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## To MOOC or Not To MOOC: A Review of Strategies to Manage High Attrition in MOOC Participation

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# **To MOOC or Not To MOOC: A Review of Strategies to Manage High Attrition in MOOC Participation**

## **ABSTRACT**

Massive Open Online Courses (MOOCs) are one of the education trends brought about by the advent in technology in the last ten to fifteen years. Since then, MOOCs have evolved and are currently available through various commercial platforms such as Udacity, Edx and Coursera, and are offered by several leading educational institutions, including the National University of Singapore (NUS). Although MOOCs have generally been successful because of their easy accessibility, relevance, flexibility and low cost (if not free), one common criticism is their low completion rates. In this article, we aim to not only consolidate and categorise the different reasons accounting for high MOOC attrition rates, but also propose and discuss strategies and “STEP’s” that policymakers and educators may consider when they develop their MOOCs with the intention of stemming MOOC dropout. Our strategies comprises of four discrete steps; namely, ‘*S*upport’, ‘*T*rend’, ‘*E*xpenses’ and ‘*P*ay-Out’, summarised as ‘STEP’. We hope that by implementing these strategies, policymakers and educators can better distinguish between participants who fall out of MOOCs for different reasons.

## INTRODUCTION

Massive Open Online Courses (MOOCs) emerged in the last decade or so as one of the education trends brought about by the advent in technology. From the initial concept developed by George Siemens and Stephen Downes, MOOCs are currently available through various commercial platforms such as Udacity and Coursera, and are offered by many higher education institutions including Harvard, Stanford, MIT and NUS. Although the concept of online courses is not new to educators and learners, what makes MOOCs unique is that most content are freely available and accessible to all (Yuan & Powell, 2013; McAuley, Stewart, Siemens, & Cormier, 2010; Siemens, 2005). Supporters of MOOCs applaud this pedagogical technique as a means to reduce widening education inequalities amongst people from different geographical, educational and economic backgrounds as well as genders (Lane, 2013). When they have access to MOOCs, students in less-developed nations or of lower socio-economic status can enjoy quality education without being hampered by formal entry requirements and costs (Chaturvedi, 2014). MOOCs, as argued by supporters such as service providers, can also be meaningful tools for students who wish to upgrade themselves or explore educational materials outside of their usual classroom curriculum. Students can make use of MOOCs either to complement or supplement their current classroom material to further their understanding of certain subjects. Other recent trends in that direction include the advent of distributed open collaborative courses (DOCCs) and synchronous massive online courses (SMOC). In DOCCs, a number of institutions come together to develop the curriculum. This means that faculty members from multiple institutions can work together to teach a course. The advantage of DOCCs is that they may help stem the high dropout rate of MOOC participants by offering more diverse ways of learning the content. However, developing a DOCC presents some challenges. For one thing, it can be tedious to build a strong collaborative environment. Participants may also feel a lack of synchrony among different lecturers and teaching materials. Meanwhile, SMOCs are not too different from MOOCs wherein faculty members broadcast their lectures “live”. The rationale for this approach is to encourage greater student commitment as participants have to pay registration fees and attend the online lesson at specific times on specific days of the week. There is also the use of technology to facilitate rapid classroom response, i.e. students can send questions while attending the online classes, and the lecturers can address their questions to the whole class immediately, which can benefit the rest too.

However, not everyone is supportive of MOOCs. Amongst the criticisms levelled against such courses are observations that faculty expend so much time and effort developing their MOOCs that they risk neglecting other aspects of their jobs (Kolowich, 2013) and that the nature of the platform places

unrealistic expectations such as expecting mastery of the content taught even for beginner-level students. Perhaps the greatest concern of all is that some policymakers and educators are struggling to understand the low completion rates of MOOCs, although there are educators who argue that this phenomenon rather demonstrates a positive sign that students are exploring MOOCs (Clow, 2013). One of key reasons identified for the low completion rates include poor design of MOOCs which do not provide a constructive learning environment for participants. Other contributing factors include users' tendency to exploit free education, the absence of pedagogy for educators and the phenomenon where unprepared universities join the MOOC movement for fear of falling behind their competing universities (Lewin, 2012).

