



MOOCS & PARTICIPATION INEQUALITIES IN DISTANCE EDUCATION: A SYSTEMATIC LITERATURE REVIEW 2009-2019

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Abstract:

The extent to which Multiple Open Online Courses (MOOCs) provide an alternative educational model to less privileged social groups is still under investigation. Purpose of this study is to examine how various social, demographic, and educational factors influence learners' participation in MOOCs. A Systematic Literature Review (SLR) was deployed focusing on empirical research published between 2009-2019. Analysis and synthesis of the literature revealed that both the geographical location and the professional status of learners have a positive impact on self-regulated learning. Learners from North America and Europe have significantly higher levels of ICT and self-regulated learning skills than learners from other regions. Moreover, inequalities persist as most MOOCs users have a better educational and professional background in relation to the general population. This study helps to further understand the profile of the "average MOOC user" and contribute to the related scientific discussion about MOOCs initiative.

Keywords: MOOCs, participation inequalities, distance education, PRISMA

1. Introduction

Massive Open Online Courses (MOOCs) were hyped to the tertiary education as a breakthrough technology that would transform teaching and learning, through a "wave" of democratization. MOOCs are considered as an important initiative to widen access to Higher Education (HE) for millions of people, as an affordable alternative to formal education for everyone without entry qualifications, and as a form of open education offered for free through online platforms (Patru & Venkataraman, 2016). From cMOOCs originally to xMOOCs nowadays, more and more higher institutions and educational

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organizations are offering a wide range of self-paced e-courses in various disciplines, following the basic theoretical principles of Open and Distance Education, adapted on new web-based learning environments and content provision practices, aiming to large audiences in a global scale. MOOCs as a «disruptive technology» (Christensen et. al, 2013; Jacoby, 2014) were welcomed by the scientific community as a change innovation that would facilitate the transition of society towards a “democratization of knowledge”, offering important lifelong learning opportunities with no geographical, physical, or economic restrictions (Karsenti, 2017, Hill & Lawton, 2018). However, after the launch of the first MOOC in 2008 (Downes & Siemens, 2008), most of the research papers related to MOOCs are focusing on instructional design, learner’s satisfaction, and peer interaction. Only few papers are focusing on social implications and learners’ characteristics and so, almost a decade after the origins of MOOCs, research upon their pedagogical, social, and economic effectiveness is still in progress and the extent, to which they addresses social inequalities by providing an opportunity for education to less privileged social groups, is yet to be clarified.

This study stems from the lack of the available research related to MOOCs users and their social, economic, educational, and geographic background and connects the aforementioned factors with the possibility of a learner to attend and complete a MOOC. More specifically, it investigates whether factors such as gender, formal educational background, and geographic location of a learner may have positive or negative effects on the participation levels in a MOOC.

2. Literature Background and Formation of Research Questions

Previous systematic reviews on MOOCs focus on different aspects of the learning process: Hew & Cheng (2014) examined students’ and instructors’ perspectives, Jacoby (2014) questioned whether MOOCs are a disruptive initiative, Veletsianos & Shepherdson (2016) gathered the available empirical studies on MOOCs through a systematic literature review, Sanchez-Gordon & Mora (2017) collected data regarding research on MOOCs and revealed 8 research open issues, while Liyanagunawardena, Adams & Williams (2013) on their extensive literature review classified research papers into 7 themes:

- introductory (explaining aspects of MOOCs),
- concept (encompassing discussion papers on topics such as the threats and opportunities of MOOCs for HE,
- case studies (examining one or more MOOCs),
- educational theory (considering the pedagogical approaches used),
- technology (presenting details or considerations about software and hardware used),
- participant focused (considering aspects related to the learners),
- provider focused (considering aspects related to MOOCs stakeholders).

Following the paradigm of other systematic reviews like Sanchez-Gordon & Lujan-Mora (2018), Liyanagunawardena, Adams & Williams (2013), Kennedy (2014), a preliminary search was conducted in order to track the most important open issues in the current literature, regarding factors influencing learners' participation and attendance in MOOCs. The search focused on educational aspects of MOOCs and returned one paper with 11 underlying research topics (Mulder & Jansen, 2016): *Economics, Location, Entry requirements, Success in completion, Scheduling, Network connectivity, Accessibility for all, Accessibility over time, Cultural issues, Legal issues, Quality issues*, yielding to the formation of various research questions, reflecting the scope of this systematic literature review, which is the examination of the level of «openness» of MOOCs in relation to various factors (gender, socio-economic status, geographic location, educational level and digital literacy):

- How can the above factors affect the participation of a learner in a MOOC and its completion?
- Are people with no tertiary education equally represented in a MOOC course in relation to Bachelor or Master holders?
- Does the geographic region of a learner predict her/his successful completion of a MOOC?
- What is the main motive for a non-privileged student to enrol in a MOOC?

