

## Teaching Project Management on-line: lessons learned from MOOCs

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### Abstract

Creating a course for teaching project management online in a full online distance-learning environment was a challenge. Working with adult learners from different continents that want to complete a Master degree was an additional challenge. This paper describes how different MOOCs were used to learn about teaching -(meta) e-learning. MOOCs provide diverse opportunities for teachers to learn and innovate in e-learning. From the analysis of 5 MOOCs in the broad field of project management we took important lessons on how to structure contents, how to prepare complex assignments and, the most important lesson of all, how to help students to learn. This paper describes our journey of learning from MOOCs how to be better online teachers.

**Keywords:** Problem based learning; e-learning; MOOCs; student-centered learning

### Introduction to the challenge

Universidade NOVA de Lisboa has a fully online Master Degree on managing e-Learning Systems. Most students are adult learners, coming from different parts of the world, mostly from Portuguese speaking countries. In the 2015 edition, the programme was re-organized and a new teaching team was assigned to the course “*Education Projects Management*”. The new teaching team, the authors of this paper, was given complete autonomy to restructure the course around the following Learning Outcomes (LOs):

- The student will be able to identify and understand basic concepts and structure of project management in the educational context;
- The student will be able to apply tools and techniques to develop an educational project, from idea generation to finalization;
- The student will be able to understand the specificities of project management in the context of e-learning;
- The student will be able to identify, group and organize information structures hierarchically, as well as to develop communication objects developed to disseminate information;
- The student will get to know alternative approaches to project management, in particular design thinking.

Project management is a useful transferable skill that learners can apply to their learning activities, their profession and their personal life. Managing projects can be a very exciting and stimulating job. However, learning about project management can be exactly the opposite: too technical and bland. Students in this programme have different backgrounds and goals for the future. What they have in common is that they are adult learners, and even though they consider project management as a useful skill and an important tool, it is not their main interest.

In this context, the challenge we faced was mostly related with motivation: how do we teach project management online, in an international context, in a way that is engaging and rewarding to the learners and to the teachers? Some of the more specific questions we were facing were:

- What is the best approach to teach a fully online course in project management?
- What is the right balance between theory, knowledge and practical work?
- How to make learning interesting and engaging but not overwhelming to the students?
- How to support students so that they don't fall behind or drop the course?

From the interpretation of the online learning continuum (Guàrdia, Maina, & Sangrà, 2013), in the far right end we can find MOOCs (Massive Open Online Courses), classified as fully online distributed learning, with complex and integrated use of ICT. Even though our goal was not to build a MOOC, we wanted to build a fully online course that uses technology in an integrated way, to deliver learning opportunities and to support students in their learning journey. For these reasons, we went to look for answers to our questions in existing courses, mainly in MOOCs.

This paper focuses on the lessons learned from analyzing different MOOCs in the area of project management. We consider this as being an innovative practice and perspective. MOOCs can be a tool for “Massive Learning”, not only for students that want to learn about a topic but also for teachers and trainers that want to learn about how to develop and deliver online learning. We can say it is a type of *meta-(e)Learning*, as we are learning about e-learning through e-learning in practice.

### Initial research and adopted pedagogical approach

With the challenge described above, we aimed at finding a student-centered approach to teaching project management that was useful and meaningful to each student and took advantage of their experiences. Most of our students are adult learners and we wanted to take advantage of their different backgrounds to build an enriching experience for all.

Given the nature of the course, we decided to adopt a problem based-learning approach (PBL) that allowed students to learn about project management, while doing a project—learning by doing. As described by Barrows and Tamblyn (1980), PBL is the ideal approach when you want student-centered individualized learning that promotes both the acquisition of knowledge related with the problem and the development and application of specific skills. This facilitates the integration of knowledge and skills that students use to solving that problem. Another important aspect was that the projects should be realistic and relevant for the students, instead of being chosen by the teachers. This was, in our opinion a crucial factor to get students engaged with the work and be able to reuse the process when trying to solve new problems. The four goals of PBL as described by Barrows (1986) and adapted by Biggs (2007), are:

- G1: Structuring knowledge for use in working contexts
- G2: Developing effective reasoning processes
- G3: Developing self-directed learning skills
- G4: Increased motivation for learning
- G5: Developing group skills, working with colleagues.