In this article, we aim to consolidate and categorise the different reasons accounting for the high dropout rates for MOOCs. Leveraging on the literature search method of Liyanagunawardena *et al.* (2013) and Gao *et al.* (2012), relevant literature was first sought from published papers and conference proceedings through Google Scholar using the search terms "MOOC" and "massive(ly) open online course". Google Scholar is the preferred search engine due to the high returns of related content as compared to academic databases such as JSTOR (Liyanagunawardena *et al.* 2013). Also, taking into account the limited number of published findings, news articles from established agencies and contributions from MOOC educators (we only managed to retrieve 5 articles) were also cited. All the cited articles were published between 2005 (when MOOCs were initially conceptualised) and 2014. Based on the literature review, we propose strategies that policymakers and educators may consider to sustain learner's interest when they develop their MOOCs.

## **MAKING SENSE OF HIGH DROPOUT RATES FOR MOOCS**

### ***Evidence from the literature***

Different models have been proposed to understand the high dropout rates for MOOCs. Clow (2013) used the 'funnel of participation' model<sup>1</sup> to characterise the pattern of attrition in MOOCs. The model is inspired by the 'marketing funnel', which is used widely in marketing and sales. Clow (2013) asserts that the model can be applied to three different sets of MOOC data and has two key features, namely a steep drop-off from one stage to the next, and highly unequal patterns of activity distribution. This model, however, does not

take into account the type of MOOCs that have the most appeal to students and what happens beyond the ‘progress’ stage that can affect the dropout rate. Balakrishna and Coetzee (2013) used the hidden Markov model to predict student retention in MOOCs with accuracy levels of more than 80%. The model made use of information such as the number of discussion threads created and viewed on the forum in order to understand and infer whether students are ‘in’ or ‘out’ of the MOOC. Nonetheless, this correlational model does not cover everything, such as the changing behaviour of MOOC participants over time, where the state of ‘in/out’ might not be that clearly defined.

Other authors sought to understand participants’ behaviour in terms of their commitment to MOOCs. For instance, Huang, Piech, Nguyen, and Guibas (2013) sought to understand participants’ commitment to MOOCs via the functional and syntax similarities in their submission behaviours. Yang, Sinha, Adamson, and Rosé (2013) argued that the learning environment plays a crucial role in influencing students’ commitment to MOOCs. They proposed the survival model to analyse student behaviour and social positioning within discussion forums (Yang *et al.*, 2013) and analysed thread starters, post length and content length to create a regression model to predict students’ survival (i.e. whether they will continue participating in a course) over time. Ho *et al.* (2014) presented their analyses on the dropout rates for HarvardX and MITx courses by classifying MOOC participants into 4 main categories which are. “only registered”, “only viewed”, “only explored” and “certified”. However, their classification of ‘certified’ did not take into account the assignment completion rates of its participants; in fact, it was based on whether the users had accessed to more than half of the online video lectures and completed appropriate assignments.

### ***Analysing engagement levels of MOOC participants***

Kizilcec, Piech, and Schneider (2013) examined the engagement levels and learning patterns of students who participated in an undergraduate level MOOC. They recognised the challenges of a uniform and monolithic view of ‘non-completers’ and sought to classify the students into different categories—completing, disengaging, auditing and sampling<sup>2</sup>. Their approach took into account MOOC participants who might join online courses with no intention of completion and to view only selected video lectures that were relevant to them.

