Participative Design of qMOOCs with Deep Learning and 3d Virtual Immersive Environments: the case of MOOCAgora

Stylianos Mystakidis
University of Patras, Greece
and
University of Jyväskylä, Finland

Eleni Berki
University of Tampere, Finland
and
University of Jyväskylä, Finland

Keywords: Massive Open Online Courses (MOOCs), Open Education, Deep Learning, 3d Virtual Immersive Environments, E-learning, Problem-Focused Education, Problem-Based Learning (PBL), e-Skills, Webliteracy

Abstract
The recommendation of the Digital Agenda Assembly 2012 to address the development of suitable socio-technical skills and expertise through open education and MOOCs in order to decrease unemployment in Europe faces three challenges: a) increase MOOC quantity, b) speed-up MOOC delivery and c) improve MOOC quality. The paper argues that a crowd-sourced open education ecosystem, called MOOCAgora, can address the first two challenges by implementing an 8-stage MOOC for a realistic employment business circle. Furthermore the authors propose a new, quality-centered format of MOOCs, the qMOOC, in order to address challenge c, above, as well as qualification and web skills needs. qMOOCs can use a modified version of the MOOC canvas framework for qualifications and competences that can be achieved through three educational components/paradigms: deep learning experiences, problem-focused education and 3d virtual immersive environments.
1. Introduction: Innovation through Online Engagement

The Digital Agenda Assembly 2012 [1] featured an organizational innovation: the active involvement of stakeholders in national and European level for the participatory agenda and policy recommendation construction through a coordinated online engagement action. The online engagement reached a wide audience of millions, produced an open, blended, high quality discussion in identified topic areas and engaged European citizens and entities in a transparent crowdsourcing process of policy making. The online discussion in the pillar “Jobs and Skills” formulated, among other, the policy recommendation to address the e-skills shortage challenge amidst of record-high European youth unemployment through open education for flexible mass scale upskilling. This recommendation was aligned with the creation of a Grand Coalition for Jobs and Skills [2].
This recommendation is an evident that disruptive policy making can emerge through crowdsourcing. However was this recommendation realistic?

2. Three Challenges for Mass Open Education for Employment

In the same year, top universities started re-engaging open and distance learning (ODL) in the form of Massive Open Online Courses (MOOCs). 2012 was hailed by mass media as the year of the MOOC. Metakides (2008) [3] proposed that the future of education in the 21st century will be both massive and personalized completing a cyclic move that started with the origins of education in ancient Greece (Figure 2). Indeed, tens of thousands people enroll to a typical MOOC. However, only a small
fraction actually completes the courses. Consequently, it was not long before the following difficult questions emerged: i) do MOOC participants really learn? ii) what is the quality of the learning, the acquired knowledge and skills? There are valid criticisms that many MOOCs provide rather poor learning experiences. This is attributed to the absence of social constructivist and connectivist pedagogical principles underlying the first, informal MOOCs organized since 2008. Hence, the initial distinction between two branches of MOOCs: connectivist cMOOCs and institution-lead xMOOCs.

Most current xMOOCs provide a limited learning experience within a learning management system without advanced pedagogical methodologies. Some xMOOCs instructors tried to address these issues by adding peer activities and an active presence in social networks and, thus, shaping a third emerging category of MOOCs, the hybrid MOOC. [4]. [5] presents an outstanding overview of MOOC pedagogies and limitation in current UK xMOOCs and hybrid MOOCs. In any case, the absence of effective pedagogy that leads to Higher Order Thinking Skills is critical and an obstacle in delivering MOOCs with reliable mainstream learning methods.

Figure 2: From massive to personalized learning for all (Metakides, 2008)
Analysing the data from studies on European MOOCs on web-related skills [6] and two research studies on MOOCs for employment purposes [7] and professionals’ participation in MOOCs [8] we deduce that there is a need for policies and initiatives to

a) design and offer more MOOCs in more EU countries [6],
b) create new models to accelerate MOOC production to address e-skills needs, and finally
c) facilitate the design of different and/or better MOOCs especially designed for webskills.

In the following sections we will offer recommendations for actions to address these three challenges.

3. Crowd-sourced MOOCs for Employment Provision Architecture

In order to address the first two challenges, we introduce an 8-stage MOOC for employment business circle (figure 3). The circle features the following stages:

1. Job Market Monitoring
2. Skills Shortage Identification
3. Set Qualification Aims (also linked with stage 7)
4. Action Decision
5. qMOOC Design
6. qMOOC Provision
7. Qualifications Certification
8. Job Market Impact
In order to increase and accelerate simultaneously the MOOC provision throughout Europe to address emerging societal and job market needs, we propose a new participative MOOC design and realization architecture: a crowd-sourced open education community ecosystem, the MOOCAgora. Like ancient Athens’ democratic Agora (=market, marketplace) of people, philosophers, learners, decision makers, MOOCAgora is conceived as an open, democratic, participative education marketplace and marketspace with a mechanism for regulated offer and demand of MOOCs for employment. This modern, educational space version of Agora is fueled by open innovation and online Communities of Practice (CoPs), where interested partners meet and forge coalitions so as to develop rapidly MOOCs to address verified local and European qualification and expertise needs.
MOOCAgora is a virtual platform where governments, industries, professional associations, educational institutions and certification providers meet. MOOCAgora draws inspiration from the already established Grand Coalition Digital Agenda action [2] and the active role of the Government of Catalonia to encourage MOOCs creation as described in a report of Spanish MOOCs [9].

