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## AN ON-LINE TEACHER TRAINING COURSE ON EDUCATION FOR SUSTAINABILITY: ASSESSMENT OF OPEN (MOOC) AND CLOSED VERSIONS OF THE COURSE

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### Abstract

This paper reports the experience of a first edition of an on-line teacher training course on education for sustainability both for open (MOOC) and closed versions, and the respective assessment. The course was implemented by the Portuguese Distance Learning University (Universidade Aberta – UAb) under a protocol with the General Secretariat of Education and Science of the Portuguese State in an Open EdX platform (NAU). The results show that the planning, preparation of own materials suitable for the target audience and the validation of this type of open/massive and certified closed courses by different actors, before the course taking place is fundamental. It was also confirmed by the positive participation and feedback from the participants. In addition, the collaborative component in both course versions were fundamental to ensure success in this type of training actions. Differences in both versions were discussed as well as recommendations for future editions.

**Keywords:** Education for sustainable development, MOOC, teachers training, collaborative learning

### Introduction

Higher education institutions (HEIs), within the scope of their duties and competencies, and also considering the implementation of the Sustainable Development Goals (SDGs) – Agenda 2030 (UN, 2015), should contribute to ensuring that all students acquire knowledge and skills needed to promote sustainable development, including, among others, through online courses.

In Portugal recent strategies about education for environmental sustainability (e.g. APA, 2016, ME, 2017) recommend the promotion of good practices and projects development in this area in all levels of education. In view of these diverse recommendations and strategies, it is urgent to train and provide trainers, particularly teachers of formal education, with tools so that they can put Sustainability Education into practice in their professional activity. Massive Online Open Courses (MOOCs) have raised remarkable attention throughout the last decade as their initial objective is to provide massive open online education within a collaborative and flexible ways of learning (Teixeira & Mota, 2014).

Earlier experiences have shown that MOOC can have an important role on promoting sustainability literacy (Coelho et al., 2015; Otto et al., 2019). However, in Portugal, full online distance courses were only recently allowed in teachers lifelong training certification and the courses must be closed and have a small number of students with a ratio of 1 teacher/15 students. (CCPFC, 2016).

In this sense, the Portuguese Distance Learning University (UAb) implemented an open (MOOC) and a closed course, for teachers' certification, called Education for Sustainability, developed under a protocol with the General Secretariat of Education and Science of the Portuguese State. The main objective of this paper is thus to report the experience of the first edition of the course (on its open and closed version), by: (a) Presenting the structure and development of the open and closed courses on Education for Sustainability; (b) Justifying the options taken for its development; (c) Analysing the results of student assessment of both open and closed versions of the course; (d) Envisioning improvements for future editions of the course.

## **Methods**

### ***Design of the Course***

The aim of this course was to train and provide trainers, in particular teachers of formal education, but not only, with tools to implement Education for Sustainable Development (ESD) projects in their professional activity. The course syllabus was divided into the following 3 topics, each scheduled for 2 weeks, preceded by a boot-camp module (with a workload corresponding to 1.5 European Credits Transfer System, ECTS): Topic 1. Main concepts, policies and strategies; Topic 2. Areas of action in Education for Sustainability; Topic 3. Implementation of Education Projects for Sustainability. The scientific contents followed the recent literature and United Nations recommendations in this thematic area (e.g. Annan-Diab & Molinari, 2017; UNESCO, 2012a; 2012b; 2017).

The courses (MOOC and closed course) were delivered on the NAU platform, the technical publishing infrastructure and course monitoring services for large audiences oriented towards Public Administration and Higher Education (<https://lms.nau.edu.pt>).

The design and development of the MOOC and closed course went through the following steps:

1. Creation of a Course Guide for each course, composed of the General Objectives, the Specific Contents and Objectives of each Topic, the Learning Environment (the Open EdX platform, used by NAU), the Methodology (based on the Virtual Pedagogical Model of the Open University (Pereira et al., 2007), Resources, Certification (certificate of completion of the course – as long as they performed 2 of the 3 e-activities proposed – or formal accreditation – which required additional work and the payment of a fee, in the case of the MOOC); creation of a video to publicize the course to be hosted on the NAU e-learning platform.
2. Conducting a validation of the objectives, contents and design of the course, through a focus group with a group of specialists and teachers (six in total) in the area and pre-test of the course already implemented on the platform, with two specialists in e-learning. These tests allowed to make several improvements to the course, in terms of content and pedagogy of open/closed, online and massive course teaching.

