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The MOOCs in face of pedagogical constraints

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Abstract— From a technical perspective, by interconnecting a large community in a free connectivist space, the cMOOCs made a big leap towards a wider access to information provided by world renowned universities (such as Harvard, Cambridge, Oxford, ...etc). However, from a pedagogical point of view, the teaching and learning via these cMOOC is still facing many challenges. As in the case of conventional education, the absence of a proper analysis for the learner's needs and abilities is still one of the major causes of students drop out, and the lack of activity and creativity in their studies. Simply, because the learner finds himself inside a system of obligations and impositions unfitting his needs, skills and level.

Index Terms—Adaptive cMOOC, learner profile and styles. MOOC and pedagogical constraints, MOOC Dropout rate.

I. INTRODUCTION

The concept of MOOCs (Massive Online Open Courses) is often confused with other types of distance learning, as the OER (Online Educational Resources), or OCW (Open Course Ware) [1]. But the difference lays in the fact that the MOOCs follow certain pedagogical principles and have organized curriculums, not just share tertiary education courses and videos in bulk.

The term MOOC was coined for the first time in 2008 by D. Cormier (Univ. of Prince Edward Island), as a response to a course called connectivism and connective knowledge launched in 2005 by G.Siemens (Atabasca Univ.) and S. Downes (National Research Council U.S). 3 years later, American universities adopted the term when they launched their own platforms, where tens of thousands of learners flocked to register [2], which resulted in the emergence of many companies competing to improve the e-learning experience in a revolutionary way and who saw in this the potential of a profitable market [3]. There are two types of MOOCs:

- **XMOOC:** is based on the same approach of conventional learning, where the teacher is the sole contributor in the course;
- **cMOOC:** This MOOC says "connectivist". The course here is the fruit of a collaborative work between teachers and learners.

The most of MOOCs offered by elite universities, provide massive courses (for example 150000 for the first MOOC of Stanford in 2011) [4].

Today, these courses are not limited to computer sciences and technology fields as they were 10 years go, but they cover various subjects and domains, such as economics, law, literature, human relations, pure sciences, art, etc.

THE MOOCS BETWEEN THE TECHNOLOGY AND THE PEDAGOGY

By the 31st of December 2014, internet coverage reached 42% of the population of our planet, 3,079,339,857 users to be exact [5]. And since the prices of personal computers are getting cheaper every year, in addition to the emergence of tablets and smart phones, the world entered a new age: the connected age.

Universities, academic institutions and enterprises saw in this a great chance to spread knowledge and maximize the profits, but due to their limited resources (time, manpower and capital), they resorted to very basic methods as recording lectures and uploading them to their MOOCs, or uploading PDFs of their lectures supporting notes, books, exercises...etc.

In doing so, the universities did indeed make access to knowledge easier and faster, the pedagogical problems and challenges nonetheless, remained the same.

Because, while recording the lectures or uploading supporting documents might be beneficial to both students and universities, as in providing recorded lectures for students in case of absence or for revision purposes, and a scientific reference to online learners, as well as helping the universities attenuate the pressure on over-crowded classrooms ...etc. It sure puts the self-learner and even other online learners in front of the same pedagogical



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challenge of conventional learning, where they find themselves obliged to follow a certain professor's methodology or pace, with limited interaction between professors and students during the lecture and afterwards. This disharmony affects negatively the student's commitment and performance. As an example, The Duke center for instructional technology recorded the variation of the number of viewers on their online platform, and we can notice in the graph below (See Fig.1) the decline in students' online viewings of the Bioelectricity lecture week after week.

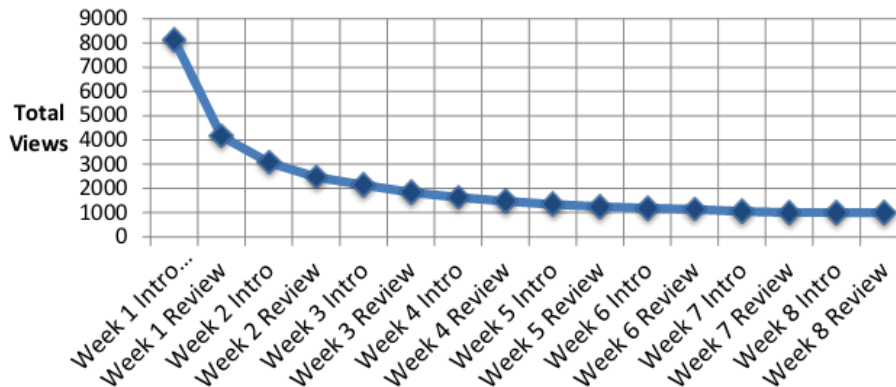


Fig.1 Bioelectricity Video views first and last video for each week (Duke Center for Instructional Technology) [6].

