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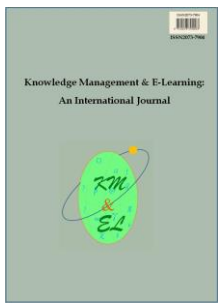

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A double-loop evaluation process for MOOC design and its pilot application in the university domain

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Abstract: The diffusion of Massive Open Online Courses (MOOCs) is significantly changing the way people learn and update their knowledge and competencies. Although the benefits characterizing MOOCs, which leverage on free and open access to know-how and digitized materials, there are some challenges which call for improving and enhancing the existing methods and approaches for MOOCs design. By combining theory and practice, this paper presents a process of MOOCs design based on a double-loop phase of evaluation. Specifically, the paper provides evidences on how to take advantage of the learners' and teachers' feedback to redesign or rethink the course's architecture, and especially the storyboard and blueprint. A pilot application of the proposed approach has been made to design a course dealing with entrepreneurship domain, and in particular with crowdfunding. The results of the application are presented to validate the approach and provide teachers and course's designers with some recommendations.

Keywords: Carpe Diem; Design; Evaluation; Massive open online course; MOOC

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1. Introduction

MOOCs are a meaningful trend in education (Alario-Hoyos, Pérez-Sanagustin, Cormier, & Delgado-Kloos, 2014). They integrate the connectivity of social networking (Siemens, 2005) with the accessibility of acknowledged domain experts and the availability of freely accessible online resources (McAuley, Stewart, Siemens, & Cormier, 2010). The term was used for the first time in the "Connectivism and Connective Knowledge" module (Cormier, 2008), at the University of Manitoba, and involved about 2200 online students. Afterwards, the number of open courses increased significantly, ensuring both the reliability of sources and the quality of contents (Stracke, 2014). MOOCs are a viable solution to provide worldwide access to educational credentials, thus contributing to overcome the economic barriers to instruction (Mazoue, 2013) and revolutionizing the entire training sector (Peters & Seruga, 2016). MOOCs enable teaching and learning processes by offering a dynamic context that merges the highly organized and structured classroom environment with the chaotic open web of fragmented information (Siemens, 2013). These courses can transform training by giving excellent choices for free education without any boundaries (Peters & Seruga, 2016). Indeed, the openness of MOOC-based programs favours the democratization (DeWaard et al., 2011) and commodification of education (Macleod, Sinclair, Haywood, & Woodgate, 2016), even if this does not imply that contents do not have to be well organized (Laurillard, 2014).

A successful example of MOOC-based initiative is the MIT OpenCourseWare (www.ocw.mit.edu), launched by the Massachusetts Institute of Technology in 1999 (De Freitas, Morgan, & Gibson, 2015). Other more recent and equally well-known MOOCs initiatives are Coursera, edX, Udacity, Futurelearn, P2P University, Open Learning Initiative, and Stanford eCorner (Liyanagunawardena, Adams, & Williams, 2013; Rodriguez, 2012).

Students attend MOOCs for different reasons, such as spreading their knowledge of a topic, completing personal task, acquiring particular qualifications, or simply satisfying curiosity about this emerging trend (Hew & Cheung, 2014). However, together with undeniable advantages, there are some open issues related to MOOCs that should be considered, such as the disequilibrium of the number of enrolments compared to the level of courses' completion, and the recognition of a growing number of legitimate peripheral members who expect to take more dynamic and central roles (McAuley, Stewart, Siemens, & Cormier, 2010).

From these issues, some key challenges for MOOCs providers arise (Daradoumis, Bassi, Xhafa, & Caballé, 2013) such as:

- the heterogeneity of MOOC students, so that the design and delivery of courses have to consider the different educational and cultural backgrounds of learners;

- the limited participation of teachers in the delivery phases, which can contribute to the high dropout rate of learners;
- the high level of courses' abandons that accounts percentages from 85% to 95%;
- the lack of a deep analysis of the learning dynamics, since there is not yet an extensive literature on learning analytics applied to MOOC;
- the evaluation process, which may have limitations due to the risk of cheating in performing the tasks.

