The MOOCs and the Learning Profiles

Khalid Boubess
Laboratory of Computer Science Operational Research and Applied Statistics, Abdelmalek Essaadi University, Faculty of Science, Tetouan, Morocco

Lazaar Mohamed
Laboratory of Computer Science Operational Research and Applied Statistics, Abdelmalek Essaadi University, National School of Applied Sciences, Tetouan, Morocco

Khaldi Mohamed
Laboratory of Computer Science Operational Research and Applied Statistics, Abdelmalek Essaadi University, Normal High School, Tetouan, Morocco

ABSTRACT
In recent years distance learning has been a revolution in the techniques used to train people; among them we find the courses as MOOCs (Massive Open Online Courses).

The use of this type of course emerged in phenomenal way especially in academia. But in parallel with this emergence, several problems related to MOOCs appeared, among them the dropout of participants, which is considered one of the major problems faced by distance learning.

This thesis focuses on one of the main causes of the dropout of participants; it is the necessary prerequisite to begin the MOOC. First job is to categorize the participants according to their prerequisites in several learning profiles, and then to propose adaptive remediation activities to each profile found before starting the MOOC.

General Terms
Education, Technology, Application, E-Learning

Keywords
MOOC, cMOOC, xMOOC, distance learning, learning profile, pedagogy, learning style.

1. INTRODUCTION
Distance training -training people who are geographically far- was existed before the emergence of the internet; what differs now are the methods practiced which make use of information and communication technologies.

With the arrival of the Internet, a new movement called Open Education appears under several forms like OER (Open Educational Resources) and OCW (Open CourseWare) of MIT (Massachusetts Institute of Technology), but the problem of this type of courses is that they are online resources, that is to say they are information and information is not necessarily training.

Distance learning as we know nowadays are not revolutionized till the advent of platforms LMS (Learning Management System) such as BlackBoard and Moodle, these are computer tools that manage content (resource management and learning paths, etc.) and follow the learners (activities, forums, synchronous communication and / or asynchronous, etc.), these Training is really interactive and can be considered as an alternative to traditional courses, but they are available for a limited audience of participants because most of them are not for free.

Accordingly, and since they appeared in 2008, and until that day the MOOCS have continued to attract considerably the media's attention because of their ability to combine the interactive dimension due to distance learning and the opened dimension (free) due to the Open Education movement.

Thus MOOCs took a considerable place in the offered distance learning courses, and the number of proposed MOOCs quickly doubled as shown in this graph published by edsurge [1]:

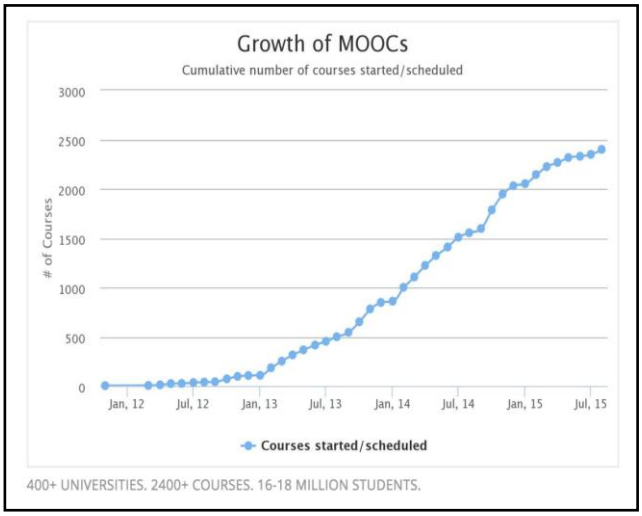

Fig. 1. Growth of MOOCs between 2012 and 2015

However, even if there is a widespread adoption of MOOCs by global universities and the huge desire from teachers to test this type of courses, several problems arose and may influence the evolution of MOOCs as: accreditation certificates, business model, authentication of participants, the rate of the abundance of participants, etc.

In this article we will try to provide a solution to overcome the problem of participants' prerequisites resulted from the opened dimension of MOOCs, which is considered one of the direct causes of abundance within MOOCs.

