transition to more flexible and online education, improve teaching);
- responding to the demands of learners and societies.

These groups were presented in their survey (2015) in order to understand the situation about the relative importance of these objectives for European institution's MOOCs. The results confirmed the data in the figure 3, seen previously. In fact, financial reasons are not the dominant objective and the other three objectives are almost equally indicated as relevant or highly relevant, with a tendency to "reputation/visibility" considered the most highly relevant. This category is comparable with the two goals "Extending reach and access" and "Building and

maintaining brand" reported in Hollands & Tirthali (2014): even according to their survey, these two goals are the two most mentioned goals.

These results are also consistent with the EUA study. They state that "international visibility" is by far the most common motivation for developing MOOCs, followed by the wish "to boost student recruitment" (Gaebel et al. 2014). They also confirm that only very few European institutions select "income generation", "cost reduction", "funding opportunities" as top priority.

Moreover, Hollands and Tirthali (2014) report that colleges and universities have adopted several different stances toward engaging with MOOCs. Some are actively developing MOOCs and may be termed "producers," some are using MOOCs developed by other institutions in their programs and could be termed "consumers," and a few are doing both. Others are adopting a wait-and-see approach, and some have considered MOOCs and have either decided against any form of official engagement or have not met with interest from faculty members to pursue them.

Consumers of MOOCs are integrating MOOCs created by other institutions into their course offerings in flipped classrooms, e.g., San José State University, or simply as supplemental resources for their students. A small number of institutions have declared willingness to consider MOOCs for credit. A few universities could be categorized as both producers and consumers, with some instructors creating MOOCs and others using MOOCs created by their own or other institutions in their classes.

Another interesting consideration is given by Limone (2016) that recognize 3 models for MOOC production:

1. the national or centralized model (e.g. France Université Numerique);
2. the industrial model, managed by private companies (e.g. Blackboard, FutureLearn);
3. the academic model, promoted by single or associated universities (e.g. Federica, EduOpen).

The differences among these models are given by economic and managerial aspects. The centralized model tends to exploit the economy of scale by spreading the materials, through the reduction of the unit costs of production with the increase in the number of resources developed. In the industrial model, single companies invest in the initiative and manage the production, promotion and sharing/selling of materials. In the third model, finally, universities produce learning contents and deliver them across their platforms. The funding center is

represented by the universities themselves, that can develop MOOC courses alone or in cooperation with other academic centers.

In the table below, there is a summary of the characteristics of the 3 models.

Table 6 The three MOOCs models. Source: EADTU 2016

	National Model	**Industrial Model**	**Academic Model**
Management	Public and centralized educational institutions.	Specialized companies.	Universities or academic consortia
Aim	To standardize the offer and to manage the certification system.	To select competitive proposals for the market and for the different categories of potential users.	To create training opportunities for large sections of students: accessible and shared knowledge.
Target	Students, professional groups.	Professional training and higher education.	Students (all levels).
Funding	Central government.	Industry.	University.
Opportunities	Customization according to national specificities, included language. Esploitation of local expertise in the different international scientific fields.	Consistency of delivery formats of the courses. Promotional power of corporate actors.	Focus on the pedagogical model. Variety of subjects and actors.
Threats	Decrease of pluralism.	Predominance of market logic.	Fragmentation and duplication of educational offerings. Academic marketing tool.

2.3.7 MOOCs business model

From an economic point of view, MOOCs differ from traditional higher education initiatives by having the potential to be a true public good, that is, to exhibit both non-rivalry and non-excludability. Non-excludability has pros and cons from a social point of view. On one side, an enhanced access to courses magnifies the positive externalities of education for society as a whole. On the other side, private provision of a non-excludable good is typically problematic as no revenues can be raised from the sales of the good.

During the years, different articles have been written on possible ways to make MOOCs sustainable.

In a paper titled *MOOCs and the Future of Higher Education*, Peter J. Billington and Michael P. Fronmueller (2013) addressed the issue related to the innovative nature of MOOC in a critical perspective, describing also the related economic models and indicating some possibilities:

- the charge for taking the course;
- the charge for certification or credits;
- the students' fees for course materials, or university fees.

In a more radical perspective, the article published on The Economist *The attack of the MOOCs. An army of new online courses is scaring the wits out of traditional universities. But can they find a viable business model?* (July 20th, 2013), also recognized the non-existence of a unique business model for MOOC platforms and describes other possibilities for financing:

- venture capital;
- free course materials for training sector but payment for tuition;
- advertising on courses websites;
- paid content related to the course.

Belleflamme and Jacqmin (2016) examined several ways to generate revenues in a sustainable manner, some of these were similar to those listed so far.

1. *Certification model*: it has been the model that traditional higher education institutions have been following for decades. MOOC platforms try to emulate this model but with two major differences. First, MOOCs still suffer from a reputation deficit with respect to traditional institutions. So far, the certificates that they deliver are not accredited by any external quality assurance institution; the only form of accreditation comes, indirectly from the reputation of the professors who conceive the MOOCs and of the universities that employ them. Second, and more importantly, MOOCs turn the certification model on its head in terms of pricing. In the traditional universities, the students pay for the access to a program of courses and the degree is delivered, free of charge, when students successfully complete the program. Instead, for MOOCs the process is different: access to courses is free but students need to pay if they want to obtain a certificate that attests of their successful learning experience. However, this model could be difficult to apply since the completion rate is low.

2. *Freemium model*: freemium is a contraction of the words 'free' and 'premium', the latter characterizing a privileged offer. The idea is to propose different versions of the service at different prices. Typically, a free version (giving basic access to MOOCs) can be offered along with a number of paid versions (including various bundles of excludable services, such as personalized tutoring, privileged interactions with teachers, unlimited access to

courses at any time, and more flexibility in the use of the platform). Although this model has proven to be successful for many Internet-based services (for example, Skype or Spotify), some specificities of MOOCs cast doubt on its replicability. Competition between MOOC platforms is quite intense as platforms are not really differentiated (nor horizontally nor vertically) and users face low switching costs.

3. *Advertising model*: it is one of the most preferred road to monetization in the Internet sector. The model can be summarized as follows: platforms do not sell contents to users directly but only indirectly, as contents serve to attract users, whose attention (and/or information) is then sold to advertisers. Advertisers are indeed willing to pay to attract eyeballs on their ads, and even more if they know to whom these eyes belong. In this respect, MOOC platforms are of interest to advertisers thanks to the information that they can collect about their users and the large amount of time that students spent on the platform. It is important that the advertisements do not interfere the learning process to not discourage students.

4. *Job matching model*: as for the advertising model, the job-matching model takes advantage of the presence of private actors around the platform and the by-product created by MOOCs, that is, the information about its users. By continuously monitoring the behavior of students, MOOC platforms accumulate big data that they can use to improve matching on the job market. By drawing an accurate and multidimensional profile of their students, MOOC platforms can help employers in their recruitment process.

5. *Subcontractor model*: MOOC platforms may raise revenues by acting as subcontractors for either universities or private companies. To universities, MOOC platforms can sell innovative ways to deliver education, as well as cost savings. To private companies, they can sell made-to-measure training programs.

Table 7 Summary of main possibilities of business models

Business model	Brief description
Certification model	The course is free, pay for the certificate
Freemium model	Different versions of the service at different prices
Advertising model	Advertisers pay to have information of users
Job matching model	Collected data about students are useful for employers
Subcontractor model	Possibility to sell MOOCs

Baturay (2014) affirmed that there is not a clear business model that has been decided yet for MOOCs. Providers are still exploring potential revenue opportunities. World leaders, Coursera and EdX, have a revenue sharing arrangements between their partners. The following are some of the issues negotiated with the partners.

- The universities should pay a fee for support to develop online courses;
- profit sharing arrangement should be course specific, depending on the period that a course is maintained, how long it appears in the institution's portfolio;
- a quality assurance check should be administered;
- partner institutions have the right to use the course platform for their own internal courses.

Some of the ways of generating revenues are educational services such as licensing of courses or certifying the course(s) would be paid.

EduOpen business model

Limone (2016) presents the interesting business model of EduOpen. The system is composed by 4 levels:

1. *Course Enrollment*: it is free, the payment is contemplated only for special services, as individual tutoring, offering of master courses or master classes, etc. The user can attend freely the whole course, but certificate of participation is not released.
2. *Attendance certificate*: the user can earn a certificate completing an online test with a small contribution. This certificate has no legal value, it is just a certificate of participation. The contributions are delivered to Edunova that manage the courses and will bear the certification costs.
3. *Verified certificate*: the user can earn a certificate passing a supervised test within universities or NICE CINECA centers. The cost is higher than the previous case and it is divided between the university and Edunova.
4. *Exam for CFU/ECTS* (formal or common recognition): in this case, there is a formal registration for individual courses at universities paying to the university the subscription fee. At the end of the MOOC, the user can access the test in front of the professor "owner" of the equivalent course at university in order to acquire CFU.

In the table below, a summary of certification costs.

Table 8 Summary of certification costs in Eduopen business model. Source: EADTU

	Attendance Certificate	Verified Certificate	Exam for ECTS
Certificate	Attendance level	Certificate recognized only within EduOpen network	Formal certificate
Type of examination	Online	Supervised test within universities or NICE CINECA centers	Assessment at university
Costs	Free or no more than 8€ (plus financial charges)	- Following single universities services - More than 25€ for supervised tests within NICE centers of CINECA, project partner	Contribution for formal registration for individual courses at universities
Recipient	Edunova	Partially to Edunova, partially to the host university	The contributions are recognized to the university (either totally, or with a small portion for Edunova)

Limone (2016) highlights 2 groups of costs related to the development and maintenance of the platform:

1. management and technology coordination of the platform;
2. production and management of courses (human resources, technical equipment, administrative costs for certification).

The first costs are in the hands of Edunova, which manages the platform. The second kind of costs is held by the individual universities that are also responsible for the generation of sustainable actions for MOOC creation and to integrate them in the regular training offer.

Moreover, there are 2 main forms of financing:

- *public funding*, so Ministry of Education, Universities and Research and incomes from subscribers when the MOOCs are integrated into the curriculum of the university;
- *private funding*, as companies that co-design with the university training courses for professional development of their employees and companies that purchase a package of courses/pathways for their employees' training.

Chapter 3

Theoretical framework

The object of this research is mapping the characteristics of the online learning in the Italian environment.

To understand the importance of this topic, it is useful to do a step back, asking us why education is important, and then why online learning is important.

> *"Give a man a fish and he will eat for a day. Teach a man to fish and he will eat for a lifetime"* (ancient proverb).

Education has a fundamental role in the economic development and growth: the qualitative improvement of human skills and knowledge of the people and of labor force holds the key to economic development of society. Education represents an investment, a necessary investment to increase the human capital, significant source of economic growth, as several studies have demonstrated. An educated nation is also able to compete in the international trade since the globalization is a reality by many years. Well-educated human capital brings added value and is more productive being able to carry out tasks more efficiently.

However, the Italian situation is critic: according to OCSE report, only 20% of Italians between the ages 25 and 34 are graduated, while the European average is 30% for the same age group. Most Italians have low level skills and there is a mismatch between what it is requested by the economy and what students learn during the years in universities.

The Minister of Economy Pier Carlo Padoan, as stated in an article of De Gregorio (2017), recognizes that "reforming the educational system, the accumulation of human capital, is the more effective long-term strategy for growing wealth" adding that is necessary to improve the quality of teaching in the country.

One way to increase access to education is taking advantage of the available technologies. E-learning represents an affordable, and sometimes free, solution through which you can learn, exploiting the several advantages.

First of all, as seen so far, the first benefit is the possibility to fit the learning activities according to the commitments that learners have daily thanks to the possibility to attend courses whenever and wherever they want through the Internet. In this way, also workers can attend courses to remain competitive without taking time off from their jobs to do this.

Anyways, online education has positive effects also for universities and for world of work. In fact, online learning has the power to reduce overheads, as manpower and classroom resources, and can also assist with scalability the universities being able to enlarge the customer base and to serve a higher number of customers at the same time and with the same resources. Moreover, the industries can benefit from these courses since they could ask to develop ad hoc courses useful to teach their employees or potential employees skills and knowledges for their needs.

Coming back to the central point of this research, the literature shows a gap for what concerns the strategy of implementation of digital learning in Italian universities. This research aims at filling part of this gap, mapping the characteristics of the developed courses.

Universities can use two main methods to deliver knowledge exploiting digital technologies: from one hand, they can develop blended and/or fully online study courses; otherwise, they can develop single courses through MOOC modality, as seen so far. To analyze these modalities, two methods of investigation have been used: as it will be better described in the sections 5.2 and 5.3, a questionnaire is delivered to get the information for blended and fully online study courses, while, for the MOOC experiences, we personally interview the actors involved to catch every nuance of the projects as it is the first study in this area. In both cases, the areas of interest are explicit, giving a guideline also for interviews.

From the literature, it has been learned that the digitization process involving university courses primarily changes the roles of professors and students. The learners are expected to be at the center of the learning process and to be more active during the lessons. However, to reach this status, the professors should design the courses in a proper way, incentivizing more active learning activities. It is important to underline that technologies themselves are not able to improve the way of delivering education, it requires investments in terms of commitment and resources. However, it is emerged the importance of having a supporting entity of the university that provides training and instructional support to professors who are used to teaching in a different, more traditional way.

At this point, we expect that, even in the Italian context, there are *dedicated organizations to support the professors* both in terms of technology and didactics. These structures follow the course development process, helping the professors by giving them all the tools they need to make reality what they plan to do and advising on possible developments or methodologies, being more competent in this field.

However, we expect the presence of *assistants also for students* for any technical problems and the presence of tutors for questions of didactic nature. As seen in the literature, it is important not to make the students feel isolated to avoid abandoning the courses. Another factor that influence the dropouts, which is a little related to this feeling of isolation just mentioned, is the lack of sense of community, as seen in paragraph 2.2.4. For this reason, we hypothesize that even Italian courses provide *group activities*, from the simple forums to group works, in which the students can discuss with other students, can work with them, developing those skills and relationships that are created by working with other people, as happens in traditional classes.

To stay on the topic of students, the literature highlights that students who have better performances in these types of courses have certain behavioral characteristics, such as higher motivation, greater responsibility, greater ability to convey their idea or problems by writing, etc. However, interviewing only universities, we are not able to know the point of view of students participating in these courses, but we have only information that can be collected by universities. For this reason, this aspect will not be studied by this analysis.

The few information that can be gathered through the interviews are about the type of students. The literature shows that online education is able to broaden access to courses through technology. For example, as seen in paragraph 2.2.5, students who enrolled in online courses were working students who wanted to improve their knowledge and their status, without giving up their work. Studies have shown that the average user differs between online courses and traditional courses. For this reason, we expect that even the enrolled students in Italian courses are mainly *workers or individuals with disabilities* who do not have the opportunity to reach and attend the lessons in campus.

Linked to the students, one last interesting point seen in the literature is about the effectiveness of these courses. There have been several studies on the performances that students can achieve through online courses, comparing the different types, from blended and traditional courses to fully online courses. It is important to emphasize that those studies were conducted specifically by analyzing the behaviors and results obtained by a particular group of students. In any case, this is not the purpose that is to be achieved with this analysis as it would require a different mode of investigation, but it represents a possible idea of future analysis.

Another crucial factor emerged from the past studies is about the commitment of faculty administrators who push the universities to this process of digitalization. Thanks to this commitment, faculty members embrace more enthusiastically this new method of delivering knowledge, having understood the advantages associated with this. Therefore, we hypothesize

that the *political leaders* of the universities interviewed are those who *push the faculties towards innovation* by trying to involve as many members as possible, even the most traditional professors.