These challenges call for the need to improve the existing models and approaches for MOOC design and evaluation. Framed in this context, the paper provides evidences on how to take advantage of learners' and teachers' feedback to redesign or rethink the course's structure through a double-loop based approach (Espada, García-Díaz, Castillo Rodríguez, & González, 2014). Indeed, the main research question investigated in this study can be defined as follows: *How can learners and teachers be effectively involved in the process of MOOC design?*

The paper is structured as follows: the relevant literature concerning MOOC design and evaluation is presented in the next section, with a specific description about the widely adopted Carpe Diem method (Salmon, 2013; Salmon, 2014; Salmon, Gregory, Lokuge Dona, & Ross, 2015). Section 3 describes the research method, whereas section 4 presents the double-loop process of evaluation that extends Carpe Diem. Finally, section 5 presents a pilot application of the approach proposed within the university domain. Discussions and conclusions are drawn in the last section of the paper.

2. Theory background

The theory background of the paper is centred on principles and approaches for MOOC design, including the evaluation aspects, with a deep investigation on the Carpe Diem method, which has been widely adopted in the last years for designing MOOCs.

2.1. Principles and approaches for MOOC design and evaluation

By adopting a pedagogical perspective, MOOCs represent the virtuous integration of two growing trends: the online learning, which has been important since the beginning of twenty-first century (Butcher & Wilson-Strydom, 2013), and the Open Educational Resources (Yuan & Powell, 2013), which include learning content, tools and implementation resources (Hylén, 2006; Pawlowski & Bick, 2012). Further, the diffusion of MOOCs allows setting up new educational approaches and design methods for on line courses, as widely discussed in the literature (Macleod, Sinclair, Haywood, & Woodgate, 2016).

Design is here conceived as the whole process that provides the structure of the overall learning experience, including the contents to be delivered, the learning tools supporting the process, the environmental conditions, and the expected learning goals (Alonso, López, Manrique, & Viñes, 2005).

Fischer, Bruhn, Grasel, and Mandl (2002) suggest design strategies for socio-technical systems aimed at motivating participation by leveraging on social exchange and cooperation. Specifically, the key elements of their approach are meta-design (realized through a collaborative approach in the course design), social creativity (aimed at

sustaining real cooperation among learners), and participation intensity (based on different levels of users' engagement with the platform and content).

According to Siemens (2006), MOOC design is the process of creating networks, where nodes represent external entities such as people, organizations, archives, links, books, papers, catalogues, or any other source of information. With such approach, MOOC design refers to the course structure, in which the contents form a cluster of resources around a specific topic (Downes, 2009).

Hill (2012) places MOOCs within a landscape of educational planning methods that reveal the role of educational technology and instructional design (Guàrdia, Maina, & Sangra, 2013). The main idea of this approach is to involve participants in creating and sharing information in a connectionist manner (Fidalgo Blanco, García-Peñalvo, & Sein-Echaluce, 2013). The design of this type of courses is grounded on four main principles (Kop, 2011): the collection and aggregation of information and resources; the sense-making to connect knowledge, practice, people and contents with each other; the repurposing of resources to generate a digital artefact and create new knowledge; and finally, the sharing on the web of the new resources created.

Conole (2013a) proposes the 7Cs Learning Design framework with the purpose to enhance learner experience and to guarantee courses' quality. The framework includes the following seven phases: Conceptualise (to explicate the aim of the course), Capture (to create the resources), Communicate (to create the communication tools), Collaborate (to create the collaboration tools), Consider (to create the assessment tools), Combine (to review and adjust resources and tools), and Consolidate (to test the efficacy of the course delivery).

MOOCs design becomes a catalyst to implement the change from traditional approach of teaching to precision-based perspectives (Mazoue, 2013), which includes teamwork activities, discussion forums and netiquettes for students during discussions or any other collaborative activities. About the use of technology, there has been a considerable amount of research on learners' involvement and opinions (Oblinger & Oblinger, 2005; Biggs & Tang, 2011; Conole, 2013b). These studies show that learners consider technologies as an indispensable tool for learning, and that they are able to use strategies for self-organisation and for collaboration with peers. In such a perspective, the main target of the MOOCs design process should be to ensure the learners to participate actively to the learning experience, with a high level of motivation and enthusiasm, and without being passive receivers of information. When these conditions are ensured, students will be engaged with the courses that they are taking (Doherty, Harbutt, & Sharma, 2015).

