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Evolution of MOOC Designs, Providers and Learners and the Related MOOC Research and Publications From 2008 to 2018

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Abstract

Massive Open Online Courses emerged in 2008 as a result of openness movement in education and drew a lot of attention by 2011 when MOOCs were adopted by higher education institutions and used as a mean to deliver knowledge and educational content. Though MOOCs have a recent history, much has been articulated and MOOCs are claimed to be a revolution in education while some others claimed that MOOCs are a hype that will eventually fade away. In this context, this research aims to investigate MOOC research by reviewing MOOC literature. The findings of the study suggest that MOOC interest tend to continue, and the evidence-based empirical MOOC research is increasing steadily. MOOC research area is dominated mostly by educational research; however, other research areas demonstrate that there is an interest from other research areas which is thought to be promising. Regional interest demonstrates that USA, Spain and UK are leading countries; and most interest stems from developed countries with Anglo-Saxon cultures. Likewise, the leading higher education institutions in MOOC research are located in Europe or USA. It is also promising that nearly half of the MOOC research is funded by stated agencies. The study concludes that MOOCs are evolving and, based on research findings, it is moving from Slope of Enlightenment to Plateau of Productivity in Gartner hype cycle.

Keywords: MOOCs, Massive Open Online Courses, MOOC research, MOOC providers.

INTRODUCTION

Massive Open Online Courses (MOOCs) started in the year 2008 by introducing connectivist approaches (cMOOCs) (Siemens, 2013) and gained broad audience and interest by 2011 upon the emergence of extended versions of first generation massive open online courses (xMOOCs) (Stracke, Downes, Conole, Burgos, & Nascimbeni, 2019). The further evolution of MOOCs offered hybrid MOOCs designed by combining both connectivist and extended MOOC design principles (Bozkurt, Kilgore, & Crosslin, 2018; Roberts, Waite, Lovegrove, & Mackness, 2013). In the beginning, there were big participant numbers as well as huge expectations that MOOCs could offer learning opportunities for all worldwide and will completely change higher education (or even destroy it) (Dillahunt, Wang, & Teasley, 2014; Hansen & Reich, 2015). A first peak of the new phenomenon MOOC was claimed in the year 2012 when it took the cover page of leading newspapers and magazines (Pappano, 2012). Daniel (2012) critically discussed in the same year the starting decline of the MOOC development. Nevertheless, MOOCs continue to be designed, taken and evaluated in research and practice until the end of second decade of 2000s (Shah, 2019).

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Many research projects and publications started as documented in several literature reviews and overviews (Bozkurt, Akgün-Özbek, & Zawacki-Richter, 2017; Costello, Brown, Mhichíl, & Zhang, 2018; Liyanagunawardena, Adams, & Williams, 2013; Joksimović, et al., 2018; Veletsianos, & Shepherdson, 2016; Zawacki-Richter, Bozkurt, Alturki, & Aldraiweesh, 2018). Key research topics are the MOOC design (Conole, 2015; Stracke et al., 2018a), the learners taking MOOCs (Christensen, Steinmetz, Alcorn, Bennett, Woods, & Emanuel, 2013, Liyanagunawardena, Lundqvist, & Williams, 2015), and the quality of MOOCs (Lowenthal & Hodges, 2015; Margaryan, Bianco, & Littlejohn, 2015; Reich, 2015; Stracke, 2017; Stracke, & Tan, 2018). It turned out that MOOCs are not achieving such a high impact as expected in the hypes of the beginning but are continuously developed, offered and taken by an increasing number of MOOC providers respectively MOOC learners.

METHOD

As a review study, this paper focuses on the evolution of MOOC designs, providers and learners and the related MOOC research and publications from 2008 to 2018. To measure and compare the different developments, researchers collected data from Class Central, the worldwide leading collector platform of MOOCs, as well as from three online scholarly databases for research publications. Class Central was established in the year 2015; therefore, they provide data only for the period from 2015 to 2018 (Shah, 2015, 2016, 2018, 2019).

As databases for research publications, the researchers selected the Web of Science. In this round, researchers examined how empirical MOOC research evolved by focusing on journal publications (n=1255; Articles = 1132; Editorial = 81; Review = 42) indexed in Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI) and Emerging Sources Citation Index (ESCI) by using the following query in titles, abstracts and keywords of the published articles: "MOOC*" OR "massive open online course*". In this analysis, researchers further examined the progress of MOOC research in terms of the number of published studies, regional interest, organizations, research areas, and funding agencies.

FINDINGS AND DISCUSSION

The following table and figures present the data collected from Class Central and Web of Science (WoS) database. All data were collected on the 20th of September 2019 following the method and using the search terms as described in the section above. In Table 1, MOOC designs refer to the number of provided MOOCs while MOOC providers refer the number of institutions offering them and MOOC learners refer to all learners who signed up for at least one MOOC.

