

MOOCs and EdTech Tools for Distance Learning

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Abstract

Nowadays, the rapid development of educational technology can enrich distance learning in many ways. MOOCs (Massive Open Online Courses) constitute a recent and widely recognized mode of learning in distance education, first introduced in 2008. MOOCs have the potential to be transformed into a powerful tool that can strengthen learners' engagement to online courses through open access to information and real knowledge. Also, web-based digital tools such as Kahoot, Google Docs (Google Documents), TitanPad and Etherpad are edtech tools that let a group of people come together to create and edit documents. These tools allow learners and instructors to ask questions, group them, write a text together and collaborate in real time. This paper aims to synthesize research and findings on the content of MOOCs utilization in the educational process and to contribute to a better scientific understanding of MOOCs and other edtech tools such as Kahoot, Google Documents, TitanPad and Etherpad, as they can be used in real conditions to improve educational technology.

Keywords: Educational Technology, Collaborative Learning, Self-Regulated Learning, Distance Learning

1. Introduction

Digital technology's presence is obvious in research and teaching. There is open access to an ocean of information that is available to everyone from everywhere via the World Wide Web. The digital technology used to facilitate learning in every educational process is educational technology.

The Association for Educational Communications and Technology (AECT) defined educational technology as:

"the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources"

("Reflections on the 2008 AECT Definitions of the Field", 2008).

Educational technology has strengthened the role of instructors, while at the same time offered great opportunities for distance learning utilization in the learning process. The learners, using educational technological tools, tailor the course to their needs and learn how to learn (Reigeluth et al., 2015). Similarly, instructors, embodying educational technology to their teaching, acquire a new role, that of the educational project coordinators and the learners' advisors in their learning journey (Beblavý, Kilhoffer, Akgüç & Jacquot, 2019). Educational Technology can help instructors to design technology-enhanced projects that facilitate learning (Jones, Valdez, Nowakowski & Rasmussen, 1995; Bates, 2011; Peters, 2003). The role of educational technology in teaching is of great significance because of the use of information and communication technologies (ICT). With the rapid development of Information and Communication Technologies in teaching and education, there is a corresponding expectation for instructors to utilize edtech tools to support teaching and learning in an innovative way. The edtech tools are utilized, in order to make educational digital content accessible by everyone and to help instructors to improve successful educational practices (Lock & Kingsley, 2007).

Rapid digital technology advancement in distance education came after the release of massive open online courses (MOOCs). Since 2002, many educational institutions, in collaboration with teacher groups, have developed the Massive Open Online Courses (MOOCs), which are online courses in many cognitive subjects grouped in levels with gradual difficulty (Bali, 2014; Yang, 2014; Evans & Myrick, 2015). Although MOOCs is a relatively new phenomenon in distance education, already in 2012 with the launch of two online learning platforms Coursera and edX, new expectations have arisen in the field of distance learning (Pappano, 2012; Hew, 2014; Patru & Balaji, 2016).

2. Research Methodology

We conducted a research that was based on the following stages:

2.1. Step 1: Specifying the Research Questions

The research questions we have formulated for this research to contribute to a better understanding of MOOCs and edtech tools and their usage and application in the distance education are:

RQ1: What do we mean by the term Massive Open Online Courses (MOOCs)?

RQ2: How MOOCs can enhance learners' participation to online courses through open access to knowledge?

RQ3: How edtech tools such as Kahoot, Google Docs, TitanPad and Etherpad can help a group of people come together to create and edit documents?

The first research question attempts to inform readers about the main purpose of Massive Open Online Courses (MOOCs) in the educational process. The second research question describes how MOOCs can enhance learners' participation to online courses through open access to knowledge. The third research question attempts to describe how edtech tools such as Kahoot, Google Documents, TitanPad and Etherpad can help a group of people come together to create and edit documents.

Consequently, to answer the research questions proposed, a comprehensive search was performed in the relevant databases to locate papers available in the literature.