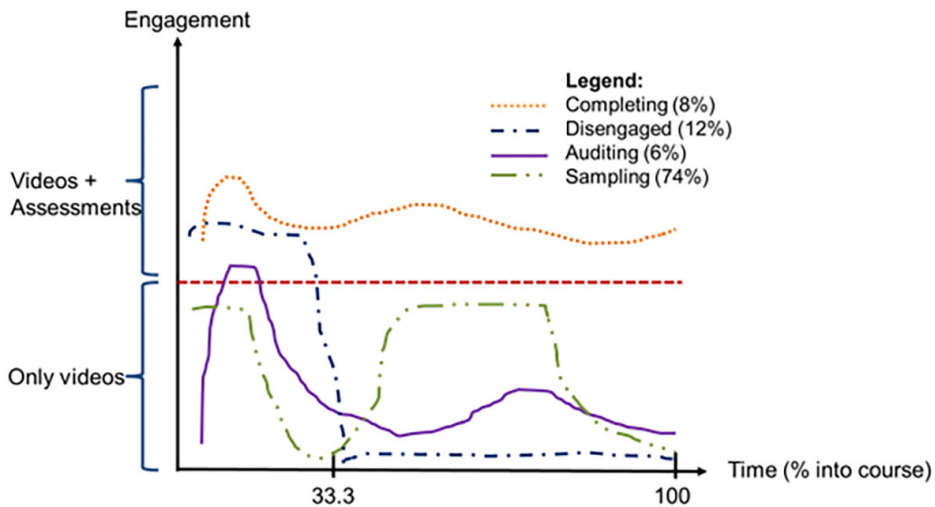


Figure 1. Engagement levels of different types of MOOC learners (adapted from Kizilcec *et al.*, 2013).

Kizilcec and his colleagues assumed that learners with higher levels of engagement would have completed both the video lectures and assessments in the MOOC, and logically they would attempt the assessments after viewing the videos. According to Figure 1, participants in the ‘completing’ category (about 8%) completed most of the assessments and their engagement levels fell within the ‘video + assessment’ region. Meanwhile, participants in the ‘disengaged’ category (about 12%) did assessments at the start of the course, usually sitting through one-third through the course before disappearing. Participants in the ‘auditing’ category (about 6%) mainly watched the video lectures and did the assessments infrequently or not at all. These learners might have attempted some assessments at the start of the course but engagement levels were mostly in the ‘only videos’ region. Finally, students in the ‘sampling’ category (about 74%) participated in the MOOC by watching selected videos only. Their engagement levels fell completely within the ‘only videos’ region as they did not attempt any assessments.

## STRATEGIES TO DECREASE ATTRITION

Published reports have shown that only about 10% of the total number of registrants complete MOOCs (LeClaire & Ferrer, 2014). We should be aware that high MOOC dropouts should be measured in the context of students’ original intent of joining the MOOC and to consider that many MOOC participants may want to try out educational resources that interest them. Nonetheless, these dropouts may also include motivated students who decided to leave due to poor pedagogy or engagement from the teaching faculty, lack of

time, changed priorities and commitments etc. This review aims to summarize the reasons leading to committed students dropping out of MOOCs and some of the measures to stem the high attrition rate. Our strategies comprises of four discrete steps; namely—‘Support’, ‘Trend’, ‘Expenses’ and ‘Pay-Out’, summarised as ‘*STEP*’.

- **Support** refers to educators building a constructive and conducive learning environment where MOOC participants are motivated to learn and able to receive academic assistance when they need it.
- **Trend** refers to developing a greater understanding of the MOOC and attempting to decipher those trends.
- **Expenses** refer to determining a suitable pricing model to boost participants’ commitment to MOOCs. The prices may to minimal so as to deter the non-committed students but at the same time not prevent the genuinely committed students. The price can also be monetary or non-monetary such as placing limits on the number of MOOCs that non-committed students can register for at a time.
- **Pay-Out** refers to the benefits that MOOC participants can gain out of their MOOC experience. Educators can provide students with more than just educational opportunities; these provisions can extend to “pay-outs” such as job opportunities, letters of recommendation, or the opportunity to feature their status as volunteer Mentors or Teaching Assistants.

We believe that with the STEP strategies, educators and policymakers can design better MOOCs to minimise high dropout rates.

### *Support*

Students who have signed up for MOOCs and expect the same level of teaching-related support they would receive in a traditional classroom may be discouraged from sustained engagement when they do not receive such support online (Mackness, Mak, & Williams, 2010). Traditional learning institutions such as schools construct learning environment by facilitating structured, closed-group classroom discussions and other face-to-face activities including consultation with teachers which help students become familiarise with the pace and rigour of higher education learning. However, in MOOCs, such support mechanism are uncommon or largely absent due to the large number of students from diverse geographical locations and the difficulty of coordinating such discussions (Sadigh, Seshia, & Gupta, 2012).

