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Βοηθητική χρήση ενός MOOC σε προπτυχιακό μάθημα

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## Using a MOOC in an undergraduate face-to-face course

### Βοηθητική χρήση ενός MOOC σε προπτυχιακό μάθημα

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#### Abstract

This paper describes the use of a free external MOOC as a supplement to the face-to-face syllabus in an undergraduate course about Internet technologies, based on the so-called LAMP stack. Since this was their first contact with MOOCs, student reactions and MOOC acceptance are investigated by qualitative research. Although there was some scepticism among the students in the beginning, finally they liked this new way of learning. Six out of eight students managed to finish the MOOC and presented a certificate, while the other two nearly finished. The students assessed the course and the instructor positively while they were able to easily perceive the material. In case some of them had questions, they would replay the video or search for the answer in Google; it seems that the students did not use the Questions and Answers forum of the MOOC. By the interview time (May 2017), six out of eight students declared that they will attend more MOOCs related to their courses in the future, while three of them had already enrolled, out of which, one had already finished four courses and the other, one course.

**Key-words:** *MOOCs, undergraduate course, qualitative research, interviews, Internet technologies, LAMP stack.*

#### Περίληψη

Στο παρόν άρθρο περιγράφεται η επικουρική χρήση ενός ανοικτού μαζικού διαδικτυακού μαθήματος (MOOC) σε ένα τεχνολογικό μάθημα σε μια τάξη παραδοσιακής διδασκαλίας της Σχολής Ικάρων καθώς και η αποδοχή του και η επίδραση που είχε στους φοιτητές (ικάρους). Πρόκειται για το μάθημα των Τεχνολογιών Διαδικτύου που περιλαμβάνει μια σειρά τεχνολογιών και λογισμικών (HTML, CSS, HTTP, PHP, phpMyAdmin και τον διακομιστή Apache), γνωστή ως στοίβα LAMP, και διδάσκεται στο 5ο εξάμηνο. Προαπαιτούμενο μάθημα είναι οι Βάσεις Δεδομένων (με το λογισμικό MySQL) του 4ου εξαμήνου και ο προγραμματισμός του 3ου εξαμήνου, ενώ ακόμα απαιτείται ευχέρεια στην χρήση του λειτουργικού συστήματος Linux και των εντολών του κελύφους (bash commands). Τελικός στόχος του μαθήματος είναι η κατασκευή διαδικτυακών εφαρμογών.

Χαρακτηριστικό γνώρισμα των μαθημάτων πληροφορικής είναι η διαρκής εξέλιξη που συνεχώς αναβαθμίζει τις τεχνολογίες και απαιτεί διαρκή και επίπονη επιμόρφωση των διδασκόντων ώστε να προσφέρουν πάντοτε την πλέον επίκαιρη γνώση.

Επειδή ο στόχος είναι φιλόδοξος και οι ώρες του μαθήματος περιορισμένες, η παρουσίαση των επί μέρους τεχνολογιών σε βάθος είναι αδύνατη. Διδάσκεται μόνον η εισαγωγή και οι βασικές γνώσεις που είναι απαραίτητες για την ολοκλήρωση της ύλης και την υλοποίηση ενδεικτικών εφαρμογών. Κάθε παρέκκλιση από το ωρολόγιο πρόγραμμα θέτει σε κίνδυνο τον στόχο του μαθήματος. Οπότε, όταν οι ίκαροι ζήτησαν περισσότερες πληροφορίες για την HTML, ο διδάσκων (που είναι εξοικειωμένος με τα MOOCs ως φοιτητής και ως ερευνητής), τους πρότεινε να παρακολουθήσουν όλοι μαζί ένα δωρεάν MOOC σχετικό με HTML5 και CSS3. Ο διδάσκων (που δραστηριοποιείται και στην εκπαιδευτική έρευνα) συνέλαβε το σχέδιο, το πρότεινε στην τάξη και μετά την σύναψη του “εκπαιδευτικού συμβολαίου” κατέστρωσε το χρονοδιάγραμμα του Σχ. 2. Αποδείχθηκε πως αυτή ήταν η πρώτη επαφή των ικάρων με τα MOOCs οπότε ο διδάσκων προχώρησε σε μια σειρά συνεντεύξεων για να διαπιστώσει την επίδραση αυτού του διαδικτυακού μαθήματος στην εκπαιδευτική δραστηριότητα αυτομόρφωσης των ικάρων. Τα κύρια αποτελέσματα της εκπαιδευτικής έρευνας συνοψίζονται ως εξής:

- Το συγκεκριμένο μάθημα απετέλεσε την πρώτη επαφή των ικάρων με τα MOOCs και άφησε θετικές εντυπώσεις.
- Οι ίκαροι έμειναν ικανοποιημένοι με τον διδάσκοντα διότι είχε μεταδοτικότητα και εξηγούσε την ύλη αναλυτικά.
- Σε γενικές γραμμές οι ίκαροι δεν είχαν απορίες. Σε ελάχιστες περιπτώσεις, είτε γύρισαν το βίντεο πίσω για να το ξανακούσουν είτε αναζήτησαν περισσότερες πληροφορίες στο Διαδίκτυο.
- Από τους οκτώ ικάρους που παρακολούθησαν το μάθημα, έξι παρουσίασαν πιστοποιητικό ενώ οι άλλοι δύο δήλωσαν πως τους έμειναν 1 και 3 βιντεοδιαλέξεις αντίστοιχα.
- Έξι από τους οκτώ ικάρους δήλωσαν ενδιαφέρον να παρακολουθήσουν περαιτέρω MOOC, συναφή με τα μαθήματά τους. Από τους 6 οι 3 έχουν ήδη γραφτεί σε άλλα και από αυτούς τους 3 ο ένας ολοκλήρωσε ήδη 4 ενώ ο άλλος 1 (τον Μάιο 2017).

Ο διδάσκων θεωρεί ότι επετεύχθησαν τόσο οι μεσοπρόθεσμοι στόχοι του που αφορούσαν στην πειραματική χρήση ενός MOOC παράλληλα με την πρόσωπο με πρόσωπο διδασκαλία και την αύξηση των γνώσεων των ικάρων έξω από την τάξη χωρίς την χρήση περαιτέρω ωρών διδασκαλίας, όσο και οι μακροπρόθεσμοι, που αφορούσαν στην εξοικείωση των ικάρων με τα MOOC που αποτελούν μια ευέλικτη μορφή επιμόρφωσης και συνεχιζόμενης εκπαίδευσης.

**Λέξεις-κλειδιά:** *MOOCs, ποιοτική εκπαιδευτική έρευνα, συνεντεύξεις, μικτά μοντέλα μάθησης, τεχνολογίες Διαδικτύου, στοίβα LAMP.*

## **1. Introduction - Literature review**

Since their appearance, MOOCs (Massive Open Online Courses) started affecting and changing education. Although this transformation is still at the beginning (since the MOOCs and the supportive technologies are still evolving), and there are many open research problems about MOOCs (Andreatos, 2015), important changes in all grades of education due to MOOCs are already evident, from elementary school (Cairneagle Associates, 2014) to high school (Jackson, 2013; Brahimi and Sarirete, 2015; Najafi, Evans and Federico, 2014), to higher education (Salisbury, 2014) and even to

Distance Education (Adham and Lundqvist, 2015), continuing education and intra-organisational learning (Andreatos, 2011; Andreatos, 2015).

According to Brahim and Sarirete (2015), MOOC penetration in traditional face-to-face settings is due to the fact that:

*With MOOCs, the teaching method is moving from the traditional transfer learning model where the teacher serves as the repository and transmitter of knowledge to the flipped classroom model where the learner interacts with other students, peers, and has flexible access to all information and resources around him before coming to the classroom. With the huge amount of online educational material this has become a useful and beneficial method in teaching.*

Today there are a lot of MOOCs providers all over the world (Andreatos, 2015; Brahim and Sarirete, 2015; Robertson and Tasso, 2015), many of which offer courses for free. Some providers combine courses and add a capstone project in order to offer specialisations. In general, MOOC cost is reasonable and much lower to that of higher education in the Western world (Andreatos, 2015).