These goals are aligned with our idea for the course. We consider project management a set of transferable skills that students should be able to take to professional lives and apply them in different situations (G1). Project management is based on a structured process of making decisions and acting accordingly, *i.e.* effective reasoning (G2). Our view for the course was that students should learn-by-doing, taking hold of their learning, deciding every aspect of the project (G3). Motivation was the most challenging aspect of learning about project management. Using a PBL approach, with a strong a relevant practical component was the solution for this problem (G4). Finally, being a full online course with an international cohort of students, developing collaboration skills and networking is a desirable goal (G5).

PBL provided us with the theoretical framework and pedagogical approach. But we needed to define the practical approach and tools for developing the course. We adopted the 7Cs of Learning Design (Conole, 2014) as an instrument to guide us in the design and development of the course. The framework consists of seven stages:

1. Conceptualize
2. Capture
3. Create
4. Communicate
5. Collaborate
6. Consider
7. Consolidate

The first stage, *conceptualize*, was in part addressed above. We described the background, the target audience, the LOs and the pedagogical approach. Still, we needed to go deeper in the conceptualize stage.

Our strategy was to research what was being done in e-learning in terms of project management. As stated above, in the online learning continuum (Guàrdia et al., 2013) MOOCs are at the far end, representing distance learning solutions fully online, highly dependent on ICT. These three features were the same as our course. Given the proliferation of MOOCs in the last few years, their *openness*, *availability* and *diversity* it was a logical decision to use them as a source for inspiration about teaching project management online but, most of all, MOOCs represent an opportunity for learning empirically about e-learning strategies, the “(meta)e-learning”. This option was reinforced by literature. Guàrdia et al. (2013) have identified ten design principles for MOOCs from the learner perspective:

1. Competence based approach
2. Learner empowerment
3. Learning plan and clear orientations
4. Collaborative learning
5. Social networking
6. Peer assistance
7. Quality criteria for knowledge creation and generation
8. Interest groups
9. Assessment and peer feedback
10. Media-technology-enhanced learning

These ten principles are aligned with our vision for the course, focusing on student-centred learning, networking, collaboration, competence based learning and students as producers of knowledge. So, for the *conceptualize* stage of the 7Cs, authors researched courses in the field of project management in the main MOOC providers: Coursera and EdX.

The first step was to analyse courses addressing project management. We selected three courses: “*Project Management: The Basics for Success*” by University of California in Coursera (University of California, n.d.); “*Introducción a la Gestión de Proyectos*” by UPValencia in EdX (UPValenciAx, 2015); “*Introduction to Project Management*” by AdelaideX in EdX (AdelaideX, 2016). These courses followed a similar structure both in terms of contents and teaching/learning activities:

- Structured units for each component of project management
- Videos with lectures
- Support documents
- Quizzes for knowledge check

These courses are clearly xMOOCs, MOOCs with a teacher and content-centered approach (Conole, 2015; Guàrdia et al., 2013; Lugton, 2012). They focused on providing knowledge about each stage of project management. There was no alignment with the PBL model that we were looking for, nor with the 10 design principles for MOOCs listed above. Still, these MOOCs were useful in terms of providing an overview on contents in project management: idea, planning, risk analysis and evaluation.

Still, we wanted to have an approach that was more engaging for the learners and teachers. During our search, we came in contact with *Design Thinking*. Design thinking, as defined by Tim Brown from IDEO (2016) is “a human-centered approach to innovation that draws from the designer’s toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success”. It provides a creative and human-centered way to address challenges, problems or projects. IDEO has published a toolkit with a specific approach for using design thinking in education (IDEO, 2012). There was a clear alignment between our vision for the course and the design thinking approach: the focus on the challenge; use of technology; people-centered; collaboration. We went back to the MOOC providers and analyzed two MOOCs in the field of design thinking. The two courses analyzed were cMOOCs, MOOCs with a focus on the student and building networks of collaboration (Conole, 2015; Lugton, 2012):

- Design Thinking for Innovation, by University of Virginia (Coursera)
- Product Design: The Delft Design Approach (EdX)

The first MOOC is a very interesting course in terms of the way the lessons are structured:

- Modules are built around questions
- Video(s) introducing the module with general contents and concepts
- Video(s) with case-studies related with the module content, including interviews with professionals in the field
- Video(s) focusing on one specific approach or tool of the design-thinking framework

Introducing the content in general terms gives the student the global perspective. Then, providing the “real-world” perspective of the same module, with concrete experiences narrated with people involved in the case. Finally, going back to the theory but focusing on practical tools or instruments that the students can use in different contexts.