All these questions are formulated as follows:

RQ1: What is the socio-economic and demographic profile of MOOC users?

RQ2: Which is the (formal) educational background of MOOC users?

RQ3: Do the educational/geographic characteristics of MOOC learners affect their self-regulating abilities, as can be found in the literature?

RQ4: What are the main reasons/motives to enrol in a MOOC course?

RQ5: What are the problems that MOOC users with special educational needs face?

3. Methodology

In order to answer to the research questions that have been posed above, we employed a Systematic Literature Review (SLR), a method defined as “*systematic and explicit regarding its design*” that has as a purpose “*the finding, evaluation and synthesis of the current literature*” (Fink, 2014). A systematic review requires a sequence of consecutive steps to be completed without fragments, as described by the Center for Reviews and Dissemination (CRD, 2008). These steps include procedures such as *scoping, planning, identification search process, screening, eligibility assessment, interpretation, and presentation of data* (Koutsos et. al, 2019). Except from the above review protocol, our analysis included a PRISMA protocol (Moher et. al, 2009), in order the method of literature selection to be seen visually from the first to the last step. After the selection of the search terms under which the research would run, inclusion and exclusion criteria were defined that limited the research scope (Table 1). The languages of the papers examined were English and Greek, while for the

purpose of this systematic review, both quantitative (surveys) and qualitative (interviews, other systematic reviews) papers were included. Furthermore, the search was applied in the following databases: Scopus, Science Direct, Educause, ERIC, DOAJ, IEEE, Taylor & Francis, and Wiley Online library. To evaluate the relevance of each paper and examine whether it could be included in the review or not, a 3-stages screening procedure was followed. First, after the location of each paper, their title and abstract were carefully read. Afterwards, the reviewers decided on the relevance of the paper and either included or excluded each result. If the abstract of this paper was not enough to decide on its relevance, the whole paper was downloaded and read to clarify whether it should be included or not (see Appendix).

Table 1: Inclusion – exclusion criteria for the selection of the literature

Criterion type	Inclusion criteria
Boolean operators	(Massive Open Online Courses OR Massively Open Online Courses OR MOOCs) AND (Systematic Literature Review)
Language	English, Greek
Methodology	Quantitative, Qualitative papers
Type of publication	Papers published in journal with peer-review evaluation, conference proceeding papers, papers published in educational journals, non-published final reports
Time range	Papers published from 1/1/2009 to 31/5/2019
Type of access	Open access, institutional access rights
Databases	Scopus, Science Direct, Educause, ERIC, DOAJ, IEEE, Taylor & Francis, Wiley Online

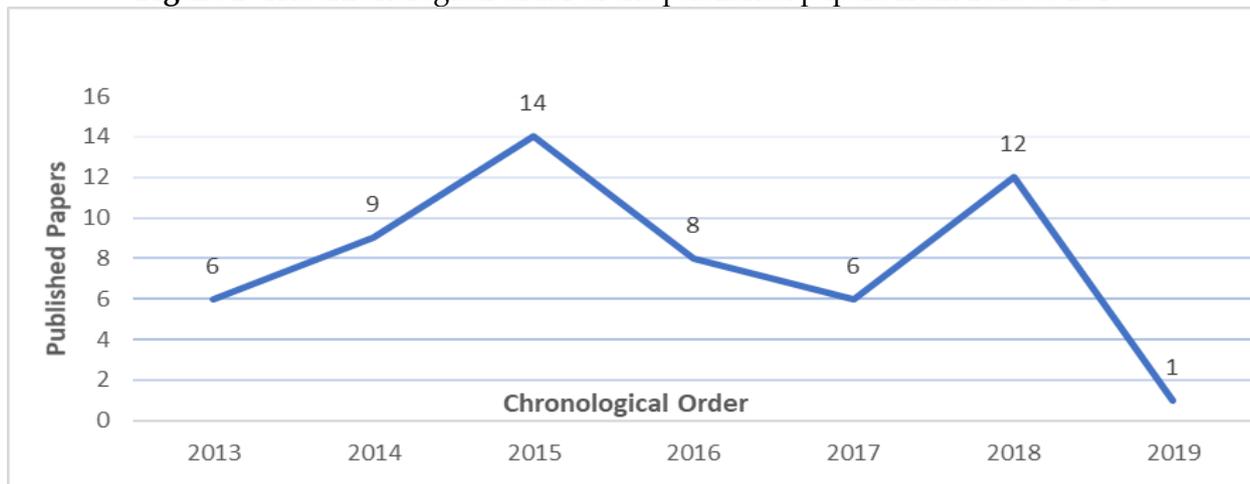
After the application of search terms in the literature databases, the search returned 7.317 results at the initial stage. After the removing of 56 duplicate papers the number of papers reached 7.261; this is the number of papers examined in relation to their relevance. From this number, 7.099 were excluded, as they were non-related to this paper’s aims, or were not related to MOOCs etc. The number of papers that reached up to final stage and examined for the final inclusion were 184, of which only N=56 was finally included on the systematic literature review. The next section demonstrates the analysis of the literature review which is split in two parts: descriptive analysis and analysis of research questions.