4. qMOOCs: q for Qualification and Quality
The 21st century European education paradigm is based heavily on the notion of qualification as it is demonstrated in the European Qualifications Framework. Accordingly, the cornerstone of MOOCAgora is the qMOOC, the qualifications MOOC.
As MOOC participants are not primarily interested in formal, academic degrees, qMOOCs focus on orchestrating the acquisition and empirical construction of specific qualifications and skills, achieving learning visible and verified outcomes.
Q in qMOOC stands also for quality. Learning quality of qMOOCs can be assured by factors such as
- 360-degree qMOOC design multi-partner MOOC development coalition structure;
- Meaningful, strong learning outcomes (e.g. certifications, e-portfolios etc.);
- active instructional design guidelines.
The composition of the MOOC development coalition defines the quality of the data and components of the MOOC and its links with real work situations and competences. For instance, partnerships among academic institutions and businesses have been proved quite successful for learning [10]. Subsequently, qMOOCs can act as active recruitment tools and virtual showcases for emerging web talents. Among the final outcome of qMOOCs can be a pool of fully qualified, manifold thinkers as employable ‘graduates’.

5. Problem-Focused Education for Deep Learning in qMOOCs
Next, the third challenge addresses the instructional learning quality of qMOOCs. qMOOCs focus on core, extended, adjacent web skills and non-technical skills [6] that correspond also to the three strands of Mozilla Webliteracy framework, Exploring, Building and Connecting [11]. Building on top of the MOOC Canvas design framework [12], we propose an additional element called “Motivational Design” for qMOOCs in the design decisions category. This proposal recognizes the importance of motivation enhancement strategies [13] to engage participants in active learning experiences.

Following the Competence-Based Design Approach suggested by Guàrdia et al [14], and also taking into account the distributed nature of intelligence in MOOCs and the evidence-based improvement element in the MOOC design & evaluation framework [15], we support that qMOOCs should emphasize social learning with socio-constructivist deep learning strategies.

Deep learning [16] or significant learning [17] promotes the development of conditionalized knowledge and metacognition through Communities of Practice and continuous inquiry. Deep learning occurs when students are actively involved in the learning process and are given opportunities to construct meaning. In so doing, they should be able to transform the courses’ concepts to personal (learning) experiences, utilize problem-solving skills [18] and enhance manifold (creative, critical, caring and reflective) thinking skills [19].

We argue that distributed Problem-Focused Education (PFE) [19] is an effective instructional strategy to achieve deep learning experiences in open and distance learning [20] and especially core and extended web skills as well as the Exploring and Building strands of the Mozilla Webliteracy framework. PFE i) begins with a problem, ii) presents the problem as a real-life situation, iii) supports students’ manifold thinking and working in a group, iv) encourages students to identify their own learning needs and take responsibility of their own learning processes, and v) encourages assessment and evaluation of the learning process and its learning outcomes.

In particular, we support that PFE can be most effective when combined with the following instructional design approaches:
• Digital Storytelling - MOOC as a unfolding story in episodes [21]
• Quest-based Learning - MOOC as the structured completion of learning quests of various nature
• Gamification - MOOC structured as a game where the learner “levels up” as s/he completes learning activities
• Evidence-Centered Design (e.g. for simulations)

6. 3d Virtual Immersive Environments (3d VIEs)
Finally, we add a recommendation to address the emergent need for the development of non-technical and transferable skills (such as virtual collaboration and project management), adjacent web skills [6] as well as qualifications of the ‘Connecting’ Mozilla Webliteracy strand [11]. Based on a preliminary literature review and findings from the 1st Greek informal BOOC in 3d VIEs [22], the authors hereby argue that deep problem-focused learning in virtual reality platforms can deliver many other, vital and currently missing, ingredients for quality mass open education. More specifically, formal and informal learning experiences that take into account online identity and avatar psychology in 3d VIEs could address the aforementioned deficiencies in MOOCs.

Mature instructional design methodologies for 3d VIEs based on Kant’s socio-constructivism, and Vygotsky’s social constructivist learning approach and Anderson’s cognitivist principles were developed taking into consideration that took into account their innovative technological and psychological affordances [23]. These pedagogical methodologies have non’t, unfortunately, been employed in scale for mass open education. This and other limitations and weaknesses of MOOCs clearly been stated and critically reviewed in the most recent and relevant published documents [24, 25, 26, 27]. These bring severe controversies over e.g. unsupervised learning, the validity of knowledge or of the way a skill is acquired and other. For a detailed and informative session the reader may refer to various sources of reference [24, 25, 26, 27].

VIEs main attributes are the enabling of enhanced, immediate synchronous e-learning interactions and the formation of virtual learning communities.
Leveraging the psychology of the avatar, the ‘digital self’ of the participant in the virtual world, we could deliver rich and effective behavior-changing learning experiences.

In the light of the above and other socio-economical needs, VIEs offer the opportunity to introduce experiential and social learning in open and distance education and MOOCs, in particular. Through immersive simulations learners are increasingly able to overcome barriers of scale, time and cost to experience learning contexts that can be inaccessible in the real world; applying also suitable advanced pedagogical methodologies can turn these immersive learning experiences into invaluable subject knowledge and skills acquisition, i.e. problem-solving, and critical, creative, reflective thinking skills.

References


http://www.eua.be/Libraries/Publication/MOOCs_Update_January_2014.sflb.ashx