In terms of assessment, this MOOC only has one assignment: an individual reflection by the student, assessed by peers. Even though the assessment is open, the MOOC provides several support tools to help students in completing the assignment and peer reviewing:

- Clear instructions about what is expected from each role
- Assessment rubric with instructions for applying and scoring
- Example of the completed assignment
- Peer-review practice quiz

In terms of collaboration, the course includes different *fora* and study groups where students interact with each other and with mentors. Summarizing, the main lessons learned from this MOOC were as follows:

- Structuring the course around questions
- Using short videos with different perspectives of the same content/issue
- Providing useful tools that students can take away with them to apply in other contexts
- Robust guidance for completing the course
- Networking and collaboration opportunities

“*Product Design: The Delft Design Approach*” (TU Delft Online Learning, 2015), provides important insights in terms of structuring the course, interacting with students and problem-based assessment. The general course framework, the way the lessons are structured, how the assignments are introduced, all of these contribute to helping students engage with the course materials and activities. The course has 7 modules with a similar structure.

- Introduction video that reviews the work of the previous module and introduces the new work
- Two or more short lectures in video
- Quizzes to control the learning of the module
- Exercises with clear and complete description of what the student is expected to do
- Templates for the exercises to guide the student
- Benchmark videos that document “model” students completing the exercises, so the student can compare their work
- Example of completed exercises
- Videos with experts related with the module
- Videos with reflections about the assignments

This MOOC has a strong social and collaborative component. Students use the discussion *fora* to publish and review their work and their colleagues’ work. The course uses social networks for helping creating a community.

The main lesson retrieved from this MOOC is the importance of supporting and guiding students in online distance learning. The MOOC includes several strategies with this sole purpose. Lectures were very short videos, with no more than 7 minutes. These small chunks of information make it easy for the student to keep attentive. Following every lecture, there was a quiz, so that the student could check their learning. Another interesting strategy was having two “model” students that had go through the course and complete every task. These students are always present through videos and they interact with the camera in a very informal way to create empathy with the learner. The delivery of the assignments is also student-centered. Every assignment includes very clear and complete instructions of the tasks the student has to accomplish. Well-structured templates are provided to facilitate and guide the students. They can watch the “model” students going through the whole process of completing the assignment. Experts provide insights about the topic of the week and give real world context about the work that is being done. Every week, the teaching team prepares a video with reflections about some of the issues raised in the weekly forum. Another interesting aspect is that weekly assignments build on the assignment of the previous week. Using this strategy, at the end of the course, students have a complete project implemented step-by-step and did not feel overwhelmed by a big task or demotivated by completing small erratic tasks.

All these strategies represent a great amount of work and a huge effort on planning and producing resources. But it provides a structured support to the student that is a crucial aspect in MOOCs and in other distance learning contexts.

Table 1 summarizes the analysis of the five MOOCs in the framework the 10 design principles listed above (Guàrdia et al., 2013), using “y” for compliance and “n” for non-compliance.

**Table 1: Analysis of MOOCs using the 10 design principles by Guàrdia et al. (2013)**

	MOOC U.California Coursera	MOOC UPValencia EdX	MOOC AdelaideX EdX	MOOC UVirginia Coursera	MOOC TUDelft EdX
Competence based approach	n	n	n	y	y
Learner empowerment	n	n	n	y	y
Learning plan and clear orientations	y	y	y	y	y
Collaborative learning	n	n	n	y	y
Social networking	n	n	n	n	y
Peer assistance	n	n	n	y	y
Quality criteria for knowledge creation and generation	n	n	n	y	y
Interest groups	n	n	n	y	y
Assessment and peer feedback	n	n	n	y	y
Media-technology-enhanced learning	y	y	y	y	y

From table 1 it is clear that the two last MOOCs analyzed have a stronger and more solid design. They provided the most valuable lessons to the authors.