As for the MOOCs evaluation, Bernal, Molina, and Pérez (2013) require that it should be based on the same quality criteria applied in open, formal and distance courses. The fact that they are massive, open and online requests a great rigor in checking their quality to satisfy different users, by considering the scarcity of capabilities to analyse the results and the attainment of the learning objectives (De la Garza, Sancho-Vinuesa, & Gómez-Zermeño, 2015). MOOCs evaluation can show significant methodological and interpretive views. Gomez, Callaghan, Eick, Carchidi, Carson, and Andersson (2012) take into account indicators related to pedagogical, functional and technological elements. Cross (2013) adopts another evaluation perspective aimed at seizing and representing the full range of participants' point of view rather than focusing on the experience of specific groups, such as only those ones who finish the MOOC.

According to Barbera, Gros, and Kirschner (2012), timing is a critical component that has to be used as a quality measure, since it refers to the duration of the whole experience in which people learn and develop practises. Indeed, time regulation is considered a factor affecting the organisational phases of this type of on-line learning courses (Franco-Casamitjana, Barbera, & Romero, 2013).

Lastly, according to Pivec and Pernold (2014), MOOCs evaluation should be focused on students' requirements, which include the devices they want to use, the social communities they are active in, and the typology of help or support they expect from teachers and tutors.

Table 1 synthesizes the basic principles of the main models and approaches used for MOOC design and evaluation.

Table 1
Principles for MOOCs design and evaluation

MOOC Design	***MOOC Evaluation***
Motivating participation through social exchange and collaboration (Fischer, Bruhn, Grasel, & Mandl, 2002). Creating networks, where nodes are external entities and can be people, web sites, reports, databases, etc. (Siemens, 2006) Clustering of resources around a knowledge domain (Downes, 2009). Collecting and aggregating information and resources, connecting people with other people and contents, repurposing of resources to generate a digital artefact and create new knowledge, sharing on the web the new resources created (Kop, 2011). Conceptualising, Capturing, Communicating, Collaborating, Considering, Combining, and Consolidating (Conole, 2013a). Team working, discussion forums, netiquettes for students, collaborative activities (Mazoue, 2013). Use of technology to involve learners and express opinions (Oblinger & Oblinger, 2005; Biggs & Tang, 2011; Conole, 2013b). Assuring enthusiastic participation of learners in the learning experience (Doherty, Harbutt, & Sharma, 2015).	Pedagogical, functional and technological perspectives (De la Garza, Sancho-Vinuesa, & Gómez-Zermeño, 2015; Domingo Coscollola & Fuentes Agustí, 2010). Timing (Barbera, Gros, & Kirschner, 2012; Franco-Casamitjana, Barbera, & Romero, 2013) Seizing and representing the full range of the participants' point of view, and not only of the ones who finish the course (Cross, 2013). Greater rigor quality criteria like the ones applied in open, formal and distance courses (Bernal, Molina, & Pérez, 2013; De la Garza, Sancho-Vinuesa, & Gómez-Zermeño, 2015). Students' requirements about technical devices, social communities, and support from teachers and tutors (Pivec & Pernold, 2014).

2.2. The Carpe Diem method

Carpe Diem is characterised by a framework with progressive stages that can support the design of online courses (Salmon, 2013; Salmon, 2014; Salmon, Gregory, Lokuge Dona, & Ross, 2015). Its simplicity has generated a wide appeal and, consequently, the method has been extensively adopted to design many MOOCs programs and initiatives. Moreover, it is characterized by high levels of flexibility and originality, which ground on the presence of skilled collaborative groups called "Carpe Diem Pod Teams", that are engaged for innovative learning design (Salmon, 2013). These groups operate as team-based pathfinders, which normally include teachers, designers, subject librarians and learning technicians, and are helped by a facilitator (Salmon & Wright, 2014).

The main purpose of the method is to support online learning effort, by using constructivist pedagogic theories. It consists of six phases in which groups are involved in the creation of MOOCs learning paths (Salmon, 2013; Salmon, 2014; Salmon, Gregory, Lokuge Dona, & Ross, 2015). Table 2 provides a synthetic description of each phase.