One important characteristic of the online education is the used format to deliver courses. In the paragraph 2.2.7, videos have been described as the most engaging way to get the interest of students. For this reason, we expect most of the *content to be in the form of video* rather than in the form of text and video should be in line with the identified features that make the videos even more engaging.

Concerning *MOOC projects*, several studies have been conducted to understand the *strategies of implementation* of European and US MOOCs, which are the motivations that lead universities to develop MOOCs. According to the results seen before, the main drivers are the wish to improve the reputation and the visibility of the university, to build and maintain the brand and to extend reach and access. We expect that similar reasons are at the basis of the development of Italian MOOC with the awareness that it is a difficult path given the greater and more solid presence of MOOC of US scene.

Moreover, we hypothesize that each single choice linked to the design of MOOCs is in line with the objective that the university want to reach, also to be able to collect data about the evolution of the project and to see if the objectives could be actually reached. For the latter reason, it is supposed the *existence of a structured method useful for the collection and analysis of data to monitor the performances of the project*.

The last point analyzed in the literature is about the sustainability of MOOCs, the different business models that could characterize the MOOC production and the possibility to continue the supply of such courses that are mainly free. It has been shown that a possible way to make the project financially sustainable is to impose a small fee in order to earn a certificate that can be recognized at the job level. Therefore, a similar solution could also be taken into account by Italian universities delivering these courses.

Chapter 4

Background

4.1 Organs of the university system

The first bodies of the Italian university system are represented by the Ministry of Education, University and Research and the individual university institutions. In addition to them, there are other agencies that perform complementary functions of particular relevance for development, comparison, evaluation and, more in general, the organization of the university system. Among them the most important are:

- **ANVUR** (*Agenzia Nazionale di Valutazione del sistema Universitario e della Ricerca*): it is the agency that carries out the evaluation of the university system and of the research. It proposes the criteria and indicators for the evaluation of the university and research system and for the accreditation of university and study courses.

- **CUN** (*Consiglio Universitario Nazionale*): it is the advisory and proposing body of the Ministry of Education, University and Research. It expresses opinions on the principal acts of the Minister for the system and the allocation of resources. It also formulates proposals, adopt motions, recommendations, studies and analyses on any matter of interest for the university system.

- **CRUI** (*Conferenza dei Rettori delle Università Italiane*): it is the association of the Rectors of the public and private Italian universities. In addition to coordinate activities and spread good practices among universities, it provides opinions on the principal acts of the Minister for the system and the allocation of resources.

- **CNSU** (*Consiglio Nazionale degli Studenti Universitari*): it is the advisory body of the Ministry and it is representative of university students. It provides opinions on the principal acts and prepares, on a biennial basis, the student status report. It offers contributions for themes related to students through opinions and motions.

- **CoDAU** (*Convegno dei Direttore generali delle Amministrazioni Universitarie*): it is the connection body of the university's General Managers and aims at the coordination of activities of universities in the area of administrative management, at sharing good practices and to carry out in-depth studies on existing legislation to support university administration.

4.2 Italian university system

Since the beginning of the 2000s, the Italian university system has been characterized by successive steps of reform, with the aim of making the structure, the organization and university systems more and more effective and in line with the standards of European countries. General criteria have been outlined on the basis of which each university has to delineate its own study courses in full autonomy. The system of Italian university studies is divided in:

- **Bachelor's degree** (*Laurea Triennale*): the access requirement is a high school diploma and it lasts 3 years with 180 CFU. With this kind of degree, the student acquires skills and tools useful to conduct a profession or to pursue university studies with Master's degree or with a 1st level Master.

- **Single cycle degree** (*Laurea Magistrale a ciclo unico*): the access requirement is a high school diploma and it lasts 5 or 6 years with 300 or 360 CFU. This category includes courses that, in line with the rules of the European Union, do not envisage the possibility of graduate courses of 3 years, like Medicine and Surgery, Veterinary Medicine, Pharmacy and Law. It allows the student to acquire advanced level knowledge for highly qualified activities.

- **Master's degree** (*Laurea Magistrale*): the access requirement is a Bachelor's degree and it lasts 2 years with 120 CFU. It aims to provide the student with advanced level training for high-qualification activities in specific areas.

- **Master's programs**: there are 2 types of Master. 1st level Master requires the Bachelor's degree and it lasts 1 year, while 2nd level Master requires a Master's degree. They are courses of study in the field of scientific improvement and of high education.

- **PhD** (*Dottorato di ricerca*): the access requirement is a Master's degree or a single cycle degree and it lasts 3 or 4 years. It is the highest level of university education and provides knowledge and skills required in the field of university or advanced public or private research centers.

- **Specialization course**: the access requirement is a Master's degree or a single cycle degree. The duration of the course and the number of formative credits are determined by the specific didactic system and form highly qualified specialists in medical specialties, legal professions and training for secondary school teachers.
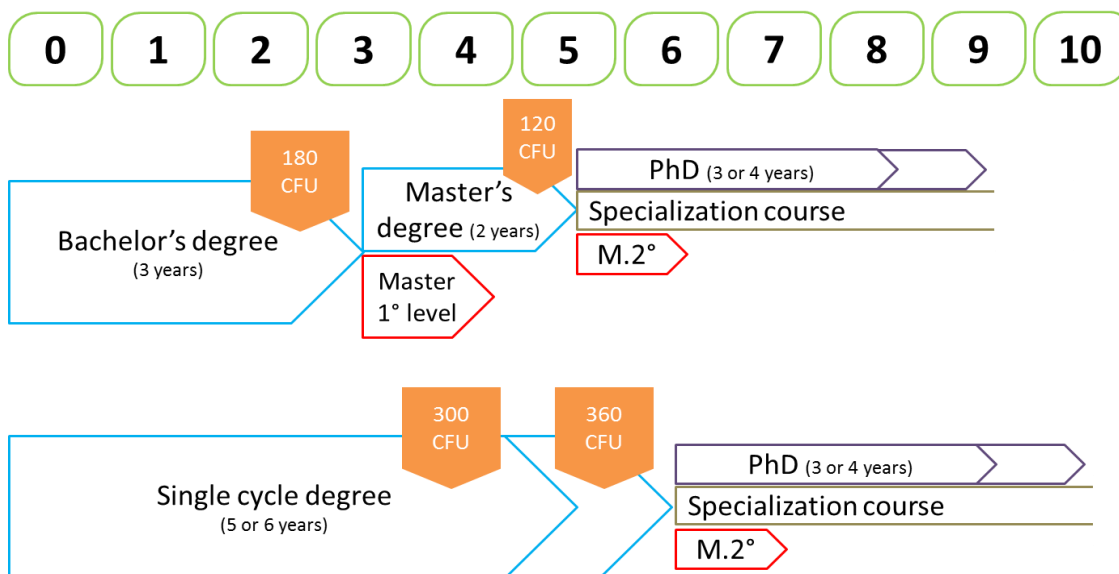
Figure 4 Italian university system

Moreover, according to DM 635 of 08/08/2016 issued by the Ministry of Education of the University and Research, universities can institute four different kinds of study courses:

- **Traditional courses**: courses offered entirely in presence, so that provide, for non-practical and non-laboratory activities, didactic activity provided by electronic mode to a maximum of one tenth of the total.

- **Mixed courses**: courses with educational activities provided by electronic mode to a maximum of two-thirds of the total.

- **Mainly distance courses**: in this case, educational activities provided by electronic mode are more than two-thirds.

- **Fully distance courses**: all educational activities are carried out with telematic mode except for exams and discussion of the final tests to be sustained in presence.

Referring to the terms found in the literature, mixed courses and mainly distance courses are what was called blended courses, part of the course in presence and part of the content of the course available online; instead, fully distance courses are simply the online courses considered so far. As it will be better explained later, central points of this analysis are mainly distance courses and fully distance courses.

Table 9 Different kinds of study courses

Italian terms	Literature terms
Traditional courses	Traditional courses
Mixed courses	Blended courses
Mainly distance courses	
Fully distance courses	Online courses

4.3 Higher Education in Italy

Italian university system is composed by 61 public universities and 30 private universities including 11 telematic. Focusing on public universities, they are homogeneously located throughout Italy and there are 12 big universities with over 40.000 students, 26 average universities with number of students between 15.000 and 40.000 and 23 small universities with less than 15.000 students.

Table 10 Number of institutions and students per kind and dimension of university in A.A. 2014/15. (MIUR – Banca dati dell'Offerta formativa, Anagrafe Nazionale Studenti)

	Number of institutions[1]	Number of enrolled	% on the whole students
Public	**61**	**1.516.337**	**90.6%**
of which universities	58	1.433.791	85.6%
Big	11	674.195	40.3%
Average	25	578.660	34.6%
Small	22	180.936	10.8%
of which polytechnic	3	82.546	4.9%
Big	1	41.442	2.5%
Average	1	30.895	1.8%
Small	1	10.209	0.6%
Private	**28**	**157.700**	**9.4%**
Total	**89**	**1.674.037**	**100.0%**

The number of students that for the first time enroll in the Italian university system is characterized by a recovery in the last 2 years. The decrease in previous years, both enrolled and first enrollment students, is due to several factors: the lack of recognition of formative credits for the work experienced gained that decreased the number of students aged 25 or over and the increase of non-Italian citizens which went from about 2% at the beginning of last decade to 9%. This range of population is less likely to complete higher studies and a lower chance of enrolling in university. During the crisis, the decrease in enrollments involved also Italian citizens, whose university enrollment rate, calculated as the ratio between the enrolled students aged 20 or less and the population aged from 18 to 20, fell by an average of about 2 points between the three-year period 2007-2010 and the three-year period 2012-2015.

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[1] Not reported data about two telematic universities not present in Anagrafe Nazionale Studenti.
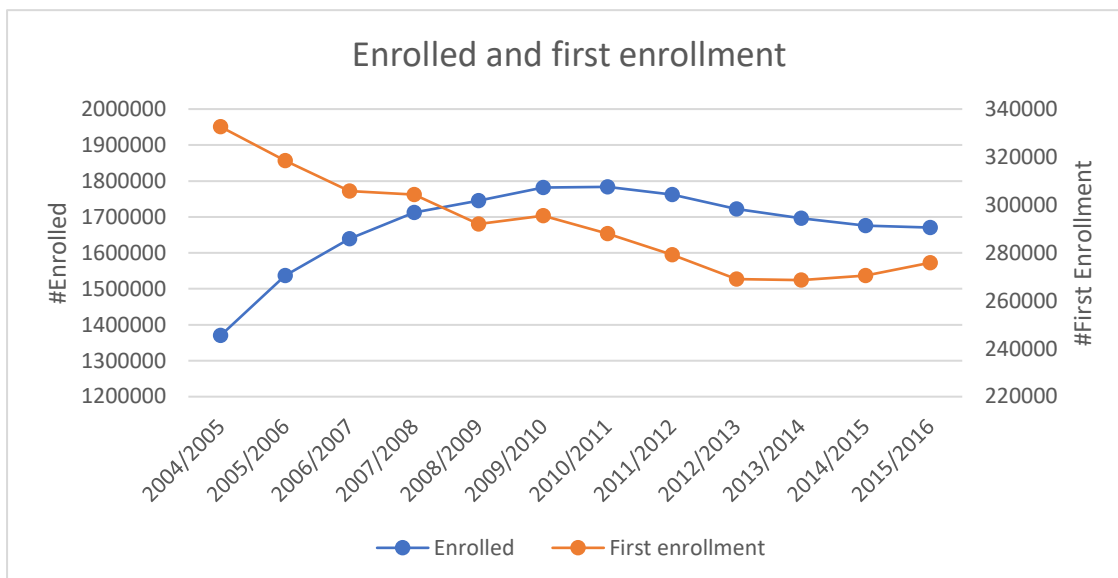
Figure 6 Number of enrolled and first enrollment students from 2004 to 2015

Looking at the trend of the number of new students enrolling in the universities, it's possible to observe that the scientific area is the only one interested by an increase in the number of new enrollments in the last 10 years, on the contrary, in the last 10 years, social studies have seen a downturn of about 30% of the enrollments. Despite this, social studies represent a great area in which students enroll, second only to the scientific disciplines, as show the table 11 too.

Figure 5 Number of new enrollments from 2004 to 2015 per subject area - absolute values (Source: Anagrafe Nazionale Studenti).

Table 11 Number of new enrollments from 2004 to 2015 per subject area – percent values

Area	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Scientific	28,4	28,6	30,2	30,7	31,7	32,4	33,0	33,8	34,9	35,0	34,4	**36,2**
Social	40,7	41,6	39,8	39,2	38,4	38,4	38,4	37,9	35,8	35,5	34,3	**33,9**
Humanistic	19,0	17,8	18,0	18,0	18,2	17,0	16,7	17,2	18,2	18,7	19,0	**19,0**
Medical	11,9	12,0	12,0	12,0	11,7	12,2	11,8	11,0	11,1	10,9	12,2	**10,8**
Total	100	100	100	100	100	100	100	100	100	100	100	**100**

In 2015/16, Italian universities offered 4.586 courses of study, as shown by the database *Offerta formativa* of MIUR. About these courses, 2.255 belong to Bachelor's degree, 2.015 to Master's degree and 316 are single cycle course (as the Law degree course). The number of study courses had grown at the beginning of the last decade due to the reform of the 3+2 didactic systems introduced with the D.M. 509/99 and reached the maximum number of 5.879 study courses in 2007/08.
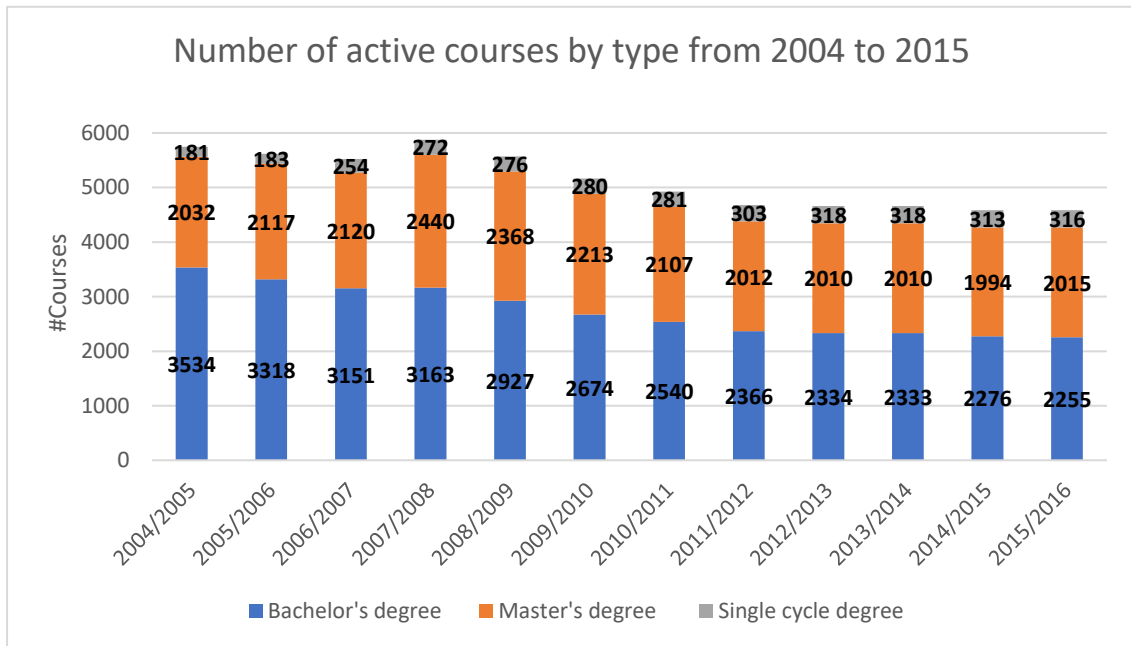
Figure 7 Number of active courses by type from 2004 to 2015 (Source: MIUR - Banca dati dell'Offerta formativa)
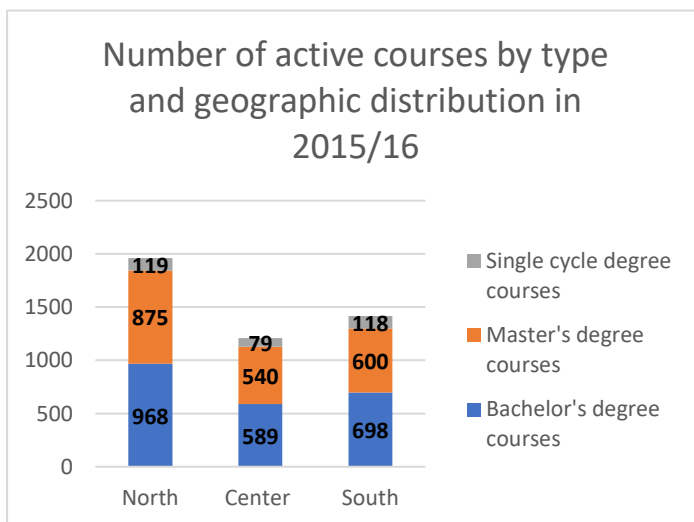
Figure 8 Number of active courses by type and geographic distribution in 2015/16

These 4.586 courses are well distributed throughout the Italian territory, as the figure 8 shows. There is a slight majority of Bachelor's and Master's degree courses delivered in the North of Italy compared to the Center and the South.

