Notes on Experiences with MOOCs / Flipped Classroom

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Abstract

Massive Open Online Courses (MOOCs) are open access and scalable online higher education courses which have been attracting a lot of attention from the higher education community throughout the world in the recent years. By imposing little constraints on entry requirements and allowing as such extended participation, MOOCs have emerged as a new learning paradigm. However, given that they do not follow the traditional teaching methods, their rapid evolution and development have triggered many debates. To get some new insights on these approaches, a panel on *Experiences with MOOCs / Flipped Classroom* was organized at the 10th International Conference on Autonomous Infrastructure, Management and Security. The panel gathered four PhD researchers working in the area of Network and Service Management who shared their experience of using MOOCS with the audience and debated possible changes in current practices to make learning more effective. This short report summarizes the main questions discussed during the panel.

1 Introduction

Massive Open Online Courses (MOOCs) have been gaining increasing popularity in recent years mainly due to their extended outreach and lack of entry requirements as well as tuition fees. Given their initial success and the interest from the higher education community, they have the potential of becoming an essential part of the education system. However, due to their online nature they do not follow the traditional teaching paradigm that requires classroom presence and involves direct interaction with the lecturer. In addition, MOOCs can be developed through various platforms (*e.g.,* Coursera[1], FutureLearn[2], FUN[3], openHPI[4] *etc.*) and can have different formats (*e.g.,* slides, articles, videos *etc.*). All these factors can influence the student learning experience and the future uptake of such courses.

To get some insights on this new learning paradigm, a panel on *Experiences with MOOCs / Flipped Classroom* was organized at the 10th International Conference on Autonomous Infrastructure, Management and Security (AIMS 2016) which took place on June 20-23 2016 at the Universität der Bundeswehr München in Germany. The main objective of the panel was to get feedback from PhD researchers working in the Network

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[1] https://www.coursera.org/

[2] https://www.futurelearn.com/

[3] https://www.fun-mooc.fr/

[4] https://open.hpi.de/

and Service Management (NMS) area to suggest changes in current practices and make learning more effective.

The panel consisted of four PhD students at different stages of their research who have followed at least one MOOC and who discussed their personal experience and expectations, and shared their insights with the audience at the conference. The session was structured in three parts. First, the panelists presented their views based on a short questionnaire provided prior to the event. Then the moderators asked some questions concerning, for example, course integration, interaction with other students/instructor, MOOC format, course customization, grading systems *etc.*. Finally, a general discussion was opened with the audience.

This short report is a summary of the main issues and questions discussed during the panel. After a short presentation of the methodology used to get feedback from the panelists (Section 2), a brief overview of the obtained responses is provided. The key questions addressed during the discussion are then presented (Section 3). Finally, some recommendations on key factors to take into account when designing a MOOC are discussed (Section 4).

2 Methodology

Given that MOOCs cover a wide range of aspects, they can be comprehended from different perspectives. To get insights onto topics and issues perceived as important by the PhD students working in the NMS area, a questionnaire was disseminated to the four panelists prior to the event. The responses were used to guide the debate. This section provides a brief overview of the questionnaire as well as the collected responses.

2.1 Questionnaire

The disseminated questionnaire consisted of 19 questions related to the experience of the panelists with MOOCs. These questions covered three main topics:

- **Personal MOOC experience**: the first topic encompasses a set of general questions about the experience of each panelist with MOOCs. In particular, questions were asked about the number of followed MOOCs, their origin (from which institution), the topics, as well as the main reasons for choosing a given course (*e.g.,* free, trendy subject, instructor reputation *etc.*).

- **MOOC structure**: the second topic covers questions related to the main content of the followed MOOCs (*e.g.,* slides, articles, video(s), combination *etc.*), potential interaction with the instructor or other participants, the duration of the course (hours/weeks), as well as the existence of practical exercises/assignments and availability of a certificate upon completion.

