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# MOOCs as Accelerators of Social Mobility? A Systematic Review

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## ABSTRACT

Due to their perceived scope and openness to socially underprivileged groups, Massive Open Online Courses (MOOCs) have been presented as tools to enhance social mobility. However, there has also been evidence to suggest that MOOCs are mainly beneficial for privileged groups and could even contribute to an increasing gap in educational opportunities between privileged and underprivileged populations. This systematic review has evaluated 31 empirical studies to examine how MOOCs benefit the socially privileged in comparison to underprivileged groups. The literature has pointed out specific formal barriers that might make MOOCs less accessible for underprivileged learners. In addition, enrollment demographics displayed that the majority of MOOC learners is well educated, employed and from developed countries. Finally, the literature suggested that privileged learners could be more likely to complete a MOOC. Nevertheless, the literature indicated a notable share of underprivileged learners that would otherwise not enjoy higher education. Moreover, it is suggested that certain MOOCs might serve underprivileged learners more than other MOOCs. The implications of these findings and recommendations for future research will be discussed.

## Keywords

Massive open online courses, MOOCs, Distance education, Digital inequality

## Introduction

Whereas education can be perceived as a means to social mobility, there are still significant barriers towards the equality of educational opportunities (e.g., Konstantinovskiy, 2012; Triventi, 2013). With the upswing of Internet, online education has evolved as a new instrument to reach those less able to enroll in formal institutions (Kuriloff, 2005). Massive Open Online Courses (MOOCs) developed as a specific form of online education, comprising well-structured, mainly university-level, programs. Since MOOCs charge small or no fees and can take up unlimited amounts of students, they are expected to alleviate barriers to higher education (Rohs & Ganz, 2015). More specifically, MOOCs seem to provide viable alternatives for higher education in developing countries where access to education is relatively limited (World Bank Group, 2012) or in countries where annual tuition fees can exceed 10,000 dollars (Usher & Medow, 2010).

However, empirical evidence has shown mixed results with regards to the social mobility in MOOCs. On the one hand, research has demonstrated that MOOCs enable less privileged groups to improve their career trajectory against lower investments than in formal higher education (Zhenghao, Alcorn, Christensen, Eriksson, Koller, & Emanuel, 2015). On the other hand, studies suggested that barriers to enrollment in MOOCs are relatively higher for underprivileged individuals (Yáñez, Nigmonova, & Panichpathom, 2014) and that less privileged populations are underrepresented in certain MOOCs (e.g., Emanuel, 2013). Even though these findings seem to contradict, it could be that outcomes with regards to social equality depend on the specific characteristics of the MOOC under study. Considering the large diversity of subjects, pedagogies and languages in MOOCs (Shah, 2014), studying a wider variety of MOOCs might help to identify larger trends of social inequalities. Reviews on MOOC literature, for example, have indicated that especially South-East Asian and African learners are in minority in the MOOC population and that linguistic or cultural difficulties could be the source of these inequalities (Liyaganawardena, Adams, & Williams, 2013a; Rolfe, 2015). Moreover, one review indicated that inequalities in MOOC participation could be caused by an uneven occupancy of electronic equipment, Internet and digital literacies (Valentin, 2015). Even though these reviews identified and explained social inequalities in MOOCs, they did not systematically evaluate the scope and the quality of the existing empirical evidence and to what extent these could support general conclusions. These reviews neither compared the social implications of MOOCs against other forms of education, which hampers an intelligible interpretation on the impact of MOOCs in the educational landscape. Addressing these issues in a systematic review will help to understand whether, which and how MOOCs currently enhance educational opportunities for those otherwise underprivileged.