2. WHAT IS A MOOC

2.1 History of MOOCs
MOOC The acronym was first used by Dave Cormier [2] to describe an online course at the University of Manitoba, organized by George Siemens and Stephen Downes (two main players in the Open Education movement) the CCK08 (The Connectivism and Connective Knowledge 2008) [3]. The latter is an open online course, and its organizers George Siemens and Stephen Downes experimented the connectivism ideas by letting the participants to interact in the way and space of their choice and create a new way to use the Internet for education, which gave an unexpected result, since more

than 2200 people were registered, and hundreds of people from around the world participated in CCK08, each with different behaviors and levels of involvement. It is this phenomenal number of participant at that time which inspired the massive dimension of MOOCs and CCK08 course was particularly seen as a convergence point for the movement of Open Education. Also the ideas that came from this movement as the idea of linking people to build knowledge are considered keys to the dynamism within MOOCs and which allowed connecting closely the MOOCs with this movement as described by Kumar and Iiyoshi [4].

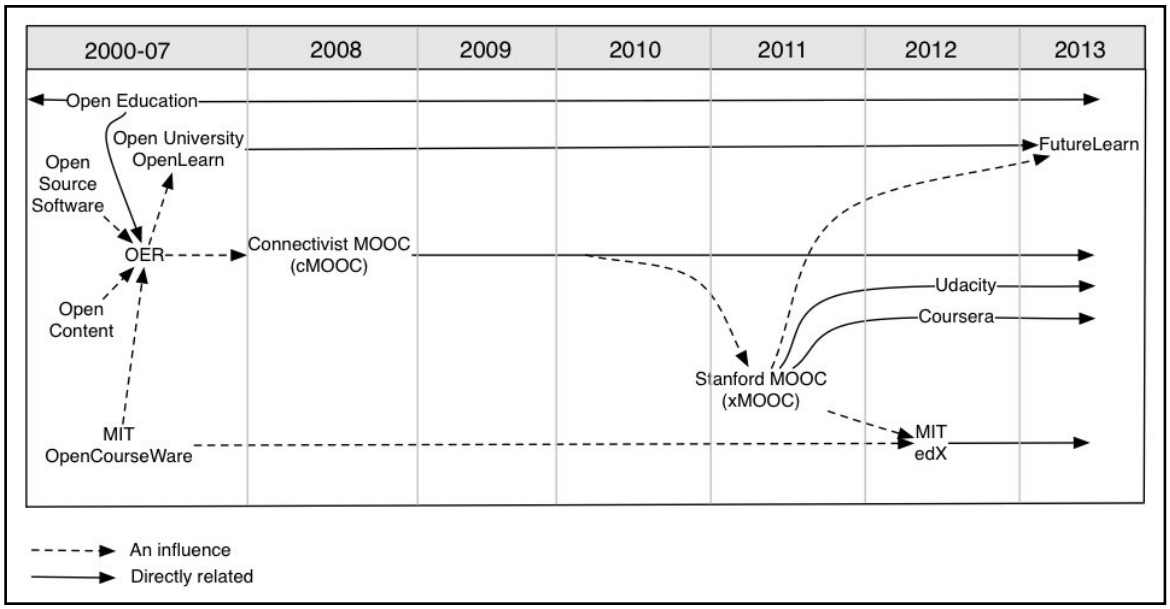

Fig. 2. MOOCs and Open Education Timeline [5]

After this fancy beginning of MOOCs several courses were created as: CCK09[6], PLENK2010[7], CCK11[8], LAK11[9], but the adoption of this new technology in distance learning is still limited until 2012 which is considered the year of their success especially in the world of online higher education. The New York Times qualify this year "the Year of the MOOC"[10]. Many universities, which are leaded by prestigious institutions in the Ivy League like Stanford, Harvard and MIT, began to organize free online courses on various topics. So many platforms that host MOOCs appeared "*Fig. 3*".