To enhance the student learning experience and attain the MOOC learning outcomes institutions providing MOOCs may consider creating moderated discussion forums (Boyatt, Joy, Rocks, & Sinclair, 2013) or blogs that facilitate

accurate and relevant academic discussions among students and serve as online consultation platforms with the professors (Siemens, 2013; Mak, Williams, & Mackness, 2010). Besides the discussion forums, the online learning portals may also function as a site for students to seek like-minded peers to form study groups in order to encourage one another to complete the course. Moderation in these discussion groups is also crucial to provide students with equal opportunities to share their views and prevent the discussion from being swayed by dominant speakers (Salmon, 2004; Mackness *et al.*, 2010). Students who contribute actively to forums may be rewarded by displaying their participation rates on their course completion certificates (Kraut *et al.*, 2012) or even in grade assignments such as having participation as part of the grade. Secondly, educators can support students taking their MOOCs through checklists and reminders (Levy, 2011). These reminders may be on course expectations, assignment deadlines and can even extend to motivational messages from the professors. A study by Cavanaugh, Lamkin, and Hu (2012) has shown that having a checklist and email reminder system in one's online course can provide a great boost to students' academic progress. Such support is extremely important because MOOC students may lack the foundational knowledge and skills to fully internalise all the MOOC materials. To fully engage students through the course, support from the administrative, teaching and student community is important. Downes and other educators have also challenged the notion that MOOCs are meant to provide education equitably for all learners and opined that current MOOCs seem to be more appropriate for advanced learners (Meisenhelder, 2013).

### ***Trend***

As the MOOC is a relatively new pedagogical approach, there are still many unknowns when it comes to gathering insights on how participation in such courses informs students' learning behaviour. This makes it important for educators to collect data and perform the required analytics to understand any trends that may emerge. This might help enhance students' learning experiences through MOOCs and in the long run reduce the high dropout rates. Researchers have identified several interesting trends. For instance, Yang *et al.* (2013) found that a student's time of entry into the MOOC heavily influenced whether he or she would commit to the entire duration of the course. In particular, students who entered late (e.g. more than halfway into the start of the MOOC) seemed to find it more challenging to integrate into that particular learning community and often failed to complete the course. This was observed in a course on 'Bioelectricity' taught by professors at Duke University's (Belanger & Thornton, 2013). Such occurrences suggest the need for educators designing and implementing MOOCs to consider putting in restrictions such as their course enrolment dates no later than one-third into the course. While this



may reduce the absolute number of enrolments to the MOOC, such restrictions may help the teaching/administrative community to better focus on a group of committed students rather than spread their resources too thinly.

Another trend we have observed is that the dropout rates for English-speaking students seemed to be smaller than for students from other non-English speaking countries. This seems contrary to the original intent of the MOOC, which is to provide educational opportunities to those who live in less wired and more remote parts of the world. Some possible reasons for the disproportionate dropout by geography may be due to language barriers that MOOC administrators need to overcome (Gaebel, 2013). Nonetheless, improvements to the system such as providing users with more diverse language options may be costly unless collaborations can be sought from companies such as Google, which has powerful translation tools. Alternatively, students themselves may volunteer to translate the languages in MOOCs to facilitate learning (Brown, 2013).

In addition, studies have shown that most participants of MOOCs tend to be males from developed countries (Ho *et al.*, 2014; Kizilcec, Piech, & Schneider, 2013). Greater awareness of MOOCs in these countries may be a contributing factor. To expand their reach and ensure all who seek to learn would have the opportunity to do so, administrators of MOOCs may also consider having audio lectures to cater for participants who stay in regions with slow and intermittent Internet access.

### *Expenses*

The costs of higher education have risen substantially, especially in countries such as the United States where many students incur huge debts to fund their college education. Therefore, the free education provided by some MOOCs seems to serve a positive social good. However, the cost involved in developing such extensive and comprehensive educational platforms should be taken into consideration. Both Cusumano (2013) and Mazoue (2013) assert that unless properly managed, the low- to no-cost aspects of online education can be exploited and taken for granted. Therefore, there is a need to strike a balance between ensuring that online education is accessible to as many learners as possible and preventing exploitation by irresponsible users without penalising the committed ones. There are a few suggestions to improve commitment from students without imposing hefty fees. For instance, MOOCs can seek a nominal registration fee from the students which can be pegged to their national GDP. Alternatively, students can put down a small deposit when they sign up for the MOOC and the fees will be forfeited should they choose to withdraw later. While such measures seem to contradict the original intent of

MOOCs, which is to provide free access to education to enhance its quality, the fact is that when users pay a price for a product or service, they tend to value it more. Perhaps the crucial factor to make this measure work is to optimise the mechanism for price setting.