2.2. Step 2: General database research

2.2.1. Scopus Statistics of MOOCs Research

Firstly, we made a search in the Scopus database in order to find Scopus Indexed Documents on Massive Open Online Courses (MOOCs) and edtech tools published from 2000 to 2019. The total number of publications amounted to 1,569 with 1,567 articles on MOOCs and only 2 articles in EdTech tools (1 document from Worcester Polytechnic Institute and Harvard University and 1 document from University of Memphis and Texas Tech University) (a search with 'Massive Open Online Courses MOOC' and 'edtech tools' in the field including titles, abstracts and keywords in the Scopus database, accessed December 2, 2019). The following results showed 1 Scopus-indexed document on MOOCs in 2000, 1 publication in 2007, 3 publications in 2008, 2 publications in 2009, there were 4 publications in 2010, 4 publications in 2011, 6 publications in 2012, 41 publications in 2013, 153 publications in 2014, 204 publications in 2015, 201 publications in 2016, 245 publications in 2017, 359 publications in 2018, 345 publications in 2019.

As for affiliations, the following universities and institutions had the highest counts, over 15 documents each, with 31 documents from Universidad Nacional de Educacion a Distancia; 23 documents from Pennsylvania State University; 23 documents from Universidad Carlos III de Madrid; 22 documents from Purdue University; 20 documents from Open University; 18 documents from University of Edinburgh; 18 documents from Open University of the Netherlands; 17 documents from Massachusetts Institute of Technology; 17 documents from Tecnológico de Monterrey and 15 documents from Universitat Oberta de Catalunya.

Of 1,569 documents on MOOCs, articles accounted for 95.4 percent (1,495 articles) and reviews accounted for 4.6 percent (72 documents).

2.3 Step 3: Focused searches

After the initial search in Scopus database, we continued with a more detailed and focused search process in other relevant bibliographic databases such as Science Direct (Elsevier) in order to find more publications of high scientific rigor. The total number of publications amounted to 918 with 874 articles (810 research articles and 64 Review articles) on MOOCs and 44 articles in EdTech tools. The total number of papers in each bibliographic database and the number of selected papers, are presented in Table 1 and Figure 1.

Table 1. Results of indexed papers in databases

Databases and Digital Libraries	Total number of papers
Scopus	1,569
ScienceDirect (Elsevier)	918

* The true number of peer-reviewed papers in some of the databases is lower than reported, as the results include in some cases, non-peer-reviewed papers published in academic journals.

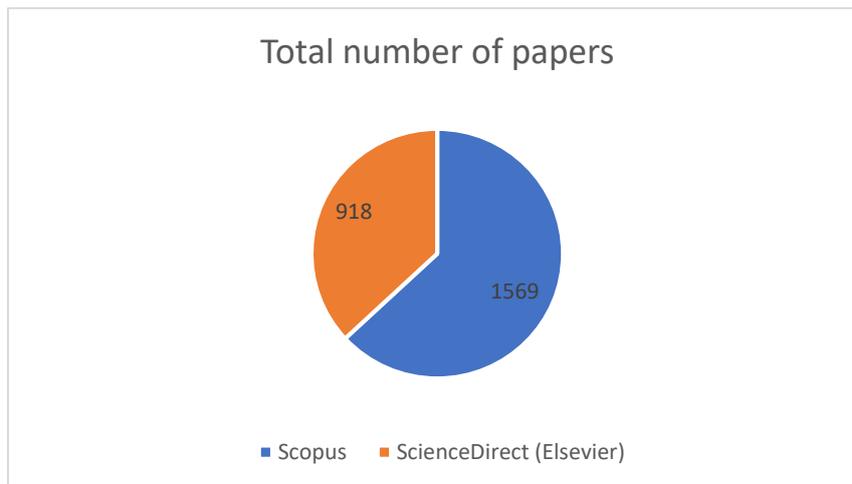


Figure. 1. Number of peer-reviewed papers indexed in each database

2.4. Step 4: Selecting Studies

The titles and abstracts of searched papers were reviewed based on the criteria mentioned above. Every paper that met these criteria was included in the review. For papers that could not be excluded based on reading of the titles and abstracts, the full texts of papers were reviewed. Through this process, the following articles were selected from the total number of papers initially found. The total number of selected papers are presented in Table 2.