4. Results & Discussion

From the 56 papers identified, 36 were published in peer-reviewed journals (64%), 16 were conference proceeding papers (29%) and 4 were independent final reports (7%). The *IRRODL* journal had the most results (7) while *Computers & Education* came second, with 2 returning results (a detailed table with the sum of the journals can be found in the Appendix). Regarding papers published as conference proceedings, just 4 papers were issued at the same conference, namely “*Learning with MOOCs-LWMOOCs*” and *International Conference on Computer Supported Education*” (from 2 papers each conference). Regarding the date of publication of these papers, the first year is 2013 and the last is

2019. The production of MOOC-related literature displays a rising trend from 2013 up to 2015 and then it declines gradually till 2017 with only 6 identified results. The year after 2017, the search returned 12 results, which means that 2018 had twice as many papers as in relation to 2017. The fact that as of the first term of 2019 just one paper appeared may be attributed to chance or to the limited time frame we imposed.

Figure 1: The chronological order of the published papers from 2013 to 2019



Regarding the geographic origin of these papers, we used as criterion the statement of their authors (professors and researchers) as an indication of their origin; specifically, we used the research institutes / universities where they were coming from as geographic indicators. Most papers had authors working in universities in U.S.A, United Kingdom, Spain, Ecuador, Germany, and New Zealand. The table below depicts this fact and demonstrates the percentage point that each country occupies in the total sum.

Table 2: Geographic allocation of HEI according to authors affiliation

Country of Origin	Relative Percentage (%)	Num. of Individual Cases F(x)
U.S.A	42 %	29
U.K.	16 %	11
Spain	9 %	6
Ecuador	6 %	4
Germany	4,5 %	3
New Zealand	4,5 %	3
Australia	3 %	2
Indonesia	1,5 %	1
Turkey	1,5 %	1
Saudi Arabia	1,5 %	1
Netherlands	1,5 %	1
Belgium	1,5 %	1
Portugal	1,5 %	1
Scotland	1,5 %	1
Switzerland	1,5 %	1
Italy	1,5 %	1
Norway	1,5 %	1

RQ1: What is the socio-economic statusⁱⁱ and demographic profile of MOOC users?

A. Demographic characteristics: Male-female proportion among MOOC users

Briefly, MOOC users tend to be males, aged 24-35, mostly employed and working professionals. Examining more thoroughly the data from the literature, we infer that males significantly dominate the online learning that takes place on MOOCs. Papers that have collected demographic data on MOOC users demonstrate a clear disproportion of males over females. According to Gameel & Wilkins, (2019) in the two MOOCs examined, men represented 85% of learners and women just 15%, while on the second MOOC the proportion was 60% (males) over 40% (females). This result is drawn as well by Dillahunt, Wang & Teasley, (2014), where 68% are men, by Christensen et. al, (2013), where the ratio is 53% and 47% respectively and Despujol et. al (2014) with 56% males and 44% females. Finally, while in the paper of Cabedo (Cabedo et. al, 2018) the sex ratio between men and women is approximately the same, in the age range of 25-34, men are three times more than women.

B. Demographic characteristics: Male-female proportion among MOOC users that are Certified

The male-female disproportion is not only evident but implies something more: men tend to get a MOOC certification far more frequently than women. MOOCs often provide the possibility of certification if users pass a standardized evaluation test. Despujol et. al. (2014), found that just 32% of MOOC completers were women who finally earned a certificate, while 68% were men.

C. Demographic characteristics: Relation between sex rates and branch of science in a MOOC

As it has been previously reported, men tend to be over-represented in the fields of Mathematics, Engineering and Programming (Veletsianos & Shepherdson, 2015). In the literature regarding MOOCs, we found three studies that confirm the sex gap between different science disciplines. In DeBoer, Stump & Seaton (2014), men were representing the 88% of participants due to the nature of MOOC course - "Circuits and Electronics"- provided by MIT university. The paper of Ho et. al (2014) demonstrates that among those who successfully completed the course, men were the striking majority with women occupying just 13% (Ho. et. al, 2014). The reverse picture is described by Evans & McIntyre (2016) where in MOOCs related to Humanities, women are significantly more, without giving the exact percentage. The only counter-male evidence is coming from the research of Gil-Jaurena (2017) where in total of 17 MOOCs examined, women represent 63% of participants and men just 37%ⁱⁱⁱ (Gil-Jaurena et. al, 2017).