Table 2
A synthetic view of the Carpe Diem method

Phase	***Description***
1.Writing a blueprint	Teachers in Carpe Diem Pod Teams outline the fundamental aspects of the courses, explore the impact of the didactic experience on students, define what is engaging for learners in each unit, and the overall evaluation process.
2. Making a storyboard	The Carpe Diem Pod Teams create the storyboard, which is the visual arrangement of each learning unit in which all actions (e.g. lectures, tutorials, assessment, online activities, etc.) are clearly organised to motivate participants, promote their online socialization and exchange of information, foster knowledge construction, and stimulate self-development. Then, the calendar for the course delivery is also established.
3. Building a prototype online	The stand-alone online activities are designed. These activities refer to online events to improve effective and active learning of single individuals or groups.
4. Checking reality	Members of each Carpe Diem Pod Teams review and give feedback to other groups of teachers, thus providing new ideas and creative perspectives about the clarity of the design of each learning unit.
5. Reviewing and adjusting	The suggestions and feedback received from the other teams are read and discussed; if accepted, the team proceed to modify the learning design, to refine the timing, and, in case, to rethink and adjust the course's storyboard or blueprint.
6. Planning your next steps	Each team elaborates an action plan to complete the course and make it available in the online platform, through specifying the progress states, the highlighted tasks, time of completion, etc.

3. Methodology

The study has been conducted by following the design science research method, which devotes attention to the development of studies that aim at prescription, project and artefact building (Dresch, Lacerda, & Miguel, 2015), in the final goal to prescribe solutions to existing problems, improving or creating new systems (Van Aken, 2004). Specifically, this method includes six key phases (Hevner, March, Park, & Ram, 2004; Peffers, Tuunanen, Rothenberger, & Chatterjee, 2006; March & Storey, 2008; Dresch, Lacerda, & Miguel, 2015): problem identification and definition, solution proposition, research goal definition, artefact development, demonstration and evaluation, and research communication.

First, problem identification and definition have been grounded on a literature review about the MOOCs, in order to explore if current approaches for MOOC design include teachers' and learners' evaluation in the overall process. Specifically, a structured documents retrieval process (Tranfield, Denyer, & Smart, 2003) has been realized through launching on Scopus database the search terms "MOOC*", and "massive open online course*", which have been cross-referenced (AND search) with "design", "evaluation" and "approach". Results have been analysed by reading the abstract and checking if the focus of the article was related to MOOC design and evaluation issues. Then, a careful reading and deep analysis of the selected articles were performed in order to identify possible contributions concerning enhancements of MOOC design principles and phases.

Then, solution proposition has been elaborated by investigating the possibility to include learners' feedback in the wide diffused Carpe Diem method for MOOC design, which is mainly based on the valorisation of teachers' feedback.

The research goal was defined coherently with the problem identified at the outset and, in particular, it consisted in the exploration of the ways through which learners and teachers can be both effectively involved in the process of MOOC design.

The artefact development was realized by introducing a further step in the Carpe Diem method, by distinguishing the feedback expressed by the teachers from those ones expressed by the learners. Both feedbacks are considered valuable to improve the overall process of MOOC design, because they may bring different and complementary enhancements.

The demonstration and evaluation of the artefact has been organized by involving a team composed by teachers, instructional designers and technicians, integrated by the learners involved in an online course on crowdfunding. Each member of this community answered to a questionnaire designed to receive feedback on the key issues for MOOCs evaluation. By analysing their comments and feedback, some implications for researchers and practitioners have been elaborated and included in this article, which represents a primary contribution for the scientific communication of the work done.

4. Results

The main result of this study consists in an enhancement of the Carpe Diem method through the introduction of a double-loop evaluation cycle of MOOC design that leverages both learners' and teachers' feedback to improve the didactic and technological issues of the course. More specifically, the "Checking reality" phase, which involves only teachers and instructional designers in the Carpe Diem method, now includes also

learners of the course that are invited to express their evaluation about the online module just created. At this purpose, two structured questionnaires have been created and submitted respectively to learners and teachers, in the final aim to collect their feedbacks and improve the overall courses' design (Conole, 2008). Both questionnaires are organized in three sections, such as didactic issues, technology issues, and overall evaluation (Liaw, 2008). With the enhancement proposed, phase 4 of Carpe Diem devoted to the "Checking reality" results split into two phases (4a and 4b), and this represents the evolution respect to the well-known Carpe Diem method. Fig. 1 shows graphically this enhancement.