Dimensions	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
MOOC designs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4,200	6,850	9,400	11,400
MOOC providers	n/a	n/a	n/a	n/a	n/a	n/a	n/a	500+	700+	800+	900+
MOOC learners	n/a	n/a	n/a	n/a	n/a	n/a	n/a	35	58	81	101

Table 1. Evolution of MOOC designs, providers and learners (according to Class Central)

First of all, the data collected from Class Central demonstrate that there is still a huge increase in MOOC design as well as in MOOC providers and learners until today. That is in contrast to some claims predicting the decline or at least slow-down of the MOOC development but not surprising: Many MOOC providers are offering their MOOCs again and again over several years as the investment for such repetitions is very small. The very big numbers of participants realized by the first MOOCs are normally not achieved anymore, but the total number of MOOC learners is still increasing due to the continuously increasing number of offered MOOCs. In fact, this finding raises further questions. In contrast to first generation cMOOCs; second generation xMOOCs and third generation hybrid MOOCs are often adopted by investors for profit purposes. While such a situation demonstrates that MOOC providers responded increasing demands from learners and further resulted with promotion of MOOCs and MOOC platforms; it should be also noted that the current state of second and third generation MOOCs, mostly, do not share the same vision of first generation MOOCs: That is, MOOCs as a mean of accessing knowledge for free and ensuring equity in education.

The number of publications demonstrates that the MOOC research growing and, especially after 2014, there is a blast in the number of MOOC publications (Figure 1). Fueled by empirical evidence-based data, the tendency in MOOC research is expected to increase.
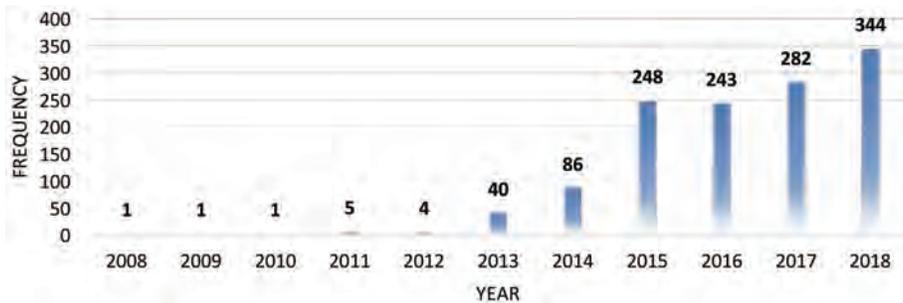

Figure 1. The number of the MOOC research publications per year.

The finding further indicates that research publications changed from descriptive and declarative papers towards quantitative and qualitative studies accepted by leading research journals indexed in Web of Science. This finding is thought to be promising because applied research can provide solutions for many ongoing discussions on MOOCs such as high dropout and low retention rates, quality issues, motivational factors, etc. The finding is further important in terms of broadening our understanding about MOOCs and drawing conclusions from empirical evidence which would help instructional/learning designers to develop better MOOCs.

Examination of research areas reveals that MOOCs publications are dominated by educational research (Figure 2) which is followed by other research areas such as computer science, engineering, business economics, information science, psychology, etc. It seems that MOOC research is being an interdisciplinary research area which is expected considering that educational processes are multilayered and multidimensional in nature.

Research Area	f	%
Education / Educational Research	779	52.00
Computer Science	193	12.88
Engineering	63	4.21
Business Economics	45	3.00
Information Science Library Science	42	2.80
Psychology	34	2.27
Communication	31	2.07
Science Technology	31	2.07
Other	280	18.69
Total	**1498**	**100.00**

Figure 2. **Research areas of MOOC publications (2008-2018).**

The regional interest in MOOC research reveals interesting patterns (Figure 3). Accordingly, many developed western countries demonstrate more interest with an exception which is China. On the other hand, taking into account that China's population is equivalent to around 20% of the total world population, the findings verify that it is worth investigating MOOC phenomena in its context, however, this is beyond the purposes of this study.

The other important point to consider is that MOOCs are supposed to open up education with some noble ideas such as equity in education, removing barriers between learners and knowledge and a sustainable learning ecology for lifelong learners. Conversely, the findings show that interest in MOOCs mostly originated from already developed countries. That being said, while there are a lot of discussions regarding knowledge gap between the global north and the global south, it is observed that MOOC research is in a bottleneck in terms of disseminating its know-how for what MOOCs promise for. It seems that there is a need to encourage and support developing and undeveloped countries to benefit from visions emerged with the advent of MOOCs by remembering that the second letter in MOOC acronym stands for 'open'.

Region/Country	f	%
USA	324	20
Spain	201	12
England	128	8
China	96	6
Australia	83	5
Canada	67	4
Netherlands	47	3
Germany	40	2
Scotland	36	2
France	34	2
Other	556	34
Total	**1642**	**100**

Figure 3. **The regional interest of MOOC research (2008-2018).**

When examined, it is seen that organizational patterns are in line with regional patterns (see Figure 4). However, it is also interesting to see that top 10 leading higher education institutions conduct around 12% of MOOC research, which raises suspicions on their being as gatekeepers. One possible solution to remove side effects of gatekeeping would be collaboration among universities by cross matching the ones from global north with ones from global south. Such a strategy would also be a remedy

for the imbalance mentioned in regional interest section and increase collaborative efforts as well as provides an opportunity for knowledge exchange.