It is evident that there are both technical and pedagogical constraints in online learning, but in this paper, we will focus solely on the pedagogical challenges.

PROBLEMATIC

A. Constraints related to the course

The learning process in conventional education often imposes the content, the technics and the methodologies of learning, as well as the evaluation methods, without any regard of their adequacy to each type of learners.

To solve that problem, some MOOCs providers or adopters are trying today to create Connectivist MOOCs (cMOOCs). In this type of MOOCs, knowledge is shared between all learners, the same information is provided in real time in an open inter-connective space. The courses are the result of collaboration between teachers, who act as leaders, and the learners who contribute via forums, wikis, blogs etc. [4].

In the other hand, the lack of a proper method of student's profiling can lead involuntarily to the loss of beginner learners saying, especially when we talk about lifelong learning, where learners can be elders who are accustomed to conventional learning tools.

The majority of other MOOCs use the conventional method, where a professor or trainer gives a presentation providing the maximum of information in a limited time, without any adaptation to the needs of each type of learners, obliging the learner to follow the professor's specific methodology and curriculum; which brings us back to the same of the pedagogical problem.

Meanwhile, these MOOCs are trying to adopt the connectivism notion, by providing some tools to facilitate interaction between learners, and between learners and their instructors, using social networks, discussion forums, FAQs, announcements, guides explaining the course progress (text, Images, Videos ...), live virtual Q&A conferences (at the end of every conference, or sometimes a full Q&A session once a month or a fortnight).

B. Constraints related to the evaluation

By joining existing MOOCs, we find two types of evaluation:

- **Automated evaluation:** Aims to test the transfer and acquisition levels of taught knowledge. It is usually in the form of tasks or practical exercises, QCM, automated Quiz, texts with fill in blanks ... etc.



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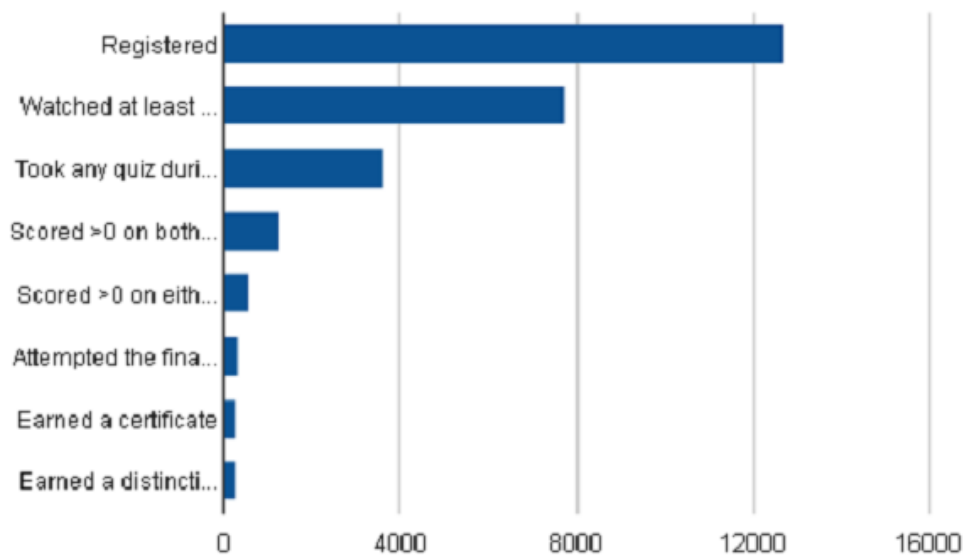
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- **Peer assessment:** The work of one of the learners is evaluated by one or more of his peers who are also learners. This type of assessment has in addition to its evaluation role, an educational and instructive role[1].