Due to the need for lifelong learning, MOOCs are very attractive to educators, since they form a flexible and economic way of personal development (Andreatos, 2015) advancing the personal Zone of Proximal Development (ZPD; Vygotsky, 1978).

Many surveys have shown that faculty members are not rejecting technology. In fact, most academics believe that technology can support education but at the same time they fear that technological or even commercial considerations, (rather than pedagogical considerations) are driving the phenomenon of MOOCs (Brahimi and Sarirete, 2015; Robertson and Tasso, 2015).

## **2. The instructor turns to MOOCs for supplemental student education**

The effort described was implemented in the academic year 2016-2017, in the 5th (Fall) semester, during the Internet Programming course. This course combines a series of technologies including HTML, CSS, HTTP, PHP, phpMyAdmin and the Apache web server. A prerequisite course is Data Bases (using MySQL) taught in the previous (4th) semester, as well as, fluency with the Linux operating system and bash commands. The whole course is taught using open-source technologies – especially the so called LAMP stack.

The goal of the course is to teach students how to build simple web applications consisting of HTML forms in the front-end and PHP scripts querying a MySQL database in the back-end, powered by an Apache web server, all running on a Linux platform.

It is obvious that the 45 didactic hours do not suffice for covering all the aforementioned subjects in depth; therefore, a compromise had to be made: teach only the basics of HTML, CSS, HTTP; recall the basics of the 4th semester's Databases (using MySQL) course, and teach the mechanism of HTML forms, PHP scripts and queries to the MySQL Data Base.

This didactic scenario was sufficient some years ago; however, HTML and CSS have evolved considerably since then, and they could be the subject of a separate course. Therefore the instructor followed this approach: he referred students wishing to learn more HTML to a MOOC provider (Udemy). He selected two free introductory courses on HTML5 and CSS3 from a major MOOC provider and presented them in the class. The students chose one of the two. The instructor attended the course simultaneously with the students (instructor as student). The MOOC attendance was optional, because the instructor knew from his experience that the students would

object to extra coursework; however, the instructor would give an extra 10% bonus to the oral grade of the students finishing the course by demonstrating the relevant certificate before the final exam (end of January 2017).

Another reason calling for this option was the acquaintance of the Hellenic Air Force Academy (abbreviated as HAFA) students with continuing education. An early introduction to MOOCs would familiarise students with MOOCs so that they would have alternative educational resources when needed in their carrier.

### **2.1. Demographic information**

The population of this educational research were eight out of nine students of the class, one female and seven males, junior students of the 5<sup>th</sup> semester of HAFA, about 20 years old.

### **2.2. Expected students benefits**

The instructor, in order to motivate the students to attend the course, presented the scenario and discussed it with the students; then he presented the following benefits for those who would decide to attend and finish the course:

- 1) Knowledge of HTML5 and CSS3;
- 2) Experience with a new way of learning;
- 3) Certificate; MOOC certificates are mentioned in CV's;
- 4) Ten percent bonus in the oral grade.

In addition, the instructor would also attend the course and would operate as his students (instructor as student), because HAFA students tend to turn to their fellow students for help.

### **2.3. About the MOOC**

The proposed MOOC contains 36 Lectures in Video clips totalling 5 hours. It is offered in English. The required Skill Level is Beginner Level. At that time (October 2016) it had 5,391 students enrolled and it was assessed by 4.5 out of 5 stars by 369 students. At the time this text was typed (Sept. 2017) the course had 22,502 students enrolled and it is still rated 4.5. This grade is relatively high given that the average course has 4.18 stars, fact which guarantees learner satisfaction and minimises drop-out (Coursetalk, 2015).

The course covers the topics shown in Fig. 1.

+ Course Intro	1 Lecture	04:06
+ Basic HTML	7 Lectures	01:08:22
+ CSS Basics	6 Lectures	49:04
+ Links	5 Lectures	29:18
+ Layout	4 Lectures	48:40
+ Tables	3 Lectures	23:55
+ Forms	5 Lectures	44:49
+ Video	3 Lectures	19:59
+ Wrap up	2 Lectures	05:41
+ Bonus Material	1 Lecture	01:04

Fig. 1. MOOC sections

The MOOC syllabus can be found on line (<https://www.udemy.com/html5-fundamentals-for-beginners>).