2015/2016	#Active courses	#Enrolled
Scientific disciplines	1854	528958
Social disciplines	1176	612239
Humanistic disciplines	631	294725
Medical sciences	925	234439
Total	4586	1670361

Focusing on 2015/16, the scientific disciplines offer the largest number of courses compared to the other areas, but the largest number of students is enrolled in social courses and, as shown in Figure 9 it represents the area with the highest number of students per course.
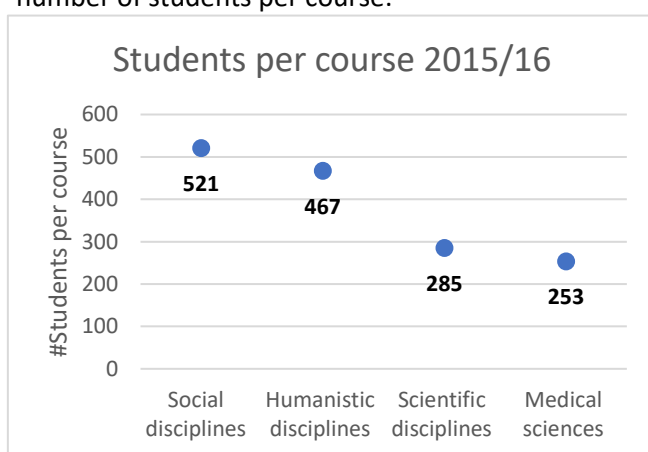
Figure 9 Number of students per course per subject area in 2015/16 (Source: MIUR - Banca dati dell'Offerta formativa and Anagrafe Nazionale Studenti)

The first sign of internationalization of a course is given by the language with which the course is delivered. Compared to the 4.586 study courses listed before, now only 4.337 courses will be considered, the difference is given by courses that are exactly replicated in different locations with the same characteristics, so they will be considered only one time. Thus, from "Scheda Unica Annuale di Corso di Studi" that universities have to complete every year for each study course, it is possible to see that the courses delivered entirely in English are 245, so only 5.6% of all courses, and 63 courses (1.5% of the total) use English partially in the educational path. Territorial distribution shows a concentration in the North of Italy (59% of the courses) compared to the Center (26%) and the South (about 15%), while the distribution by subject area shows a strong concentration in the areas of Economic and Statistical Sciences (23.5% of the courses) and Engineering (22.9%).

Table 13 Number of courses in English by geographical area in 2015/16

Geographic area	Entirely in English	% on the total	Partially in English	% on the total	Tot. English courses	% on the total
North	151	61.6%	32	49.2%	183	**59.0%**
Center	63	25.7%	18	27.7%	81	**26.1%**
South	31	12.7%	15	23.1%	46	**14.8%**
Total	**245**	100.0%	**65**	100.0%	**310**	100.0%

4.4 Online education in Italian Higher Education

The online education in Italy is composed principally by telematic universities.

They were set up in 2003 by the Ministerial Decree regulating "Criteria and Procedures for Accreditation of Distance Learning" (Castagneri, 2013). By definition, they are institutions that can provide academic degrees of legal value with distance learning modality, based on new telematic technologies.

There are 11 universities that are recognized from MIUR:

- Pegaso Università Telematica;
- Università San Raffaele;
- Università Mercatorum;
- Università Telematica Internazionale Uninettuno;
- Università degli studi eCampus;
- Università degli Studi Giustino Fortunato;
- Università degli Studi di Roma Unitelma Sapienza;
- Università degli Studi Guglielmo Marconi;
- Italian University Line;
- Università degli Studi Niccolò Cusano – Telematica Roma;
- Università Leonardo da Vinci.

According to the website "Universitaly" of MIUR, these universities have offered a total of 99 courses in the academic year 2016/17. As it is shown in the figure 10, the number of students enrolled has increased tenfold over the past 10 years demonstrating an interest also by Italian user.
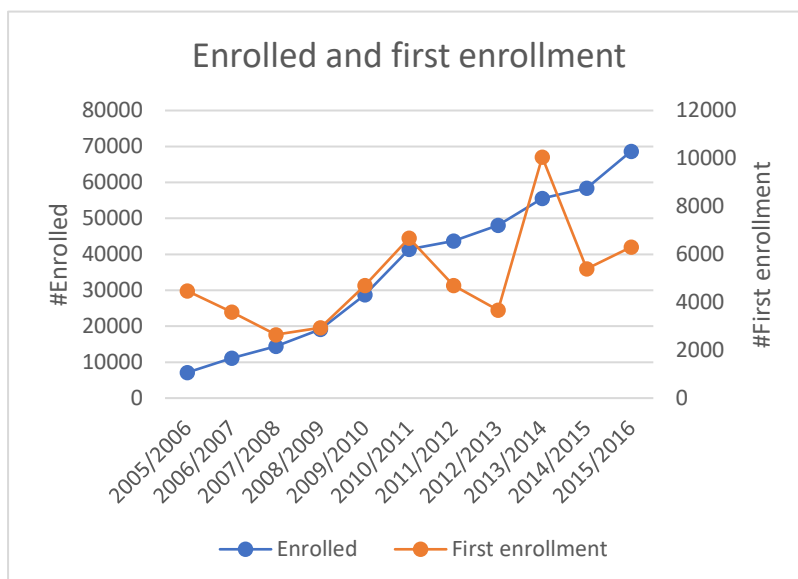
Figure 10 Number of enrolled and first enrollment students from 2005 to 2015 in telematic courses

Anyways, surfing the Internet, it is not possible to catch information related to the online courses offered by the traditional universities, so everything linked to the central point of this research. On the website "Universitaly" only few mainly or fully distance courses are listed, so it means that there is not a clear mapping of the Italian situation on the mainly or fully distance courses. Aim of this research is also to try to bridge this gap.

The situation is little different if you focus on MOOCs: in particular, there are 3 relevant cases to describe for Italy.

First of all, there is EduOpen, already mentioned in paragraph about "European MOOCs". It is an Italian consortium born from the need to create high quality MOOC courses through the joint effort by a group of more than 10 Italian public Universities (Limone, 2016).

Within the EduOpen platform you can find:

- courses, usually lasting 3-5 weeks. Courses are structured in sections; each section is related to a topic and contains various activities such as: video lessons, documents and resources, forums, collaboration tools, tasks, tests, etc. Once the course is completed, you will receive a Certificate of Attendance, an Open Badge and, if provided by the university provider, a Verified Certificate and University Credit Credits (CFUs);
- pathways that are a set of courses associated with a single subject that converge on a unitary set of training objectives. Pathways can link together a sequence of courses and their completion may lead, if they are expected, to acquire ECT or, if so, improvers courses or Masters. Within a "Pathway" you can find courses labeled "Milestone" which identify the achievement of intermediate training goals, and "Capstone", the final part of a Pathway. You can enter the entire path directly from the Pathway submission page and check the progress status in the individual dashboards. Upon completing the Pathway training path and passing, if provided, an examination according to the rules defined by the University providing the Pathway, you may apply for a university certificate or diploma. Pathways, like individual courses, can be delivered in three modes: online, blended or in attendance.

Another noteworthy project is "Federica.eu": it is an online learning platform made by the University of Naples Federico II, where to study, update, deepen and prepare for life, university and work. It takes on the challenge of online training, embracing the MOOC format. According to an article of Fubini (2016), Federica.eu represents the most robust and interesting experience in Europe in the free online university courses offered by a public university. The platform counts 75 MOOCs held in many subjects by high quality professors and it has attracted 5 million users.

Thanks to the European structural funds, Federica has become a vanguard platform on the international scene.

The last project to mention is the platform POK – Polimi OPEN KNOWLEDGE. It is the MOOC program of Politecnico di Milano and its main objective is "to bridge the gaps". These gaps could be of students with gaps in educational field, but not only. For this reason, Politecnico di Milano divides the courses in two main streams: MOOCs for students and MOOCs for all.

In the first case, the further classification is:

- from High school to University: the aim is to improve and consolidate high school skills before starting courses at Politecnico di Milano;
- from Bachelor of science to Master of science: in this case, the aim is to align the acquired skills to the ones of Politecnico di Milano Master of Science if you come from another educational path;
- from University to job: strengthen and enhance soft skills to be ready for the job scene.

Instead, among the courses for all, there are:

- MOOCs for Citizens: to open up the expertise of Politecnico di Milano for the benefit of a general audience, promoting conscious citizenship in compliance with the third mission of universities;
- MOOCs for Teachers: to support teaching innovation in both Higher Education institutions and schools;
- MOOCs for Researchers: to support researcher to develop transversal skills useful for their activities.

The courses present a variety of topics and the general guideline is to create unique content, the courses developed by the Politecnico di Milano are not the same as other courses already on the net. To create the content are used the knowledge of the professors of the university, but also external collaborators for specific topics are involved.

However, Politecnico di Milano with his platform is part of this research, for this reasons POK platform and its characteristics will be better described in the next sections.

Anyways, there are not studies on these MOOCs, maybe given the recent birth. As said before, the aim of this research is also to try to fill this gap.

Chapter 5

Methodological approach and data

5.1 Good Practice project

This research is part of the larger project "Good Practice 2016" that has the aim to measure the performances of administrative services of Italian universities. Italian public universities, on a voluntary basis, participate and provide the data needed for comparison.

The project started in 1999 with the aim of:

- measuring and benchmarking performances of a set of universities,
- favoring the diffusion of knowledge and best practices between participants.

Initially, it was promoted and financed by the central government through a specific entity called CNVSU (Comitato Nazionale Valutazione Sistema Universitario), whose purpose was to evaluate the Italian higher education system. In 2002, the project ended to be committed by the Ministry and, from that time until today, it is self-financed by participating actors. Each year the project evaluates administrative services to students, professors and administrative staff in terms of effectiveness and efficiency.

For the effectiveness evaluation, the data collected relies on a survey on the customer satisfaction. The customer base is composed by the students, the professors, the doctoral candidates, the research fellows and the technical-administrative staff. First-year students were asked to comment on the service given entering the university, while the other students expressed their opinion on Job Placement and internationalization. Lastly, a benchmark was also made on organizational well-being questionnaires.

For the efficiency evaluation, the analysis is done calculating total and unit costs with reference to internal staff, collaborators and external consultants involved in each of the 26 administrative support services under evaluation. Moreover, the universities can detect costs, not only of services, but also of the elementary activities that constitute the service itself.

To this edition of "Good Practice", 38 Italian universities, listed in the table 14, decided to participate voluntarily.

Table 14 Participating universities to Good Practice 2016

University of Bologna	University of Piemonte Orientale
University of Brescia	Politecnico di Bari
University of Cassino and Southern Lazio	Politecnico di Milano
University of Chieti-Pescara	Politecnico di Torino
University of Ferrara	Sapienza University
University of Florence	University of Rome Tor Vergata
Gran Sasso Science Institute	UniSalento
School for Advanced Studies Lucca	Sant'Anna School of Advanced Studies
Università degli Studi dell'Insubria	University of Sassari
University IUAV of Venezia	University of Siena
School of Advanced Studies IUSS Pavia	International School for Advanced Studies SISSA
University of Messina	Scuola Normale Pisa
University of Milano Bicocca	University of Teramo
University of Milan	University of Turin
University of Padova	University of Trento
University of Palermo	University of Udine
University of Parma	University of Urbino
University of Pavia	Ca' Foscari University of Venice
University for Foreigners Perugia	University of Verona

To all these universities, it was sent an email to invite them to participate to the Digital Learning laboratory too. The Digital Learning laboratory is the third part of the project with the aim of identifying and mapping the experiences in digital learning of the participating universities, crucial point of this research. In particular, for this laboratory it was required to have and to share experiences regarding MOOC (Massive Open Online Courses), mainly and/or fully distance courses developed and provided by the university.

5.2 Online courses

The analysis for the mainly/fully distance courses is conducted on data collected through a questionnaire[2]. It was developed and distributed between February and June 2017. In February, the questions were designed, in March they were sent through email to universities to ask them suggestions and if something was not clear to have the possibility to give clarifications. So, some of the suggestions received were implemented in the survey. Therefore, a pilot study was conducted at the beginning of April with the involvement of the university of Bologna. Then a Google form was open from May to June 2017 to collect data. The universities were contacted

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[2] In appendix A

through email to complete the questionnaire for each active course in 2016/17 with one of the two modalities.
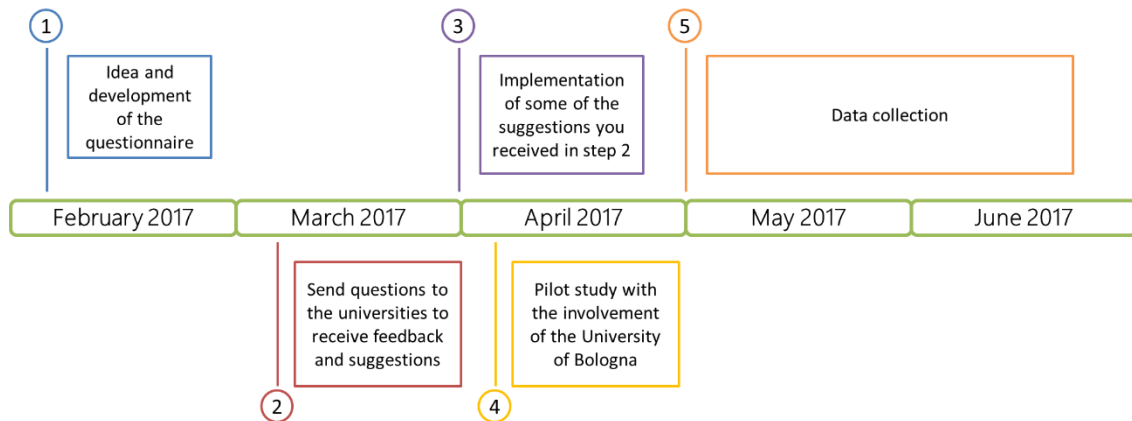
Figure 11 Phases adopted working method for mainly or fully distance study courses

The survey is divided in 5 macro areas of interest:

- General data about the course

- Course design

- Structure and activity of technical and administrative support

- Assessment method

- Professors involvement

Among the 38 universities contacted, only 9 have these kind of degree courses and decided to share their experiences:

- Politecnico di Milano (PoliMI)

- Sant'Anna School of Advanced Studies – Pisa (SSSA)

- Università degli Studi dell'Insubria – Varese (UniINSUBRIA)

- University of Milan (UniMI)

- University of Padova (UniPD)

- University of Parma (UniPR)

- University of Pavia (UniPV)

- University of Siena (UniSI)

- University of Turin (UniTU)

The word in brackets is the name that will be used during the analysis chapter to be more incisive.