3. Construction of Resources and implementation of the final version of the course on the NAU platform. Small PDF manuals were developed, and interactive videos were created, with questions embedded through the H5P software and formative and summative activities were built, designed to promote research and critical thinking of the participants (following Leicht et al., 2018). At week 4 a 1-hour synchronous session Webinar was organized with an invited speaker that presented and discussed a success case of ESD implementation at a school. The session was recorded and made available on the course platform.
4. The MOOC and closed course were taught by 2 teachers who accompanied the participants daily for the seven weeks of its duration (from January to March 2020).
5. The course was designed favouring a hybrid approach (Crosslin, 2014), with characteristics of an xMOOC and a cMOOC, in which the participants could choose individual or collaborative e-activities, depending on their preferences or constraints. Participants had available one e-activity by topic (3 in total). E-activities were based on a quiz, sharing of photos and videos of examples of ESD good practices, and reflection about new project themes proposals within ESD. In the case of the MOOC, the e-activities were evaluated by peers, using pre-defined criteria in order to obtain a certificate of participation. In the case of the closed course, the e-activities and a final project assignment was evaluated by the course teachers. For course certificates (in both open and closed) it was mandatory to complete 2 of the 3 e-activities. In the case of the closed course incentives were given for each e-activity successfully achieved (0.5 grades for e-activity). Every week the teachers motivated participants to explore new resources and share and discuss them with the others in the debate forums.
6. To evaluate the course quality, we used the MOOC Quality Checklist developed by the MOOQ project (MOOQ, 2018; Teixeira et al., 2018).

The MOOC was open to any teacher or any participant that wanted to enrol in the course through the NAU platform. In the case of the closed course, the course was first certified by the national body of life long teacher training, and chosen the first 30 (the maximum number allowed for this type of courses) school teachers that registered in the course through UAb registration system.

### **Course assessment**

A pre and post course questionnaire survey was developed aiming, respectively, characterize the participants' profiles and their assessment of the course. The pre-course questionnaire asked about age, education, and motivation for enrolment, previous e-learning and use of open EdX platform experience. The assessment questionnaire was adapted from UAb course assessment questionnaire, used in the institutional UAb MOOCs site (<https://aulaberta.uab.pt/>). It was developed in Google Forms and delivered to the participants of both courses, respectively at the beginning and end of the courses. The post questionnaire assessed the following dimensions: *Navigation* (5 questions with a 5-Point Likert Scale), *Contents and Activities* (9 questions with a 5-Point Likert Scale), *Interaction and Teaching Support* (2 questions with a 5-Point Likert Scale), *Development of knowledge, skills and attitudes* (4 questions with a 5-Point Likert Scale), *Time Management* (3 questions with a 5-Point Likert Scale), and *Level of Global Satisfaction* (1 question with a 5-Point Likert Scale). Apart from these, there were open response questions about Positive and Negative issues of the course, Suggestions and, if that was the case, reasons for not completing the course. There were some small differences in the questionnaires of the 2 course versions: a question about peer evaluation in the MOOC and a question comparing

online with face to face training course experiences in the closed course. Success rates in both courses were calculated and the e-activities collaboration levels and the forums participations were also analysed.

## Results and discussion

A total of 702 participants enrolled in the courses, 673 in the MOOC and 29 in the closed course. In the MOOC 136 students successfully completed the course, which corresponds to a 19.5% completion rate. From these 5 participants also requested accreditation. These values were well above the average of the MOOCs completion rates, one of the main criticisms of this type of course (Waks, 2016). In the case of the closed course, 54 % of the participants successfully completed the course, with an average of 8 in 10 for final classification. At the end of the course, the assessment questionnaire obtained a response rate of 20% (141 responses) in the case of the MOOC and 48% (14 responses) in the case of the closed course.

The participants' profile, according to the pre-questionnaire, are presented in Table 1.