Table 2. Selected papers

Papers type	Studies
Research articles and reviews	(Al-Rahmi, Alias, Othman, Marin & Tur, 2018; Bali, 2014; Bates, 2011; Baumeister; Leary, 1995; Beblavý, Kilhoffer, Akgüç & Jacquot, 2019; Blaxter et al, 2006; Brodahl, Hadjerrouit, & Hansen, 2011; Dillenbourg, Järvelä & Fischer, 2009; Jonassen, Davidson, Collins, Campbell & Haag, 1995; Jones, Valdez, Nowakowski & Rasmussen, 1995; Kaplan & Haenlein, 2016; Kirkpatrick, Searle, & Smythe, 2019; Kirkpatrick & Klein, 2016; Kirschner, Paas, & Kirschner, 2009; Kizilcec, Pérez-Sanagustín & Maldonado, 2017; Kloos et al., 2015; Leontyev & Baranov, 2013; Littlejohn & Margaryan, 2013; Lock & Kingsley, 2007; "Massive Open Online Courses", n.d.; Milligan & Littlejohn, 2017; Milligan, Littlejohn, & Margaryan, 2013; Niemiec & Ryan, 2009; Pappano, 2012; Patru & Balaji, 2016; Peters, 2003; Ramesh, Goldwasser, Huang, Daumé III & Getoor, 2013; "Reflections on the 2008 AECT Definitions of the Field", 2008; Scanlon, McAndrew & O'Shea, 2015; Staubitz, Pfeiffer, Renz, Willems & Meinel, 2015; Evans & Myrick, 2015; Yang, 2014; Yousef et al., 2014; Zheng et al., 2015)

2.5. Step 5: Conceptualizing MOOCs and EdTech tools

2.5.1. RQ1: What do we mean by the term Massive Open Online Courses (MOOCs)?

According to the definition of Massive Open Online Courses (MOOCs) proposed by the SAGE Encyclopedia of Educational Technology:

“A massive open online course (MOOC) is a kind of online (Internet-based) course that typically involves a large number of students completing a particular course of study. A MOOC has some dimension of openness in that it may use open educational resources (OERs, which are openly licensed) and students can often enroll and participate free of charge. MOOCs arose to prominence in the late 2000s and have experienced rapid growth in North America and across the world. Recently MOOCs have been widely hyped as representing a fundamental shift in both the practice and business of education.”

(“Massive Open Online Courses”, n.d.)

The openness of Massive Open Online Courses (MOOCs) and their availability to a great number of learners is significant. MOOCs represent innovative practices in open educational resources development. Numbers indicate the utilization of MOOCs across 190 countries with the participation of 160,000 learners (Al-Rahmi, Alias, Othman, Marin & Tur, 2018).

In a Massive Open Online Course (MOOC), individuals make their own decisions with what educational material and learning activities they should engage (Littlejohn, Hood, Milligan & Mustain, 2016; Milligan & Littlejohn, 2017). The target audience of MOOCs is made up of people who are either 'active participants' (this category includes goals and strong motivations from the outset) or 'casual participants' or 'lurkers' (participants in this category, although active in the course, do not interact among them), or 'passive' participants (this category includes unsatisfied with the learning process) (Honeychurch, Bozkurt, Singh & Koutropoulos, 2017).

Based on the above, it seems that open courses address to a wide audience. Therefore, it is necessary to redefine the principles on which they must base their pedagogical planning to meet the criteria of quality education (Scanlon, McAndrew & O’Shea, 2015). According to Yousef, Chatti, Schroeder & Wosnitza (2014), time, research, and resources are needed to develop MOOCs into integrated and effective learning environments.

MOOCs represent innovative practices in distance learning. Therefore, many researchers focused their research on why learners still find it difficult to study the educational material of these massive open online courses. Self-regulation strategies in MOOCs are mostly based on self-regulated learning (SRL) theory, which describes how learners can be autonomous in their learning (Kizilcec, Pérez-Sanagustín & Maldonado, 2017). In our paper, we choose to combine self-regulated learning with collaborative learning.

Collaborative learning can offer many benefits because a successful collaborative learning environment creates the conditions for effective interactions between team members. Collaborative learning is about working together as a team while emphasizing collaboration between learners and instructor with learners (Dillenbourg, Järvelä & Fischer, 2009).

However, through collaborative learning, 'passive participants', and individuals who cannot self-regulate their learning, can create problems in team collaboration, due to their obvious dissatisfaction with the learning process (Milligan, [Littlejohn](#), & Margaryan, 2013). Online learning environments can help learners to be actively educated and collaborate directly with both the instructor and other peers.

2.5.2. RQ2: How MOOCs can enhance learners' participation to online courses through open access to knowledge?

E-Learning, as a distance learning methodology, is the learning process where learning is carried out via the Web through modern technologies, such as computer software and advanced telecommunication systems. The learner usually has full control of progress, while at the same time there is available, if desired, support from the instructor.