Figure 12 Italian map highlighting the participating universities for online courses

The degree courses being analyzed are 17:

Table 15 Universities and study courses under analysis

University	Study course
Politecnico di Milano	Ingegneria Informatica
Sant'Anna School of Advanced Studies	Master in Electoral Policy and Administration
Università degli Studi dell'Insubria	Scienze della Comunicazione
	Giurisprudenza
	Scienze dell'Ambiente e della Natura
	Matematica
	Laurea Magistrale in Scienze Ambientali
	Master FILIS (Formatori Interculturali di Lingua Italiana per Stranieri)
University of Milan	Sicurezza dei Sistemi e delle Reti Informatiche
University of Padova	Scienze Tecniche Psicologiche
University of Parma	Matematica
	Lettere
	Beni Artistici e dello Spettacolo
University of Pavia	Master in Medicina Estetica e del Benessere
University of Siena	Scienze Economiche e Bancarie
University of Turin	Amministrazione Aziendale
	Scienze dell'Amministrazione

5.3 MOOCs

The analysis for the second part of the laboratory regarding MOOCs is conducted through case studies. In February 2017, universities were asked about their willingness to participate and share experiences regarding MOOC developed by their university. The data collection was done through face-to-face interviews with one or more representatives of the university's digital learning area. In May 2017, a semi-structured interview[3] was developed; the macro-categories of investigation concern:

- the objectives with which the university has decided to develop MOOCs;
- the main features with which the courses were designed;
- the main performance measures monitored to evaluate the success of the project.

In June 2017, we started the interviews with the volunteer universities. In the days before the interview, the list of questions previously developed had been sent to the representative to give an idea of the discussion topics. Interviews were conducted in June, July and September 2017.

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[3] In appendix B

Figure 13 Phases adopted working method for MOOCs

The universities, with the number of MOOCs delivered on their platform, and main representatives involved in the interviews are listed in the table 16 and in the figure 14.

Table 16 Main representatives interviewed for MOOCs

University	#MOOCs	Main representatives interviewed
Politecnico di Milano	22	Dott.ssa Sancassani Susanna – Director of METID Prof.ssa Sciuto Donatella – Vice-rector
Ca' Foscari University of Venice	37	Prof.ssa Masiero Pia – Rector's delegate for E-learning
University of Bologna	6	Prof.ssa Salomoni Paola – Vice-rector for digital technologies
University of Padova	1	Prof. Mariconda Carlo – Director E-learning center
University of Parma	2	Prof. Tomassini Adriano – Director E-learning center
University of Pavia	3	Dott.ssa Caldirola Elena – Director of E-learning and didactic innovation center

Figure 14 Italian map highlighting the participating universities for MOOCs

Chapter 6

Results

6.1 Descriptive analysis of online courses

6.1.1 General data about the courses

As said in the previous chapter, 17 courses fall in the definition of mainly or fully distance courses given by the Ministry and 10 are mainly distance courses and 7 are fully distance courses. Instead, considering the type of the course, there are 11 Bachelor's degree courses, 3 Master's degree courses and 3 Master courses. The table 17 shows this crossed information and in particular, it is possible to notice that there are not Master's degree courses in fully distance mode. Bachelor's degree and Master courses are well distributed between the two delivery modes.

Table 17 Study courses per level and kind

Type	University and name of the course	Mainly distance	Fully distance
Bachelor's Degree	**UniINSUBRIA**_Matematica	✔	
	UniINSUBRIA_SAN	✔	
	UniINSUBRIA_SCOM	✔	
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche		✔
	UniPD_Scienze e Tecniche Psicologiche		✔
	UniPR_Beni Artistici e dello Spettacolo	✔	
	UniPR_Lettere	✔	
	PoliMI_Ingegneria Informatica		✔
	UniSI_Scienze Economiche e Bancarie		✔
	UniTO_Amministrazione Aziendale		✔
	UniTO_Scienze dell'Amministrazione		✔
Master's degree	**UniINSUBRIA**_Giurisprudenza	✔	
	UniINSUBRIA_Scienze Ambientali	✔	
	UniPR_Matematica	✔	
Master	**UniINSUBRIA**_FILIS		✔
	UniPV_Medicina Estetica e del Benessere	✔	
	SSSA_Electoral Policy and Administration	✔	
	TOTAL	**10**	**7**

From the point of view of the subject areas, most of the analyzed courses (8) belong to the scientific disciplines, 5 courses belong to humanistic disciplines, 3 to social disciplines and only 1 covers the medical sciences.

Table 18 Study courses per level and subject areas

Type	University and name of the course	Scientific disciplines	Social disciplines	Humanistic disciplines	Medical sciences
Bachelor's Degree	**UnilNSUBRIA**_Matematica	✔			
	UnilNSUBRIA_SAN	✔			
	UnilNSUBRIA_SCOM	✔			
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	✔			
	UniPD_Scienze e Tecniche Psicologiche		✔		
	UniPR_Beni Artistici e dello Spettacolo			✔	
	UniPR_Lettere			✔	
	PoliMI_Ingegneria Informatica	✔			
	UniSI_Scienze Economiche e Bancarie		✔		
	UniTO_Amministrazione Aziendale	✔			
	UniTO_Scienze dell'Amministrazione			✔	
Master's degree	**UnilNSUBRIA**_Giurisprudenza			✔	
	UnilNSUBRIA_Scienze Ambientali	✔			
	UniPR_Matematica	✔			
Master	**UnilNSUBRIA**_FILIS			✔	
	UniPV_Medicina Estetica e del Benessere				✔
	SSSA_Electoral Policy and Administration		✔		
	TOTAL	**8**	**3**	**5**	**1**

Analyzing activation years of the courses in question, it emerges that the courses active from more years, delivered by the University of Milan, University of Padova, Politecnico di Milano and one of the course of University of Turin, active respectively since 11, 9, 9 and 11 years, fall in Bachelor's degree and fully distance courses. In fact, Bachelor's degree courses are active for 5 years on average, but you can notice a high value of the standard deviation given by the presence of recent activation courses too. Master's degree courses are active, on average, for more years than Bachelor's degree courses and they are characterized by a lower dispersion, but there are fewer courses in the sample. On the other hand, the average of the years of fully distance courses is clearly greater than mainly distance courses.
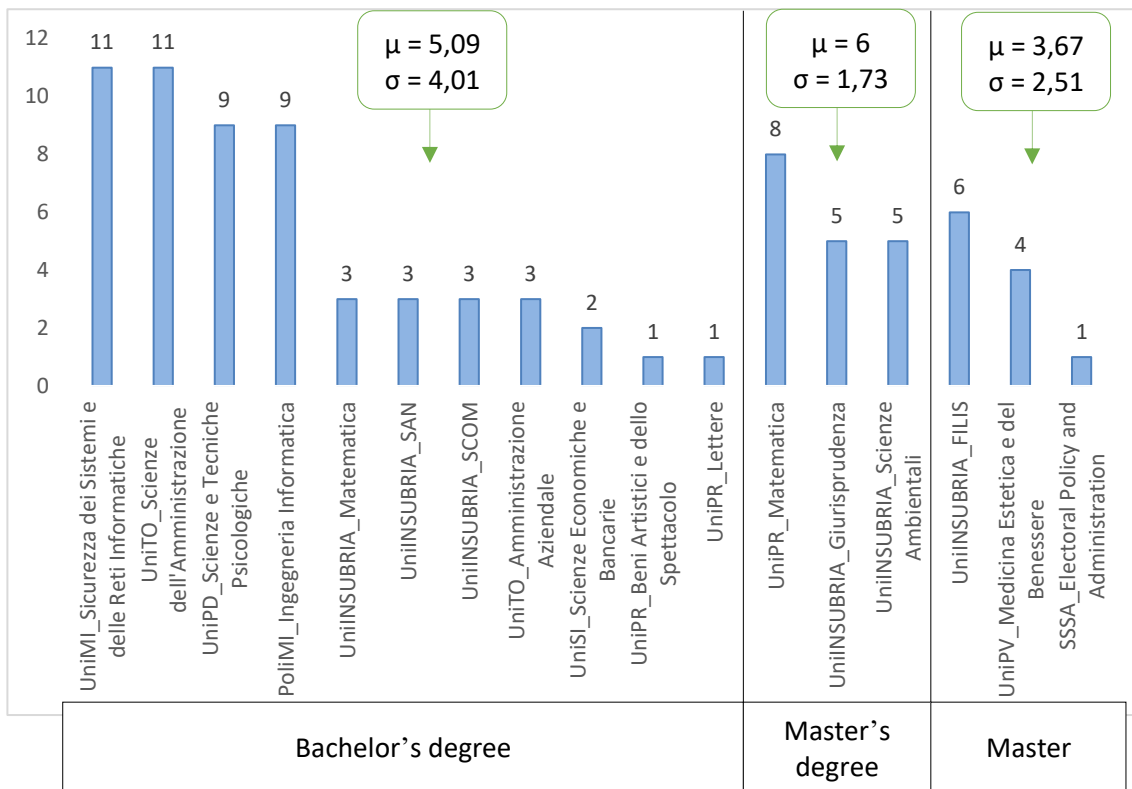
Figure 16 Histogram representing the years of activation of the courses per level
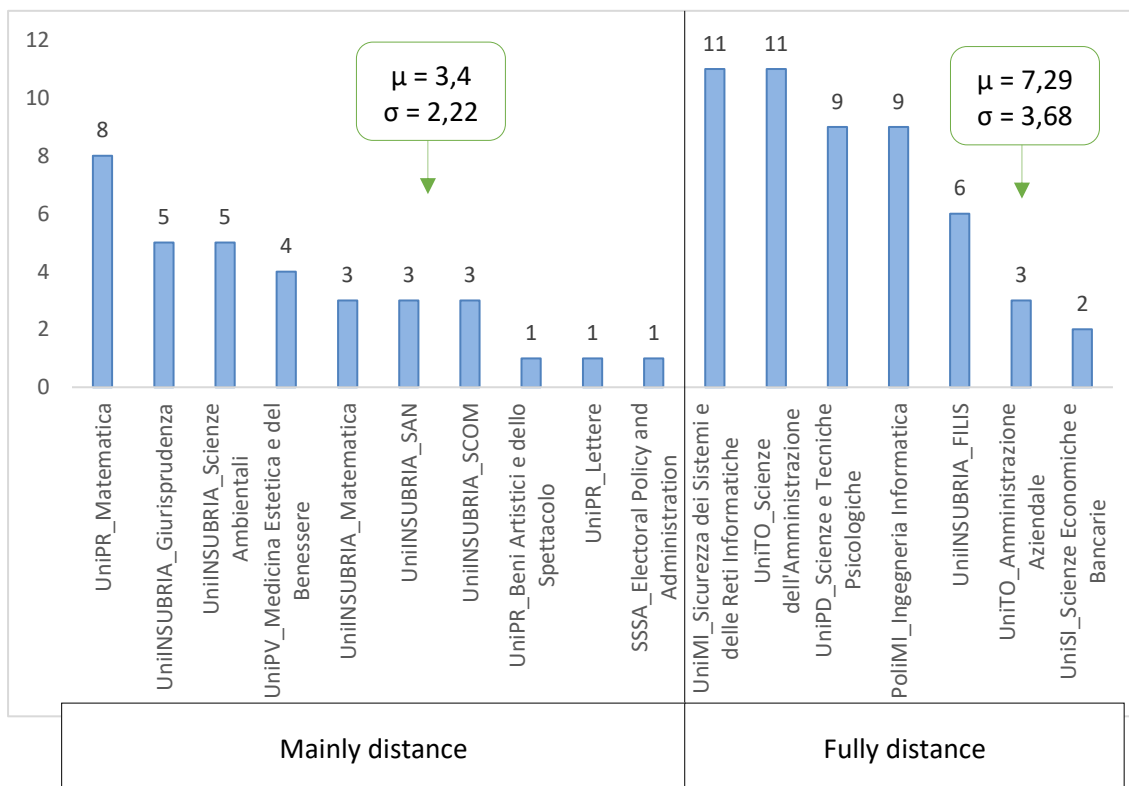
Figure 15 Histogram representing the years of activation of the courses per kind

Figure 17 Average number of students enrolled from 2013 to 2016 per kind
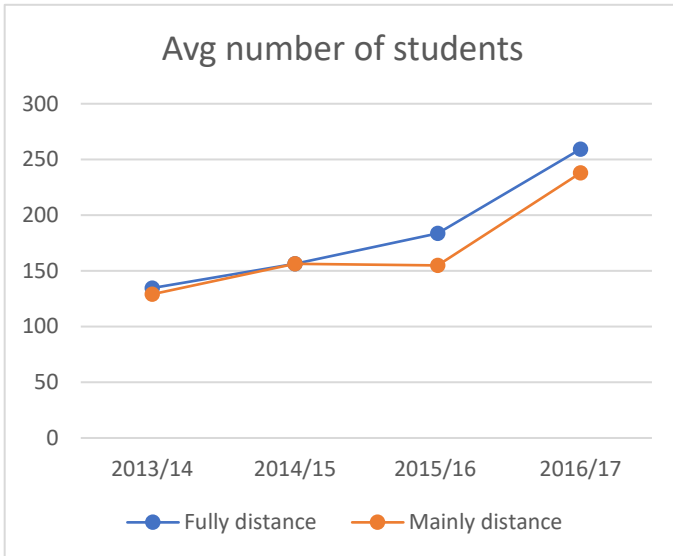
From the point of view of the number of students, distinguishing between mainly and fully distance courses, it is possible to see that on average, the enrolled in the first two years analyzed are similar, while in the last 2 years there is an increase in both cases, but it is greater in fully distance courses.

