

CHAPTER 9

THE VALUE OF DATA FOR IMPROVING EFFECTIVENESS OF CAMPUS COURSES: THE CASE OF HYBRID MOOCS

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Abstract

In recent years with the advances in technology, learners started to learn various concepts in informal learning environments apart from the official traditional learning programs. We describe such learning environments as part of the Personal Learning Environment (PLE) approach. One great resource for these environments is using Massive Open Online Course (MOOC). Learners can learn any subject by enrolling in MOOCs easily and develop themselves by reaching their personal learning goals. But in such an informal learning environment, it would be hard to manage the learning process. Learners need some ability to manage this process that is called “self-regulation”. There are some problems in both fully face to face learning (like difficulties in following courses), and fully online MOOCs (like lack of interaction). So, a midway approach is a hybrid MOOC that is a combination of both methods. Literature and author experiences indicated that this method would make learning more effective. However, there is a need for improving the method with proper data management. We provide a list of data collection methods in hybrid MOOCs and explain how this data helped us to improve the learning process. In the PLE approach, students need data to shape their learning process, similarly instructors need to obtain data with various strategies and reshape the course structure by using this data. We think that in education, data usage is somehow limited, but it is required for making it more efficient.

Keywords: Hybrid massive open online courses, Massive open online course, Educational data analysis, Data for evaluation, Data for quality of education

1. Introduction

In recent years, online learning degrees have been created in addition to traditional classroom learning programs. Many people have been learning with the help of computers and the internet for decades, and they have gotten degrees. The Personal Learning Environment (PLE) approach -apart from the institutional degrees- is another way of learning. In this approach, learners set their learning goals and reach the learning content that they need and learn by themselves (Initiative, 2009). The last generation seems to use this method as well (Hollands & Tirthali, 2014).

Of course, there are some challenges in using this method. One of the main challenges is that students need to have self-regulation skills. Self-regulation is -in brief- a skill for managing individual learning processes (Zimmerman, 2000). Learners need to determine what they are required to learn and how to manage that process. Today, learners that have this skill can reach almost all knowledge within structured mediums like massively open online courses (MOOCs). MOOCs are online courses that can usually be accessed for free, without any prerequisites and are offered by credible universities around the world. Currently, there are really huge amount of MOOC resources that can easily be reached and millions of students are taking them (Liyanagunawardena, Adams, & Williams, 2013; Shah, 2015). Moreover, it is also known that the current generation can learn differently (Prensky, 2001). In addition, they can manage their learning process easily by using various tools like the Learning Management Systems (LMS).

Although some students can successfully manage their personal learning environments, some cannot. Similarly, although some students perform well in traditional learning courses, some do not. To help poorly achieving students in both environments a hybrid approach should be used. In particular, some online materials can be implemented into learning courses and both type of students could benefit from it. In this chapter we will demonstrate the use of hybrid Massive Open Online Courses (h-MOOCs) (Perez-Sanagustin, Hilliger, Alario-Hoyos, Kloos, & Rayyan, 2017).

The aim of this chapter is to clarify a personal learning environment method and how it could support traditional learning in the h-MOOC form. One important requirement for managing this process and maximizing its effectiveness is the use of good data management. It is because, data usage will enlighten learners and the course providers in such informal learning environments. Different types of data could be collected in h-MOOC applications with various methods like observations, interviews with students, logs from the tools etc. So,

we will discuss how to realize the inclusion of MOOCs into classroom learning and improve the process with the use of data.

2. An Alternative Learning Approach: Personal Learning Environments

2.1. What is Personal Learning Environment (PLE) Approach?

The personal learning environment approach consists of tools, services, and communities that create a learning environment with the aim of reaching students' personal learning goals (Initiative, 2009). So, to learn anything, participants do not have to follow a degree path, but can learn by themselves through this approach. Actually, this method existed before the computer and internet era, but the current tools and services make it a more feasible way of learning. And it seems people are using this method.

