

MADRID, SPAIN

17 - 20 JULY

MCCSIS 2018

MULTI CONFERENCE ON COMPUTER SCIENCE AND INFORMATION SYSTEMS

Proceedings of the International Conference
e-Learning 2018

Edited by:
Miguel Baptista Nunes
Pedro Isaias



iadis

international association for development of the information society

INTERNATIONAL CONFERENCE
E-LEARNING 2018

part of the

MULTI CONFERENCE ON COMPUTER SCIENCE AND
INFORMATION SYSTEMS 2018

**PROCEEDINGS OF THE
INTERNATIONAL CONFERENCE**

E-LEARNING 2018

**Madrid, Spain
JULY 17 - 19, 2018**

**Organised by
IADIS
International Association for Development of the Information Society**

Copyright 2018

IADIS Press

All rights reserved

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Permission for use must always be obtained from IADIS Press. Please contact secretariat@iadis.org

Volume Editors:

Miguel Baptista Nunes and Pedro Isaias

Computer Science and Information Systems Series Editors:

Piet Kommers and Pedro Isaias

Associate Editor: Luís Rodrigues

ISBN: 978-989-8533-78-4

TABLE OF CONTENTS

FOREWORD	ix
PROGRAM COMMITTEE	xiii
KEYNOTE LECTURES	xv
TUTORIAL	xvii

FULL PAPERS

THE COLLIDING VIRTUAL AND PHYSICAL ACADEMIC WORKING ENVIRONMENT <i>Hilary Collins</i>	3
A TRAINING PROGRAMME TO SUPPORT AQUASmart PROJECT EXPLOITATION <i>Elsa Marcelino-Jesus, Andreia Artifice, Joao Sarraipa, Gary McManus and Fernando Luis-Ferreira</i>	11
MOOCS AND TEACHER PROFESSIONAL DEVELOPMENT: A CASE STUDY ON TEACHERS' VIEWS AND PERCEPTIONS <i>Nikolaos Koukis and Athanassios Jimoyiannis</i>	19
DETERMINING THE EFFECTIVENESS OF A MASSIVE OPEN ONLINE COURSE IN DATA SCIENCE FOR HEALTH <i>Abrar Alturkistani, Josip Car, Azeem Majeed, David Brindley, Glenn Wells and Edward Meinert</i>	27
LISTENING AND LEARNING? PRIVILEGING THE STUDENT VOICE IN E-LEARNING DISCOURSES OF WITHDRAWAL: A QUALITATIVE ANALYSIS <i>Hayley Glover, Frances Myers, Bronagh Power, Carey Stephens and Jane Hardwick</i>	35
EFFECTS OF ONLINE EDUCATION ON ENCODING AND DECODING PROCESS OF STUDENTS AND TEACHERS <i>Riaz Ahmed</i>	42
INFLUENCE OF VIRTUAL SIMULATOR ON THE CHANGE OF VIEWS ON BEHAVIOUR IN TRAFFIC. CASE STUDY <i>Jovica Vasiljevic, Goran Jovanov, Radovan Radovanovic, Nemanja Jovanov and Djordje Vranjes</i>	49
ASSESSING THE IMPACT OF STUDENTS' ACTIVITIES IN E-CLASSES ON LEARNING OUTCOMES: A DATA MINING APPROACH <i>Lan Umek, Nina Tomažević, Aleksander Aristovnik and Damijana Keržič</i>	57
ONLINE VS. CLASSROOM STUDENTS IN AN UNDERGRADUATE UNIVERSITY DEGREE <i>Nello Scarabottolo</i>	65