Instead examining the different subject areas, it is evident that humanistic courses have, on average, the greater number of students in all the 4 years analyzed and with the greater increase in the last year. Scientific courses register a growth that is roughly constant over the years. Lastly, there is a remarkable increase in the number of enrollments in social sciences over the last year, ranging from an average of 50 students to an average of 150 students in just one year.
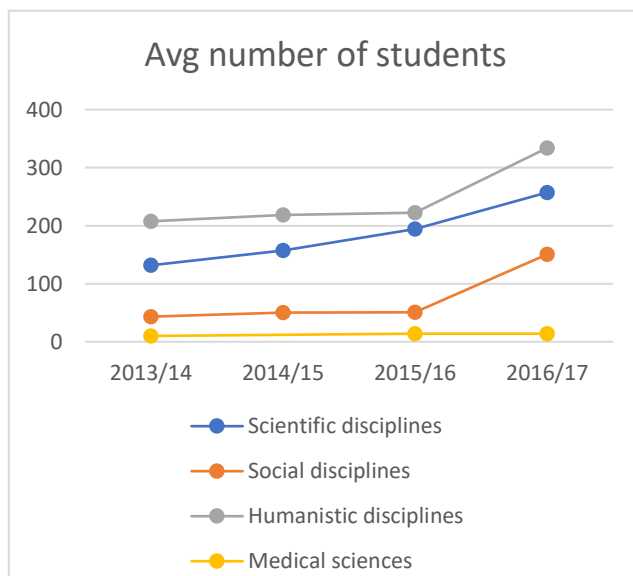
Figure 18 Average number of students enrolled from 2013 to 2016 per subject area

More in detail, the growth of the number of students is particularly relevant for 3 courses: SCOM delivered by Insubria, Amministrazione aziendale delivered by University of Turin and Scienze e tecniche psicologiche by University of Padova. These last 2 courses belong to the category of fully distance courses and so, it explains the increase of the number of students noted previously. The other courses do not show any particular change over the last 4 years as the figure 19 shows.
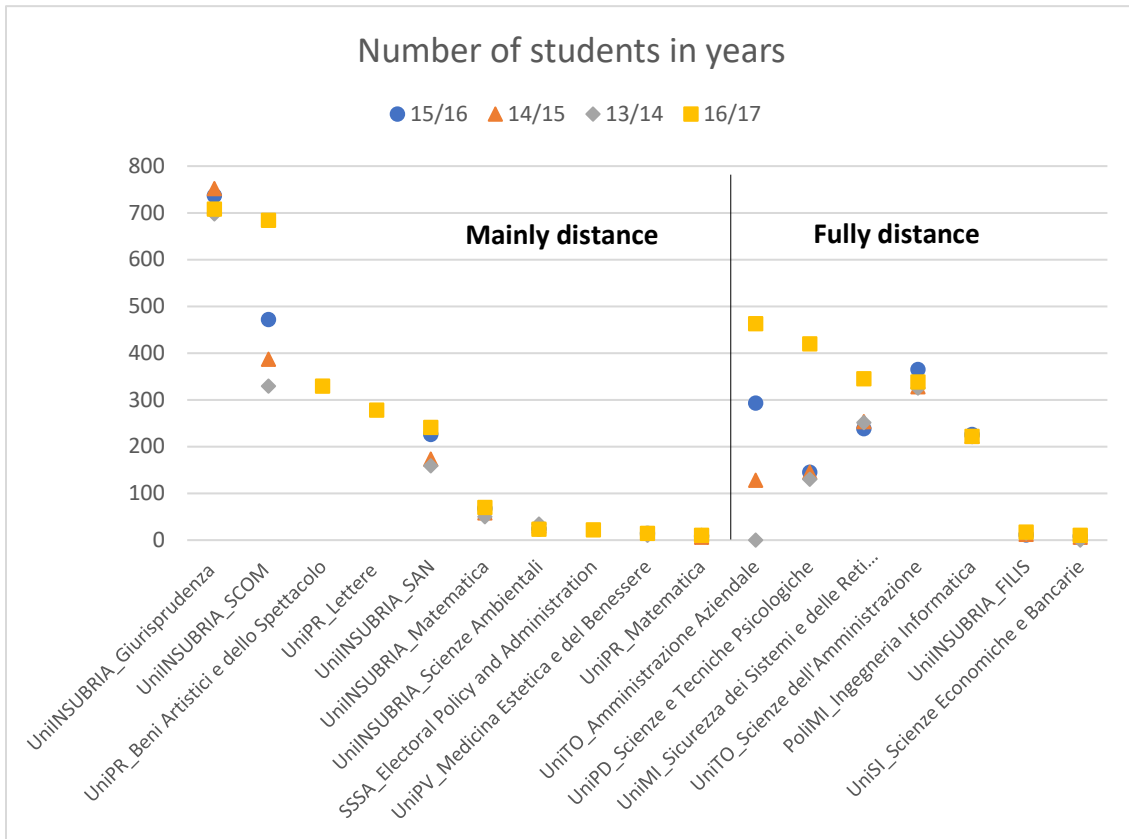
Figure 19 Number of students from 2013 to 2016 per course

In the questionnaire, it was requested to indicate the percentage of some personal data of the students who attend the course in 2016/17. In particular, it was requested the percentage of:

- Student workers;
- International students, i.e. students with no Italian citizenship;
- Students with disabilities greater than 50%.

Some courses under analysis did not answer these questions, probably because this information is not required at the time of enrollment and for this reason the universities cannot keep track of it.

Focusing on collected information, the most interesting data are about the percentage of student workers: as seen in the literature, the online courses are designed for people who are not able to attend courses on campus and this aim is achieved by the analyzed courses offered in Italy. In fact, the percentage of workers is high for most of the courses of which we have information and, in particular, all students of 2 courses have a job.

Regarding the citizenship of the students, the collected data reveal that the percentage of international students is generally very low. The only exception is with the Master in Electoral Policy and Administration delivered by Sant'Anna School of Advanced Studies and this exception

can be easily explained by the used language for the distribution of content, as it will be better explained in the following section.

Instead, the percentage of students with disabilities is low for all analyzed courses.

Table 19 Percentage of workers, foreigners and disables in each course

Type	University and course name	% workers	% foreigners	%disables
Mainly distance	**UniINSUBRIA**_Giurisprudenza	-	7,50%	1,30%
	UniINSUBRIA_Matematica	-	8,60%	1,40%
	UniINSUBRIA_SAN	-	2,10%	1,20%
	UniINSUBRIA_Scienze Ambientali	-	4%	0
	UniINSUBRIA_SCOM	-	3,40%	1,30%
	UniPR_Beni Artistici e dello Spettacolo	3,34%	1,22%	0,91%
	UniPR_Lettere	0,72%	0,72%	0,36%
	UniPR_Matematica	10%	0	0
	UniPV_Medicina Estetica e del Benessere	**100%**	0	0
	SSSA_Electoral Policy and Administration	**100%**	**99%**	0%
Fully distance	**UniINSUBRIA**_FILIS	-	11,76%	-
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	-	-	-
	UniPD_Scienze e Tecniche Psicologiche	42,50%	-	-
	PoliMI_Ingegneria Informatica	-	5%	0
	UniSI_Scienze Economiche e Bancarie	0	0	0
	UniTO_Amministrazione Aziendale	**95%**	3%	1,50%
	UniTO_Scienze dell'Amministrazione	**80%**	2%	-

The answers linked to the number of professors – owners of individual training modules - and tutors – staff supporting teaching activities - involved in the teaching show that generally there are more professors than tutors, especially for mainly distance courses. While for fully distance courses there is a greater involvement of tutors. Insubria of Varese does not involve tutors in the teaching of all courses offered by their university.

Table 20 Number of students, professors and tutors in each course

Type	University and course name	N° students	N° professors	N° tutor
Mainly distance	**UniINSUBRIA**_Giurisprudenza	708	70	-
	UniINSUBRIA_Matematica	70	24	-
	UniINSUBRIA_SAN	241	32	-
	UniINSUBRIA_Scienze Ambientali	23	24	-
	UniINSUBRIA_SCOM	684	35	-
	UniPR_Beni Artistici e dello Spettacolo	329	10	1
	UniPR_Lettere	278	12	1
	UniPR_Matematica	10	17	2
	UniPV_Medicina Estetica e del Benessere	14	65	15
	SSSA_Electoral Policy and Administration	22	8	2
Fully distance	**UniINSUBRIA**_FILIS	17	7	-
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	345	22	23
	UniPD_Scienze e Tecniche Psicologiche	420	27	25
	PoliMI_Ingegneria Informatica	222	21	23
	UniSI_Scienze Economiche e Bancarie	10	19	1
	UniTO_Amministrazione Aziendale	463	38	32
	UniTO_Scienze dell'Amministrazione	338	44	41

For each course, the number the students per professor is less than 20, the only relevant exception is the course Beni artistici e dello spettacolo delivered by University of Parma where the ratio is 32 students per professor.

Excluding courses of Insubria where there are no tutors, the other mainly distance courses do not show any relevant variations in the ratios considering at the denominator tutors too; the ratio varies more in fully distance courses due to the presence of more tutors.
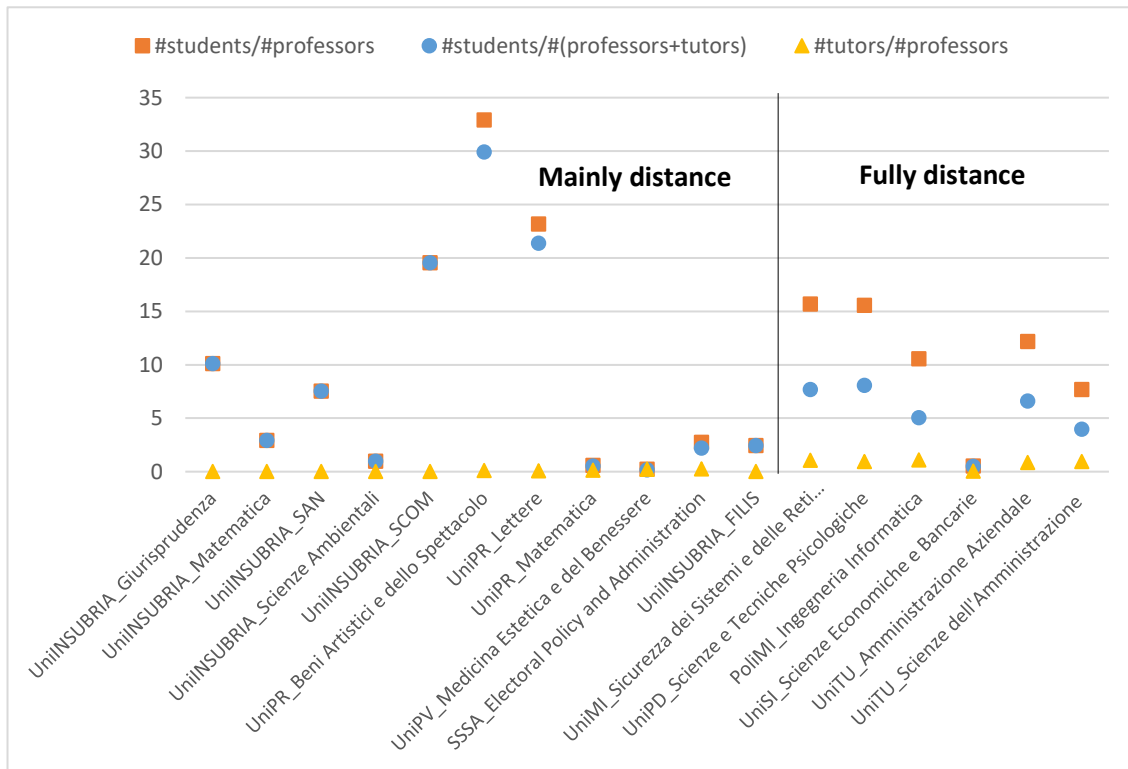
Figure 20 Ratio of students to professors, students to professors and tutors and tutors to professors in each course

6.1.2 Course design

The first dimension of course design analyzed is about the language with which the course is delivered. Most courses (70,5%) deliver content entirely in Italian, 4 courses (23,5%) deliver mainly in Italian and only 1 course (6%), the Master in Electoral policy and administration of Sant'Anna School of Advanced Studies, delivers the content of the course entirely in English. So, we can assume that this course is mainly designed for an international audience: indeed, the results of the survey shows that 99% of students enrolled in the course delivered entirely in English has not Italian nationality, while for the other courses the percentage, on average, is less than 4%.

Table 21 Language of the courses

Type	University and course name	Entirely in Italian	Mainly in Italian	Entirely in English
Mainly distance	**UniINSUBRIA**_Giurisprudenza	✔		
	UniINSUBRIA_Matematica	✔		
	UniINSUBRIA_SAN	✔		
	UniINSUBRIA_Scienze Ambientali	✔		
	UniINSUBRIA_SCOM	✔		
	UniPR_Beni Artistici e dello Spettacolo		✔	
	UniPR_Lettere		✔	
	UniPR_Matematica		✔	
	UniPV_Medicina Estetica e del Benessere	✔		
	SSSA_Electoral Policy and Administration			✔
Fully distance	**UniINSUBRIA**_FILIS	✔		
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	✔		
	UniPD_Scienze e Tecniche Psicologiche		✔	
	PoliMI_Ingegneria Informatica	✔		
	UniSI_Scienze Economiche e Bancarie	✔		
	UniTO_Amministrazione Aziendale	✔		
	UniTO_Scienze dell'Amministrazione	✔		
	TOTAL	**12**	**4**	**1**

For the 76% of the courses under examination, the universities offer in their educational syllabus a traditional version in presence. The few exceptions (24%) are most due to the 3 Master's courses delivered only in distance version, although they belong to 3 different universities.

Table 22 Existence of a traditional version of the course

Type	University and course name	Existence of traditional version	Not existence of traditional version
Mainly distance	**UniINSUBRIA**_Giurisprudenza	✔	
	UniINSUBRIA_Matematica	✔	
	UniINSUBRIA_SAN	✔	
	UniINSUBRIA_Scienze Ambientali	✔	
	UniINSUBRIA_SCOM	✔	
	UniPR_Beni Artistici e dello Spettacolo	✔	
	UniPR_Lettere	✔	
	UniPR_Matematica		✔
	UniPV_Medicina Estetica e del Benessere		✔
	SSSA_Electoral Policy and Administration		✔
Fully distance	**UniINSUBRIA**_FILIS		✔
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	✔	
	UniPD_Scienze e Tecniche Psicologiche	✔	
	PoliMI_Ingegneria Informatica	✔	
	UniSI_Scienze Economiche e Bancarie	✔	
	UniTO_Amministrazione Aziendale	✔	
	UniTO_Scienze dell'Amministrazione	✔	
	TOTAL	**13**	**4**

In the survey, there was also a question regarding the request to attend part of the course in class, so in presence. Only few courses (12%) require the presence; for the majority of these the frequency is not required (47%), or just recommended (41%). The only 2 courses that require

the presence in class belong to Master's courses and it is interesting to note that they are 2 of the 4 courses for which do not exist a traditional version offered by the university.

Table 23 Is classroom attendance required / recommended for at least part of the course?

Type	University and course name	Required	Recommended	Not required
Mainly distance	**UniINSUBRIA**_Giurisprudenza		✓	
	UniINSUBRIA_Matematica		✓	
	UniINSUBRIA_SAN		✓	
	UniINSUBRIA_Scienze Ambientali		✓	
	UniINSUBRIA_SCOM		✓	
	UniPR_Beni Artistici e dello Spettacolo			✓
	UniPR_Lettere			✓
	UniPR_Matematica			✓
	UniPV_Medicina Estetica e del Benessere	✓		
	SSSA_Electoral Policy and Administration		✓	
Fully distance	**UniINSUBRIA**_FILIS	✓		
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche			✓
	UniPD_Scienze e Tecniche Psicologiche			✓
	PoliMI_Ingegneria Informatica			✓
	UniSI_Scienze Economiche e Bancarie		✓	
	UniTO_Amministrazione Aziendale			✓
	UniTO_Scienze dell'Amministrazione			✓
TOTAL		**2**	**7**	**8**

	Required frequency	**Recommended frequency**	**Not required frequency**
Existence of traditional version		**UniINSUBRIA**_Giurisprudenza **UniINSUBRIA**_Matematica **UniINSUBRIA**_SAN **UniINSUBRIA**_Scienze Ambientali **UniINSUBRIA**_SCOM **UniSI**_Scienze Economiche e Bancarie	**UniPR**_Beni Artistici e dello Spettacolo **UniPR**_Lettere **UniMI**_Sicurezza dei Sistemi e delle Reti Informatiche **UniPD**_Scienze e Tecniche Psicologiche **PoliMI**_Ingegneria Informatica **UniTO**_Amministrazione Aziendale **UniTO**_Scienze dell'Amministrazione
Not existence of traditional version	**UniPV**_Medicina Estetica e del Benessere **UniINSUBRIA**_FILIS	**SSSA**_Electoral Policy and Administration	**UniPR**_Matematica

Figure 21 Existence of traditional version and classroom frequency

For what concern the content of the lessons, almost all the courses are made up of a balanced mix of texts and videos, the only exceptions are the Law course of Insubria and the course of Security of the Systems and the Computer Networks of the University of Milan, which have, respectively, mostly texts and predominantly video.