## **Theoretical background**

In order to understand social inequalities and to define privileges in formal education, the social- and cultural reproduction theory forms an intelligible framework (Bourdieu, 1973; Bourdieu, 1986). This theory explains educational participation, success and attainment by different forms of “capital”. On the one hand, it is acknowledged that economic capital, in terms of financial investments and the ability to spend time off paid labor, is an important condition for educational participation (Bourdieu, 1986). Social and cultural capital, on the other hand, represent the knowledge, social ties and cultural conceptions that make it easier to function in educational institutions (Bourdieu, 1973). These latter forms of capital constitute more hidden conditions for educational success, as these tend to be conveyed within families and internalized at an early age (Bourdieu, 1986). Based on these assumptions, those who are raised in culturally and socially dominant contexts and possess a solid financial background could be regarded as privileged in formal education sectors. Underprivileged individuals, consequently, have relatively less resources in the financial and social domain and their cultural understandings might diverge more from those in educational institutions. Considering their usefulness to understand privileges in education, this study will adopt these conceptualizations in order to compare whether and to which extent MOOCs could improve social equality in comparison to formal education.

## **The present study**

This study aims to synthesize empirical evidence on the potential of MOOCs to reach and serve those who are privileged versus underprivileged in formal education. As this study will systematically evaluate empirical findings on social inequalities in MOOCs, it could provide fundamental insights on the scope, strengths and limitations of evidence on this issue. Therefore, the research outcomes could inform MOOC providers on the social implications of MOOCs. In addition, it will help to estimate the validity of previous findings and could inform researchers on specific issues related to studying social inequalities in MOOCs.

Based on these concerns and the theoretically based conceptualizations of privilege, the following three research questions guided the research process:

- To what extent are formal barriers to MOOC participation unequal for underprivileged and privileged groups?
- To what extent is MOOC enrollment unequal between underprivileged and privileged groups?
- To what extent is MOOC completion unequal between underprivileged and privileged groups?

## **Methods**

### **Literature selection**

The literature search for this review was conducted from the 17th to the 26th of October 2015. Three databases, ERIC, Webofknowledge and Google Scholar, were chosen for the reliability, quality and the relevance of their sources. In order to reach a broad scope of literature, “MOOC” was used as a general search term in ERIC and in Webofknowledge. In Webofknowledge this yielded many articles in irrelevant research domains such as chemistry or music history. Hence, a filter for social science domain was added in the literature search. The searches yielded 207 articles in WebofKnowledge and 270 articles in ERIC, with some overlap in the presented articles. To amplify the selection of literature, Google Scholar was searched for “MOOC accessibility,” “MOOC reach,” “MOOC qualitative,” “MOOC quantitative” and “MOOC demographic.” The criteria for the selection of articles were that (a) it concerned an empirical study (b) the study provided of either data on formal barriers, learner demographics or completion and (c) implications of these data could be related to patterns of social equality or inequality. These criteria were considered to lead to a selection of high-quality and relevant studies that would be relevant for answering the three research questions. The final selection of articles comprised 31 studies published in the period of 2013-2015, sorted for their relevance for the three research questions. These studies are marked with an asterisk (see References).

### **Coding**

The analysis started with a process of open coding. In this phase, the first author distinguished text fragments in the studies that could be relevant for at least one of the research questions. Open codes constituted descriptive labels for these text fragments. In the next phase, the first author compared the open codes and grouped the codes

to compose specific sub-domains within the research questions. These sub-domains were labeled, which constituted a proposed code structure. In order to secure the validity of the codes, the second author reviewed the codes in reference to the associated text fragments and provided suggestions for adjustments in case of discordance. Finally, the authors collaboratively associated each of the selected articles with at least one code, along with a specific negative or positive orientation. Table 1 provides a clarification of the codes. An elaborated table on the analyses can be found at [www.orhanagirdag.com/jets](http://www.orhanagirdag.com/jets).