MANULEARNING: A KNOWLEDGE-BASED SYSTEM TO ENABLE THE CONTINUOUS TRAINING OF WORKERS IN THE MANUFACTURING FIELD <i>Enrico G. Caldarola, Gianfranco E. Modoni and Marco Sacco</i>	73
AN EMPIRICAL STUDY ON THE IMPACT OF USING AN ADAPTIVE E-LEARNING ENVIRONMENT BASED ON LEARNER’S PERSONALITY AND EMOTION <i>Somayeh Fatahi and Shakiba Moradian</i>	81
PROCESS-BASED ASSISTANCE METHOD FOR LEARNER ACADEMIC ACHIEVEMENT <i>Joffrey Leblay, Mourad Rabah, Ronan Champagnat and i Samuel Nowakowski</i>	89
AN ANALYSIS OF EXCHANGES IN CHINESE SOCIAL MEDIA. ARE SOCIAL NETWORKING SITES CONTRIBUTING TO CHEATING? <i>Andrew D. Madden, Ting Yu Luo and Miguel Baptista Nunes</i>	97
MULTIPLE CHOICE QUESTIONS: ANSWERING CORRECTLY AND KNOWING THE ANSWER <i>Peter McKenna</i>	105
INVESTIGATING THE ROLE OF BIOMETRICS IN EDUCATION – THE USE OF SENSOR DATA IN COLLABORATIVE LEARNING <i>Georgios A. Dafoulas, Cristiano Cardoso Maia, Jerome Samuels Clarke, Almaas Ali and Juan Augusto</i>	115
IMPLEMENTATION OF COMPUTER GAMES ELEMENTS INTO THE VIRTUAL EDUCATIONAL ENVIRONMENT <i>Iryna Vereitina and Yurii Baidak</i>	124
APPLYING THE QUANTITATIVE EVALUATION FRAMEWORK MODEL FOR ENSURING THE MOOC QUALITY <i>Bertil P. Marques, Ana Barata, Piedade Carvalho, Ana Silva, Patrícia Queirós and Paula Escudeiro</i>	131
 SHORT PAPERS 	
ACADEMIC IDENTITIES AND THE DIGITAL SELF? A CROSS CULTURAL STUDY OF DIGITISATION IN HIGHER EDUCATION TEACHING <i>Hayley Glover, Frances Myers and Hilary Collins</i>	141
MONITOR FOR ICT INTEGRATION IN FLEMISH EDUCATION (MICTIVO): THE THEORETICAL AND METHODOLOGICAL FRAMEWORK <i>Pieter Jan Heymans, Eline Godaert, Jan Elen, Johan van Braak and Katie Goeman</i>	146
INVESTIGATING THE ROLE OF SOCIAL NETWORKS IN ENHANCING STUDENTS’ LEARNING EXPERIENCE: FACEBOOK AS A CASE STUDY <i>Rdouan Faizi and Sanaa El Fkihi</i>	151
THE INTERACTIVE SURVEYING INSTRUCTOR (ISI) FOR TEACHING OPTICAL-MECHANICAL INSTRUMENT READINGS IN SURVEYING ENGINEERING <i>Jaime Garbanzo León and Gustavo Lara Morales</i>	156
E-LEARNING SYSTEM FOR ELECTRONIC CIRCUIT CONSTRUCTION USING HANDWRITING RECOGNITION AND MIXED REALITY TECHNIQUES <i>Atsushi Takemura</i>	161

HOW PEDAGOGICAL DESIGN OF TECHNOLOGY-ENHANCED ACADEMIC COURSE PROMOTES LISTENING TO STUDENT VOICE AND REFLECTING ON STUDENTS' PERCEIVED LEARNING? <i>Orit Avdiel, Ina Blau and Tamar Shamir-Inbal</i>	167
THE PROCESS OF PLANNING AND BUILDING A XMOOC: A PRACTICAL REVIEW <i>Vitor Gonçalves and Bruno Gonçalves</i>	171
RESEARCH ON MODERN METHODS OF ADOPTING AND IMPLEMENTING E-LEARNING WITHIN COMPANIES <i>Anca Alexandra Purcărea, Mirona Popescu and Simona Gheorghe</i>	177

REFLECTION PAPERS

THE COURSERA CASE AS THE PREFIGURATION OF THE ONGOING CHANGES ON THE MOOC PLATFORMS <i>François Acquatella, Valérie Fernandez and Thomas Houy</i>	185
SEMANTIC WEB AND QUESTION GENERATION: AN OVERVIEW OF THE STATE OF THE ART <i>Andreas Papasalouros and Maria Chatzigiannakou</i>	189
CHARTING NEW TERRITORIES: WADING IN THE E-LEARNING WATERS AT A PROMINENT UNIVERSITY IN JAMAICA- CASE STUDY EXPLORING THE FIRST FULLY ONLINE PROGRAMME OVER THE PERIOD 2013-2017 <i>Kamla S. Anderson</i>	193
MOBILE PROBABILITY AND STATISTICS COURSEWARE REFLECTIONS <i>Alisa Izumi</i>	197
ORGANIZING OF INTERNATIONAL “KANGAROO” COMPETITION IN ALBANIA WITH PERSONALIZED ANSWER SHEETS AND ASSESSMENT BY SCANNER <i>Romeo Tenegexhi, Loreta Kuneshka and Adrian Naço</i>	201
ISSUES THAT REVOLVE AROUND THE CONCEPTS OF DISTANCE EDUCATION AND E-LEARNING <i>Maria Georgiou</i>	205