These digital contents can be produced in different ways according to the universities:

- autonomous self-production by professors (35% - A);
- self-production with dedicated and selected software support (24% - B);
- professionally assisted production (41% - C).

There is not a predominance of a method over the others. Focusing on universities delivering more than one course under analysis, it is possible to affirm that, generally, the contents of the courses delivered by the same university are produced with the same method. The only exception is represented by the Master's course delivered by Insubria that is produced through professional support and not autonomously self-produced by the professors as for the other 5 courses.

Table 24 Modality of content production per course

Type	University and course name	A	B	C
Mainly distance	**UniINSUBRIA**_Giurisprudenza	✔		
	UniINSUBRIA_Matematica	✔		
	UniINSUBRIA_SAN	✔		
	UniINSUBRIA_Scienze Ambientali	✔		
	UniINSUBRIA_SCOM	✔		
	UniPR_Beni Artistici e dello Spettacolo			✔
	UniPR_Lettere			✔
	UniPR_Matematica			✔
	UniPV_Medicina Estetica e del Benessere			✔
	SSSA_Electoral Policy and Administration			✔
Fully distance	**UniINSUBRIA**_FILIS			✔
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche		✔	
	UniPD_Scienze e Tecniche Psicologiche		✔	
	PoliMI_Ingegneria Informatica			✔
	UniSI_Scienze Economiche e Bancarie	✔		
	UniTO_Amministrazione Aziendale		✔	
	UniTO_Scienze dell'Amministrazione		✔	
	TOTAL	6	4	7

Moreover, these contents can be open or protected by copyright: the courses with open contents are those delivered by Insubria, by the University of Padova and only one course, Master's degree course in Matematica, offered by the University of Parma. Categorizing the courses by type, the table 25 shows that the contents of all the Master's degree courses are open, while most of the contents of the Bachelor's degree courses are copyrighted. Royalties are paid only for the Bachelor's degree course of Amministrazione aziendale offered by the University of Turin.

Table 25 Are content protected by copyright?

Type	University and name of the course	Open content	Protected by copyright
Bachelor's Degree	**UniINSUBRIA_**Matematica	✔	
	UniINSUBRIA_SAN	✔	
	UniINSUBRIA_SCOM	✔	
	UniMI_ Sicurezza dei Sistemi e delle Reti Informatiche		✔
	UniPD_ Scienze e Tecniche Psicologiche	✔	
	UniPR_ Beni Artistici e dello Spettacolo		✔
	UniPR_ Lettere		✔
	PoliMI_ Ingegneria Informatica		✔
	UniSI_ Scienze Economiche e Bancarie		✔
	UniTO_ Amministrazione Aziendale		✔
	UniTO_ Scienze dell'Amministrazione		✔
Master's degree	**UniINSUBRIA_**Giurisprudenza	✔	
	UniINSUBRIA_ Scienze Ambientali	✔	
	UniPR_ Matematica	✔	
Master	**UniINSUBRIA_**FILIS	✔	
	UniPV_ Medicina Estetica e del Benessere		✔
	SSSA_ Electoral Policy and Administration		✔
	TOTAL	**8**	**9**

Finally, from the answers to the survey, you can see that most of the courses (76%) have digital and multimedia contents part of open libraries, with few exceptions (24%) with contents that are part of paid libraries:

- Master's course in Estetica e del benessere offered by University of Pavia;
- Bachelor's degree course in Amministrazione aziendale offered by University of Turin;
- Bachelor's degree course in Sicurezza dei Sistemi e delle reti informatiche by University of Milan;
- Bachelor's degree course in Scienze economiche e bancarie by University of Siena.

The technological support platform - Learning Management System – adopted is generally a Moodle, that can be standard or customized; the only exception is represented by Politecnico di Milano that uses its own platform internally developed.

A further central part of the course design involves the methods of student engagement that can be:

- individual learning that includes activities as self-evaluation test, evaluation test, production of individual elaborations;
- collaborative learning that includes group activities as discussion in forums and small work groups;
- both methods listed above.

Through the questionnaire it appears that no course prefers only collaborative learning; more than half of respondents (65%) prefer only individual learning and the other part of the respondents (35%) has both engagement methods.

Focusing the attention on the universities participating in the project with more than one course, you can note that the choice is recursive in all the courses offered by the same university suggesting it is a choice thought by the single university.

Instead, according to the type of the study course, all Master's degree courses involve the students through the individual learning.

The following table 26 details the different methods of involvement of the analyzed courses.

Table 26 How the course involves students

Type	University and name of the course	Individual elaboration	Evaluation test	Self - valuation test	Discussion forums	Group works
Bachelor's Degree	**UniINSUBRIA_**Matematica	✔				
	UniINSUBRIA_SAN	✔				
	UniINSUBRIA_SCOM	✔				
	UniMI_ Sicurezza dei Sistemi e delle Reti Informatiche	✔	✔	✔		
	UniPD_ Scienze e Tecniche Psicologiche	✔	✔	✔	✔	✔
	UniPR_ Beni Artistici e dello Spettacolo			✔		
	UniPR_ Lettere			✔		
	PoliMI_ Ingegneria Informatica	✔	✔	✔	✔	
	UniSI_ Scienze Economiche e Bancarie	✔				
	UniTO_ Amministrazione Aziendale	✔	✔	✔	✔	✔
	UniTO_ Scienze dell'Amministrazione	✔	✔	✔	✔	✔
Master's degree	**UniINSUBRIA_**Giurisprudenza	✔				
	UniINSUBRIA_ Scienze Ambientali	✔				
	UniPR_ Matematica	✔	✔			
Master	**UniINSUBRIA_**FILIS	✔	✔			
	UniPV_ Medicina Estetica e del Benessere			✔	✔	
	SSSA_ Electoral Policy and Administration	✔		✔	✔	
	TOTAL	**14**	**7**	**9**	**6**	**3**

6.1.3 Structure and activity of technical and administrative support

The third part of the survey concerns the structure and activity of technical and administrative support. For technological support, all the universities offer systematic support to professors through a dedicated structure; the only exception is represented by the University of Padova that does not offer this kind of support. This dedicated structure is generally at university level, with only two exceptions:

- Sant'Anna School of Advanced Studies supports the professors through professionals;
- University of Torino uses a decentralized structure.

The same applies to students: all the universities offer technological support for them as before. Contrary to what seen previously, the University of Padova and of Siena give support through a decentralized structure as University of Turin does.

Instead, for the questions regarding pedagogy design, there are fewer courses (59%) that offer systematic support from a dedicated structure and, as seen for technological support, most of these structures are at university level. But, even if the percentage of those who do not offer this support is higher, we must point out that, in reality, only two universities fall into this percentage:

- University of Siena;
- Insubria with its 6 courses under analysis.

While the Universities of Padova and of Turin rely on a decentralized structure.

As before, the same applies to students: the only difference is given by Politecnico di Milano that does not offer this support for students.

Table 27 Presence of a dedicated structure to support professors and students

Type	University and course name	For professors			For students		
		Univ.	Decen.	Profess.	Univ.	Decen.	Profess.
Mainly distance	**UniINSUBRIA**_Giurisprudenza	✔			✔		
	UniINSUBRIA_Matematica	✔			✔		
	UniINSUBRIA_SAN	✔			✔		
	UniINSUBRIA_Scienze Ambientali	✔			✔		
	UniINSUBRIA_SCOM	✔			✔		
	UniPR_Beni Artistici e dello Spettacolo	✔	✔		✔	✔	
	UniPR_Lettere	✔	✔		✔	✔	
	UniPR_Matematica	✔	✔		✔	✔	
	UniPV_Medicina Estetica e del Benessere	✔	✔		✔	✔	
	SSSA_Electoral Policy and Administration		✔	✔		✔	✔

Type	University and course name	For professors						For students					
		Univ.		Decen.		Profess.		Univ.		Decen.		Profess.	
Fully distance	**UniINSUBRIA**_FILIS	✓						✓					
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	✓	✓					✓	✓				
	UniPD_Scienze e Tecniche Psicologiche			✓						✓	✓		
	PoliMI_Ingegneria Informatica	✓	✓					✓					
	UniSI_Scienze Economiche e Bancarie	✓								✓			
	UniTO_Amministrazione Aziendale			✓	✓					✓	✓		
	UniTO_Scienze dell'Amministrazione			✓	✓					✓	✓		
	TOTAL	13	7	2	3	1	0	12	6	4	3	1	0

✔ technological support ✔ pedagogical support

Mainly or fully distance courses are generally a new reality in the Italian university context, so it is interesting to analyze whether some training activities have been done to the professors of the courses.

The answers to the survey gave a positive reply: only the University of Siena did not carry out technical training activities oriented to the professors of the courses. Most of the universities did benefit from internal staff for training. Different choice was made by Sant'Anna School of Advanced Studies, University of Padova and of Parma that also sought help from external staff. No university had only turned to external personnel.

Table 28 Who is in charge to training activities for professors?

Type	University and course name	Internal staff	External staff	Internal and external
Mainly distance	**UniINSUBRIA**_Giurisprudenza	✓		
	UniINSUBRIA_Matematica	✓		
	UniINSUBRIA_SAN	✓		
	UniINSUBRIA_Scienze Ambientali	✓		
	UniINSUBRIA_SCOM	✓		
	UniPR_Beni Artistici e dello Spettacolo			✓
	UniPR_Lettere			✓
	UniPR_Matematica			✓
	UniPV_Medicina Estetica e del Benessere	✓		
	SSSA_Electoral Policy and Administration			✓
Fully distance	**UniINSUBRIA**_FILIS	✓		
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	✓		
	UniPD_Scienze e Tecniche Psicologiche			✓
	PoliMI_Ingegneria Informatica	✓		
	UniSI_Scienze Economiche e Bancarie			
	UniTO_Amministrazione Aziendale	✓		
	UniTO_Scienze dell'Amministrazione	✓		
	TOTAL	11		5

Investigating more about the type of training developed, the table 29 shows that for all the professors in the different courses a training for technological issues has been developed, in individual, in group or in both modalities. Instead a smaller number of courses provide a training for pedagogical content. One last observation has to be done for the universities delivering more than one course: in these cases, only Insubria carried out the same kind of training activity for all the professors of all the courses under analysis, differently from University of Parma and of Turin.

Table 29 Kind of training for technological issues and pedagogical content for professors

Type	University and course name	Individual techno	Individual pedagog.	Group techno	Group pedagog.
Mainly distance	**UniINSUBRIA**_Giurisprudenza	✓		✓	
	UniINSUBRIA_Matematica	✓		✓	
	UniINSUBRIA_SAN	✓		✓	
	UniINSUBRIA_Scienze Ambientali	✓		✓	
	UniINSUBRIA_SCOM	✓		✓	
	UniPR_Beni Artistici e dello Spettacolo			✓	
	UniPR_Lettere			✓	
	UniPR_Matematica	✓			
	UniPV_Medicina Estetica e del Benessere	✓		✓	
	SSSA_Electoral Policy and Administration	✓			
Fully distance	**UniINSUBRIA**_FILIS	✓		✓	
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	✓	✓		
	UniPD_Scienze e Tecniche Psicologiche	✓	✓	✓	✓
	PoliMI_Ingegneria Informatica	✓		✓	
	UniSI_Scienze Economiche e Bancarie				
	UniTO_Amministrazione Aziendale	✓	✓	✓	✓
	UniTO_Scienze dell'Amministrazione			✓	✓
	TOTAL	**13**	**3**	**13**	**3**

6.1.4 Assessment method

All the universities have a system for assessing the level of satisfaction of the course students. It is interesting to understand whether the system has been realized ad hoc for these mainly and fully distance courses.

Most of the courses (65%) measure the level of satisfaction through the same system used for the assessment of traditional courses, only for the 35% of the courses the system has been realized ad hoc. In particular, the following study courses fall into this group:

- Matematica delivered by University of Parma;
- Scienze e tecniche psicologiche of University of Padova;
- Sicurezza dei sistemi e delle reti informatiche by the University of Milan.

Moreover, for all Master's courses the assessment system has been realized ad hoc.

Table 30 System adopted for the assessment of the level of satisfaction of the students of the course

Type	University and name of the course	Ad hoc system	Standard system
Bachelor's Degree	UniINSUBRIA_Matematica		✓
	UniINSUBRIA_SAN		✓
	UniINSUBRIA_SCOM		✓
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	✓	
	UniPD_Scienze e Tecniche Psicologiche	✓	
	UniPR_Beni Artistici e dello Spettacolo		✓
	UniPR_Lettere		✓
	PoliMI_Ingegneria Informatica		✓
	UniSI_Scienze Economiche e Bancarie		✓
	UniTO_Amministrazione Aziendale		✓
	UniTO_Scienze dell'Amministrazione		✓
Master's degree	UniINSUBRIA_Giurisprudenza		✓
	UniINSUBRIA_Scienze Ambientali		✓
	UniPR_Matematica	✓	
Master	UniINSUBRIA_FILIS	✓	
	UniPV_Medicina Estetica e del Benessere	✓	
	SSSA_Electoral Policy and Administration	✓	
	TOTAL	6	11

An interesting point for future research is represented by the courses that provide an evaluation system of the results of the students in order to compare them with the results of students attending the traditional course offered by the same university.

This is the case for only 5 courses of the sample shown in the table 31. Among these courses there is also the Master's course in Estetica e del benessere provided by the University of Pavia, although there is no a traditional version of the course, as seen in the paragraph 6.1.2.

Table 31 Evaluation system of the results of the students of the course compared to similar courses realized in the traditional way

Type	University and course name	Provided	Not provided
Mainly distance	UniINSUBRIA_Giurisprudenza		✓
	UniINSUBRIA_Matematica		✓
	UniINSUBRIA_SAN		✓
	UniINSUBRIA_Scienze Ambientali		✓
	UniINSUBRIA_SCOM		✓
	UniPR_Beni Artistici e dello Spettacolo		✓
	UniPR_Lettere		✓
	UniPR_Matematica		✓
	UniPV_Medicina Estetica e del Benessere	✓	
	SSSA_Electoral Policy and Administration		✓
Fully distance	UniINSUBRIA_FILIS		✓
	UniMI_Sicurezza dei Sistemi e delle Reti Informatiche	✓	
	UniPD_Scienze e Tecniche Psicologiche		✓
	PoliMI_Ingegneria Informatica	✓	
	UniSI_Scienze Economiche e Bancarie		✓
	UniTO_Amministrazione Aziendale	✓	
	UniTO_Scienze dell'Amministrazione	✓	
	TOTAL	5	12

6.1.5 Professors involvement

Finally, the last part of the survey concerns the involvement of the professors: from the answers, it emerges that only the professors of 2 courses receive incentives of economic nature to deal with these courses. These 2 are the Master in Electoral policy and administration delivered by Sant'Anna School of Advanced Studies and the Bachelor's degree course in Amministrazione aziendale of University of Turin, involving respectively 10 and 38 professors in the teaching of the course.