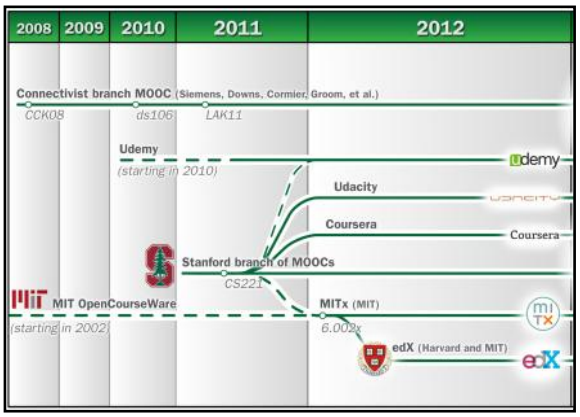

Fig. 3. History of MOOC platforms[11]

2.2 MOOCs definition

To define the term MOOC is a difficult task, because the term is changing rapidly. With its first appearance we were talking about the MOOCs connectivists that designate a collaborative learning by gathering people on a subject. Knowledge is constructed by the participants' interactions in forums, social networks, and blogs. With the development of platforms dedicated to MOOCs as Coursera, Udacity and edX, the notion of the term has totally changed to designate a transmissive approach to knowledge that can be considered as the digital version of the traditional courses. But there is problem which is the confusion between MOOC platforms - sites that host MOOCs- and MOOCs courses [12].

Several definitions of the term MOOC were given, but even if the notion of MOOCs changing rapidly, and each letter of Acronym MOOC can accept multiple interpretations "*Fig.4*" [13], each tentative to give a definition to this term should respect the Acronyms elements of MOOC, that's why the MOOC can be defined as :

An interactive course with objectives and learning paths, open to everyone to register for free and without having to justify a degree or any prerequisites, which can accommodate thousands of people or more, and it's designed to be followed entirely online for a limited time, generally few weeks.

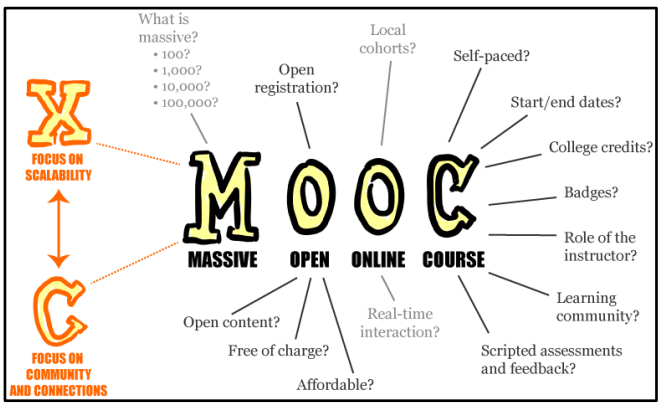

Fig. 4. MOOC, every letter is negotiable

3. TYPES OF MOOCS

According to the evolution of MOOCs definition, George Siemens distinguished two different types of MOOCs: *"Largely lost in the conversation around MOOCs is the different ideology that drives what are currently two broad MOOC offerings: the connectivist MOOCs (cMOOCs?) that I have been involved with since 2008, and the well-financed MOOCs by Coursera and edX (xMOOCS?).*

Our MOOC model emphasizes creation, creativity, autonomy, and social networked learning. The Coursera model emphasizes a more traditional learning approach through video presentations and short quizzes and testing. Put another way, cMOOCs focus on knowledge creation and generation whereas xMOOCs focus on knowledge duplication."[12]

To sum up, the cMOOC focus on the exchange between the participants and the xMOOC are based on the transmission of knowledge already developed by an educational team, the table below shows the aspects of the differences between these two types (this table is made by Jean-Marie Gilliot [14] to synthesize Georges Siemens article "What is the theory that underpins our MOOCs?" [15]):