*Table 1. Codes per research question*

Research question	Code
What are the formal barriers to participation in MOOCs?	ICT – ICT access PRK – Prerequisite Knowledge COS – Cost
To what extent do enrollment rates show patterns of social (in)equality in MOOCs?	EDU – Educational attainment OCC – Occupational position GEO – Geographical location
To what extent do completion rates show patterns of social (in)equality in MOOCs?	EDU – Educational attainment SKL – Skills and Knowledge
Relation to social equality	(+) – positively related to social equality (-) – negatively related on social equality (+/-) – ambiguously related to social inequality

The codes selected for the first research question represented three formal barriers that were interrelated with privileges in education. The first code, “ICT access” (ICT), represented the requirement of hardware, software and Internet infrastructures, indicating both social and economic privileges. The second code, “Prerequisite Knowledge” (PRK), described the necessity of prior knowledge in MOOCs as a privilege in the cultural domain. The code “Costs” (COS) indicated the social implications of financial requirements in MOOCs. The codes for the second research question represented privileges that could be derived from learner demographics. The code “Educational attainment” (EDU) represented information on learners’ highest obtained diploma, as an indicator of general privilege in formal education. As all articles used the bachelor diploma as a reference category, well-educated learners were defined as “having a bachelor’s degree or higher” and less educated as the remaining population. Furthermore, the code “Occupational position” (OCC) demonstrated information on employment rates within the MOOC population and industries of employment. Employment rates were depicted in four categories: “employed,” “student,” “retired” or “unemployed,” where the full-time, part-time and self-employed populations are all integrated into the “employed” category. The third code, “Geographical Location” (GEO) comprised information on the residence of learners, indicating privileges due to cultural resources or social ties. The codes for the third research question explained or predicted MOOC completion by learner characteristics that could be related to privilege. The code “Educational Attainment” (EDU) addressed the potential impact of educational background, as an indicator of privilege in formal education, on completion. The second code, “Skills and Knowledge” (SKL) represented the influence of prior knowledge and skills on completion. Skills and knowledge were considered as indirect indicators of social, cultural and economic background as they represent the quality of experienced education, the absence of financial constraints to participate in education and a favorable upbringing. All of these codes were complemented with a code for their relation to social equality, indicating either a positive (+), negative (-) or ambiguous (+/-) association with social equality.

## Results

### Formal barriers to MOOCs

The online availability, absence of pre-selection and low expenses support the expectation that MOOCs alleviate barriers to higher education for those less privileged in formal education. Still, the literature indicated three potential barriers that might hamper the access to MOOCs specifically for underprivileged students. These barriers were related to ICT access, prerequisite knowledge and costs, indicating the necessity of financial, cultural and social resources for MOOC participation.

#### *ICT access*

Five studies discussed ICT access as a barrier to MOOC participation. Only one case study did not acknowledge ICT requirements as a barrier, stating: “Personal computer and Internet access, as well as minimal computer

literacy are the only prerequisites to register and access MOOCs” (Leontyev & Baranov, 2013, p. 1534). In contrast, other studies indicated that especially underprivileged learners might be unable to access MOOCs due to this requirement. First, it was emphasized that learners from isolated regions in developing countries experienced more impediments towards MOOC participation than those in urban areas, considering the unreliability of electricity provision, the remoteness of Internet facilities and the poor quality of those facilities (Alcorn, Christensen & Kapur, 2015; Liyanagunawardena, Williams & Adams, 2013b). Although there are initiatives to provide offline content and hardware in rural regions (Hollands & Tirthali, 2014), the impact of these interventions is restricted to certain areas and small supplies. Moreover, it was pointed out that there is a substantial number of families in Western countries that is unable to access Internet in their own homes (Evans & McIntyre, 2014). Computers in public libraries do not provide viable solutions, as learners are often disallowed to download the necessary software or visit the relevant websites on these computers (Audsley, Fernando, Maxson, Robinson, & Varney, 2013). This illustrates that the social context can hamper ICT access as a requirement for MOOC participation.