6.2 Analysis of Italian MOOCs

6.2.1 General data about MOOCs

At the beginning of the interviews, it was asked general data about the MOOC project; the first information collected is about the number of courses the universities offer on their platform. Ca' Foscari university and Politecnico di Milano are the most active in this field having the higher number of active courses: 37 and 22 respectively. This could be explained by the fact that most of the other universities claimed to be just at the beginning of this path, but they have programmed to increase the number of courses in the next coming years.
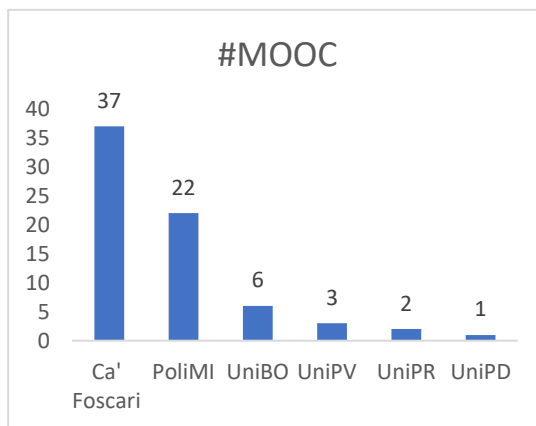
Figure 22 Number of MOOCs per university

There is high disparity among the number of users enrolled in the courses, as shown in the figure 23: Politecnico di Milano has, on average, 40.000 users per year and about 70% of them are students, not only attending Politecnico di Milano. Instead the courses of the other universities do not reach 10.000 users. In particular, Ca' Foscari counts 8.000 users of which 25%-30% are Ca' Foscari's
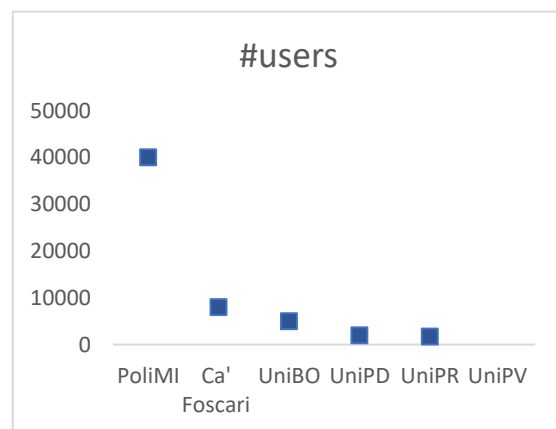
Figure 23 Number of Users per university

students; on the other hand, almost all the 2.000 enrolled in the courses of the university of Padova are students of the university. There are no data about the university of Pavia.

6.2.2 Objectives of MOOC projects

The first dimension of investigation regards the objectives, what are the reasons behind the choice to develop MOOCs and what goals universities would like to reach.

As seen in the 2nd chapter we have already discussed about it, so it is interesting to understand if the objectives of Italian universities are in line with the results emerged in the other studies of European situation.

Each university has its own objectives different from the others with which the university has decided to develop MOOCs and the objectives have guided and are guiding the choices for the development of courses. It is interesting to understand if these goals have changed over the years, if they have undergone minor changes or if they have remained unchanged.

In general, no relevant changes are noticed, this is due to the fact that the universities started the projects few years ago.

From the interviews, it is possible to classify the goals in 4 main groups:

- to improve the brand of the university;
- to give visibility to the university;
- to bridge the gaps;
- to do didactic innovation.

In particular, "to improve the brand" and "to give visibility to the university" are the most cited objectives, perfectly in line with what emerged in the studies conducted in Europe. With huge investment in MOOCs production, they want to give a clear signal, they want to be perceived as innovative universities, ready to intercept changes in the educational world and show their disciplinary wealth. They would like to be present not only on the Italian territory, but to compete with big universities worldwide, trying to reach a global visibility. Some universities think that MOOCs are a useful means to attract more talented students, to reach students who live in distant places and so to extend accessibility to education.

"To bridge the gaps" is another objective cited more times.

In particular, Politecnico di Milano wants to reach it and, based on this, designs tailored courses. The objective has slightly changed during the years. Initially the gaps were those of students: for this reason, the courses were designed to fill any lack in the typical topic of the first year of

Politecnico di Milano in order to start the traditional courses having students with the same skills/knowledge. Then, the target has expanded and they would like to fill the gap of everyone: from this, in addition to the branch "for students", they developed other branches "for citizens", "for teachers" and "for researchers". The general idea is to provide courses not overlapping with curricular didactics or other existing courses. So, Politecnico di Milano realized that MOOC, as an open knowledge, could also be a useful tool for meeting the educational needs of other populations of the university world or of dialogue with the outside world. Then, the line remained the same, only the reference target expanded.

The last objective is about "doing didactic innovation". Even Italian universities understand the potential of MOOCs, and recognize them as a means to innovate teaching and learning.

Some universities want to integrate MOOCs in traditional courses, also to reduce the problem of overcrowding of the classrooms for the huge number of enrolled students. These courses are seen as a way to replace frontal courses for which a quality standard cannot be guaranteed. Moreover, one interviewed suggested a possible road: the university might produce courses useful for traditional ones to be used before going to class to be ready and use class hours differently from classical front lesson, a model similar to flipped classroom.

Anyways, MOOCs are considered, in general, as an additional mean to support traditional didactic, not a substitute.

6.2.3 MOOCs design

There are different points that have been investigated about the design in these interviews.

The first point is linked to the used **technological platform**: the universities benefit from different platforms; some choices are connected to the objectives. In general, the courses are present on:

- EduOpen;
- Open edX;
- Iversity;
- FutureLearn;
- Coursera.

Most courses are on the Italian aggregator platform EduOpen: the universities involved are part of the promoters of the project.

However, the different objectives have led to a differentiation of the platform: for example, in order to get the internationalization is required a more international platform as Iversity or FutureLearn. One university shares its courses in Italian on EduOpen, but the courses produced in English are delivered through Iversity.

Another observed point is about quality: to deliver courses on EduOpen, there are no particular requirements regarding quality standards, this leads to have courses of low quality. Some universities know the importance of high quality courses to have higher retention rates. For this reason, they would not appear on a platform where there are low quality courses in order to not be perceived as those courses. So, an interviewee affirmed that all its courses have been moved on another platform, FutureLearn, that gives clear guidelines for the production of high quality courses and without some characteristics the courses will be not upload on this platform.

Instead, one university chose Iversity as a result of an analysis: this platform has proved to be the most suitable for the European context, but with features of internationalization. Even in this case, the platform guides universities for content production, giving, for example, guidelines for the length of videos.

Finally, there are also 2 cases in which the used platform is OpenEdX. The choice to customize an open platform is due to the need of having functional guarantees for the big numbers and the certainty of referring to an active development community on which you can rely to be able to modify and to upgrade the platform. In addition, the OpenEdX architecture occupies very little of the university's servers because the bulk of the traffic passes from YouTube. This represents an advantage since the infrastructure of the university could be a limit. These two platforms are the twin platforms POK of Politecnico di Milano and BOOK of University of Bologna.

The second point is about the MOOC planning: from the survey, it appears that, in general, the planning phase is internal. The design of MOOCs is essentially on the creative and imaginative shoulders of the professor. The E-learning team, present in each university, support the professors during this phase sketching out the instructional design and letting the professors customize it. Some guidelines useful to the creation of the content are given to the professors: how to divide the content, how many modules, how long the video should be, and so on.

An interviewed university underlined the importance of the course design phase, and in particular of the video, fundamental part of MOOCs. It is important that the professor arrive prepared to record the video, to speak off the cuff causes delays, risking taking 20 minutes to

record a video of 5 minutes. It has been emphasized how delivering a lesson through a video is not like the traditional university lessons, it needs a long preparation.

From the interviews, it emerged that is also essential the presence of a project manager who coordinate the different points of the whole work, from the idea to the starting date of the course. The project manager is generally part of the staff of the university, in case the professors involved in the production of the course are more than one, he/she coordinates them and deals with scheduling schedules and deadlines. The university that chose FutureLearn as technological platform affirmed that, behind the internal project manager, there is another one offered by the platform that represents the contact point between the two parts and supports the production checking if the content respect FutureLearn standards.

There is only one case where the university takes advantage of the professionalism of another university: University of Bologna affirmed that its process of didactic innovation has begun in April 2017, then the university has decided to rely on others, in particular on Politecnico di Milano, to be able to compete and not to stay behind the other universities. In the partnerships, they give the contents of the courses, they make available the multidisciplinary knowledge of the university for the creation of the MOOCs which, in this case Politecnico di Milano, would not have, with the view of sharing a common training path with different points of view.

The presence of a tutor makes it necessary for the courses to be paced: this is the case with most courses, with the exception of courses delivered by University of Pavia that are all self-paced.

Generally, at the end of each module, quizzes and assignments are present to test the acquired knowledge and, if a certain percentage of questions are responded rightly, an attendance certificate is given to the student. Quite all the universities do not involve the users with activities of "active learning". They think that it can be a possible road to follow in future with discussions in forums, peer reviews and group activities. Politecnico di Milano stated that implementing active learning activities is difficult due to the big number of enrolled and implementing such activities require, in primis, a higher number of tutors who can verify and evaluates assignments, and so higher resources. In some courses, there are discussions and other activities, but they are not subject to evaluation. There had been only one case in which the certificate varied according to the kind of activity done: it was for a course for teachers about flipped classroom. There was the standard certificate, like the other courses, but there was also the "super" certificate that the teacher could earn having elaborated a project in which he/she applied the flipped classroom in his/her contest. A tutor was responsible for grading these work projects and a "flipped classroom designer" certificate was given to these teachers. It was done

for one ad hoc edition as part of a European project that gave the funds for the tutoring of the course.

Most interviewed universities are responsible for all the activities linked to the production of the content, after its planning phases. So, the E-learning team is responsible for the realization of the videos, but also for the creation of the course itself, as matching the videos with the slides, editing the videos.

There are 2 exceptions: in one case – University of Bologna – the E-learning team, present in the university, is not able to do all these activities since it was born recently and lacks some resources. For this reason, they rely on the team of another entity – Politecnico di Milano for example – that is in charge of recording and editing the videos with the idea of internalizing it in the future.

In the other case – Ca' Foscari University of Venice – outsource to a third entity the activities linked to the recording and editing of videos.

Another important design factor linked to the objectives is the target user, so, who the universities want to reach with their courses. In general, all the universities design their courses having in mind the students, that could be the same students of the university itself, or an external audience. In particular, universities that want to improve the brand and to reach a global visibility, address an international audience. Supporting this, there is also the choice of the delivery language: universities with this aim, develop contents of the courses in English, not only in Italian.

There are cases in which the choice of the language depends on the professor responsible for the course: in particular, University of Pavia deliver a course in French because the original documents used as attachments are in French, so it is a choice tied to the desire to maintain a certain homogeneity.

A particular case needs to be mentioned. Politecnico di Milano has enlarged the objectives and also the target user base during the years, keeping at the center their students or potential students. On the platform, the courses are classified on the basis of the users to reach: "from high school to university", "from bachelor to master", "for citizens", "for teachers" and "for researchers". According to this classification, the courses are in Italian and/or in English: for example, the courses thought to bridge the gaps of students of high school that are going to start the university and those courses for citizens are delivered in Italian; instead, the courses useful for the passage from bachelor to master are in English, since the courses of master are in

English and so they are also thought to bridge the gaps of international students that will start studying in Politecnico di Milano.

Anyways, from the interviews it emerged that the 3 factors – objectives, target user and language – are always aligned, showing a clear strategy behind the project.

The courses have a strong bond with the traditional offer of the university for 2 main reasons:

1. the professors responsible for the courses are the same professors that teach in traditional courses of the university itself having specific knowledge in specific discipline area;
2. most MOOCs are developed for integrative purposes and supportive to the traditional offer.

Moreover, this is in line with the target user base: as said before, all the universities design their courses having in mind their students, so it is fundamental and correct that the relationship between MOOCs and traditional offer is strong.

However, there are also cases in which the relationship is less strong: two universities affirmed they have developed some courses not strictly related to the traditional offer, but for purely "knowledge-sharing" scope. For example, Ca' Foscari University of Venice offers courses for which traditional students are encouraged to attend because they are related to the courses they attend in classroom and, of these, professors can know who actually attends the courses keeping track of them; instead, others are "knowledge-sharing" courses conceived for a niche. The other case is given by the University of Pavia that delivers courses on peculiar areas of the university: for example, the MOOC on Alessandro Volta who worked in this university leaves the opportunity to exploit the historical collections kept in museums of the University of Pavia.

Once a course is completed, the interviewed universities do not issue ECTs, except for the University of Bologna which, from September 2017, starts with an experimental test: the MOOCs become an integral part of some courses in presence and part of the credits are issued by obtaining the MOOC certificate. Moreover, for some PhD courses of Politecnico di Milano, MOOC certificate is required to have access to the final exam; the entire course cannot be delivered only through MOOC, it does not have the weight of a traditional course.

Communication

Universities are engaged in communication activities towards entities inside the university itself and towards external audience.

Internal communication starts from the political leaders who are responsible for launching the project. Most of the universities communicate directly to the different departments to show MOOC's potentialities and to involve the professors more; introducing MOOCs in the wider plan of didactic innovation. The other tools used to communicate are the emails, the website of the university and, in one case, the university's magazine. Some universities noted a kind of resistance coming from some professors since they should rethink about the primary object of their work, how to deliver lessons. Some professors do not understand the importance of these courses, they prefer writing an article rather than develop a MOOC. For this reason, some universities declared the importance of incentivizing the departments in order to incentivize indirectly the single professors.

Instead, the external communication relies on tools as emails, the press, social media and the website.

Sometimes, the professors themselves spread the voice about a particular course in which they have worked.

Politecnico di Milano, instead, benefits also from some partners with which they have worked for the creation of a course: for example, the course "Entrepreneurs without borders" was promoted by the agency Unite Nations UNCTAD that was partner in the project bringing a lot of participants from Africa.
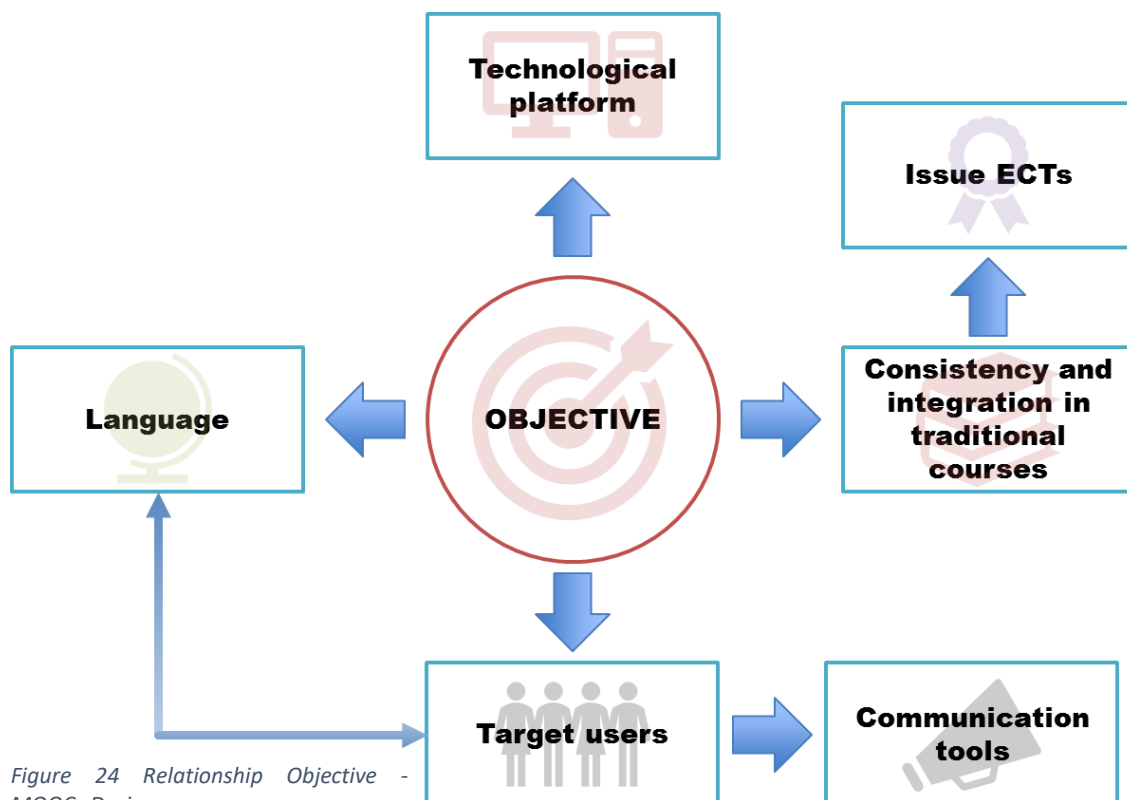

Figure 24 Relationship Objective - MOOCs Design

6.2.4 Observed performances

The aim of this part of the interview was to understand if the universities have created a structured tool to measure performances and if universities collect data and analyze them to have a feedback on how the project is going.