DOCTORAL CONSORTIUM

RECOMMENDER SYSTEM: COLLABORATIVE FILTERING OF E-LEARNING RESOURCES <i>Baba Mbaye</i>	213
--	-----

AUTHOR INDEX

THE PROCESS OF PLANNING AND BUILDING A XMOOC: A PRACTICAL REVIEW

Vitor Gonçalves¹ and Bruno Gonçalves²

¹*Research Center in Basic Education, Instituto Politécnico de Bragança, Portugal*

²*Externato Infante D. Henrique, Braga, Portugal*

ABSTRACT

The Massive Open Online Courses (MOOC) apply, nowadays, as an opportunity for teachers to invest in their continuous training aiming to improve or update knowledge and skillsets on their respective scientific areas. Taking these claims into account, the authors of this paper planned, developed, attended and evaluated an xMOOC, reportedly named as a “MOOC on MOOCs and other educational technologies”, which is meant for the continuous training of teachers. This MOOC proved to be the main source of information and asynchronous interaction of the online training course organized at the end of the 1st semester of 2015. Considering this formative experience while promoting some changes, we present the planning, development of another MOOC for a 2nd edition of this online training course organized in the beginning of the 2st semester of 2018, characterizing its creation process not only on the technological level but on the pedagogical and content-related levels. The results were obtained through a categorization process of a set of stages that characterize the development process of a continuous teacher training focused MOOC. This study can contribute towards the deepened comprehension of the development of a MOOC and, most of all, contribute towards the fitting of this technology in the teacher training process as well as in the overall education system.

KEYWORDS

MOOC, Development Process, Teacher Training, Udemy

1. INTRODUCTION

The Massive Open Online Courses (MOOC) correspond to a relatively recent distance based educational technology that allows anyone to acquire a given skillset which may, eventually, be useful to apply in their area of expertise. Considering this assumption, the MOOC can represent an opportunity for teachers to invest in their ongoing education, regardless of geographical location, temporal limitations as well as the regular contingencies that come with the teacher profession. Taking this into account gives the MOOC an edge, making them a powerful and emerging learning strategy with repercussions in both the educative and continuous teacher training areas. As it so happens in the classroom training, teachers can professionally develop themselves through MOOCs, aiming to improve or update their knowledge and skillset, which can then increase the efficiency of their lessons regarding technologies meant to be applied inside the classroom. Note that, in previous researches, the authors of this paper presented the MOOC as an educational technology that can mediate or even support the continuous training of teachers, while defending that the presential or classroom training remains essential when it comes to different formation typologies, especially on the pedagogical level such as, for example, proximity between pairs, socialization and sharing personal experiences amongst the intervenients of the teaching and learning process. The authors of the paper made in 2015, Assessment of platforms for creation and distribution of a MOOC for the continuous training of teachers, developed and used a MOOC on Udemy called “MOOC on MOOCs and other educational technologies” targeting the continuous teacher formation. The course was done through a workshop (25 hours) that assured the following objectives: (i) Understand the theoretical and practical knowledge about MOOCs and their role in the current digital society; (ii) Contribute towards the growth of the teacher as a professional and a human being; (iii) Promote the enrichment of knowledge and skills in the realm of conception, development and use of MOOC by teachers. Seventeen professionals, such as childhood

educators and primary through high school teachers, with different academic degrees as well as different areas of expertise participated in this course's edition.

The 2nd edition of this online course or online workshop was scheduled for the first semester of 2018, which is suffering some changes in comparison to its spring. Therefore, the case study is adopted in the current paper, since it describes the development process of the 2nd edition on the technological, pedagogical and content-related levels as well as the respective evaluation, which is done by four users: four teachers (students) from four different teaching levels, selected from the sixty-eight enrolled users.