Table. I. The deffirences between XMOOC and CMOOC

	xMOOC : from traditional courses	**cMOOC : from the approach connectivist**
Educational model	Classical : Course - exercises - Control of acquired knowledge	Connectivism
Knowledge	Prepared before course - declared	Distributed - generated
Consistency	Given by the teacher	Constructed by the participants
Learning Objectives	Defined by the teacher and the program	Defined by each participant for himself
Learn	Take the course	Navigation, establish connections
Ressources	Defined in the course	Aggregated by participants, abundance
Importance of Peer Exchange	Low to medium	Core
Interactions	Forum on the course website	Distributed, starting from a gate, each participant can use Twitter, her blog.
Synchronization by	Unroll of the course and instructor	Interactions between participants, theme of the week, meeting point (live videoconference)
Resonance		Between peers
Encouraging autonomy and self-regulation		Mastery the e-skills
Learning field	Disciplinary linked to a university course	Central theme, but open and interdisciplinary
Evaluation of success	Deliverance of a Certificate of Achievement	Self-assessment of learning
Oriented innovation and impact	Disciplinary oriented	By interdisciplinary nature
Certification	Leaning against the university or business contacts	Leaning against the university or badges
Continuous assessment	Automated	Between peers
Technical Platform	Centralized	Web: Personal Learning Environment
Teacher intervention	Professor guide	Facilitator

4. MOOCS OBJECTIVES

The main purpose stated by the various actors of MOOCs is to democratize the access to quality training, but this goal differs from one institution to another. Sometimes we find that the objective is to revolutionize education by removing the constraints of time, space and money, or just to bring the best teachers and the most motivated students.

In a study made by Babson Survey Research Group titled "Grade Change: Tracking Online Education in the United States", which looks at the state of online learning in higher education institutions in the United States, found that the two most cited goals by institutes that offered or will offer a MOOC is to "Increase Visibility Institution" and "Drive Student Recruitment" "*Fig. 6*" [16] and enter these two objectives in the marketing policy of these institutes.

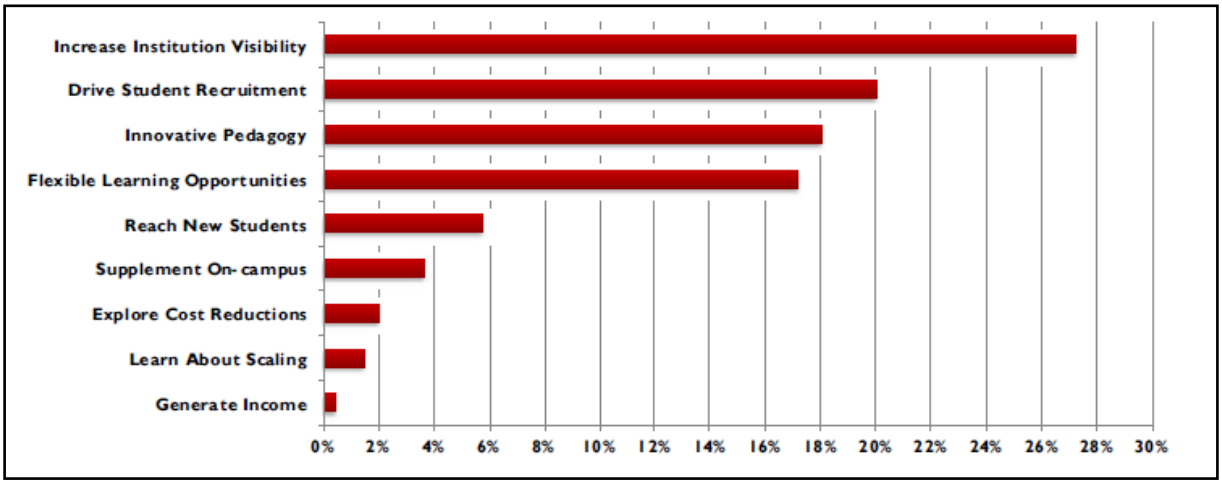

Fig. 5. The main objectifs of the instituts adopted the MOOCs in the United States.

5. BARRIERS AND LIMITATIONS OF MOOCS

The MOOCs are new techniques of training, even if they have rapidly emerged and everyone talks about them, many obstacles and problems emerged which can be grouped into four broad categories:

5.1.The business model

All MOOCs are free, which generates a revenue problem for platforms which host them, especially the lucrative ones as Coursera and Udacity.