ⁱⁱ SES-status is a term from Sociology and Economics that defines a person's economic wealth based on specific factors. In Hansen & Reich's study, SES was defined by three sub-factors: i) the educational level of the parents of MOOC users, ii) the average income of the geographic area of the MOOC user and iii) the average educational level (in years) of the region of the MOOC user.

ⁱⁱⁱ The authors of this paper explain this discrepancy on the nature of these courses: the majority belong to the Social sciences and Humanities where female learners are ad hoc the majority (Gil-Jaurena et. al, 2017 p.8).

D. Professional background of MOOC users

Having examined the sex ratios of MOOC users, our focus centers on the professional status of MOOC users. A lot of previous papers on MOOCs have supported that they are mainly attended by students (Stich & Reeves, 2017, Christensen et. al., 2013). The above argument is not concluded considering the available data: according to Bayeck (2016), 60% of MOOC users are employed and 40% unemployed, while in the research of Cabedo et. al. (2018) 73% of users are employed, 8,5% self-employed, 6,5% unemployed and just 5,7% are students. Finally, Gil-Jaurena (2017) states that 36% of MOOC users were unemployed, 35% were employed, 20% were students and 7% were employers (Gil-Jaurena et. al, 2017). Consequently, most papers show the dominance of employed learners rather than learners that are students.

Table 3: The professional status of MOOC learners as found in the literature

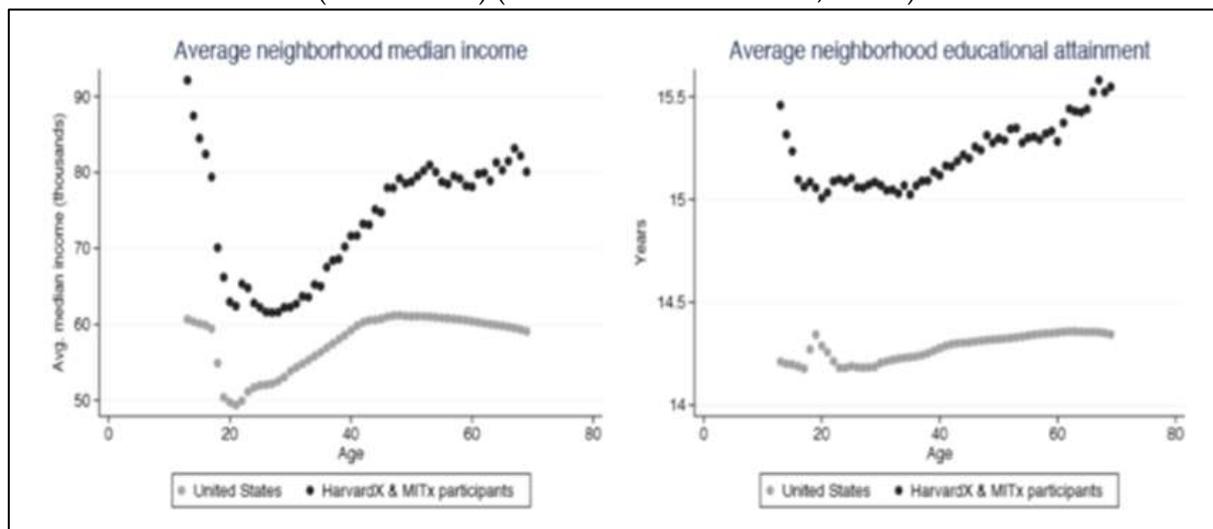
Professional Status	Employed (Self-employed and partially employed included)	Not Employed- Looking for a job	Students
Bayeck (2016)	60 %	40 %	-
Cabedo et. al (2018)	80 %	6,5 %	13,5 %
Christensen et. al (2013)	67 %	14 %	17 %
Gil-Jaurena et. al (2017)	35 %	36 %	29 %

E. The geographic location of MOOC users and the relation with their SES-status

Across all 56 papers that made up the systematic literature review, only the paper of Hansen & Reich (2015a, 2015b) correlated the SES-status^{iv} of a MOOC user with her/his geographic location in relation to MOOC attendance and completion (Figure 2). The study involved students who were enrolled in MITx and HarvardX courses and examined the differences between a target group (MOOC users) and a control team (general population who were not MOOC attenders). What Hansen & Reich found in their study was that the average income of MOOC users was 12.000\$ higher than the average income of people of the same geographic region who did not attend a MOOC course. Proceeding to a logistic regression analysis, Hansen & Reich found that an increase of 20.000\$ on the annual income of a person would mean a 27% increase in the possibility of attending a MOOC course for the same person (Hansen & Reich, 2015a, p.6). Furthermore, the factor of educational level of a person was statistically significant predictor of the participation in a MOOC; an increase in the educational level (i.e. the transition of a MOOC student from Bachelor's degree holder to Master's holder) of a MOOC user would mean a 69% increase of possibility of attending in a MOOC. The above data demonstrate that the educational level and economic status of a person are strongly related to the possibility of a person to attend/ participate or complete a MOOC course.