2. LITERATURE

Taking the revision of literature into account, the main goal is to contextualize both fundamental thematic of the current research, which are the teacher training and the MOOC.

2.1 Training Teachers

The constant and ever-growing mutations that occur in society are usually accompanied and, sometimes, even boosted by technological changes. Many of them have come to justify certain educational modifications.

Taking advantage from this tide of change, teachers should, not only acknowledge that technologies can be useful as a basis of help and support to the teaching and learning process but use them in a way new learning method would be unlocked from those very technologies as well. Thereby, "teachers should be partners in the design and conduct of ICT activities and not mere spectators and performers of tasks" (Penteado & Borba, 2000, p. 29).

We can claim that, due to massification of internet usage, the continuous teacher training may be increasingly connected to digital learning nets. Therefore, it becomes crucial that teachers can match this change and, at the same time, develop skills, acquire new knowledge and, naturally, adopt an educational practice with the ICT. In this sense, mobilization of teachers towards the acquisition or update of technological skillsets, through continued training courses that allow the usage of technologies is of the essence, as it implies that they have "the opportunity to learn and observe new ICT teaching methods, to share issues and problems with others and to explore new ideas with experts and peers" (Baylor & Ritchie, 2002, p. 410). These training courses are, for example, foreseen in Portaria n.º 731/2009 of July 7th (D. R., 2009) as it concerns the ICT Competency Training and Certification System (*Sistema de Formação e de Certificação em Competências TIC*) for teachers in Portugal who are performing functions in educational facilities, which include pre-school, primary school and high school. This training system is organized in three distinct levels: Training in digital skills (level 1); Training in TIC related pedagogical and professional skills (level 2); Training in TIC related advanced skills on education (level 3). Therefore, it's up to each teacher, according to their skillsets, objectives, professional culture and, above all, the real context that it's inserted into, to select the most appropriate formations regarding their professional reality so that, through them, it becomes possible to improve their practice with the TIC and, essentially, improve the quality of the educative process.

2.2 Massive Open Online Courses (MOOC)

In generic terms, the MOOC favor an inclusive learning, with participation of students with distinct interests and motivations (Lobo, 2012), but also allow a learning process based on interaction and group knowledge. They don't demand access prerequisites and possess an open and flexible itinerary (Codarin, 2012). According to Edu Trends Report (Monterrey, 2014), there are other advantages to highlight such as: positioning the brand and the best teachers, strengthen the MOOC as a tool that can captivate and attract students towards formal programs; supply an offering of alternative and continuous education programs; enter new markets; and, finally, develop a new economic model to approach emerging markets.

According to Siemens (2013), "the MOOCs are a continuation of the trend in innovation, experimentation and the use of technology initiated by distance learning and online, to offer learning opportunities in a massive way" (Siemens, 2013, p. 5). Littlejohn (2013) claims that a MOOC can be defined as a course that

offers open access, based on a model of distance education, promoting a large scale interactive participation (Ma DLee et al., 2013) and can be one of the most versatile methods to offer quality education, especially to those who live in distant and disfavored regions (Daradoumis et al., 2013). Thus, a MOOC “is in principle an open online course (free of charge, with no prerequisites for participation and using open educational resources) and massive (offered for a large number of students)” (Mattar, 2013, p. 30).

Presently, there is a convergence in the literature regarding the distinction of the MOOC as suggested by Downes (2012), which designates some by cMOOC and others by xMOOC (Watters, 2012). The cMOOC are centered in context and match a connectivist perspective. They base themselves off of a collaborative methodology and “are structured from self-organized learning, centered on gaining meaning through community experience, using participation tools such as blogs, RSS feeds, and other decentralized methods” (Torres, 2013, p. 66). Some examples from courses of this typology stand out, such as: Connectivism and Connective Knowledge course (CCK08); Digital Storytelling (DS106) and Learning Analytics and Knowledge (LAK12) (Rodriguez, 2012). The xMOOC, which originated from MIT/Stanford, are centered on contents and have a more rigid organization, capping creativity. They are the most common model of MOOC and follow an instructivist course project, whose learning objectives are defaulted by the instructor (Littlejohn, 2013) and the materials are planned out and prepared beforehand. Students watch video lectures, read recommended papers and solve quizzes (Bali, 2014). Udemy, EdX, Coursera, Udacity and FutureLearn are a few examples of the available platforms (Auyeung, 2015; Downes, 2013). Udemy was founded by Eren Bali and Oktay Caglar and currently counts with over 11 million students and 40.000 courses (some free and others with associated costs, depending on its type). It’s an example of a platform that allows the creation of courses without the need for any institutional connection (useful for any promoter that desires to develop and disseminate their own MOOC). As a specific example of xMOOC we can share our MOOC about MOOCs available in <https://www.udemy.com/mooc-sobre-moocs-e-outras-tecnologias-educativas/>. This platform and xMOOC course will be characterized in detail in the presentation and results discussion chapter.