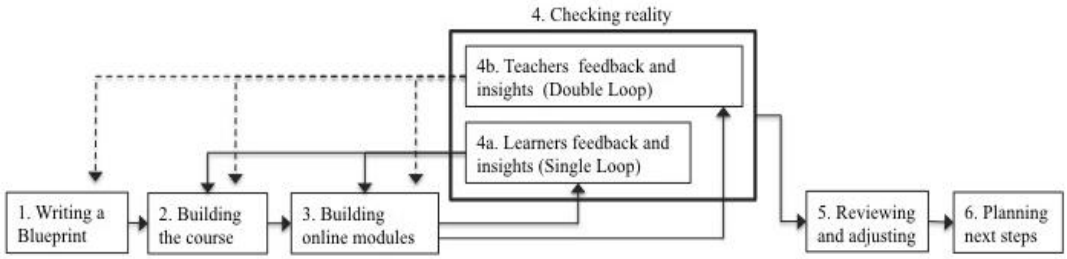

Fig. 1. Double-loop evaluation cycle of MOOC design

As shown in Fig. 1, teachers' and learners' feedbacks may have a different impact on the overall evaluation process. Actually, learners' suggestions and opinions (phase 4a) may be considered to revise stage 2 and stage 3 of the method, thus improving and modifying the storyboard and the online prototype. Teacher's feedback (phase 4b), instead, beyond introducing changes at the same levels, can transform also the blueprint, which refers to the stage 1 of the method and expresses the general outline and the key aspects of the course.

The collection of teachers' and learners' feedbacks has been conducted through two questionnaires, which have been designed by the authors on the basis of the theory background to evoke answers over different aspects of the course (Pishvaei & Kasaian, 2013). After, they have been validated by involving three researchers working in the education domain, and finally transformed into a web-based version for the data collection.

Specifically, the questionnaire for learners allowed for collecting data related to didactic issues (content, teaching and mentoring, course organization and assessment), technological issues (simplicity of use, communication and interaction tools), and overall evaluation (originality and interest, satisfaction and recommendation), as perceived by learners. The questionnaire has been submitted to ten undergraduate students enrolled in the Management Engineering degree.

As for the questionnaire for teachers, it has allowed for gathering information and opinions related to didactic issues (instructional design choices, effectiveness of e-learning approach, role of e-learning to innovate the education, validity of the assessment phase), technological issues (authoring tools and back-office interaction services), and overall evaluation (characteristics and services of the course). The questionnaire has been submitted to two professors acknowledged on the same topic of the course.

Both questionnaires included closed questions with a 1 to 5 Likert scale (1 for the lowest evaluation, and 5 for the highest evaluation). The period of data collection lasted 15 days, during which both categories of respondents could modify their answers. After

the expiration of the validity period, all the submitted answers have been analysed by the authors, and the final marks were calculated by adopting the average function.

Table 3 illustrates the main items included into the students' and teachers' questionnaires.

Table 3
The main items constituting the students' and teachers' questionnaires

	Item for the students' questionnaire	Item for the teachers' questionnaire
Didactic Issues	Clarity of contents	Level of innovation in teaching
	Clarity of learning goals	Personalization of the didactic respect to the learner's needs
	Coherence between learning goals and contents	Responsibility of learners
	Usefulness of additional resources	Virtual contexts for collaboration, cooperation, and knowledge sharing
	Coherence between foreseen and effective work	Approach new topics and concepts
	Knowledge acquisition	Enhancement of the work of the teacher
	Usefulness of tutorship and mentorship	Change of the role of the teacher: from "content provider" to "designer of learning experiences"
	Typology of assessment	Change in competence development
	Effectiveness of teacher (competency and clarity)	Effectiveness of the learning process
	Organization of learning activities	Effectiveness of the role of teacher
		Concreteness of the course
		Flexibility of the course
		Assessment of the course
Technological Issues	Simplicity in using the platform	Accessibility and use of facilities
	Access to services	Usability of authoring tools
	Communication tools	Graphics
	Content management tools	Video
	Teacher-learner interactions	Audio
	Learner-learner interactions	Teachers - Back Office interaction
Overall Evaluation	Level of involvement respect to traditional learning	Level of involvement in the course
	Level of originality respect to traditional learning	Originality of the course
	Overall satisfaction level	Fatigue
		Required technological skills
		Interest in participation to the initiative
		Satisfaction with logistics and organization
		Communication with team members
		Level of innovation of the course

Both questionnaires have been used to collect feedback from the two targets (teachers and learners) during the design of an online course. In such a way, a collaborative design path based on a single and a double-loop of evaluation of the online course has been experimentally activated.

5. Pilot experimentation

The double-loop evaluation cycle has been implemented in the overall course design process, in particular within a course on crowdfunding. Thus, the six phases of the Carpe Diem method have been realized by involving team composed by teachers, instructional designers, and technicians. The collaborative space of design process has been organized in the Department of Engineering for Innovation at the University of Salento.