Organizations	f	%
Universidad Nacional De Educacion a Distancia	30	1.6
Open University UK	26	1.4
Pennsylvania Commonwealth System of Higher Education	24	1.3
University of California System	24	1.3
Universidad Carlos III De Madrid	23	1.2
Massachusetts Institute of Technology	21	1.1
Harvard University	19	1.0
Open University Netherlands	19	1.0
Penn State University	18	1.0
University of London	18	1.0
University of Edinburgh	17	0.9
Other	1653	87.40
Total	1892	100

Figure 4. Organizational interest in MOOC research (2008-2018).

Another issue investigated in the research is the pattern of how MOOC research is supported or funded (Figure 5). Accordingly, 502 out of 1255 which equals to 40% of total number of the sampled publications are funded by mostly state agencies or organizations. Though this finding is still promising, it is expected that supranational organizations, such as UNESCO, can be leading contributor by funding MOOC research.

Funding Agencies	f	%
National Natural Science Foundation of China	24	3.6
National Science Foundation	19	2.8
European Union	16	2.4
Spanish Ministry of Economy and Competitiveness	12	1.8
Ministry of Science and Technology Taiwan	9	1.3
Fundamental Research Funds for The Central Universities	6	0.9
National Institutes of Health Nih USA	6	0.9
United States Department of Health Human Services	6	0.9
Comision Nacional De Investigacion Cientifica Y Tecnologica Conicyt	5	0.7
Regional Government of Madrid	5	0.7
Conicyt Fondecyt	4	0.6
Dutch Ministry of Education Culture and Science	4	0.6
Emadrid Project Regional Government of Madrid	4	0.6
European Social Fund	4	0.6
Gates Foundation	4	0.6
Other	541	80.9
Total	669	100

Figure 5. Funding agencies of MOOC research (2008-2018).

CONCLUSION

The analysis of the collected data is presenting some aspects. The overall interpretation indicates that MOOC research is still a trending topic and scholarly MOOC literature grows by strengthening its arguments. Locating the overall MOOC research on Gartner Hype Cycle (Gartner, n.d.), it can be claimed that MOOC research is moving from Slope of Enlightenment where the phenomenon is understood widely to Plateau of Productivity where the phenomenon mainstreams and is accepted by a wider audience (Figure 6).
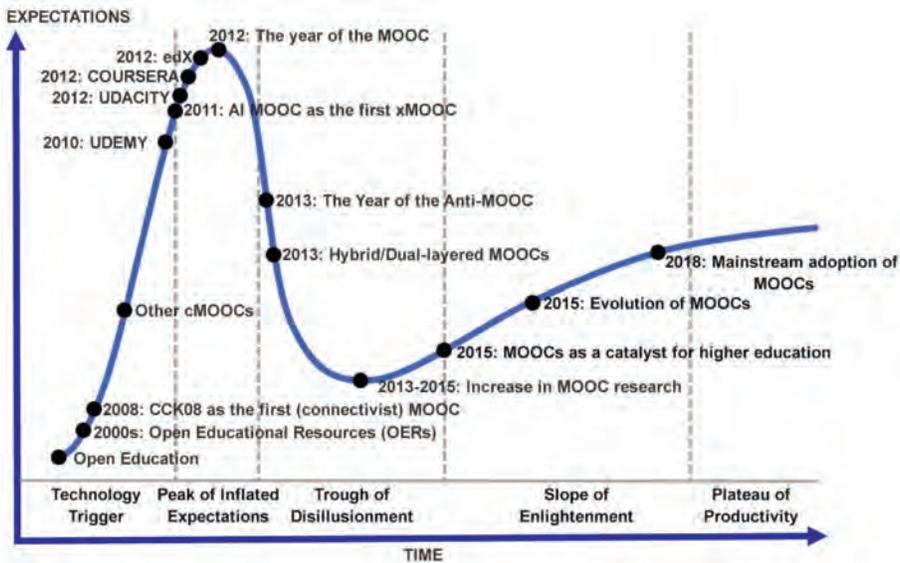
Figure 6. Progress of MOOCs on Gartner's Hype Cycle (Adopted from Bozkurt, Özdamar Keskin, & de Waard, 2016)

However, there is still a huge demand for further research on the MOOC designs, providers and learners and, in particular, on the quality of MOOCs. First initiatives like MOOQ (www.MOOC-quality.eu) and research results like the Quality Reference Framework (QRF, see: www.MOOC-quality.eu/QRF) for MOOCs are promising but require more validation, extension and improvement of the whole MOOC research and results (Stracke et al., 2018). Future research directions should focus the impact achieved by MOOCs on the individual learning processes as well as on the institutional developments in relation to learning designs and organizational strategies to provide, use and improve MOOCs. Furthermore, it would be beneficial to analyse how cross-institutional, -national and -cultural MOOCs can contribute to overcome the identified imbalance and to fulfil the fourth Sustainable Development Goal of the United Nations for equity and high quality learning and education for all.

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