Looking at the cost of operation and the significant investments that have been made in these platforms, it is probably that these platforms will develop revenue models to ensure the autonomy of revenue.

5.2.Authentication of participants

This is a general problem in the distance learning, no one guarantees that the person passing the online exam is the one whose name will be in the certificate. We must develop systems that identify learners so they can be known by the accreditation institutes. Coursera has launched a secure certification system "Signature Track" [17] which allows, via an association with the ID photos, a greater assurance of the identity of the person who obtained the certificate.

5.3.The recognition of certificates

All MOOCs give certificates of monitoring or completion of the courses, but the problem is that all of these certificates are not recognized in the academic world and the job market. Maybe the problem is due to the lack of reliability of evaluation systems within MOOCs, plagiarism and also its relationship with the direct authentication problem.

5.4. The dropout of participants

The dropout is one of the major problems faced by distance education, generally 10% of registered persons finalize the MOOC, and until now we do not know the cause of this phenomenon. The example most cited in the articles is the course "Circuits and Electronics" organized by MIT, the course received 155,000 enrolled people, but eventually 7157 which finalized the course, this is not even 5% of enrollment.

However, several hypotheses have been developed to explain the reasons for dropping out: the free courses, workload, instructional strategies, support and animation during the lessons and the necessary prerequisites to start the MOOC (even if it is open to all).

6. PREDECESSOR WORK

A special feature of this type of distance education is that they are open to everyone without any age, knowledge, and level of education restrictions; obviously. This openness will generate heterogeneity in tracking the MOOC courses, profiles of the participants, and also prerequisites.

The issue of prerequisites is one of the main problems that cause the abandonment of MOOCs participants. in order to overcome this problem we have to pursue one of the following directions, on the one hand we can limit the access to MOOCs by defining prerequisites for success, which is totally contradictory to the opened aspect of MOOCs. Otherwise, we can propose remedial solutions during the MOOC and we will perhaps generate an extra workload.

In this research, we have chosen the second direction. That is to say, we will offer participants adaptive remediation activities before starting MOOC in order to fill the gap in their prerequisites. Actually there is no similar work that has been done so far to solve this kind of problems, may be because of the workload requested, since designers of MOOCs always try to minimize the workload as possible as they can. In our case we will use the period of the promotion of MOOC to implement our remediation activities, in this way we will avoid adding a workload during the MOOC.

Further, MOOCs are new technologies in distance learning, they are not yet identified especially in terms of their educational side which is still an active research topic. Therefore any proposals to solve the MOOCs' educational problems will be considered a new job which is the same like ours.

7. OUR WORK

This research will focus on the educational part of xMOOC, and more specifically on one of the causes of the participant's abundance within MOOCs. We talk of the necessary prerequisites to start a MOOC, for example if you want to follow a MOOC PHP 5 you must possess basic knowledge of web programming and algorithms.

The goal of this work is to decrease the dropout rate by finding a solution to the problem of the prerequisites, thus we will divide our response within MOOCs into three phases "Fig. 6":

Phase 1: in this phase we will collect information on participants in order to build the profile of each; these profiles will enable us to clearly identify the levels of the prerequisites of each participant. A well elaborated entrance test, according to the requirements of each MOOC, will be the best tool to achieve our first objective. This test will not be obligatory but the participants will be forwarded directly to the test after their enrollment in MOOC, making them free to choose whether to accept or ignore this test.

The use of questionnaires before starting the course has become a standard for all MOOCs, their stated goal is to get to know the participants and to adapt the training to their expectations and their needs, but what we reproach is that no adjustment will be made for the current training, and even if there will be some changes they will be for the other MOOCs. Besides, who will guarantee to us that there will be the same participants or participants with the same profiles?

Phase 2: After the phase of the constitution comes the profiles harmonization phase, which allows to model these profiles to make them usable, for this we will rewrite them using a common formalism or a modeling profiles language.

Phase 3: In this final stage we will operate these profiles in a learning situation, we offering for participants adaptive remediation activities according to their profiles found in the first phase, these activities will be prepared respecting with the requirements of MOOC at the prerequisites level, and they will not be mandatory and they will be visible to participants who have passed the profiles constitution test.