The rapid development of Information and Communication Technology in teaching and education has led many researchers and instructors to seriously consider adopting new pedagogical approaches in distance education.

E-Learning through the utilization of MOOCs offers a number of important advantages but also some drawbacks. The advantages are as follows:

1. Educational material is continuously available twenty-four hours a day. The learner can access educational material at any time if there is a connection to the Internet.
2. Courses are available to all people who have a computer and an internet connection, without the need for a specially organized training area.
3. Teaching is effective when it comes to different ways of presenting the educational material, such as: multimedia (image, video, audio), performances, speech, interactive collaboration.
4. MOOCs are rich in content, comprehensive and help the instructor to teach.
5. MOOCs take place in online learning environments and access to knowledge is provided in a number of ways, such as self-teaching, asynchronous collaboration, modern teaching, communication with the instructor and with the other learners.
6. Participatory learning with active rather than passive learners is achieved.
7. Segmentation of both presentation and content is being offered, offering possibilities for reuse and creating a common basis with many themes.

MOOCs brought a better understanding of how higher modern learning can be offered online at massive scale. MOOCs can help to widening access to knowledge and improving its quality. MOOCs on e-learning platforms such as Coursera and EdX have adopted an instructivist approach to learning. Coursera and EdX are the two frontrunners among the MOOC providers. Coursera was founded in 2012 by two Stanford professors. With more than 37 million users it is the largest MOOC platform worldwide. EdX was founded in 2012 by the universities MIT and Harvard. Both platforms offer a diverse range of courses.

The proliferation of new technologies, and in particular the Internet, minimizes obstacles to physical distance between instructors and learners, in distance education. Online learning program designers argue that distance education requires the introduction of a new form of pedagogical approach structured in the relationship developed between instructors and learners. The principles of the philosophical stream of constructivism offer the ideological background that will help adult educators to create learner-centered and collaborative environments that aim at the development of critical thinking from learners and learning through experience (Jonassen, Davidson, Collins, Campbell & Haag, 1995).

Although MOOCs are an educational innovation, education researchers still attempt to know what learner needs a MOOC may address (Leontyev & Baranov, 2013; Kaplan & Haenlein, 2016). MOOCs is a relatively new phenomenon compared to Virtual Learning Environments (VLEs). Some researchers believe MOOCs differ from VLEs in issues concerning learner's level of control and flexibility, the roles of instructor and learners, learners' motivation and final outcomes (Zheng, Rosson, Shih & Carroll, 2015).

Milligan et al. (2013) have stated about learners' motivation and engagement to the educational process that:

“Understanding the nature of learners and their engagement is critical to the success of any online education provision, especially those where there is an expectation that the learner should self-motivate and self-direct their learning. Massive courses, by their very nature, bring in learners with a range of backgrounds, previous experience, and skill levels, and it is therefore incumbent on course organizers to design a learning experience that accommodates these diverse learner profiles. ”

(Milligan, Littlejohn & Margaryan, 2013, p.157)

Criticism about MOOCs is based on the poor ratio of learners who achieve to complete successfully their courses. However, we believe that this fact is not resulting from MOOCs structure because each individual should take his own decisions on when, how and with what educational content and learning activities he should engage. Each learner when studying at a distance, needs much more motivation in order to complete his learning goals and is responsible of his own learning progress.

MOOCs rapid advancement has brought innovative educational practices in e-learning and distance education. Compared to traditional online courses, MOOCs are larger in scale and distributed worldwide via the Web, with no limitations on individual involvement. MOOCs provide instructors the opportunity to implement, scaffold and extend instruction to meet a range of learners' needs.

2.5.3. RQ3: How edtech tools such as Kahoot, Google Docs, TitanPad and Etherpad can help a group of people come together to create and edit documents?

With the rapid advancement of digital technology and its integration in the educational process, many software applications, such as online games, simulations, virtual learning environments, as well as collaborative-text writing applications enable learners to develop cooperation as members of a team for the benefit of all members of the team (Kirkpatrick, Searle, & Smythe, 2019; Kirkpatrick & Klein, 2016; Brodahl, Hadjerrouit, & Hansen, 2011). In this case, the instructor coordinates and supports learners to complete specific learning activities, while the initiative to design and implement the work is taken by the team itself.