^{iv} SES-status is a term from Sociology and Economics that defines a person's economic wealth based on specific factors. In Hansen & Reich's study, SES was defined by three sub-factors: i) the educational level of the parents of MOOC users, ii) the average income of the geographic area of the MOOC user and iii) the average educational level (in years) of the region of the MOOC user.

Figure 2: Differences in the average median income (first graph) and educational level in years (second graph) between learners of two MOOCs and the general population of U.S in years (second graph) between learners of two MOOCs and the general population of U.S (data on U.S) (Source: Hansen & Reich, 2015a)



RQ2: What is the (formal) educational level of the average MOOC learner?

A. The proportion of MOOC users who have high educational level in relation to general population

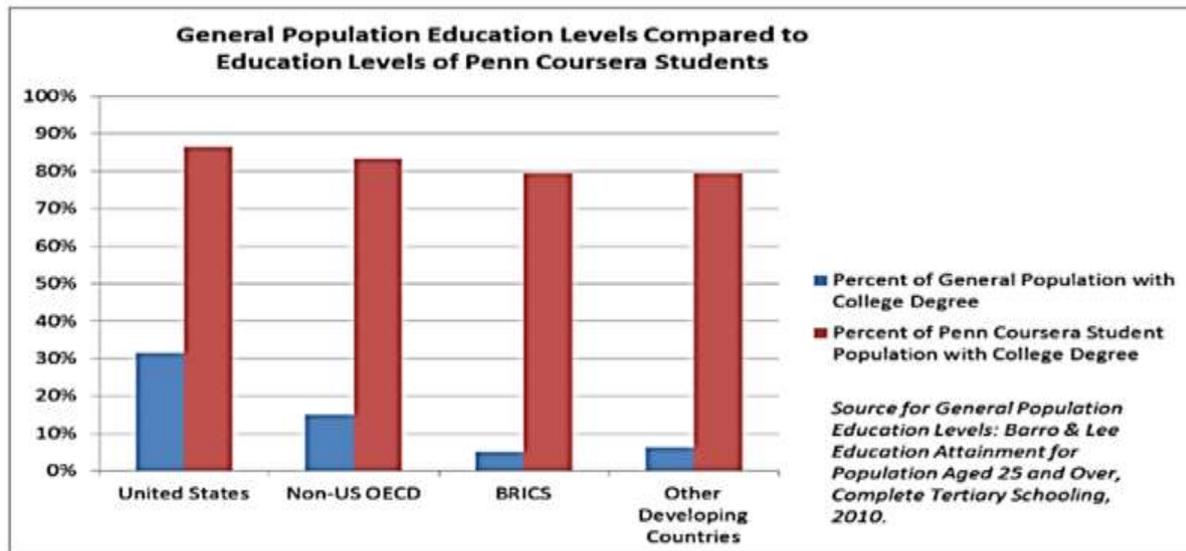
While it has been proved by empirical data that MOOC users are highly educated, holding degrees and being highly skilled, this tells little if not compared to the general population: “Are MOOC users actually more qualified and educated than non-MOOC users?” This question is answered by three papers identified in the literature review: Rohs & Ganz (2015), Stich & Reeves (2017) and Christensen et. al (2013). Surprisingly, these papers deal with MOOC participation in three different regions of the world: U.S, Europe, and BRICS^v countries.

This is extremely helpful, as it demonstrates the different levels of digital acceptance of online learning across the globe. In the first case, Rohs & Ganz studied the demographic characteristics of users from two MOOCs in Germany, one related to Management and the other on Adult Education. The percentage of degree holders in Management MOOC surpassed 80%, while for the second MOOC (Adult Education), half of the participants (49%) had a degree in Education, while “in general population this percentage was only 27%” (Rohs & Ganz, 2015, p. 11). Christensen et. al (2013) found a stark contrast between the educational level of MOOC users in BRICS countries and the general population: while 79,5% of MOOC users from these countries were degree holders, this percentage declined dramatically to 5,1% for the general population, according to Barro-Lee data set (Barro-Lee attainment data set, 2010). The above data underline the inequality of opportunity that persists in the developing countries in relation to the participation in tertiary education and lifelong learning (Peter & Deimann, 2013). The last study of Stich & Reeves (2017) asserts this disproportion of educational

^v Brazil, Russia, India, China, South Africa.

level in the US, where just 30% of the total population has a degree, while a stunning 80% of MOOC users from Penn University are degree holders (see table 8) .