Thus at the end of our intervention all participants have the same level of prerequisites to begin the MOOC.

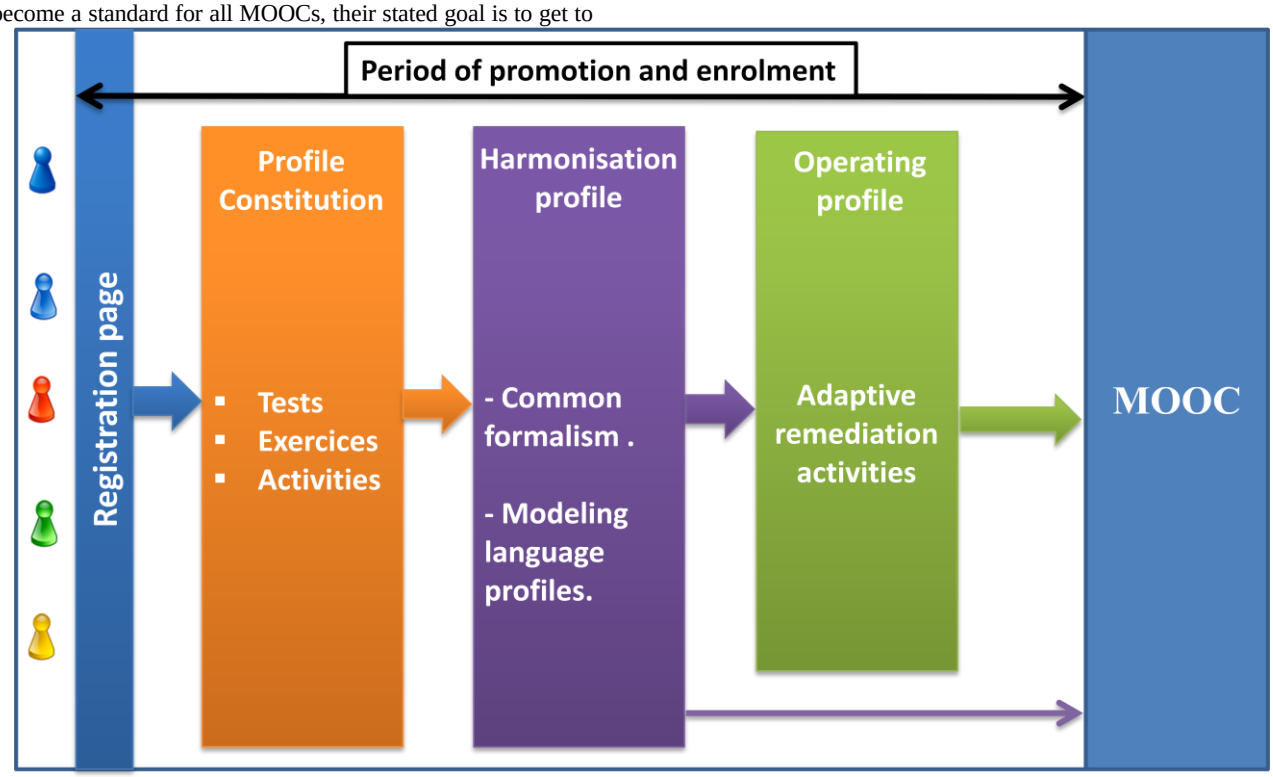

Fig. 6. Illustration of our solution

8. CONCLUSION AND PERSPECTIVES

Several points make it difficult to solve the problem of the dropout among MOOCs, The first one is that MOOCs are new techniques and it is too early to say that we will identify them; the second one is that the dropout is related to other problems.

Failure to resolve the prerequisites problems will decrease the rate of the dropout. Some People will say that our solution will raise the workload within MOOCs; we must remember that these modules will be implemented in the period of the promotion of MOOC, they will not be required to begin the MOOC, and they will be very useful for motivated individuals who meet the prerequisite problem.

The next step of our work is to implement and test our design in a MOOC, and verify the effectiveness of our solution by analyzing the results and assessment of participants.

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