Since the invention of computers and the internet, learning management systems (LMS) have been using. With LMS, instructors can manage learning periods and create valuable data to better follow students' development. Personal Learning Environment (PLE) applications may be similar to LMS, but actually they are different. LMS is primarily designed for course management but PLE's main aim is to manage the learning period (Ebner & Taraghi, 2010; Initiative, 2009). It is important to differentiate the PLE approach and tools as well. PLE tools are software designed for using as part of the PLE approach.

To better understand this method, we need to discuss the place where learning occurs. Traditionally schools were addressed as the primary learning place. However, a school is not the only area, there is significant learning happening outside schools (Humanante-Ramos, García-Peñalvo, & Conde-González, 2015). Students can learn from other sources like books, media, friends, and family. To support this fact, Banks et al. (2007) stated that students only get about 19% of all learning gains in the classroom within their first 12 school years. A significant amount of learning occurs outside. In the PLE approach, our aim is to better manage the outside learning. Students need to have the ability to manage their own learning periods by using quality learning resources. In outside learning, descriptive data is needed for delivering these good information resources to students. In this way, learners could better decide their learning requirements and find the related resources. For example, when anyone buying a product from the internet he should follow some steps: First, he needs to decide what is required and then analyzes the products to see if the quality and specifications fit the requirements. In online sales, most stores try to provide data that best describes the product, they try to get feedback from users to describe how well the product functions. Manufacturers may use this data to produce better products next time. The PLE approach is similar to this

marketing example. Learning is a requirement and a person needs to have the ability to manage their learning needs and find resources that best fit their requirements. So, using good data in the PLE approach is critical.

Currently there are different physical and digital learning resources, but MOOCs seem to be the one that is well structured (but still need more development) and easy to access. So, in a PLE approach learners could use various learning resources including MOOCs. In this chapter we will try to better understand MOOC resources and in particular their integration with face to face courses using data.

2.2. Self-Regulation in Personal Learning Environments Approach

Self-regulation is an ability that includes thoughts, emotions, and actions to help a learner reach their personal goals (Zimmerman, 2000). Recently the term was mostly related with online environments (e.g. Kuo et al., 2014). It is because, students need to have more autonomy and responsibility skills in an online learning environment (Artino, 2008). Normally if students learn from instructors face to face, it is easier to communicate and ask questions, but in an online environment they have limited interaction with the content provider. It seems, it is one of the most difficult part of this approach, but good self-regulation skills could solve this problem.

Moore (1993) defined the “transactional distance” concept as the psychological and communicative distance between learner and instructor, and it is clearly high in online learning environments. However, in such environments like MOOCs this distance can be closed by a learners’ autonomy skill (Shearer, Gregg, Joo, & Graham, 2014). So self-regulation is a critical skill. To get this skill, students need to learn how to study by themselves from an early age. It seems once students have this skill they can manage learning by themselves for their whole life. We think ‘learning how to dress’ as an example: First, a child gets instructions of how to dress from an early age. Parents give instructions on how to put on a piece of clothing step by step, and never allow the child to try their own way. With this learning approach, every time the child faces a new type of dress, they would have difficulty and require parent support. In this example a parent’s help is similar to an instructors’ presentation in the classroom. Students need to learn their own way. If they don’t find methods to learn by themselves, they would require an instructor’s help in every learning process and this will limit learning.

3. Massive Open Online Courses (MOOCs)

3.1. A Good Resource for Learning

If we consider the profiles of current personal learners, we are faced with two major types of learners. The first type is the adult learners that are trying to improve their job skills (Castano-Munoz, Kreijns, Kalz, & Punie, 2017) and the second type is the students that are trying to complete their school learning. Both of them require information which they could get from various tools including the internet. Of course, there are other learner profiles as well, for example parents who need to learn “how to care for their child” or a person who would like to learn “how to cook” etc.