3. METHODOLOGICAL FRAMEWORK

The case study is adopted in the current paper in order to answer the following investigation question: How to characterize the development of an xMOOC? The methodology of the case study aims to explain a given situation and describe an object or phenomenon, in this case, the stages that make up the development process of an xMOOC, particularly on Udemy. Guidelines shared in the training process were intended to help instructors create well-designed xMOOC and to evaluate how the teachers develop their xMOOC. In this study, it is made use of qualitative investigation techniques (content analysis) aiming to understand, thoroughly, the phenomena that occur in this particular case in study and the information in the logbook or in the investigator’s journal resulting of participating observation is applied as a data retrieval tool. The results of this research were obtained through the categorization of the set of stages that characterize the development process on Udemy (Table 1).

Table 1. Categorization of the stages that characterize the development of a MOOC

Categories	Technology	Pedagogy	Contents
Stages	Registry and authentication Course’s settings Automatic messages Analysis	Goals Learning level Captions or Subtitles	Thematics and designations Course’s description Course’s image Promotional Video Instructors’ profiles Curricular grid

As the course “MOOC on MOOCs and other Educational Technologies” (2nd Edition) has in its scope the continuous teacher formation, childhood educators and primary school and high school teachers are considered the addressees of the research.

4. PRESENTATION AND DISCUSSION OF RESULTS

The following consists of the characterization of the development process for the 2nd edition of the xMOOC not only in the technological but in the pedagogical and content-related level as well.

These stages were grouped in the Technology category: the registry and authentication, the course settings, the automatic messages and the analysis.

Stage 1 (Registry and authentication): the instructor has two alternatives in order to register and authenticate their account; the first option is through social media like Facebook or Google, which, in this case, no registry is needed at all as access is given almost automatically; the second way is through registry, which requires information like the name of the instructor, their email address and a password in order to allow future access to the platform Udemy. Next, you will receive in your inbox of the provided email address a confirmation message to activate your account.

Stage 2 (Course settings): After registry and authentication, the instructor is free to apply the basic settings of his course, such as defining the MOOC's privacy status or its access permissions (these should only be given to the course's instructors).

Stage 3 (Automatic messages): On this stage, as a way of motivating students to interact with the content, the instructor can write messages, which will be automatically sent to the students once they access or finish the MOOC.

Stage 4 (Analysis): On this phase, the instructor submits their MOOC for Udemy's analysis, where the platform performs an assessment in order to verify if the course respects the parameters set by the company on the level of adequate content and its quality.

These stages were grouped in the Pedagogy category: the goals or objectives, the learning level and the captions or subtitles.

Stage 1 (Goals): This stage contemplates a subset of parameters that must be filled; the first one refers to the tools and necessary knowledge for the trainees to use the MOOC; the second is related to the definition of the target audience; and, the third and last aspect consists of the expected results after finishing the course.

Stage 2 (Learning level): In the "course's homepage" option, an item can be found, which allows the instructor to set the difficulty level of the course - beginner, intermediate or expert. It is also possible to select the three options simultaneously.

Stage 3 (Captions): This stage facilitates the comprehension of the available contents in the MOOC, such as the videos uploaded by the instructor to the curricular grid. The grade curricular corresponds to the main component of the category Content.

These stages were grouped in the Content category: the thematics and designations, the course's description, the course's image, the promotional video, the instructors' profiles, and, finally, the curricular grid.

Stage 1 (Thematics and designations): On this stage, the instructor can type in the subject or the thematic area approached in the MOOC. This option is meant to broadly describe the course's contents. Besides, in the "Course landing page", the instructor should type in the title and subtitle which are used to identify their MOOC.