On the other side, deadlines for filing homework or quizzes cause a new constraint related to time and speed of progress, which is somehow contradictory to the principle of the whole project. Especially when we say "Open", it means that people can learn and practice according to their schedule and rhythm. Besides, each student has a different profile, and pedagogically this process won't be very effective because it is not adapted to the needs and skills of all learners.

C. Dropout rate in MOOCs

That is why we find, in spite of the massive number of registered learners in a certain course, the number of active participants who take the course from beginning to end is still very limited (Fig.2).



Source: Duke Center for Instructional Technology

Fig.2 Student Persistence in one MOOC: Bioelectricity, fall 2012 [7].

Among the large number of registered learners in MOOCs, the modest percentage of those who complete their courses is about 10% [8]. Compared to conventional courses, MOOCs with its both types (xMOOC & cMOOC) experienced a high dropout rate [9].

In 2012, R. Meyer [10] (A. Editor at THE ATLANTIC) reported that MOOCs provided by Massachusetts Institute of Technology (MIT) and University of California Berkley, scored a dropout rate between 80% and 95% [11].

Taking the example of Software Engineering course offered by the university of California Berkeley on the Coursera platform, from more than 50,000 registered only 7% were able to complete their courses [11]. And according to a research made by K. Jordan (Open Univ. UK) in 2013, among 48 MOOCs analyzed, the MOOC GDP #1 (Project management) offered by Lille Central School on the Canvas platform (www.canvas.net) had the highest dropout rate [9].

According to Andrew Ho, assistant professor of education at Harvard University, involved in research related to MOOC, researchers are trying to determine the different types of learners registered on the platforms, and subsequently analyze the objectives of each one of them. Because most of them do not seek to pass the tests or to get a certification of accomplishment. A fact that still puzzles the researchers [7].



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II. THE LEARNER PROFILE

A. Definition

A learner's profile is an accumulation of data concerning the skills, abilities and behavior of a learner or a group of learners. This information (computerized or not) collected or deduced through a set of pedagogical tools and methods [12].

The elaboration of a learner profile can be made manually or automatically (by professors or by automated programs). Such a work can provide valuable data to institutions, teachers or even to the learners themselves. Now and then, we can find in one or more fields and for the same learner, sometimes complementary profiles, sometimes not, or even incompatible [12].

Each of these profiles focuses on finding a suitable learning process for each learner depending on his specific way of learning, and helps analyzing his knowledge to define his level.

B. Profile or Model?

Because our aim is to make a specific analysis at an individual level, setting a model would be too general, thus we chose to make profiles. A profile for each type of learner that can be adapted, according to the data collected (skills, needs, behavior...) to each learner.

C. Why a learner profile?

Because each student has a different way of learning and of thinking, it was required to anticipate a learning process (as well as evaluation) adaptive and modeled according to these types of learners.

The learner profile enable the acquisition and collection of the data needed to develop, in accordance with the results, teaching and learning styles compatible with every type of learners. What would contribute in the creation of an adaptive educative system, or at in the short term, an adaptive cMOOC - as in the case of our research- that would meets the specific needs of each distant learner.

If the profile is rich and detailed (with data including but not limited to interests, personality, gender, age, culture, etc. [13]), the analysis of the skills, learning styles, preferences, and needs can be made easier, more precise and faster.

D. Why a learning style?

The way or the manner how each of us uses his senses to receive a message or process information is different. This is what often called a "learning style."

Each learning style is characterized by certain criteria that can notably help discovering the various types of learning, how to learn better, and the adequate and compatible learning methods for each type of learners. Consequently, improving the learning process's efficiency and allowing a better time and knowledge management[14].

E. The types of learners from cognitive side

Everyone is characterized by cognitive dominant type, and other secondary. In 1987, Rita Dunn (St. John's Univ. of New York) and Ken Dunn (City Univ. of New York) identified three sensory learning styles (see Table I.):

The change and the development of the preferences and styles of a learner is related to continuous experiences, and is made gradually in time, and depends heavily on circumstances and environment. For instance, a learner who prefers to study alone at home might also prefer to work in groups in class [13].

Moreover, nobody can say that one style is better than another, because the majority of people use a combination of the three sensory learning styles, with a preference for one of them [14].