The description of each phase here follows, including the details related to the pilot application realized in a course on crowdfunding.

I. *Writing a blueprint*

Team working with teachers, instructional designers and technicians demands initial planning and coordination efforts. Through a brainstorming process, the key goals and the essential aspects of the course are conceived, including the target skills. With reference to the course on crowdfunding, the target skills refer to the knowledge of the financial instruments to manage the business risk, and to the use of the crowd-based tools for business financing. A set of keywords for the course has been also identified, such as startup financing, venture capital, and crowdfunding.

II. *Making a storyboard*

Course's architecture is depicted by groups of teachers through the detailed definition of the main building blocks (modules) and the final assessment. In the course on crowdfunding, a visual layout has been created in order to visualize the entire structure of the contents.

III. *Building a prototype online*

Each group involved develops the online course, with the support of technicians and instructional designers, and by using specific software and authoring tools. With reference to the course on crowdfunding, a group of teachers has been involved for the prototype building. It has developed the module, with interactive digital contents and audio-video synchronization. The module contains video, slide presentation and a self-assessment tool. Furthermore, additional resources are included as recommended material (e.g. hand-outs, concept maps, web links, case studies, papers, reports, synthetic bibliography, studies, webinar, papers, reports), together with some other collaboration activities (e.g. participation in a virtual classroom).

IV. *Checking reality*

In this stage, both teachers and students are involved to revise the online modules and provide their feedbacks. It is in this phase that the double-loop evaluation process is implemented. Indeed, with reference to the course on crowdfunding, the module has been evaluated, at the same time, by a group of teachers different from the one engaged for the prototype building, and a group of learners. Table 4 shows the specific evaluation and feedback provided by the two categories of actors.

Table 4
The synthesis of the evaluation provided by students and teachers

	Learners' Evaluation (1 Lowest - 5 Highest)	Teachers' Evaluation (1 Lowest - 5 Highest)
Didactic issues	4.34	4.58
Technological issues	3.98	4.92
Overall evaluation	4.07	4.61

V. *Reviewing and adjusting*

Workgroups analyse the feedback collected through the two questionnaires, in order to decide how to modify and improve the design phases. Referring to the course on crowdfunding, most of the answers positively assessed the item related to both questionnaires.

Students' answers revealed a high level of satisfaction for what concerns the elements related to didactic issues (4.34), less satisfaction was expressed as for the technological tools (3.98). The main modifications suggested by the learners concerned the improvement of the collaboration services of the system in order to simplify the online collaboration, and the addition of further resources to know more in detail the point of view of a crowdfunding platform. Thus, respectively, the integration of skype call conference service was implemented, and an interview with a manager of a crowdfunding platform was added in the additional resources of the course. These actions were implemented to promote a much more satisfactory learning experience.

For what concerns teachers' feedback, there was a high level of satisfaction for the elements related to didactic issues (4.58) and technological tools (4.92). The main suggestion was to add a further target skill devoted to design from scratch a crowdfunding campaign. In such a way, the blueprint has been integrated, and the online course was updated to include further concepts, material, and activities strictly related to the new skill added.

VI. *Planning next steps*

This phase consists in courses delivering to students. Thus, the MOOC design and evaluation process can be considered closed, and the modules can be officially uploaded in the system in order to be delivered. With reference to the course on crowdfunding, the system and the contents are now ready to be accessed by a wider number of learners.

6. Discussions and conclusion

MOOCs offer a significant opportunity for training of thousands of individuals worldwide, allowing free online access to education in companies, universities and informal settings (DeWaard et al., 2011). MOOCs represent a current trend in the e-learning domain, and their arrangement is continually improved as more experience is gained in design methods. MOOCs represent today a positive example to open new learning chances (Guàrdia, Maina, & Sangra, 2013) by focusing on innovative user-centred course design approaches (Daradoumis, Bassi, Xhafa, & Caballé, 2013).

In such a perspective, based on the Carpe Diem method (Salmon, 2013; Salmon, 2014; Salmon, Gregory, Lokuge Dona, & Ross, 2015), which is widely adopted for MOOCs design, this paper proposes an enhancement by introducing a double-loop evaluation process that involves not only teachers, but also learners. This approach is aligned with the recent trends in technology-based instruction, which consider learners' preferences and perspective of educational feedback as valuable sources of information to improve an online course (Lefevre & Cox, 2016). In such a way, the double-loop evaluation process based on the learners' involvement represents the main difference respect to the pure Carpe Diem method. Definitely, the proposed approach leverages both teachers' and student's feedback collected during the check reality phase, in order to refine the course storyboard or blueprint.