There are lots of learning opportunities today. Historically, learning has evolved with the advances in technology. Especially TV, radio, computers, and the internet have affected learning processes (Liyanagunawardena et al., 2013). After MIT’s open Courseware project in 2001 a new era of “open learning” was started. It was because previously reaching good courses or course materials was limited as they were part of some learning degrees. In 2008 the first massive open online course was created (Liyanagunawardena et al., 2013) and since then there has been a massive open online course movement around the world.

Today, more than five thousand MOOCs are created, and more than 60 million learners are already registered for them. So, they are being actively used. Currently, there are two types of MOOCs; xMOOCs and cMOOCs. xMOOCs usually consist of video lectures and evaluated assignments (Siemens, 2013) and today most of the MOOCs in the USA are in this form (Daniel,2012). On the other hand, cMOOCs use a connectivist approach, which includes social interaction and online tools to create knowledge networks (Siemens, 2013). Any learner can reach a MOOC from any part of the world with internet access usually for free. It is a good opportunity because the MOOC content is provided by top universities in the world.

Hollands and Tirthali (2014) asked the reasons for providing MOOCs to MOOC administrators. They listed a set of reasons that includes; increasing the reach to learning, improving brand, economic reasons, innovation, and research about education. Interestingly, they did not talk much about the use of data or improving the quality of learning by using it. This would be the one missing point most educationalists have about this method of learning. Learning is not a process of content providing and presentation, and administrators need to acquire better use of the data inside the courses.

3.2. MOOC in Personal Learning Environment Approach

We stated that the PLE approach needed tools, services, and communities. As tools, online learning environments provide some software that includes LMS functionality. In addition, there are lots of services and communities that support learners like google docs, google drive, forums, discussions networks etc. Any person can use them to achieve their personal learning goals, but it may be hard for some learners to manage lots of different components. Especially for more traditional learners, a MOOC could be a better alternative because they are designed as a whole.

Any learner can take a MOOC to reach their own personal learning goal. Some platforms even offer MOOC degrees that are not like traditional learning programs. They are a kind of learning path recommended for some main learning targets. Learners can follow these paths and improve their ability in a specific field. The difference between these paths and traditional ones is that they are not mandatory, learners do not have to follow a strict schedule, and they have a certain prerequisite to access the learning content including entrance exams. As a result, MOOC is a good learning resource for a personal learning environment approach.

4. Hybrid Approach with the Use of Data

4.1. Hybrid Massive Open Online Courses to Improve Classroom Learning

Blended learning is a method for using both face to face and online learning together. Means et al. (2009) stated that blended learning usually results in better outcomes than solely online or solely face to face learning. So, although personal learning is usually outside official learning programs, they could be implemented into them, because in reality learners already try to use online resources to support their school learning.

There are different types of blended learning approaches. Kloos et al. (2015) stated the ways as: local digital prelude, flipping classroom canned digital teaching with remote tutoring, face to face and connected teaching, live teaching with remote tutoring, and face to face teaching with remote tutoring. Similarly, Perez-Sanagustin et al. (2017) showed four types of MOOC integration in the classroom as: MOOC as a service (MOOC can be recommended and not related to curriculum), MOOC as an added value (a MOOC that is related with curriculum is recommended), MOOC as a replacement (face to face course is replaced by a MOOC), and MOOC as an operator (face to face course is operated by a MOOC).

There are some h-MOOC examples in the literature. Konstan et al. (2015) applied a “MOOC as an added value” type of implementation. The application resulted in good learning gains and in general better student perception. Similarly, Bruff et al.(2013)’s “MOOC as an operator” application study showed that students similarly liked this application. In other studies, researchers reported usually more positive effects than the negative ones (Robinson, 2016; Swinnerton, Morris, Hotchkiss, & Pickering, 2017). They all showed that students in the current generation would benefit from this application.

Moreover, in one study, students used some common PLE devices and more than 90% of them stated that they would continue to use the platform after graduation (Tsui & Sabetzadeh, 2014). It seemed that PLE tools supported lifelong learning.