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Sensory learning style	Learning preferences
<i>Auditive learner</i>	<ul style="list-style-type: none"> • Hears aloud ; • Listens carefully ; • Discusses what he learns; • Plays vocabulary games ; • Solves and makes puzzles; • Works in collaboration ; • Screams and recites by singing ; • Shares with others what he learns to clarify the lessons etc.
<i>Visual learner</i>	<ul style="list-style-type: none"> • Memorize by using visual indexes and drawing images in the his head; • Designs diagrams and plots graphs; • Clarifies the ideas through drawings; • Revises by watching videos; • Participates in school activities to live scientific experiences; • Observes how others do • Makes games and puzzles, etc.
<i>Kinesthetic learner</i>	<ul style="list-style-type: none"> • Seeks to move; • Prefer walking while talking; • Writes or draws while listening ; • Elaborates models ; • Marks and highlights the essentials ; • Manipulates material ; • Lives experiences ; • Imagine himself in situations; • Makes interpretations for stories and concepts, etc. [13].

Table .I Learning preferences depending on sensory learning style

F. The pedagogical or teaching styles

A pedagogical or a teaching style is the methodology of teaching, simply put, it is the “how to teach”. The pedagogical style is focused on three dimensions (Fig.3):

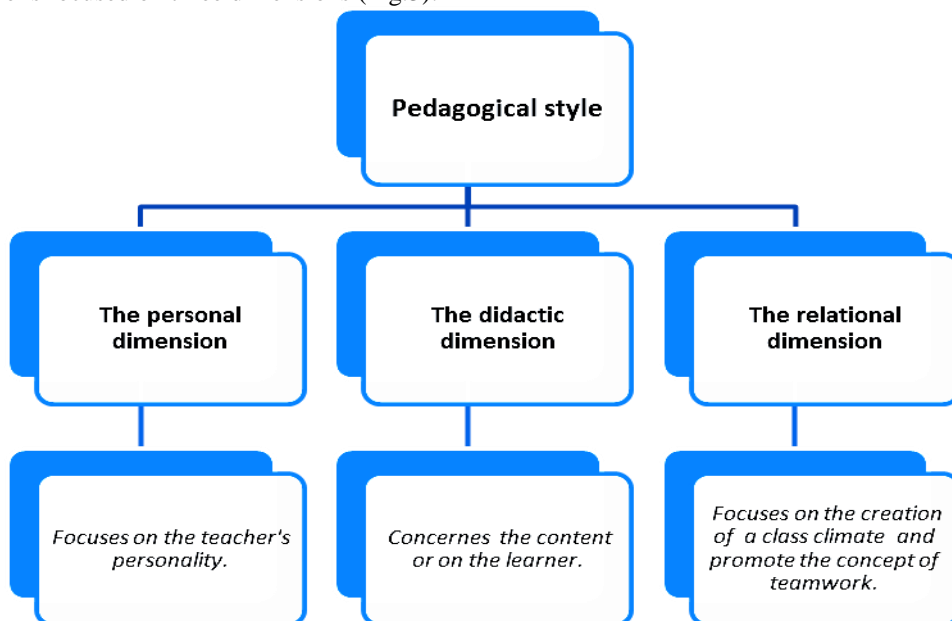


Fig.3 Pedagogical styles dimensions



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The learning styles combined with teaching styles can help us achieve a better teaching / learning process, and increase the efficiency of both instructors and learner

III. CONCLUSION

Our objective in this present paper was to point out the pedagogical constraints related to cMOOCs, and trying to bypass them by opting for adaptive cMOOCs as a solution that will respect the compatibility with the specific need, capacities and skills of different learners, based on the analysis of their profiles.

We opt for the development of a distinguished model, which will enable effective learning, despite the variation of learner's types, based on the principles of differentiated pedagogy. In which the teacher takes in consideration the fact that he is working with different skills and learning styles.

This work will pass by stages, from automated data collection through the online platform, to the analysis of the learners' profiles. The collected information will allow the analysis of interests, needs, skills, preferences and learning styles. In its turn the analysis will allow development of a course common in terms of the information delivered, but automatically customizable in terms of presentation and evaluation, to fit each different profiles detected.

The technological evolution is urging us today either as researchers or decision makers, to think seriously about intelligent and pedagogically advanced solutions, that can both optimize performance and promote scientific achievement and innovation in universities.

A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

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