### *Prerequisite knowledge*

Although MOOCs do not preselect students based on their academic records, seven studies indicated that prerequisite knowledge could be a barrier towards MOOCs. Of all courses on Coursera, Udacity and Edx, 29 percent required some background knowledge, like English proficiency, programming skills, or educational attainment (Audsley et al., 2013). These requirements might depend on the perceived difficulty of the course. A study on humanities MOOCs found that 20 percent specifically stated that an academic background or prior knowledge was required (Evans & McIntyre, 2014), whereas a study on medical MOOCs indicated 47 percent required background knowledge (Liyanagunawardena & Williams, 2014). In these and other domains, there were also courses that either gave conflicting information on the required level of experience (Evans & McIntyre, 2014), suggested prior knowledge was helpful (Liyanagunawardena & Williams, 2014) or did not state any indication on the level of the course (Raposo-Rivas, Martínez-Figuera & Sarmiento Campos, 2015). Even though MOOCs rarely meet the complexity of university level courses (Rhoads, Camacho, Toven-Lindsey, & Lozano, 2015), these ambiguous or compelling messages might dismay those with less background knowledge or academic experience. In this way, cultural or educational factors can play a role in MOOC participation.

### *Costs*

Even though MOOCs are generally perceived as free of cost, six studies discussed their financial barriers. In general, it is noted that MOOCs offer underprivileged populations the opportunity to enjoy higher education due to their affordability (Rhoads et al., 2015). Even for certain courses that require payments for personal certificates, there are financial aid programs for students who can prove they cannot afford these (Audsley et al., 2013). However, the fact that most platforms currently run on unsustainable business models leaves it uncertain what will happen with the height and frequency of the certificate fees (Evans & McIntyre, 2014). If these costs increase in their size and forcefulness, it will become less likely that underprivileged students opt for a certificate. Another potential financial barrier is interrelated with the barrier of ICT access. Namely, a substantial share of families with lower incomes is unable to buy the appropriate ICT equipment to participate in MOOCs (Evans & McIntyre, 2014). Especially in countries where Internet provision is unstable or of poor quality, watching online lectures might require relatively expensive extra bandwidth (Hollands & Tirthali, 2014). Other potential costs could evolve from additional learning materials, as many MOOC instructors strongly recommend and a smaller percentage requires the purchase of reading materials, technical gear or other materials (Audsley et al., 2013; Evans & McIntyre, 2014). Even though these costs are marginal in comparison to the overall costs of formal higher education, it shows that financial requirements might have a filtering effect for those less affluent.

### **Patterns in MOOC enrollment**

As demographic data of MOOC learners could characterize their relative privilege, they can be adopted to interpret potential inequalities in enrollment. Most frequently reported demographic data comprise learners’ educational attainment, representing the ability to achieve success in formal education. In addition, the data contains information on learners’ occupational position, which could represent financial advantages and professional relations. Finally, the geographical location could indicate privileges related to cultural understandings and social surroundings that could advance educational opportunities.

### Educational attainment

Fifteen of the selected studies provided information on the educational attainment of learners. These studies focused on one or multiple MOOCs on four major platforms. One study revealed the overall data of Coursera, currently the largest MOOC platform (Robinson et al., 2015). Table 2 shows an overview of these studies, including the related subject domain of the MOOC, the facilitating university and university ranking, as well as the percentages and absolute numbers of learners with a bachelor's degree or higher.

Table 2. Selected case studies, MOOC characteristics and learner data

Article	Field of study	University	QS World Ranking (2015)	bachelor's degree or higher %	Respondents with bachelor or higher / All respondents
Alcorn et al. (2015)	All courses	University of Pennsylvania	18	82.1%	122,239/148,955
Banerjee & Duflo (2014)	Economics	MIT	1	82.0%	3,772/4,600
Belanger & Thornton (2013)	Bio-electricity	Duke University	29	72.0%	2,575/3,576
Christensen et al. (2013)	Multiple	University of Pennsylvania	18	79.4%	27,630/34,799
DeBoer et al. (2013)	Electronics	MIT	1	70.9%	2,138/3,014
Dillahunt et al. (2014)	Multiple	University of Michigan	30	80.0%	33,366/41,709
Gillani & Eynon (2014)	Business Strategy	<i>ns</i>	<i>ns</i>	81.9%	6,009/7,337
Goldberg et al. (2015)	Understanding Dementia	University of Tasmania	379	51.0%	2,637/5,168
Greene et al. (2015)	Metadata	University of North Carolina	79	81.0%	4,298/5,306
Guo & Reinecke (2014)	Multiple	MIT, Harvard & Berkeley	1, 2, 26	78.2%	86,191/110,162
Liyanagunawardena et al. (2015)	Programming	University of Reading	156	69.9%	4,377/6,263
Robinson et al. (2015)	GiS	Penn State University	101	84.1%	6,350/7,551
	<i>Coursera average</i>			75.8%	
Schmid et al. (2015)	Several	Duke University	29	67%	18,719/27,939
Sánchez-Vera et al. (2014)	Web Science	University of Southampton	81	43.0%	345/802
Total				78.7%	320,646/407,183