Stage 2 (Course's description): On this stage, the instructor can proceed to the detailed description of their course and add other relevant information, so the trainees can, eventually, attend the MOOC.

Stage 3 (Course's image): On this stage, the instructor is allowed to upload a quality image, either created by them or by the Udemy team. No matter what option the instructor chooses, the image should follow these parameters: 750 x 422 pixels; .jpg, .jpeg, .gif or .png.

Stage 4 (Promotional video): On this stage, the instructor can publish a promotional or marketing video in order to contribute towards captivating more trainees into attending the MOOC. The video must show graphical and textual quality levels (720p (1280x720 pixels) or 1080i/p (1920x1080 pixels)).

Stage 5 (Instructors' profiles): On this stage, the instructor may edit their profile, focusing, particularly on their profession, biography, native language and external links leading to their social media or webpages. The instructor's profile can be seen by any trainee attending the MOOC.

Stage 6 (Curricular grid): Finally, from this stage, the instructor builds his course. Sections can be used in order to divide the different contents and subjects to be studied. Inside each section, a set of items can be added such as: classes, which can contain videos, mashups and papers; multiple choice; quizzes; programming exercises (C++, C#, HTML, JavaScript, ES6, Java, PHP5, PHP7, Python 3, Ruby and Swift 3);

simulations; and, finally, tasks. In comparison to the 1st edition of the course “MOOC on MOOCs and other Educational Technologies” from 2015, some upgrades on the platform Udemy are noticeable, especially on the technological and content-related levels.

Simplifying the discussion of the results, the content analysis based in the categories described let us very gratified because the four teachers (trainees) were very satisfied using our improved xMOOC after deliver some ideas and thoughts about our previous version. Thus, with support in the suggestions proposed by the teachers, we present below the main changes implemented in the 2nd edition of this course, of course, according to the previously defined categories:

- At the technological level; we sought to encourage teachers to use all the technologies available on the Udemy platform and other external tools such as several image, sound and video editing programs that were fundamental to the realization of the activities suggested by the trainer. In addition to these tools, we highlight the use of Intact (Interactive Teaching Materials Across Culture and Technology) as a platform for communication and synchronous interaction between all the actors that served essentially for the generic exposition of the contents by the trainer, for the presentation of the work done by the teachers and, consequently, for the discussion of ideas and collaboration between the respective professionals. Based on the experience gained in using this set of tools, teachers recognize that they have more technological skills and, consequently, more digital skills that make them more capable of achieving an educational process that is increasingly mediated and / or supported by technologies.

- At the pedagogical level; we highlight the introduction of two pedagogical strategies that meet the educational reality in online learning; on the one hand, to the detriment of the conventional methods (expository and interrogative), all the learning was focused on the teachers, that is, each teacher had a personalized follow-up both at the technical and pedagogical level and at the content level. There was, therefore, a concern on the part of the trainer to accompany individually each teacher so that it was possible to ensure that these professionals performed the activities correctly and in a timely manner, but above all that they understood all the dynamics that the same involved. On the other hand, it was also decided to create a virtual learning community that allowed all teachers to actively participate in the (in) formal activities and debates that were created around the topics covered in the training. Thus, it was possible to enrich the teaching-learning process with the sharing of ideas and knowledge, with the own reflections raised by the debate and, above all, the capacity to understand how these subjects can be essential in the daily life of these education professionals, in the education of students.

- At the content level; as a way to contribute to the quality of learning, we tried to use all kinds of multimedia content, including text, image, video and sound. Through their contact with this range of contents, teachers were better able to adopt new practices in the design of educational materials, but, above all, to be responsible for producing those same contents. Of course, these contents should meet the aspirations of the students and be appropriate to each context of learning. It is therefore up to each teacher to produce, select and / or adopt the contents for each situation, since each learning context is unique and therefore requires discernment, assertiveness and effectiveness in the choice for the type of content most appropriate to the kind of students and to the topic addressed in a given course.