In general, the used technological platform collect data about the users, but the universities do not analyze them. Someone affirmed that the MOOC project is just at the beginning, so it is too early to analyze them, but it is a possible road for the future. Only Politecnico di Milano analyzes data, but it affirmed that the collected data are few since it is required few information to enroll in a MOOC to lower the entry barriers to the minimum. What they can analyze are the number of enrolled, the number of certificates, the average grade, how many exercises the users have done, and something like this. However, they affirmed to not use this information to redesign the MOOC, it could be a useful tool for the professors, but in general terms.

Indexes monitored to understand if the project is successful depend on the kind of course. In general, the indexes could be:

- number of enrolled;
- participation, how much the users are active on the platform;
- number of issued certificates;
- completion rate;
- satisfaction level.

However, as said before, they depend on the kind of course analyzed: for example, courses thought for a niche will not have a high number of enrolled, so the success for this kind of course is given with a number that is smaller than the expected number of participants of another course like Mathematics.

Then, completion rates, and so the number of issued certificates, could not be the indicators of all the courses given the nature of some courses: for example, users who enrolled in a course of Mathematics, or Physics, could be interested only in some particular topics, they could "learn on shelves", for this reason, for the universities, it does not make sense to use those 2 indicators as indicators of success.

All the courses of all the universities have the user satisfactory survey; however, someone thinks that the results are not very reliable since the survey is at the end of the course and only the users who enjoy the course arrive at the end giving a positive feedback. In fact, most feedback reveals a high satisfactory level.

The last step is about resources: in the interviews, it was asked if the university monitors the costs associated to the development of the project, how the budget works, if there are incentives for the professors, how to decide how many resources are needed for a MOOC.

Generally, the universities did not mention the monitoring of the costs, in one case the costs are analyzed at the end of the project. It seems that universities recognize the importance of these initiatives and do not matter too much about the costs, seeing them as necessary; it could be explained by the fact that they are just at the beginning of the projects, later on they will be more careful. The allocation of resources depends on the importance of the project; on average, the actor involved are the E-learning office, present in each university, with the technicians, professors, tutors and at least one project manager.

Only one university was identified that used incentives for the professors involved in the development of MOOCs, but at the time of the interviews, no university affirmed to give financial incentives to the professors, two universities see it as possible future road.

Chapter 7

Conclusions

Digital innovation is entering the Italian Higher Education system, it does *not* represent a *revolution, it is a slow process*. Italian universities, also driven by the educational innovation plan of the Ministry of Education, recognize the potential and the importance of digital innovation, but, even considering the small number of universities participating in this research, few universities have already developed and implemented these online courses or MOOCs.

This study is the first to investigate the characteristics of these courses in the Italian context and does not have the claim to be considered definitive, given the limit of not involving all the Italian universities.

Anyways, there are some interesting lessons learnt by this analysis.

First of all, the universities do not follow a single way to develop courses, it emerged a variety of features that characterize the courses that let assume a non-homogeneity at the bases of them.

The online courses under analysis are developed by universities in northern Italy, they are well distributed between mainly and fully online courses, with a little predominance of mainly online courses rather than fully ones. This could be explained by several factors, as, for example, resistance to technology by some more traditional professors and initial investment costs, especially to make quality products.

The analyzed courses reach all the disciplinary areas and some of them have been active for several years, as seen before, two courses started 11 years ago, showing a modest experience in this field, compared to the strongest experience developed by foreign universities.

Most courses present an increase in the number of enrolled students, demonstrating a growing interest by the Italian users, given the low percentage of students of different nationality than the Italian one. Differently from what expected, the reached users are not students with disabilities, so it is not possible to say that these courses are able to extend the customer base in this sense; however, the percentage of working students is quite high, so, in this sense, it is possible that the online courses increase the access to education.

As expected, most universities have dedicated organizations to support the professors both in terms of technology and didactics; only few exceptions do not provide this service. Anyways, the

support is mainly for technological issues. Moreover, another important signal of support given to the professors is demonstrated by the training of technological and didactic nature offered to them in order to help them. This shows a real commitment by the political leaders of the universities who identify the importance of pushing this process, but recognizing, at the same time, the need for training of professors who have to change the way they teach.

For what concerns the activities offered to users, it emerged that not all the courses provide group activities, rather, the majority only provides for individual learning activities; moreover, few activities of active-learning are provided, not showing, in this way, a real change in the role of the students, as seen in the literature.

Past studies had demonstrated that videos are the most engaging way to get the interest of students. For this reason, in chapter 3, we said to expect that most of the content of the analyzed courses is in the form of video rather than in the form of text. Actually, almost all the courses are made up of a balanced mix of texts and videos; anyways, the interviewed universities, knowing some effective ways to keep the attention of students, as the length of the video, give clear guidelines to the professors to plan in the right way the lessons. Anyways, the practice of video lessons is not yet widespread in an innovative and qualitatively perfect way, since few universities are professionally assisted in video production, preferring self-production; the reason can be found in the economic factor linked to this.

For what concerns MOOC, the most relevant factor emerging from the interviews is about the goals the universities want to achieve. It emerged that the main objectives of the Italian universities, as to get global visibility and to increase the brand awareness of the university, are in line with the objectives of the European universities. Even in Italian context, MOOCs are not seen as a new road to increase revenues, on the contrary, the main advantages of them are the non-monetizable returns, as visibility and reputation.

Moreover, the choices linked to every aspect of MOOCs are related to the objectives, showing a solid work of design behind the course. As seen in the literature, the design phase is the most important one and the importance of this phase emerged also through the interviews, demonstrated also by the presence of project managers who are in charge of controlling and monitoring the whole project. Before starting the production, the whole project needs to be planned in every detail even for the interviewed universities. On the other hand, the universities have not developed a structured tool to measure the progress of the MOOC, with the consequence of not being in a position to analyze whether the targets are actually met.

One last point is about the business model. The literature shows different revenue models and most of the cases seen before let users attend the courses freely, but they have to pay for the certificate. A similar model was also assumed for Italian cases, but it is not the case. In fact, the interviewed universities did not mention the payment for the certificate, maybe it is due to the willingness to attract as many students as possible, lowering the entry barriers to the minimum and being, in this way, competitive.

To sum up, what it is important to underline is that technology itself is not able to innovate the way of deliver education, it needs commitment, you cannot only transfer the traditional material online, but it requires a meticulous work behind it, it is not a work that professors can do when they have free time.

In conclusion, the common thought emerged, mainly from the interviews, is that E-learning is not like a tsunami that revolutionizes everything, but it is seen as a drop that digs a rock: the process is slow, but the effects begin to be noticed in the Italian Higher Education context.

Moreover, digital technologies are seen as means to improve the teaching process, the courses, mainly MOOCs, are integrative means to teaching activities, not substitutes for the traditional way, but facilitators, tools that further help students.

Appendix A

Digital Learning questionnaire

General data about the course:

1. Name of the university

2. Name of the study course

3. Kind of course:

   ☐ Mainly distance

   ☐ Fully distance

4. Level of course:

   ☐ Bachelor's degree

   ☐ Master's degree

   ☐ Master

   ☐ PhD

   ☐ Specialization course

5. To which disciplinary area does the course belong?

   ☐ Scientific discipline

   ☐ Social discipline

   ☐ Humanistic discipline

   ☐ Medical sciences

6. Which class does the course belong to?

7. How many years has the course been active for?

8. What is the number of students enrolled in the 2015/16 academic year?

9. What is the number of students enrolled in the 2014/15 academic year?

10. What is the number of students enrolled in the 2014/13 academic year?

    With reference to the course and to the 2016/17 academic year:

11. How many students are enrolled?

12. What is the percentage of female students?

13. What is the percentage of "workers" students?

14. What is the percentage of international students (not Italian citizenship)?

15. What is the percentage of disabled students (disability> 50%)?

16. How many structured professors are involved in teaching the course? (With professors we mean the holders of the single training modules)

17. How many contract professors are involved in teaching the course? (With professors we mean the holders of the single training modules)

18. How many tutors are involved in teaching the course? (With tutor we mean the staff to support the didactic activity)

Course design:

1. Is there a traditional (in presence) version of the course?

    ☐   Yes

    ☐   No

2. In which language are the contents of the study course delivered?

    ☐   Entirely in Italian

    ☐   Mainly in Italian

    ☐   Entirely in English

    ☐   Mainly in English

3. Is the classroom frequency requested / recommended for at least part of the course?

    ☐   Not requested

    ☐   Requested

    ☐   Recommended

4. The content of the lessons of each course consists of:

    ☐   Mainly video

    ☐   Mainly text

    ☐   Other multimedia content

    ☐   A balanced mix of the tools mentioned above

5. How are the digital contents of the lessons of the individual lessons produced?

    ☐   Autonomous self-production by professors

    ☐   Self-production with dedicated and selected software support

    ☐   Professionally assisted production

6. The contents are:

    ☐   Open

    ☐   Protected by copyright

7. Does the university or the course pay royalties for the contents?

    ☐   Yes

    ☐   No

8. Digital / multimedia contents are part of libraries:

    ☐   Open

☐ For a fee

9. Which technological platform for teaching support (Learning Management System) is adopted?

    ☐ Moodle (standard / personalized)

    ☐ Another open platform (standard / personalized)

    ☐ Proprietary platform developed internally

10. How are students involved in online activities?

    ☐ Individual learning

    ☐ Collaborative learning

    ☐ Both methods

11. What kind of activities are you planning to propose to the students?

    ☐ Self-evaluation test

    ☐ Evaluation test

    ☐ Production of individual elaborations

    ☐ Group activities

    ☐ Discussion in forums

    ☐ Small work groups

12. Briefly describe (in max 100 words) the main characteristics concerning the mode of delivery / functioning of the online part

Structure and activity of technical and administrative support:

1. Is there a systematic support for the professors, for technological assistance, by a dedicated structure?

    ☐ Yes

    ☐ No

2. The support structure is at the level of:

    ☐ University

    ☐ Decentralized structure

    ☐ Other

3. Is there a systematic support for teachers, for pedagogical issues, by a dedicated structure?

    ☐ Yes

    ☐ No

4. The support structure is at the level of:

    ☐ University

    ☐   Decentralized structure

    ☐   Other

5. Is there a systematic support for the students, for technological assistance, by a dedicated structure?

    ☐   Yes

    ☐   No

6. The support structure is at the level of:

    ☐   University

    ☐   Decentralized structure

    ☐   Other

7. Is there a systematic support for the students, for pedagogical issues, by a dedicated structure?

    ☐   Yes

    ☐   No

8. The support structure is at the level of:

    ☐   University

    ☐   Decentralized structure

    ☐   Other

9. Has a technical training activity been carried out for the professors of the course?

    ☐   Yes

    ☐   No

10. What kind of training was given to teachers?

    ☐   Individual training on technological issues

    ☐   Individual training on pedagogical issues

    ☐   Group training on technological issues

    ☐   Group training on pedagogical issues

11. Are there tutors to support students on pedagogical issues?

    ☐   Yes

    ☐   No

12. How many tutors?

    ☐   One

    ☐   Two

    ☐   Three

    ☐   More than three

13. Are there tutors to support students on technological issues?

    ☐   Yes

    ☐   No

14. How many tutors?

    ☐   One

    ☐   Two

    ☐   Three

    ☐   More than three

Assessment method:

1. Is there a system for assessing the level of satisfaction of the students of the course?

    ☐   Yes, standard compared to the evaluation of traditional courses

    ☐   Yes, it was made ad hoc

    ☐   No, there is no assessment of the level of satisfaction

2. Is there a system for evaluating the results of the students of the course compared to similar courses implemented in the traditional way?

    ☐   Yes

    ☐   No

Professors involvement:

1. Are there incentives provided for the teachers involved in the course?

    ☐   Yes

    ☐   No

Appendix B

Semi-structured interview for MOOCs analysis

1. How many MOOCs have been implemented by the university? Which disciplinary area do they belong to? What degree of coherence is there between MOOC and traditional courses?

2. How many, on average, take the course each year? How are they distributed among university students and not?

3. What kind of platform is used? Open standard, open personalized, or licensed platforms? If a personalized platform is used, what needs is this choice linked to?

4. When and with what objectives did the university decide to provide MOOC courses?

5. Have these goals changed over time? For what reason?

6. How are these objectives communicated within the organization?

7. What is the future development plan of the MOOC courses and how does it fit into the university strategy?

8. Have courses been developed according to a predefined model or is the design chosen by developers?

   - In the case of standardization, who is responsible for the design of the model? And which standards must be respected?

   - In the absence of standardization, which actors deal with course design? How is the feasibility of the project monitored?

9. Who deals with the production of content? How are the contents structured between video, text and other tools?

10. Have MOOCs been designed and developed for a specific user target? If so, what and for what reason?

11. Are the MOOCs linked to the traditional educational offer? If so, how? Are they an integral part of some traditional courses? Are credits recognized?

12. In which language are MOOCs delivered? For what reasons has this choice been taken?

13. Is there a direct involvement ("Active learning") of the students / users of the course or are these mainly passive users? If so, how are they involved?

14. How do the courses design choices link to the strategic objectives with which they are delivered?

15. Which internal / external communication tools are used to give visibility to the courses?

16. Is there a "structured" tool for measuring the performance of the MOOC courses? If so, what are the main characteristics of the instrument? How did you reach its definition?

17. What are the main performance dimensions of the MOOC courses that should be monitored? Success? Degree of completion? Degree of interaction? Realization costs?

18. What were the university's expectations in terms of impact of MOOC courses on these dimensions of performance? Did they actually take place?

19. Is there a systematic collection of data concerning user interaction with the platform? If yes, which data are collected and how often? Are these data subject to analysis?

20. Is user satisfaction monitored in some way?

21. How many and which human / economic / IT resources are necessary for the realization of a MOOC course? How are they financed? What cost items are considered for disbursement?

22. In the case of the development of a new MOOC course, how is the allocation of resources decided? Who decides the MOOC budget?

23. In the production / management of MOOCs, does the University make use of external consultancy? If so, with whom?

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