The MOOC plan was clever: the MOOC teacher is building a complete website step-by-step using HTML5 and CSS3 in eight sections. He starts from a very simple site and he introduces new concepts in each section, which then he uses in the course project in order to advance it.

### 3. Diary/ Schedule

The instructor introduced two courses for the students to choose at the beginning of October 2016. During the class of the 5th of October 2016, after a brief discussion, the students chose one of the proposed courses and agreed to start attending the videos as soon as possible. The instructor used a researcher's diary to note the students' progress.

From time to time the instructor was asking the students about their progress as well as their opinion about the course and was recording notes in his diary. It was noticed that the students' progress was varying greatly at the beginning. However, the progress of the most eager (active) students acted as a motivation for the rest, so that they were not left behind, with the exception of one student who refused to participate due to lack of interest. As expected, his performance was low in the course also. Fig. 2 shows the research plan.



Fig. 2. The research plan

The instructor finally finished the course by October 25, 2016, because he was familiar with the course material, as well as, a frequent MOOC learner (Andreatos, 2011). Then he demonstrated his certificate to the class (Fig. 3) in order to motivate the students.



Fig. 3. The MOOC certificate

It was observed that the students did not ask questions about the MOOC content, which implies that the material was presented well and high quality.

## 5. Assessing the experiment

Two months after the course (and after the exams of the fall semester) the instructor interviewed all eight students. From these interviews some interesting results emerged that will be presented in the next subsection.

### 5.1. Research results

In general, the following conclusions may be drawn from the interviews:

- For all of the students this was their first contact with the MOOCs;
- Their first impressions were positive;
- They liked this way of learning;
- In general, the students were satisfied with the MOOC teacher because they were able to easily follow him and to understand the concepts presented in the videos. One of the students added that the MOOC instructor delivers the course clearly; another student added that if he has not understood something well, he turns the video back. It seems that they did not use the MOOC forum to pose questions;
- Out of eight students, six presented a certificate while the other two reached close to the end (missing 1 and 3 lectures respectively);

- One of the students who did not finish the MOOC declared that he was attending the lectures only during the weekends. This student faced the following problem: he could not recall the previous lectures, and so he had to repeat them before going on;
- The other student who did not finish the course considers MOOCs inferior to face-to-face teaching because he cannot ask questions to the teacher and get immediate answers;
- One of the students declared that he would willingly take MOOCs in parallel with his face-to-face courses in the future if the syllabus were comparable;
- Six out of the eight students subscribed to additional MOOCs of their interest.

One of the students was so excited with the MOOC learning method that he immediately subscribed to four other courses from Udemy! One of these courses was related to background material offered by HAFA during the second year of studies and the other three were related to courses offered by HAFA during the fourth year of studies! He finished these four courses before the HTML5 and CSS3 MOOC and after that, he subscribed to another 3-4 MOOCs to attend during the Easter holidays (April 2017).

## 6. Discussion and Conclusion

The educational experiment presented here shows that the students assessed positively their first MOOC experience independently of the face-to-face course assessment (which was average).

In general, the students were satisfied with the MOOC teacher because they were able to comprehend him and understand the concepts presented in the videos. It was critical for the students to be able to easily follow a MOOC instructor in order to successfully finish the course; this is fairly reasonable, taking into account that the courses are given in English which is not their native tongue.

The relatively high success rate (six out of eight students or 75%), compared to 4-8% which is the average in MOOCs (Andreatos, 2015) is due to the high motivation and support by the instructor and fellow students, as well as, the fact that the students are already active in the learning process, compared to adult learners who have graduated some years ago.

The instructor's short-term goals were related to the HAFA course; The instructor's long-term goals were the use of MOOCs in parallel with face-to-face courses and even further, the introduction to lifelong learning via MOOCs (Andreatos, 2015). Judging by the results, the instructor feels that both the short-term as well as the long-term goals were met, to a different degree, depending on the students' willingness and initiative.

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