5. CONCLUSION

Considering the development and use of the 2nd edition of “MOOC on MOOCs and other Educational Technologies” scheduled for the 1st trimester of 2018, it was possible to characterize the development process of an xMOOC on Udemy while answering the question of investigation through analysis of its usage by four users and, consequently, extending the debate to the whole scientific community. In this sense, through the results’ analysis, it was possible to determine that the development process of a MOOC can be characterized in three dimensions - Technology, Pedagogy and Content. These dimensions are found on the same level, therefore there is no defined hierarchical order. They are all essential in order to achieve a quality learning and teaching process. Each dimension focuses on a set of fundamental stages towards planning and developing a MOOC. As is provided by the obtained results, the content is the category that gathers the most stages. This question seems to meet literature in the sense that the xMOOC are focused on contents. The type of content available from Udemy (videos, papers and quizzes) also seems to be in accordance with the bibliography. But the task feature can support some context approach. Nonetheless, despite the xMOOC

possessing a more rigid organization and learning objectives set by the instructor, we are convinced that they can greatly contribute towards the continuous training of teachers, given their characteristics. The data collected through the satisfaction survey about the participation in the MOOC, answered by forty-five trainees, reflect this aspect.

REFERENCES

- Auyeung, V., 2015. Review: To MOOC or not to MOOC: Issues to consider for would-be MOOC academic leads. *Higher Education Research Network Journal*, 9, 64–71.
- Bali, M., 2014. MOOC pedagogy: gleaned good practice from existing MOOCs. *Journal of Online Learning and Teaching*, 10(1), 44.
- Baylor, A. L. & Ritchie, D., 2002. What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? *C&E*, 39(4), 395-414.
- Codarin, L., 2012. Impacto de los MOOC en la formación corporativa. Retrieved from <http://www.slideshare.net/lcodarin/mooc-leandro-2012>
- Daradoumis, T., Bassi, R., Xhafa, F., & Caballé, S., 2013. A review on massive e-learning (MOOC) design, delivery and assessment. In *P2P, Parallel, Grid, Cloud and Internet Computing (3PGCIC)*, 2013 Eighth International Conference (pp. 208–213). IEEE.
- Diário da República, 2009. Decreto-Lei n.º 731/2009 de 7 de julho (Vol. Diário da República I Série-A). Lisboa: Ministério da Educação. Lisboa.
- Downes, S., 2012. Commentary by Stephen Downes about Massively Open Online Courses Are “Here to Stay”. Retrieved from <https://www.downes.ca/post/58676> on April 27, 2018.
- Downes, S., 2013. What the “x” in “xMOOC” stands for. Retrieved from <https://t.co/qrS8Si0DZs> on October 27, 2017.
- Fortin, M.-F., Côte, J. & Filion, F., 2009. Fundamentos e etapas do processo de investigação. Loures: Lusodidacta, 4–568.
- Littlejohn, A., 2013. *Understanding massive open online courses*. CEMCA EdTech Notes.
- Lobo, J., 2012. MOOC: caracterización, experiencias e implicaciones para el aprendizaje informal. Retrieved from <http://www.slideshare.net/JoanFernandoChipia>
- Ma J., Lee, K. & Kuo, J., 2013. A massive open online course on pharmacogenomics: not just disruptive innovation but a possible solution. *Pharmacogenomics*, 14(10), 1125–1127.
- Mattar, J., 2013. Aprendizagem em ambientes virtuais: teorias, conectivismo e MOOCs. São Paulo: TECCOGS-PUC/SP, (7), 21–40.
- Monterrey, T., 2014. Edu Trends Report. Retrieved from <http://observatory.itesm.mx/edutrendsmooc/> on April, 10, 2018
- Penteado, M., & Borba, M., 2000. A informática em ação: formação de professores, pesquisa e extensão. São Paulo, Olho D'Água.
- Rodriguez, C., 2012. MOOCs and the AI-Stanford like courses: Two successful and distinct course formats for massive open online courses. *European Journal of Open, Distance and E-Learning*, 15(2).
- Siemens, G., 2013. Massive open online courses: Innovation in education. *Open Educational Resources: Innovation, Research and Practice*, 5.
- Torres, D., 2013. Reflexiones y primeros resultados de MOOCs em Iberoamerica: UNEDCOMA y UNX. In: *Revista Iberoamericana Tecnologia Educativa*, v.2, n. 1.
- Watters, A., 2012. *Top Ed-Tech Trends of 2012: MOOCs*. Hack Education.