- **Feedback and position**: the third topic focuses on questions about the main positive and negative points of the followed MOOC(s) and the position of the panelist with respect to (i) the ideal duration of a MOOC, (ii) the ideal content for a better learning experience, (iii) the added value of practical exercises, (iv) the assignment marking philosophy, (v) the value perceived in obtaining a certificate and (vi) the future of MOOCs compared to traditional learning methods.

2.2 Overview of the Responses

The panelists mainly followed MOOCs on specialized topics (especially on Machine Learning and Software-Defined Networking) offered on Coursera. It was interesting to

Positive Aspects	The technical depth contributes to my learning experience.
	The ability of the instructor contributes to my learning experience.
	The offered flexibility contributes to my learning experience.
	The availability of exercises and feedback contributes to my learning experience.
Negative Aspects	My motivation can be affected if the course is too long.
	My motivation can be affected if the pace is not adapted.
	My motivation can be affected if the structure/format is not adapted.
	My motivation can be affected by the absence of time constraints.
	My learning experience can be affected by the absence of offline replay.
	My learning experience can be affected if the structure/format is not adapted.

Table 1: Overview of the positive and negative aspects reported by the panelists.

see that the instructor reputation was considered by almost everyone as a key reason for choosing a MOOC. In addition, it was reported that all followed MOOCs were interactive and consisted in a combination of material, including automatically graded exercises. The duration varied from 4 to 11 weeks. All MOOCs offered certificates upon completion. A general consensus could be noticed among the panelists on the fact that the main positive point of MOOCs is in the flexibility that these provide in deciding when and where to study. As for the negative points, however, a wide range of opinions was expressed, which in our opinion shows that there still exists room for improvements. An overview of the positive and negative aspects reported by the panelists is presented in Table 1.

It is worth highlighting that these responses were obtained for a very limited sample. While some commonalities could be observed in the answers, it would be very hazardous to draw any general conclusions. To consolidate these observations, it would be essential to disseminate the questionnaire to a larger group of PhD students.

3 Discussion

This section summarizes the key points discussed with the audience during the panel.

The self-motivation factor There was a general consensus among both the panelists and the PhD students in the audience to say that one of the key challenges when following MOOCs is self-motivation. Different factors affecting the motivation were put forward by the participants: the quality of the course in terms of presentation, the duration, the degree of interactive features (*i.e.,* proportion of lectures vs. exercises), as well as the suitability of the MOOC to the participant background and expertise. The absence of direct interaction with other participants and/or instructor was also mentioned as a key factor that can severely affect self-motivation.

Should financial incentives be provided? It was argued that one way to circumvent the self-motivation issue could be to introduce entry fees. This in turn raises questions on how to fix the value of these fees and what these would cover. A rather unrealistic and yet interesting suggestion was to make use of betting system allowing participant to bet on whether or not they would complete a course. This made the audience remark that, in practice, MOOCs can be used in different ways. For instance, they can form an integral part of an higher education curriculum, in which case it was argued that incentives do not differ much from the ones of traditional teaching where the goal is to pass the course. However, it was objected that MOOCs can also be used for either consolidating or acquiring new knowledge independently of any curriculum, in which case motivations to complete the course may become less tangible.

How to use MOOCs? All agreed that MOOCs can be regarded in different ways. In this context, the analogy between MOOCs and textbooks was suggested. It was argued that in a similar fashion to what is expected for producing a textbook, the time and efforts invested in the creation of a MOOC may not be worth in economical terms. The analogy was further prolonged by hinting at the fact hat MOOCs may eventually replace textbooks. The argument was then made that in case MOOCs were to be regarded as the next generation textbooks, self-motivation should not be considered as an issue *per se*. In particular, it was argued that it is generally not expected from a textbook user to strictly read all the chapters in a given time period.