The possibilities of synchronous and asynchronous communication enhance the development of cognitive communities, where learners share information and ideas, demonstrating both the level of knowledge they have built and the cognitive processes they have developed (Jonassen, 2000). Jonassen states that learners can use technology as intellectual collaborator in their attempt to formulate their prior knowledge, compare their previous learning experiences and clarify semantically the concepts they have learned and developed through the continuous critical thinking process. The following edtech tools can offer all the technology cognitive tools mentioned above and help learners to achieve their learning goals.

- **EdTech tools**

- **Kahoot**

Kahoot! was founded by Johan Brand, Jamie Brooker and Morten Versvik in a joint project with the [Norwegian University of Science and Technology](#). Kahoot (getkahoot.com) is a digital tool based on game-based learning, created in Norway in 2013. Kahoot was designed for [social learning](#), with learners gathered around a common screen such as an [interactive whiteboard](#), projector, or a computer monitor. Its main purpose is to create online quizzes, in

the form of a game. It enables participants to respond both through their personal digital device (computer or smartphone), a fact which makes it easy to use. The questions on the kahoot can be multiple-choice or descriptive and learners have a predetermined time to answer them. These questions can be changed to award points. Points then show up on the leaderboard after each question. At the end of the predetermined time, participants are no longer able to participate in this process. Answers to quizzes can be stored directly in excel format and used later for data processing and analysis. This digital learning tool is very commonly used by instructors with the aim of providing feedback to learners, through their answers.

- **Google Docs**

Google Docs is a free text-sharing tool-provided by Google. It is also considered necessary to create a google account. With this digital tool a group of learners can simultaneously write a text which can save to the cloud and be able to access it anytime and anywhere.

- **TitanPad**

Another modern collaborative writing tool is TitanPad (<http://titanpad.com/>), which was developed by a research team in Austria and it is freely available online, enabling learners to write simultaneously at the same document. Each learner can have a distinctive color when he/she edits the document. This color indicates the involvement of each learner in the text. This way the instructor can immediately coordinate and evaluate the offer of each, in the common document, while at the same time all learners can see their participation and self-evaluate.

- **EtherPad**

EtherPad is a modern collaborative writing tool first launched in November 2008. In December 2009 EtherPad was acquired by [Google](#) and released as open source software. Further development about this software is coordinated by the Etherpad Foundation. Etherpad (<https://etherpad.org/>) allows users to edit documents collaboratively in real-time, much like a live multi-player editor that runs in the browser. Anyone can create a new collaborative document, known as a "pad". Each pad has its own [URL](#), and anyone who knows this URL can edit the pad and participate in the associated discussions. Password-protected pads are also possible. Each participant is identified by a color and a name. A "time slider" feature allows every user to explore the history of the pad. The document can be downloaded in plain text, [HTML](#), [Open Document](#), [Microsoft Word](#), or [PDF](#) format.

3. Conclusions

All of the above-mentioned edtech tools have advantages and disadvantages depending on the point of view from which the user examines them. In particular, Google Docs have the advantage of easy use, but do not show the degree of the learners' involvement in the common text, which is very evident in the text written with the TitanPad. Also, Etherpad allows users to edit documents collaboratively in real-time, much like a live multi-player editor that runs in the browser. Therefore, it is mainly up to the user and the team to choose the most appropriate collaborative writing tool for them. Consequently, the role of the learners in the Digital Text Writing Toolkit selection team, we think, is mainly directly

related to how well the participants themselves are familiar with digital technology, as well as the capabilities they have to self-regulate their learning. Every active participant in a team must first have himself adjust his learning goals and personal time in such a way that he can then collaborate properly with the other members of the team. Thus, we could have here the corresponding categories of the participants with those mentioned in the MOOCs and, in particular, to have the active, the casual and the passive participants in the common text writing tasks.

In conclusion, edtech tools can prove to be a powerful collaborative learning tool in distance learning for instructors and learners. Moreover, in today's era which is characterized by continuous flow of information and the rapid development of technology, these edtech tools can be used for both synchronous and asynchronous learning, but also for all levels of distance education.

List of abbreviations

MOOCs: Massive Open Online Courses

AECT: [Association for Educational Communications and Technology](#)

ICT: Information and Communication Technologies

VLEs : Virtual Learning Environments

Google Docs: Google Documents

OERs : Open Educational Resources

edtech tools: educational and technological tools

(SRL): self-regulated learning theory

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