Table 1: Course participants' profile

Course	MOOC	Closed course
Age	Between 20-30: 7% Between 31-40: 32% Between 41-50: 36% Between 51-60: 21%	Between 20-30: 16% Between 31-40: 13% Between 41-50: 41% Between 51-60: 25%
Gender	Male: 26% Female: 74%	Male: 14% Female: 86%
Education	Master's degree or above: 70% High school degree or less: 17%	Master's degree or above: >80%
Previous e-learning experience	None: 13% Some: 78%	None: 13% Some: 81%
Previous open EdX platform experience	None: 17% Some: 77%	None: 72% Some: 28%

The participants profiles are rather similar in terms of age and gender distribution (being the closed course participants somewhat older and with more women). In terms of education we find some more latitude in the MOOC, with some high school degree participants. The previous e-learning experience is also very similar but not the previous open EdX platform experience, as most participants in the closed course had no experience and most of the participants of the MOOC had some experience, namely in other NAU courses.

The assessment results show rather positive values in the dimensions Navigation, Contents and Activities, Interaction and Teaching Support, Development of knowledge, skills and attitudes, Time Management and Level of Global Satisfaction (see Table 2, below).

Table 2: Courses' assessment results (dimension averages, scale from 1 to 5)

Dimension	MOOC	Closed course
Navigation	4.13	4.50
Contents and Activities	4.36	4.68
Interaction and Teaching Support	4.12	4.11
Development of knowledge, skills and attitudes	4.46	4.68
Time Management	4.48	4.71
Global Satisfaction	4.43	4.64

The comparison of the 2 courses' global results shows that the closed course participants rated most of the dimensions higher than the MOOC participants. In the case of the *Navigation* dimension, that may be explained by different experience and practice with the Open EdX platform in the 2 groups of participants. The dimension of *Interaction and Teacher Support* was rated in average in a rather similar way in both courses the Teacher Support being rated higher than the Student Interaction level. A component in which the results were still positive, but to a lesser extent was Peer Evaluation (a component of the *Contents and Activities* dimension) in the case of the MOOC, with an average of 3.84. We believe that this was due to a technical problem with the platform, namely, the fact that it did not assign an extension to the file to be transferred and peer evaluated, making it difficult for participants to open it. Even though they were supported (repeatedly) by teachers with instructions on how to proceed to remedy this problem, this had repercussions on the assessment of the peer evaluation process. Regarding the reasons why they did not complete the course, most of the participants mentioned lack of time, namely due to the transition to teleworking, as the COVID-19 pandemic began when the course was taking place. An interesting result, in the closed course, was the average score of 4.14 in the question comparing online to face to face teacher training (the scale ranged from 1-inferior to 5-superior). These results show that it is not only possible to develop online teacher training with quality but also with some advantages over face to face training. That became even more evident a few months later with a surge in the online teacher training offers due to the COVID-19 pandemic.

Although collaborative e-activities were encouraged, only about 10% of the participants, in both courses, choose to work in group. One reason that may explain these results is the fact that online group work and coordination is more demanding than doing the assignments individually. Non-mandatory interaction in the forums (sharing of resources and initiatives) were proportionally higher in the open course. In the certified and closed course participants seemed to be more focused on the mandatory and graded tasks.

With the balance of the course completed, the aspects to be improved are mainly of a technical nature associated with the platform: ensuring better functioning of the peer evaluation, resolve the issue of the platform not sending a copy of messages from the forums to email, which allows for better teacher monitoring, and the fact that participants are unable to attach files to forum messages, which limits collaborative work. In addition, some changes in the schedule of activities will also be considered and will be implemented in a 2<sup>nd</sup> edition of the course. Bearing in mind collaborative and team advantages for the e-learning process (Teixeira & Mota, 2014) and in particular considering the holistic and integrated approach of ESD (Annan-Diab & Molinari, 2017; UNESCO, 2012b; 2017) we will try to rethink their design, support tools and evaluation so that more participants will choose collaborative e-activities. Incentives, like badges, could be used in this context, as they can foster learning engagement and creativity (Bidarra & Rusman, 2017).

## Conclusions

It can be concluded that the planning, preparation of own materials suitable for the target audience, the validation of this type of open/massive and certified closed courses by different actors and the collaborative component and exchange of experiences, were fundamental to ensure success of the training actions. HEIs with their experience and knowledge thus have a fundamental role in the implementation of these courses and can contribute to teach wider audiences, outside the formal educational system, on topics as necessary as those related to the Sustainable Development Goals. Both open and closes courses had high level of satisfaction, highlighting that MOOCs can be a learning tool useful for teacher training.

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