Figure 3: The percentage of education levels of the general population compared to education levels of Penn Coursera students (Source: Christensen et. al, 2013)



B. The educational level of MOOC learners

This research question examines the validity of the argument that MOOCs are a great opportunity for non-privileged students and people who cannot afford to pay for their education. This argument is evident in many of the papers included in the review (Garrido et. al, 2015, Dikran & Kasabian, 2014, Literat et. al. 2015).

However, empirical studies demonstrate that most MOOC learners are already well-educated, holders of at least a bachelor’s degree (see table 7). In table 7 we summarize the empirical studies identified through the literature search that prove the very high educational attainment of MOOC learners (Cabedo et. al 2018, Christensen et. al. 2013, Gameel & Wilkins, 2019, Despujol et. al. 2017, Gil-Jaurena et. al. 2017, Ho et. al. 2014). For the sake of space scarcity, MOOC users that identified themselves as graduates of secondary education were unified along with those that had “occupational qualifications” under one category. The table below confirms the fact that MOOC users have a high educational status before attending a MOOC rather than the opposite.

Table 4: The (formal) educational level of MOOC users as found in the literature

Research / study found	Percent (%) of Graduate holders and / or Master – Ph.D. holders	Percent (%) of Graduates of secondary level High School or Graduate of technical / vocational schools
Cabedo et al. (2018)	93 %	3,5 %
Christensen et al. (2013)	79,5 %	-
Gameel & Wilkins (2019)	71% to 63% ^{vi}	11,4 to 15,5 % ¹

^{vi} These ratios refer to the users of English and Arabic MOOC respectively

Despujol et al. (2014)	64 %	10%
Gil-Jaurena et al. (2017)	64 %	29 %
Ho et al. (2014)	64 %	43% to 15% ¹

¹Highest to lowest level of graduates per MOOC.

RQ3: How educational and geographical parameters affect the Self-learning abilities (SLR) of MOOC learners?

In this question we aim to address whether socio-demographic characteristics can affect the self-learning ability of an independent MOOC learner. While there are numerous studies on the requirements needed for the successful attendance in a MOOC^{vii} (Alcorn, Christensen & Kapur, 2015, Agirdag, 2018, Audsley et al., 2013, Balula, 2015, Liyanagunawardena, Adams & Williams, 2014, Ichou, 2018, Yousef et al. 2015), most of them are theoretical in nature and don't employ empirical data. The studies of which the results are presented here employ empirical data (Gameel & Wilkins, 2019, Garrido, 2015, Hood & Littlejohn, 2015, Ruiperez & Valiente, 2018, Tang & Wang, 2017) and examine the effect of geographic, educational and socio-economic factors in the readiness of users^{viii} to participate in a MOOC.

A. Relationship between geographic location and educational level of a user in the ICT use

To measure the relation of these two concepts and use of ICT, this paper employs Dray's scale (Online Learning Readiness Scale-OLRS) as found in the study of Gameel & Wilkins (2019). This scale consists of three individual scales measuring: i) ICT engagement, ii) learner's self-efficacy and iii) learner's locus of control, all related to how well an online learner can accomplish certain tasks when learning online (Dray, 2011). The above scales are comprised of nine, six and four elements respectively to assess the validity of what each is measuring (see Appendix). Therefore, the first question arising after the application of Dray's scale into MOOC use is the following: *Does the geographic location (as a dependent variable) of a user affect: a) The ICT engagement of a user when learning in a MOOC, b) The levels of self-efficacy of the user, c) The level of locus of control of the user when using a MOOC?*

In the study of Gameel & Wilkins (2019), 5 MOOCs were examined (1 in English and 4 in Arabic). The aim was to identify whether ICT use and engagement could differ depending on the geographic location of the learner; other factors, such as age and gender remained as independent variables. More specifically, after applying general linear regression model testing, authors found that the geographic location of a learner (as a dependent variable) is positively related to ICT use: learners coming from North America and Europe had significantly better relation with *ICT engagement* than learners from Arabic states and states from Caribbean ($F \{4, 2526\} = 30.56, p < .001$). In terms of *user*

^{vii} Except for the Internet connection, as this is a "material inequality" according to Van Dijk (2006).

^{viii} The online «readiness» of a learner is a term common in distance learning that refers to specific learner characteristics (ability to complete a college degree, problem solving skills, time management) and ICT engagement skills (Dray et. al, 2013).

efficacy, this study found that learners coming from U.S were more efficient in learning via MOOCs than learners from other countries, as they had stronger ICT skills ($F(4, 2526) = 24.47, p < .001$).