### Implementing the lessons learned

After the conceptualization stage of the 7Cs of Learning Design, we proceeded to the next: *capture*, *create*, *communicate* and *collaborate*. These consist in defining the practical approach to the course.

The first step was to define the content of the course (*capture* and *create*). We decided to have weekly modules, each built around one question related with project management. We were trying to make students understand, right from the start, the relevance of what they were learning:

1. Where to start? (Idea)
2. Who cares about my project? (Stakeholders)
3. What has to be done and when? (Planning and scheduling)
4. Who will do what? (Project team)
5. What types of education resources should I include? (Content development)
6. How users access contents? (Information architecture)
7. How much will it cost? (Budget)
8. What problems should I expect? (Risk analysis)
9. Did it go well? (Evaluation)
10. Can I do it better next time? (Improvement plan)

In terms of general structure of the course, we wanted to provide as much help to the students as possible, to keep them interested, motivated and avoiding getting overwhelmed by the course. We decided that every module should have the same structure and follow the same weekly calendar. We wanted students to know, from start, what to expect from us and what was going to be expected from them. In terms of structure, every module had the following components:

- Introduction video, reviewing the previous week and introducing the new week.
- Short lecture videos
- Quiz about the module
- Additional readings
- Assignment:
  - Explanatory video
  - Written instructions
  - Template
  - Completed example

Another important issue was the balance between the theoretical and practical components. We wanted students to feel that what they were learning was relevant to them. Working with adult learners, relevance is an important issue (Newman & Peile, 2002). Also, we wanted students to contribute with their experiences and making the course more enriching to all. Assignments are a great opportunity to achieve this. The strategy adopted was to have a small weekly assignment, linked to the theme of the module. In the first week they worked on the idea using a mind-mapping tool. On the second week, they identified stakeholders, defined priorities and analyzed their needs. The same strategy was used for the following weeks. At the end of the course students completed a full project, decided by them in every aspect, according to their ideas and interests. At the end, students had two weeks to review the project and present it in a single integrated document. As the assignments were aligned with course content, this final step was important to integrate the new knowledge (*Consider* and *Consolidate*).

A final issue of the course was the final exam that was compulsory for every course of the Master. As our course has a strong practical component, we decided to follow the same line and do a case-study analysis focusing in critical aspects of project management. There was an intentional alignment between the exam and the weekly modules and assignments to increase the consistency of the course (Anderson, Krathwohl, & Bloom, 2001).

*Collaborate* and *Communicate* were the “Cs” where there was less investment. It is intended to improve these two missing Cs in the next edition.

## Conclusion

Designing a e-learning course from scratch is an opportunity to innovate and learn. MOOCs are learning tools for learners to acquire knowledge and competences in different areas. But MOOCs create opportunities to “learn by example” how to teach in innovative ways, to (meta)e-learn. We have available courses from universities around the world, with different views, different strategies with different teams. It is a wonderful opportunity to learn about learning, teaching, assessing, motivating and engaging students.

In the course “*Education Projects Management*” we invested in analyzing these five MOOCs and it was an important step that helped us to define the strategy for the course. As a result, students were engaged and motivated and only two students of a total of twenty-two did not complete the course (one of them never logged on). All the others completed the 14 assignments on time, as requested. Feedback from students was very positive and the results of the final exam were coherent with their performance during the semester.

The main lesson learned from MOOCs was the importance of having a well-structured guidance system that facilitates and supports learning. Making the learning process easy for the students does not mean lowering the standard. It means putting the student at the center, creating a supportive and transparent learning environment where students know, at all times, what is expected from

them and what to expect from us. It is not an easy task and it requires thorough planning, thinking ahead and a lot of work. We were not able to implement every detail of our strategy but next year we will do better and the year after that one, we will do even better. Learning about teaching is a never-ending process.

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