4.2. Data Collection in Hybrid MOOC Applications

In MOOCs, there were too many learners, so it was hard to give personal feedback and evaluation needed to automatize (Daradoumis, Bassi, Xhafa, & Caballé, 2013). Current automatic evaluation systems have limited interaction and seem not good enough. Similarly, peer review -which is a valuable evaluation type--is limited again because the learners were not professionals (Daradoumis et al., 2013). However, we think that automatic evaluation systems could evaluate learners, the problem is not related to its nature, but it is related to the limitations of current technologies.

Liyanagunawardena et al. (2013) analyzed 45 studies and found data collection techniques such as email interviews, focus groups, Moodle (an LMS) logs, discussion forums, blogs, and observations. By using a combination of techniques, MOOCs can be better evaluated. But in the case of hybrid MOOCs, data collection is somehow different. Actually, it is hard to reach MOOC usage data, but with alternative data collection methods students’ data could be collected. We think it is better to evaluate what was learned than what was reached. For example, to understand student gains from a MOOC chapter, a very basic assignment about the related MOOC content could be given to students. To do so, short answers or writing some comments for discussion forum entries would be good.

While in MOOCs some quantitative data like questionnaires are collected, in hybrid MOOCs there is an opportunity to use qualitative measurements as well, because there is more interaction with student and instructor in face to face sessions. For example, the instructor can ask for feedback about the MOOC content and make observations about students understanding.

5. A Case Study: Data Analysis from a Hybrid Massive Open Online Course

In our case, an introductory database management course was given to 3 different groups of higher education students with a hybrid MOOC approach for three consecutive years. In each group there were about 30 students (there were 92 students in three years, 41% female and 59% male) who made good scores in the national university entrance exam in Turkey. Participants were in their 3rd year at university (average age is about 23). Participants followed half of the course from a MOOC while they followed the other half face to face. The MOOC course was an introductory database course that was given by Stanford University. Each week, participants studied two hours from MOOCs and the other two hours in class, face to face. While students studied theoretical concepts from the MOOC, in face to face sessions they learned a general summary of the theory which was mainly applied to small example projects.

In this process, it was recommended that learners study some MOOC content every week during their own time and place. During this period some data collection techniques were used and in general students' satisfaction and learning improvement was observed.

In this hybrid MOOC application, some qualitative and quantitative data was collected with different methods. As a quantitative method, students completed some database diagram assignments during the term, and entered an exam. Moreover, they submitted small discussion post entries on homework each week about the given MOOC content. As qualitative data, very quick verbal surveys at the beginning of face to face meetings were done. The instructor asked some basic questions about the weeks' content like "how can you merge 2 tables with SQL's 'select' statement with alternative ways? Did you learn from the MOOC?" and he observed their level of understanding during the face to face learning. One advantage of hybrid MOOC application over a completely online MOOCs was to get weekly qualitative data from students. If they had some difficulty they could freely ask their instructor in meetings. So, it is a good idea to follow students' level of learning in the face to face meetings.

Moreover, in the hybrid MOOC application instructors can evaluate assignments and have a better understanding about what they learned. This is much more difficult in fully online MOOCs. In fully online MOOCs, the course is usually limited to content presentation and basic assignments. Some students may not learn the concepts although they completed a MOOC. It is because, usually in MOOCs they do not have to mirror their learning with projects, but in h-MOOC there is such an opportunity. In fully face to face courses, students need to take notes during class or instructor should share course content to allow them to

study on their own time. In this method even though students connect with the content, their effectiveness is limited compared to a recorded course. In MOOCs there is usually a recorded and carefully planned course content. Student could work by themselves with this and can repeat the content if they did not understand a part.

After three consecutive years of h-MOOC application, the course instructor -depending on his observations of the courses- perceived that students were learning subjects much more easily in the course hours as compared to fully face to face. For example, if the course instructor taught a new concept in a face to face section, because many students were learning the content for the first time, they had difficulties in understanding. But in h-MOOC sections, they performed clearly better because they already viewed new course content before the session that made them familiar with the concepts. Moreover, it is known that students learn at different speeds. Previously, although many students understood the course, some of them had problems and they asked questions during the classes. These questions were slowing down the learning process of the whole class in face to face sessions. But in h-MOOC, the instructor reminded them that they would repeat a part of the face to face course from MOOC if they did not understand. If they still had difficulties, there was an ‘office hours’ option as well.