Finally, regarding the scale of *locus of control*, users from Arabic states scored significantly lower than users from Europe, U.S, Latin America, and Caribbean. Therefore, it was observed that the so-called ICT diffusion isn't proportionately allocated across the globe (Gameel & Wilkins, 2019), as the ICT skills are disproportionately located in learners from developed countries, while in developing countries severe skills and usage inequalities regarding the use of ICT still persist (Van Dijk, 2006). In the study of Mirza & Abdulkareem (2011) this phenomenon is explained culturally: countries that for several reasons delayed adopting Internet as a vital educational medium were substantially lacking in ICT engagement levels in relation to countries where distance education was prominent from the start. The theory of Hargittai for Internet use (Hargittai, 2004b) complies with the above observations: the more time a person spends in front of a computer, the more likely he acquires / sharpens his digital skills and therefore the more possible it is for them to be able to successfully attend / complete an online course.

RQ4: What are the main reasons / motives for enrolling in a MOOC?

Understanding the socio-demographic and educational characteristics of MOOC learners is vital for the comprehension of the learning cohorts of MOOCs. However, the above information is not sufficient without knowing why students and / or learners enroll in such a course. Through the literature review, the studies of Christensen et. al (2013), Bayeck (2016), Garrido et. al (2015), Schmid et. al (2015) and Shrader et. al (2016) were located; they provided reasons for the enrolment in a MOOC through surveys with questionnaires sent to MOOC learners before the start of the course (pre-course surveys).

A. Why learners enrol in a MOOC?

In Christensen et al. (2013), reasons for enrolling in a MOOC were: i) «curiosity/just for fun» (50%), ii) «gain specific skills to do my job better» (44%), iii) «gain specific skills to get a new job» (17%) iv) «gain knowledge to get my degree» (13%) while Shrader and his colleagues found that the participation in a MOOC can have 7 possible reasons: i) «knowledge expansion on a specific topic» (65%), ii) «general interest or curiosity» (35%), iii) «importance of the topic» (27%), iv) «MOOC subject related to academic studies / degree» (19%), v) «knowledge acquisition for current job» (16%), vi) «increase of hiring probability» (13,3%), vii) «interest on subject instruction» (11.8%) (Shrader et. al., 2016). The study of Bayeck (2016) is important because it emphasizes the influence of social environment on the decision of a person to participate in a MOOC. In a pre-course survey^{ix} conducted to study the motives of participation in a MOOC, the findings were

^{ix} This pre-course survey concerned the MOOC «The creativity, Innovation and Change (CIC 2.0)» offered by Pennsylvania State University.

the following: i) «A friend took the course» (99,7%)^x, ii) «Course taught by these professors» (91,5%), iii) «Using the skills I'll gain from that course»(81%), iv) «Earn credits» (80%), v) «Course relates to job» (72%), vi) «Personal interest» (66,5%), vii) «Reputation of the institution» (65%), viii) «Connect with others» 60%, ix) «Course relates to degree / curriculum» (54%) (Bayeck, 2016). Consequently, the most referred reasons / motives for enrolling in a MOOC may be the desire of learners to upgrade their knowledge on a specific topic, to gain useful skills for their professional occupation and to satisfy a general curiosity that accompanies MOOCs (Garrido, 2016, Schmid et. al, 2015).

B. The reasons of enrolling in a MOOC in 3 developing countries: the study of Garrido et al. (2016)

In this study, Garrido and his colleagues investigated the reasons of enrolling in a MOOC for people coming from Philippines, Colombia and South Africa, countries where tertiary education enrollment is still on the rise (Peter & Deimann, 2013). The responses of the participants could be organized in three main categories: «*employment*», «*education*» and «*personal development*» (Figure 4). As it can be observed from the graph, the most common response in the category of «*employment*» is «acquisition of certain skills to be more effective in my job» with 60% of participants stating that. Moving to the category of «*education*», two questions had the same percentage: «preparation for further education» with 40% and «acquisition of professional qualification» with 36%. Finally, 30% of people who were included in the category of «*personal development*» stated as the main reason for enrollment the «prestigious professors that were teaching» (Garrido et. al, 2016).

Figure 4: The most common answers participants stated, when asked why they enrolled in a MOOC (Source: Garrido et. al, 2015)



^x It must be noted that the participants could vote for more than just one reason.

RQ5: What are the problems that MOOC users who have special educational needs face?

Having examined a wide range of factors that affect MOOC participation and completion based on socio-demographic, educational and economic factors of learners, the last research question addresses the issue of MOOCs accessibility. Specifically, the last part of literature review targets non typical learning cohorts: are people with special educational needs able to attend a MOOC? Are there studies regarding specially designed MOOCs for people that have a cognitive /visual/speech/kinetic or any other type of impediment?