Note. *ns* = not stated.

Table 2 shows that, in all studied MOOCs, there was an evident majority of highly educated learners. However, the figures are mainly based on samples with a high level of survey non-response. One study explicitly discussed the large probability for non-response bias (Salmon, Gregory, Lokuge Dona, & Ross, 2015) and was therefore excluded from the analysis. Still, we should interpret the remaining figures as approximations for the actual proportions, keeping in mind the potential bias.

Moreover, as the figures vary somewhat among MOOCs, it could be that particular characteristics of MOOCs could attract or serve underprivileged learners. Withal, the two MOOCs with the lowest proportion of well-educated learners (Goldberg et al., 2015; Sánchez-Vera, León-Urrutia, & Davis, 2014) shared one specific characteristic: They both accommodated their instructional design to the needs of less experienced learners. The Understanding Dementia MOOC, for example, allowed learners to study at a flexible pace and to retake the exams as many times as they would like in order to accommodate learners with different levels of prior understandings and skills (Goldberg et al., 2015). The Web Science MOOC mainly considered the understandability of the reading material for non-native speakers and learners without an academic background (Sánchez-Vera et al., 2014). The fact that these two MOOCs specifically considered the non-academic audience

in their instructions could have had a positive effect on the proportion of less educated learners enrolled in these MOOCs. Nevertheless, as these are only exemplary cases for today's large supply of MOOCs, these explanations are limited to serve as suggestions.

### Occupational position

The occupational position of MOOC learners has been the focus of ten selected studies. Table 3 provides an overview of the articles, the reported formal employment rates, industries of employment and the total amount of respondents. Two articles (Liu et al., 2014; Liu, Kang, & McKelroy, 2015) focused on the same MOOC, yet a different cohort of learners. Again, these learner demographics are potentially biased due to selective response to the surveys.

Table 3. Overview of articles, employment rates and respondent rates

Article	% Employed	% Student	% Retired	% Unemployed	Industries of employment	Respondents
Alcorn et al. (2015)	72.1%	32.1%	<i>ns</i>	20.5%	ICT (22%) Business (14.6%) Management (7.9%)	148,955
Christensen et al. (2013)	69.3%	17.4%	6.8%	6.6%	<i>ns</i>	34,799
Greene et al. (2015)	68.0%	29.0%	<i>ns</i>	<i>ns</i>	<i>ns</i>	5,306
Liu et al. (2014)	84.0%	10.0%	1.0%	<i>ns</i>	<i>ns</i>	409
Liu et al. (2015)	83.0%	12.0%	<i>ns</i>	<i>ns</i>	Journalism (30%) ICT (18%) Education (10%) Business (7%)	320
Robinson et al. (2015)	74.9%	<i>ns</i>	3.8%	18.6%	ICT (32.8%) Education (14.2%) Business (7.5%) Management (4.3%)	7,551
Schmid et al. (2015)	57.3%	<i>ns</i>	<i>ns</i>	12.0%		27,939
Coursera's average	73.3%	<i>ns</i>	4.9%	18.0%	ICT (25.2%) Education (16.6%) Business (9.8%) Management (5.1%)	<i>ns</i>
Total	69.9%					225,279

Note. *ns* = not stated.