The approach has been also applied in a pilot course on crowdfunding, in the aim to show how it can be profitably adopted. Indeed, during this preliminary application, the feedbacks expressed by teachers and learners, and collected through a web-based questionnaire, have been used to enhance part of the online course, in order to finalize it and make it available to a larger audience.

The logic behind the proposed method can be interpreted within the principle of user-driven innovation (Prahalad & Krishnan, 2008). Actually, contextualizing this principle in the online education domain, it allows for considering learners as fundamental actors to engage for co-designing and co-producing the online course within real-world settings, thus realizing the co-creation through a virtuous collaboration between producers and users (Prahalad & Ramaswamy, 2002). This is deeply different from the traditional collection of users' feedback since it usually happens at the end of the course. Instead, in this case, the course's evaluation process is based on the feedback expressed by a limited number of teachers and learners, and collected through a web-based questionnaire. These feedbacks allow obtaining a preliminary evaluation about the course, as well as defining the main enhancements to implement to the course, under the perspective of both teachers and learners. Respect to the Carpe Diem method that valorises the teachers' feedback, the suggested improvement allows considering also the learners' point of view, requirements, expectations and feedback, which become a fundamental input in the MOOC design process, above all for the aesthetic attraction, the pedagogical effectiveness, the multimedia sources and the multimodal composition. In such a way, the output of the MOOC design process can have more chance to satisfy a wider target of learners, and not only teachers, thus providing them consciousness of learning trajectories (Guàrdia, Maina, & Sangra, 2013).

From a research perspective, this paper explores the opportunity to include also learners in the design process, thus offering the opportunity to raise awareness of learning intentions, and explore new ways through which overcoming the MOOCs limitations related to the assessment process (Hill, 2013), the interactivity between learners and contents (Grünewald, Meinel, Totschnig, & Willems, 2013), the diversity of MOOC participants (Conole, 2013b), the absence of face-to-face interaction (Schulmeister, 2014), and the drop-out rate (Yousef, Chatti, Schroeder, & Wosnitza, 2015). Furthermore, taking into account the learners' feedback for MOOCs design, the proposed approach can support more effectively those MOOC environments where learners can self-organize and practice networked learning, so taking an active role in the management of their learning activities (Yousef, Chatti, Schroeder, & Wosnitza, 2015). In such a way, the enrolment in a MOOC environment can positively affect the use of the system itself and the student's achievement (Liang, Jia, Wu, Miao, & Wang, 2014). This could bring to relevant results related to the transversal skills such as the empowering of learners in open applications, the encouragement of critical thinking, the consolidation of know-how

based on outcomes, and the providing of instruments for self-regulation (Guàrdia, Maina, & Sangra, 2013).

From a practitioner view, this article presents a method through which realizing a double-loop phase of MOOCs evaluation. Indeed, suggestions and feedback collected from teachers and learners can really improve the quality and the effectiveness of the overall online modules. In such a way, the evaluation process is here considered fundamental to extend the students' participation, to support their awareness, to encourage the development of learner-centred courses and, consequently, to generate value in MOOCs' implementation (Nkuyubwatsi, 2013). In particular, due to the high level of heterogeneity of MOOC learners, the feedback expressed by different profiles of learners may allow also identifying some parts of the course that can be more suitable to ensure some degree of course customization (Daradoumis, Bassi, Xhafa, & Caballé, 2013). Moreover, the proposed evaluation conducted before to make a new online course available to the large audience, may contribute to enrich the overall course by implementing the suggestions and comments gathered, thus increasing the chances to be accepted and appreciated by both teachers and learners. Afterwards, traditional approach for evaluating MOOCs at the end of the learning program can be applied, as the one proposed by Cross (2013), which bases the MOOC evaluation on a number of perspectives including participant compliance and deviation from the design, attainment of design and participant goals, and performance against measures. Besides, the approach proposed can assist also the software agents that perform a data mining analysis on the data stored in the MOOC system or in external data sources to provide a complete online support in the design, delivery and assessment phases (Daradoumis, Bassi, Xhafa, & Caballé, 2013).

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