The literature review identified a very limited number of studies regarding MOOCs for people with special needs. The studies of Sanchez-Gordon & Lujan-Mora (2016), Rolfe (2015) and Beltran et. al (2017) are what the literature search located. The above studies were theoretical and therefore they did not bring out any empirical data. In Beltran's systematic review (Beltran et. al. 2017), it was recognized that a MOOC for people with customized learning needs does not exist yet. The only empirical data comes from the study of Bong & Chen (2016), where an accessibility -usability testing was undertaken to assess the ease of use of a MOOC for older people. Severe accessibility problems were found, as the participants had difficulties in pressing the buttons, were incapable of undertaking the online assignments, while some tasks (drag n' drop clues) were not performed at all. The study concluded that an important part of the learners had little to no self-confidence at all about the tasks of the course and most of them didn't participate in the online discussion forum, as they thought it was useless (Bong & Chen, 2016).

In conclusion, there is lack of research done regarding MOOCs directed to non-typical students, but the already existing literature showcases severe usability and accessibility problems that make the procedure of online learning less effective (Sanchez-Gordon & Mora, 2017).

5. Conclusions

In this systematic literature review we gathered the theoretical and empirical literature on MOOCs published between 2011-2019 and identified 56 publications. Using this dataset, we examined the socio-demographic, educational and geographical background of MOOC learners and then the relation of these factors with MOOC participation / completion as found in the literature. Most of the publications were papers published in journals (64%), followed by conference proceedings (29%) and independent reports (7%).

The results of this review are briefly summarized below.

Regarding **demographics**, MOOCs seem to maintain the gender gap as men outnumber women and in some cases with striking difference in male-female proportions (Gameel & Wilkins, 2019, Despujol et. al, 2014). Furthermore, men are far more frequently certified, therefore completing MOOCs in a higher rate than women, as only 32% of them are certified out of the total (Despujol et. al 2014).

Regarding the **socio-economic profile**, most of MOOC users are employed and professional workers, while student rates ranged between 20-30% out of total. Beyond professional status, MOOC users tend to live in more affluent geographic regions (Hansen & Reich, 2015a, 2015b) and the educational level of a person's family (educational level of parents) increased the possibility of MOOC participation by 30% for a person (Hansen & Reich, 2015b).

In terms of **formal educational attainment (level of education)** most MOOC learners across the globe are degree holders and more than 1/3 of them are Master / PhD holders (Cabedo et. al 2018, Christensen et. al 2013, Gameel & Wilkins, 2019) according to the latest empirical data. Regarding the connection between geographic location and the digital literacy of a learner, there is a strong relationship : MOOC students coming from Europe and North America had scored better in each of the three sub-scales of the Online Learning Readiness scale items: *i) ICT engagement* , *ii) self-efficacy* and *iii) locus of control*. Apart from the above, the literature research found the following **reasons for enrolling** in a MOOC as the most common: upgrade knowledge on a specific topic, gain useful skills for professional occupation and satisfy a general curiosity that accompanies MOOCs (Garrido, 2016, Schmid et. al, 2015).

Finally, regarding **MOOCs for people with disabilities and special education needs**, there is not yet a satisfactory production of studies. The empirical study of Bong & Chen (2016) is the only one that the search found.

What this paper aims, is to better contribute to the knowledge of MOOC learners : who they are, what their educational and social status is and what do they expect from these courses. From the empirical data this paper identified, MOOC courses rarely are destined to reach exclusively under-privileged learning populations and even when they do so, they already acquire prerequisite knowledge, which is not always easy for those populations to possess. Questioning why people choose to attend a MOOC in each of the three most common categories (employment, education and personal fulfilment), the answers were related to a level of working or educational status that pre-existed MOOC attendance and therefore, people consider MOOCs as a part of their life-long education and training rather than as immediate means of formal knowledge substituting university degrees and diplomas. This does not necessarily mean that MOOCs have "failed" to fulfil their goals neither that only an Ivy League student or professional can attend them. Instead, it means that MOOCs have a long way ahead of them in order to be better structured both educationally and in terms to whom they are offered ; most importantly, in order to avoid the high attrition rates, MOOC providers should carefully consider if the large number of participants (which is a fundamental characteristic of such courses) is accompanied by the same learner enthusiasm across the duration of the course and if content commitment remains unabated till the end. After all, is the high participant heterogeneity, both in terms of socio-cultural, educational and geographic terms a clue that may indicate the success of a MOOC ? The former research questions should lead the ongoing research on MOOCs that has just started.

6. Limitations

This paper was based on literature research in 9 different resources and during a time period from June to September 2019. It was a particularly meticulous procedure demanding from the author several hours per day of searching, identifying, screening, selecting and compiling papers and resources. However, Systematic Literature Reviews are traditionally undertaken by two or more researchers (Fink, 2014, Randolph, 2009) in order to have a better management of the total data resources; additionally, two or more researchers can broaden the inclusion criteria or reflect on them and cross-check the final literature research results. Therefore, during the literature research process some papers relevant to this paper's aim may have been unintentionally missed or ignored by the author due to the huge return in research results.

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