Table 3 shows that the majority of MOOC learners in these studies was employed and that the employed learners most frequently held an occupation in ICT, education, business, management and journalism. Moreover, it demonstrates a substantial proportion of formal students and smaller proportions of retirees. As this illustrates that a large part of the learners has or has had access to formal education, have challenging jobs or are not compelled to work, it seems that a large proportion of the learners is from a privileged background. However, Table 3 also demonstrates unemployment rates that vary from marginal to substantial. This could be due to the fact that some studies included students and retirees in the "unemployed" category. Moreover, there could be a discrepancy between the unemployed population and the population that is actually looking for a job (Alcorn et al., 2015). A more systematic use of specified categories (e.g., "student," "retired," "unemployed and looking for a job" and "unemployed and not looking for a job") might have supported the interpretation of the relative privilege of learners.

### Geographical location

Of all selected articles, fourteen provided information on the geographical location of MOOC learners. Coverage and reliability of these data are superior to other indicators, since the geographical location of learners can be obtained through IP addresses and is therefore more resistant to non-response bias. However, the reports on learners' geographical location within the selected studies were barely exhaustive. Some studies only reported the proportion of MOOC enrollees for one country or merely reported absolute numbers without a reference group (Belanger & Thornton, 2013; DeBoer, Stump, Seaton, & Breslow, 2013; Sánchez-Vera et al., 2014). The remaining studies reported proportions for the top few countries, ranging from three (Dillahunt, Wang, & Teasley, 2014) to eleven (Robinson et al., 2015). Table 4 provides proportions of MOOC learners compared to their proportion in the world population among the most frequently reported countries.

Table 4. Estimated proportion of learners per country in comparison to world population

Article	Developed nations <sup>a</sup>	Less developed nations <sup>a</sup>	U.S.A.	India	U.K.	Canada	Brazil	Total Population
Alcorn et al. (2015)	<i>ns</i>	<i>ns</i>	13.2%	5.5%	<i>ns</i>	<i>ns</i>	4.0%	1.7 million
Banarjee & Duflo (2014)	<i>ns</i>	<i>ns</i>	28.0%	10.0%	5.0%	<i>ns</i>	3%	4,600
Christensen et al. (2013)	67.0%	33.0%	33.9%	7.3%	3.9%	3.4%	4.4%	34,779
Dillahunt et al. (2014)	<i>ns</i>	<i>ns</i>	28.7%	7.8%	4.5%	<i>ns</i>	<i>ns</i>	37,148
Diver & Martinez (2015)	<i>ns</i>	<i>ns</i>	20.4%	7.3%	<i>ns</i>	<i>ns</i>	3.6%	11,183
Gillani & Eynon (2014)	62.0%	38.0%	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>	3,631
Greene et al. (2015)	72.0%	28.0%	36.0%	8.0%	4.0%	4.0%	3.0%	3,875
Guo & Reinecke (2014)	<i>ns</i>	<i>ns</i>	20.9%	12.9%	6.2%	<i>ns</i>	<i>ns</i>	110,162
Impey et al. (2015)	<i>ns</i>	<i>ns</i>	45.0%	5.0%	6.2%	4.7%	1.5%	1,991
Liu et al. (2014)	<i>ns</i>	<i>ns</i>	44.0%	<i>ns</i>	5.0%	4.0%	3.0%	409
Liu et al. (2015)	<i>ns</i>	<i>ns</i>	30.0%	3.0%	<i>ns</i>	5.0%	4.0%	320
Robinson et al. (2015)	<i>ns</i>	<i>ns</i>	30.4%	5.7%	3.5%	3.6%	3.1%	7,551
<i>Coursera average</i>	<i>ns</i>	<i>ns</i>	27.7%	5.6%	3.6%	3.7%	4.7%	
Total World Population <sup>a</sup>	17%	83%	4.4%	17.8%	0.8%	<i>ns</i>	2.7%	7,349 million

Note. *ns* = not stated. <sup>a</sup> = The definition of developed nations and the estimation of their proportions in the total world population is based on data of the United Nations (2015).

