

## The lecture video recording in university: A case study

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**Abstract.** The latest European statistics show that Italy has the second lowest percentage of university graduates because of different reasons such as the outdated teaching methodologies or the high costs of university tuitions. Hence, Italian universities have launched several projects to improve or innovate the pedagogical strategies, to raise the student recruitment and to increase access to education.

In this work, we describe a pilot study about the use of the video recording of the traditional lessons in order to create specific university MOOCs. In particular, the degree course in Computer Science of University of Naples Federico II is involved in this project. The use of the lecture video recording reduces the MOOC costs and facilitates the contents management. In fact, the production of these MOOCs does not require professional operators so it is possible to involve students of university part-time job or Civil Service volunteers. The results show a good satisfaction by students and prove as these MOOCs can support the university teaching.

**Keywords:** university teaching, lecture video recording, video analysis, MOOCs.

### 1 Introduction

The idea of using video-recorded lessons and sharing via Internet dates back to 1995; [1] instead, the first study about the use of streaming video as educational tool is dated 1998 [2]. The spread of the network band have determined a growth of projects in this field [3, 4]. In particular, the Massive Open Online Courses (MOOCs) have allowed the large diffusion of on-line videos. The MOOCs are courses of learning and educational training delivered online on specific platforms. The MOOCs videos are usually a short presentation of an idea, a concept, a technique, an example and not a video recording of a lesson. For these reasons, the MOOCs require an important commitment to prepare learning material and to record quality videos. In fact, the MOOC production involves a team of professional operators, Epelboin reports a minimal annual cost of 20.000\$ for the different involved figures [5].

The following work presents a case study about using video recording of the lessons in order to create a university MOOCs to support the traditional teaching. In particular, we describe how to reduce the costs of MOOC production using university resources. This experimentation is part of an interventions plan aimed to improve some critical issues of degree course in Computer Science of University of Naples Federico II.

The degree course in Computer Science (L-31 Class of degrees in Science and Information Technology) attracts a huge number of students: there were 317 registrations in the academic year 2017/18 and 327 registrations in the academic year 2018-19. However, the data of Italian National Agency for the Evaluation of Universities and Research Institutes proves that the principal problematic issues of this degree course are the desertions of the first year and the small number of collected academic credits (ECTS). In fact, at the end of the first year the most of the students acquire 16 ECTS (on 60 provided) reporting an important difficulty to pass basic exams (math, physics and informatics). In the 2016-17 cohort, only 37.5% of first year students enrolled to the second year with at least 20 ECTS (they were 31.3% and 32.5% in the two previous years respectively). Moreover, only 9.5% of matriculated students went on the second year with at least 40 ECTS (11.4% in the 2014-15 cohort and 9% in the 2015-16 cohort). In the same cohort, only 61.1% of matriculated students continued in the same course (52.4% in the 2014-15 cohort and 57.5% in the 2015-16 cohort). In addition, the time to finish the studies is a critical aspect: the percentage of university graduates within a year beyond the normal duration of the course was 8.9% in 2016.

## 2 Methods

The Degree Course in Computer Science of University of Naples Federico II in collaboration with the SInAPSi Centre carried out this study.

The SInAPSi Centre is the university center of Federico II for all the students who feel excluded from the university life due to disability, specific learning disorders (dyslexia, dysgraphia, dysorthography and dyscalculia) or temporary difficulties. SInAPSi provides different services and supports initiatives to facilitate the participation of all the students in university life. The Civil Service volunteers are an integral part of personalized services for students with disability and learning disorders. In fact, the volunteers help the students with disability or learning disorders through physical support, textbooks digitations, tutoring and video recording of lessons. In particular, the video recordings are available only to students with disabilities according to Italian Law 17/99 and 170/210 [6, 7] despite educators, pedagogics, psychologists validated the model of video recording of lessons positively [8, 9].

### 2.1 Experimental Design

Before the start of courses, different meetings were organized to coordinate the different unities defining an operation protocol. According to the student difficulties, two courses of the first year (Algebra and Programming) and one course of second year

(Algorithms and Data Structures) were involved in this project. The MOOCs were realized based on the traditional lessons and were used by students of the chosen courses. The study started in the first semester, especially, by September to December 2018.

The classrooms of the courses did not have special infrastructures to facilitate video recording, and most professors used the traditional whiteboard. Therefore, the video recording of lessons was realized just by using traditional video cameras together Bluetooth microphones in order to have better audio. The Civil Service volunteers of SInAPSi Centre made the operative activities of video recording and they provided post-production and upload of the videos on a YouTube channel, created ad hoc. After the YouTube upload (unlisted modality), the video link was sent to the corresponding professor who shared it to the students on his university web page. In this way, the university web page became the platform to deliver the MOOCs. YouTube was chosen because it allows watching the videos on different devices and it has a specific plug-in to analyze the channel data.

After a brief period of testing, the workflow was fully implemented assuring the availability of the videos with a maximum delay of 48 hours.

### 3 Preliminary Results

A total of 173 videos were produced, as shown in Table 1, with a total of 594 man-hours including post- processing activities and upload on YouTube.