### ***Payout***

Lastly, to reduce dropout rates for MOOC, it is important for the teaching community to reflect on what their online courses can offer the committed and successful MOOC participant. It is a challenge for universities to offer certifications for their MOOCs as they would have to differentiate between their MOOC students who do not pay a single cent when they enroll for the online course, and their matriculated (and fee-paying) students who participate in MOOCs. Besides accreditation, there are other ways universities can help their MOOC students achieve their educational aims. These include writing job/scholarship recommendation letters for top students and inviting potential employers to look at the best online assignments or projects submitted by students. Such measures would motivate participants, especially those who already have degrees, to complete the courses. In other words, higher education institutions need to work out what they can offer, besides educational content, to entice MOOC students to complete the lessons.

Next, it is important to question whether accreditations from MOOC providers are valued. Undoubtedly, an accredited degree from Harvard or MIT naturally commands a premium in the marketplace. However, does that hold true for an accredited MOOC certificate? A MOOC certificate is most likely not the same as a university degree due to many factors, one of which is how grades are assigned. In Coursera, peer marking is used for its online courses and this method obliterates professional opinions from submitted assignments (Pappano, 2012). Unethical behaviour such as plagiarism is also a recurring issue and challenge in MOOCs (Boyatt, Joy, Rocks, & Sinclair, 2013). Therefore, MOOC participants need to understand that the certificate they receive when they complete a course is still inherently different from a degree and would not have the same impact in the marketplace. This would better correct the misconceptions MOOC students might harbour, that the certificate they receive upon completing the MOOC is equivalent to a degree.

## CONCLUSION

MOOCs are an evolving phenomenon, offering learners unprecedented access to quality education materials and a diverse range of courses from top higher education institutes without the hassle of physically going to an actual university. Likewise, many universities and educators are keen to offer MOOCs and be part of a platform where their courses could potentially reach a global audience. Nonetheless, it is still too early to determine if MOOCs are able to offer educational opportunities to those who need them the most; people who are economically and socially disadvantaged.

In addition to understanding the benefits of MOOCs, it is equally crucial to understand reasons behind the large dropout rates for many such courses. Most importantly, we need to investigate what causes committed MOOC participants to leave the courses. We have looked at several models which attempt to explain this phenomenon. However, there are inherent limitations in most of them such as the inability to distinguish between the different types of learners who drop out for instance, or taking into account voluntary withdrawals and dropouts due to academic failure (Liyaganawardena, Parslow, & Williams, 2013). Nonetheless, with more data being collected and analysed, an improved and more sophisticated predictive model can be created to better understand and more effectively infer students' learning behaviour in MOOCs. These can be based on their contributions in the discussion forums, video viewing rates as well as scrutinising the percentage of participants who manage to partially or fully complete their assignments. Besides developing models to better understand this phenomenon, it is also crucial to introduce policies to ensure more sustained MOOC participation. Policymakers and educators can consider using the 'Support, Trend, Expenses and Payout' strategies, summarised as STEP, to minimise the high dropout rates for MOOCs. These strategies can help developers of MOOCs to manage their resources more effectively in order to design courses which fulfil the educational aims of truly committed students.

## ENDNOTES

1. The model charts the pattern of attrition in four stages—(I) Awareness (potential learners know about the MOOC); (II) Registration (only a proportion of those who are aware sign up for the MOOC) (III) Activity (a fraction of those who registered will participate in the activities within the MOOC ); (IV) Progress (some of those who did the MOOC activities will make meaningful learning progress).
2. Kizilcec and his colleagues classified MOOC learners as follows—(I) ‘Completing’ (learners who completed most of the assessments offered in the MOOC); (II) ‘Disengaging’ (learners who attempted assessments at the start of the MOOC but whose engagement tapered off towards the end); (III) ‘Auditing’ (learners who did the assessments infrequently and watched most of the video lectures offered in the MOOC); ‘Sampling’ (learners who watched the video lectures for only one or two assessment periods offered by the MOOC).

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