Table 4 illustrates that MOOC learners from developing countries take up a small share of the MOOC population compared to their share in the world population, whereas U.S. learners comprised an unrepresentative large proportion of the MOOC population. Possible explanations for this inequal distribution, is that learners appear to be mainly attracted to MOOCs that originate from their own country (Sánchez-Vera et al., 2014), are in their native language (Impey, Wenger, & Austin, 2015) or apply cultural customs that conform to their norms (Liyanagunawardena et al., 2013b). Therefore, MOOC courses and platforms outside of the Western paradigm might serve learners from other regions, like Rwaq for Arabic populations (MacLeod, Haywood, Woodgate, & Alkhatnai, 2015) and Swayam for Indian populations (Alcorn et al., 2015). And although a notable proportion of the MOOC population is from the developing world, 22 to 38 percent, it is also noticed that the majority MOOC learners from developing countries is highly educated (Alcorn et al., 2015; Christensen et al., 2013). This reiteratively underscores the social inequal distribution of MOOC participation. In addition, it raises questions on the purpose of MOOCs as an alternative for higher education, as it is mainly used as an addition to formal education.



## **Factors contributing to MOOC completion**

Knowledge about the impact of privilege on MOOC completion can also be crucial for understanding the social impact of MOOCs. Although MOOC completion rates generally tend to be very low (Jordan, 2014), it might be that privileged learners have better opportunities to successfully complete a MOOC than underprivileged. The selected studies discussed two factors that are related to privilege: educational attainment and skills and knowledge.

### *Educational attainment*

Six selected articles have addressed the potential relationship between educational attainment and MOOC completion. These studies have not shown one consistent outcome. Three studies found a positive association between educational attainment and MOOC completion. Although these studies acknowledged multiple predictors for completion, including age, motivation and prior MOOC experience (Engle, Mankoff, & Carbrey, 2015; Greene et al., 2015; Guo & Reinecke, 2014), the relative significance of educational attainment remained unclear. Two studies indicated that, whereas completion was generally higher among those with higher levels of educational attainment, there were also substantial proportions of less educated learners who received a certificate with an excellent evaluation (DeBoer et al., 2013; Dillahunt et al., 2014). Furthermore, there was one study that denied the association between educational attainment and completion (Goldberg et al., 2015). These findings can be explained by the instructional design that allowed more time, flexibility and more opportunities to retake the exams (Goldberg et al., 2015). Even though these studies are not exhaustive, have made use of specific methodological designs or focused on specific MOOCs, it shows that educational attainment does not have to determine MOOC completion.

### *Skills and knowledge*

Six of the selected articles discussed skills and knowledge as potential predictors for MOOC completion. Three studies indicated that subject-specific work- or school experience decreased the likelihood of drop out, increased the likelihood of passing exams and even increased grades (Engle et al., 2015; Greene et al., 2015; Masanet, Chang, Yao, Briam, & Huang, 2014). These quantitative findings were supported by qualitative studies on learners' experiences. These indicated that shortfalls in knowledge could cause feelings of panic or incompetency among learners, making drop out more likely (Belanger & Thornton, 2013; Park, Jung, & Reeves, 2015). In addition, English proficiency appeared to explain successful MOOC completion (Banerjee & Duflo, 2014; Engle et al., 2015). One study also illustrated that US learners had significantly higher grades and needed less time to watch video lectures (Diver & Martinez, 2015). In turn, non-native speakers seemed to experience less confidence in their ability to pass assignments and exams in MOOCs (Park et al., 2015). Even though these findings imply that native or proficient English speakers might experience fewer barriers in successful MOOC completion, there is an increasing amount of MOOCs in alternative languages (Shah, 2014). Therefore, conclusions on the opportunities for non-native speakers can only be given after extensive comparisons with MOOCs in alternative languages.

## **Conclusion**

This systematic review examined empirical literature to congregate knowledge on MOOCs and to what extent they are able to reach and serve underprivileged learners better than formal higher education. The relative impact of MOOCs is evaluated against theoretical understandings of social reproduction in education (Bourdieu, 1973; 1986). As it is the first review to systematically assess MOOC studies on their reports of social inequalities, the findings have social as well as methodological implications.