What would be the ideal MOOC structure? The idea of envisioning MOOCs as textbooks found a positive echo among both the panelists and the audience. In fact, it was argued that for effective learning MOOC videos should be short in duration and focus on specific topics. Several participants mentioned that in their view, what could make a very good MOOC would be the ability to select lectures based on their level. In particular, a suggestion was made to provide for each topic a set of videos with different levels suitable for learners with different background and experience. This suggested the idea of developing MOOCs as a collection of short videos on very specific topics associated with interactive exercises in a modular system where students could browse through a catalog to select the courses based on their interests and expertise (a panelist refer to such a system as a "Wikipedia"-type). Two key elements regarding the MOOC structure were discussed during the panel. First, the availability of interactive exercises/assignments was repeatedly highlighted as one of the main strengths of MOOCs. It was argued that interactive exercises and assignments are must-be to ensure the success of any MOOC. In addition, participants insisted on the fact that having the ability to access the MOOC when they want would be one of the most desirable features of MOOCs. This would strongly contribute to make learning more effective by allowing students to go through parts of the course that they may not have well mastered multiple times. This feature is currently supported by few platforms only [5].

Will MOOCs replace traditional teaching methods? In addition to the self-motivation factor, the absence of social interaction when following a MOOC was also pointed out by the participants as a main drawback of this type of learning. Social interactions between the students and/or with the instructor are hopefully still considered as crucial for personal development and constitute an integral part of a learning experience. In addition, it was reported that the absence of interaction can not only affect the students but also the instructor who may find it difficult not to receive direct feedback during the lecture so that the course can be better adapted to student needs on the fly. While some level of interactions can be achieved via the user forums, it was argued that this is not comparable to face-to-face interaction and, according to the participants, it proved to be rather ineffective when the number of students is large, in particular.

4 Recommendations

Participants expressed different points of views during the panel. While multiple questions were discussed, *motivation* was central to the debate. We therefore believe that this is an essential factor to take into account when designing an online course. The discussion showed that different aspects can affect the learner's motivation. One of these factors reported by several participants is the course duration, which not only concerns the overall time period covered by the course but also the length of each individual part.

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[5]We would like to remark here that these considerations raise multiple questions regarding the material copyrights and control enforcement.

Determining the appropriate duration is particularly crucial as its negative effects can be amplified by what is perceived as a lack of direct interaction between the students and/or with the instructor. To maintain the attention and as such make the learning experience more effective, the participants suggested that courses with short duration should be preferred.

In addition to duration, the suitability of the course in terms of level and technical depth was also reported as a key factor affecting the motivation. Given that not all students have the same background or expertise, the ability for learners to personalize the course based on their needs and constraints is an option that deserves to be further investigated. In practice, such an approach could be achieved by segmenting the course into units of different levels and offering the student the possibility to acquire new knowledge on a specific topic more progressively (including the possibility to access the course offline). While this might be easier to implement for an online course as opposed to a traditional lesson, the realization of such an approach may however require much more efforts from the perspective of the course designer. In that respect, we believe that understanding the underlying motivation of the instructor him/herself is as important as taking into account the motivation of the students.

Most participants of the panel perceived the lack of direct social interaction in MOOCs as a major inconvenient to their learning experience. At the same time, they all agreed that the availability of graded exercises was essential to the success of the course. We believe that while it may not be possible to replace the social bounds emerging from a class room presence, online exercises coupled to systematic personalized feedback provided by the instructor and/or other participants could help the learner to feel more engaged in the course.

Finally, we have observed that another key factor with a significant influence on the student's experience is the personal commitment of the instructor in the course design. From this perspective, MOOCs do not differ much from traditional teaching methods. In addition to the competence of the instructor and his/her enthusiasm when delivering the course, the originality of the content is perceived by some learners as essential. Replaying a pre-recorded lecture might not satisfy the students' expectations and as such can negatively affect the learning experience.

5 Conclusion

To conclude, we believe that the panel was a positive experience. Both the panelists and the audience got actively involved in the debate and interesting constructive ideas were suggested. Given the nature of AIMS that focuses on gathering Ph.D. students, most people attending the panel were young researchers in the early stage of their academic career.We believe that giving them the opportunity to lead the discussion on a general topic relevant to their position made them feel more comfortable to express their opinion and actively participate in the conference.

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