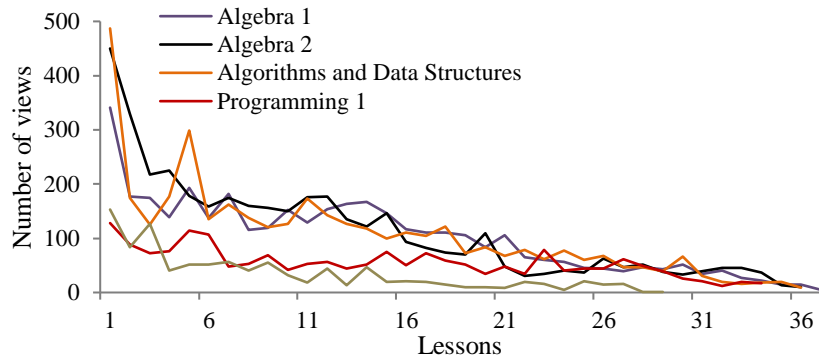
**Table 1.** Summary of video recording of lessons

Course	Number of video recordings	Total in minutes of video recordings
Algebra 1	37	3797
Algebra 2	37	4078
Algorithms and Data Structures	36	3908
Programming 1	31	2843
Programming 2	32	2904

The Civil Service volunteers, employed for the operative activities, are not a project cost because the volunteers receive a financial reward by Italian Government. However, the video recordings of non-professional quality have to accept because the volunteers or students are not technical operators. In our study, this did not affect the efficacy of video recording.

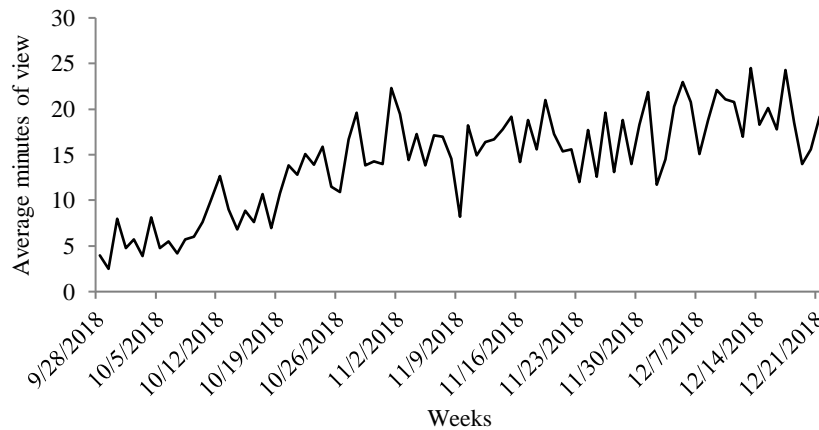
We obtained the number of video views from YouTube Analytics in order to analyze the user behavior. The view report and the watch time report were elaborated in reference to lessons period. In particular, the view report shows a decreasing trend (see Fig. 1) so same videos are watched by students in different times (for a limited duration,

see Fig. 2) while the videos of old lessons are watched several times with a linear progression over time.



**Fig. 1.** The figure shows the number of views for each video uploaded on YouTube. The x-axis reported the lessons in progressive order.

The watch time report shows fluctuating values in the time but also a crescent trend initially (see Fig. 2) because the students increase the videos use during the courses. Moreover, this result is consistent with the behavior of MOOC users shown by Hill [10].



**Fig. 2.** The trend of watch time during the lessons period.

### 3.1 Report of customer satisfaction

At the end of courses, 356 students filled out a questionnaire of satisfaction about the provided service. In particular, the questionnaire was structured in the following questions:

1. What did you like most about the video recordings in the MOOCs? (open-ended)

2. How much useful for the study the MOOCs are? ( Likert scale by 1 to 5)
3. Do you think the support of MOOCs, with textbooks, makes the learning easier? (Yes/No/Do not know)
4. Do you think all courses should be videotaped? (Yes/No/Do not know)
5. What are the possible advantages of MOOCs? (open-ended)
6. What would you improve about the service? (open-ended)
7. Have you decreased the attendance to the courses due to MOOCs? (Yes/No)

The following Table 2 gives a summary of questionnaire data in reference to answers with fixed values.

**Table 2.** Summary of satisfaction questionnaire

Question	Answer	
2. How much useful for the study the MOOCs are?	4 (Avg. Score)	
3. Do you think the support of MOOCs, with textbook, makes the learning easier?	Yes	95%
	No	2%
	Do not know	3%
4. Do you think all courses should be videotaped?	Yes	95%
	No	3%
	Do not know	2%
7. Have you decreased the attendance to the courses due to MOOCs?	Yes	3%
	No	97%

Moreover, the possibility to resume the contents of lesson (84% of answers) and the lesson use despite problems to attend the lesson (79% of answers) were the indicated principal advantages.

## 4 Conclusions

The MOOCs use opens different pedagogical and operative discussions in university environment; however, the production of specific MOOCs, based on the video recording of lessons, can produce different advantages. For example, it is possible to use the time of lessons in order to promote the inclusion of students with learning difficulty and to make other activities as group discussions or exercises [11].

The present study shows a case of study about the university MOOCs use based on the video recording of traditional lessons. The production of these MOOCs allows reducing the MOOCs cost and supporting the students. In fact, the results show how the students have used the MOOCs frequently as support tool because the lesson video recording allows reviewing the lesson, checking the notes and focusing attention in order to enhance the learning contents [12, 13, 14]. Moreover, our study prove that the MOOCs use did not influenced the attendance of students.

The study was conducted on whole cohort of first year so we expect to evaluate differences in the indicators of teaching improvement in the next months. In the last years, these indicators remained constant despite different attempts of educational innovations; of course, if they change due to this method, a new scenario will open.

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