The literature substantiated that there are fewer barriers to MOOCs than to higher education. Still, the remaining barriers seem to specifically hamper access for underprivileged populations. Especially for individuals with little resources or in remote areas in developing countries, the necessity Internet access or additional expenses could obstruct their participation in MOOCs. In addition, confusing indications about prerequisite knowledge could hamper the MOOC enrollment for those with little educational experience. Even though MOOCs require less financial investment or social and cultural proximity to higher education institutions, the results show that individuals with little financial resources or in less culturally or socially dominant contexts experience evident barriers towards MOOC participation.

Reported demographic data of learners showed that the majority of the MOOC learners is well educated. Moreover, a large proportion is employed in challenging sectors and an unrepresentative large share is from developed countries. It is suggested that the instructional design, the language of instruction or the cultural origin of the facilitator could play a role in the demographic composition of the MOOC population. Still, as the average level of educational attainment among MOOC learners is high, the findings articulate that those who experience or have experienced privileges in formal education are overrepresented in MOOCs. Moreover, professional relations and the cultural background could function as privileges in MOOC participation.

Finally, the results showed that prior skills and knowledge, as a form of cultural capital, could be explanatory for the completion of MOOCs. There have been mixed outcomes, however, with regards to the impact of educational attainment on completion. Although there is evidence to suggest that educational background influences MOOC completion, several studies nuanced this conclusion. This leads to the implication that certain social privileges might help in MOOC completion, yet that underprivileged learners can still be successful in MOOCs.

### **Strengths and limitations**

This review has been able to discuss diverse manifestations of social inequalities in MOOCs, as it focused on formal barriers, enrollment and completion. Moreover, the review encompassed studies from different academic traditions, indicating diverse issues on a large variety of MOOCs. Therefore, this review has been able to apply a relevant degree of nuance in its conclusions.

However, the scope of this review is not exhaustive. In order to assure relevance, quality and reliability of the examined studies, literature was selected from three academic databases using specific search terms and search filters. Still, some potentially relevant sources of literature might have been missed. There were at least some indications that the results might not be representative for the total MOOC population, including the lack of publications on MOOCs from smaller or non-Western platforms as well as the low response rates in MOOC surveys. Therefore, this review holds exploratory value and could serve to inform future research on issues that need to be addressed in order to enhance knowledge on social inequalities in MOOCs. To remind the audience of these restraints in the conclusions, these limitations were considered in the interpretations of the findings. A final limitation of this review is that only a selection of variables was examined, as the empirical studies provided limited information on income, parental education, ethnicity of learners or other socially relevant factors. To be able to examine the effects of these variables on enrollment or completion, more data on these characteristics of MOOC learners is needed.

### **Suggestions for future research**

The limitations that were encountered within this review evoke suggestions for future research. As it appeared that most empirical studies on MOOCs rely on surveys with low response rates and with unclear indications of their representativeness, more research is needed in order to make valid generalizations. Consequently, future research could examine strategies to improve knowledge on learner characteristics. For example, researchers could experiment with different surveys modes to examine how this could affect response and representativeness of samples. Furthermore, this review demonstrated a lack of empirical studies on MOOCs on smaller or non-Western based platforms. As these might have other implications for social equality, it is very important that a larger variety of MOOCs will be studied. Specific aspects of concern are the effects of the instructional design or the language of instruction on the learning progress of underprivileged learners. One possibility is to examine whether multilingual platforms can reduce existing inequalities in participation and completion rates (see also Van Laere, Agirdag, & van Braak, 2016). This could yield guidelines for new MOOCs that specifically aim to serve all types of learners. And because the purpose of MOOCs is to increase and enable access to higher education for all people in the world, MOOCs should be responsive to the needs and capabilities of the general global population. In this way, MOOCs might truly enrich the world, and not only the rich.

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