According to instructor observations in the courses and small discussions with the students, the instructor perceived another good side of the h-MOOC application as having flexibility for both instructors and students. As students usually have complicated schedules, if they do not have to enter a course, it is observed that some prefer to do the work themselves rather than follow the course. This was especially valid if they could find some equivalent online courses like physics or computer science. In this manner, when they are given the opportunity to take some part of the courses on their free time, students were observed to be happy because of this flexibility. This was valid for the instructor. Because he assigned some online courses, he had additional time for managing the course quality and giving more feedback during office hours.

In fully online MOOCs, one problem seemed to be the lack of interaction (Daradoumis et al., 2013). It was also observed in our three years of study. But this was not a big problem in h-MOOCs because if students did not understand some part of the online form they could ask questions in the class. Actually, two types of students were observed: The first type of students prefer to search the content over the net and find answers to their questions on MOOCs. They seem to have high self-regulation skills. The second type of students prefer to ask the instructor questions instead of searching over the net. This type of students may not be happy

about using the MOOCs but only a few complaints were observed over the three years. We think that using h-MOOC can serve both types of students. In fully online MOOCs high dropout rates were observed (Liyanagunawardena et al., 2013). One reason would be that they were looking for extra interaction. On the other hand, although there is high interaction in fully face to face courses, some students hardly focus on the course, because they want to learn at their own pace. So, because h-MOOC type includes both methods together they would better help both groups of students.

6. Conclusion

In this chapter we mentioned that MOOC is a good type for a personal learning environment approach and also a good resource for data collection to improve learning outcomes. In addition, a PLE approach can be used in face to face learning with the help of MOOCs. So, a combination of MOOC and face to face sections that is called as hybrid MOOCs (PerezSanagustin et al., 2017) could be an effective way of learning.

In related literature it is understood that using a hybrid MOOC would result in mainly positive outcomes in terms of achievement and student feelings. Data collection is a critical part of the learning period because it will shape the overall process. Especially in the PLE approach, good data would be very helpful for students to allow them to shape their own learning process.

In h-MOOCs there is a need for special data collection approaches. It includes short interviews with students, observing their learning level, and evaluating homework. This data can help instructors to manage the course content. Actually, an instructor does not have to use only one MOOC resource (Bruff et al., 2013), instead he could take different chapters from different MOOCs and even alternative web resources. So, in time, the course content is getting better with the help of data. In this process, an instructor always needs to look at the effectiveness of the specific material that he used. In addition, an instructor should be encouraged to share this data in various platforms. In learning, there is a need for sharing learning experiences about such cases to make the learning process more effective.

Instructors can use LMS or similar software to manage their courses. It is good to assign the online courses, assignments, and discussion sections in a proper way. Many LMS, like Moodle or Edmodo, could be used for this aim. Instructors could share the required course content with URL to related sources. By using such LMS, students will have a live portfolio for their future life. Whenever they need, they could open required course from this portfolio.

Although it seems frustrating at the beginning, instructors could easily adopt this kind of application and over time it would become routine for them. Overall, because it gives some flexibility to both students and instructors, and it helps students to learn the content easier, this method makes learning more efficient. In addition, with the h-MOOC method, a course could be driven with more data and it has an advantage to better track the process. Of course, there could be problems as well. Some students, especially the ones that are more comfortable with the traditional education system and do not have high self-regulation skills may not like these methods. But, in the current generation, the number of this type of students is probably very limited. Finally, although the method works well in a Database Management Course, it may not be a proper way for learning in a different type of course. There is a need to research and evaluate the effectiveness of it in different courses like the social sciences, history, and the arts.

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