

Why do MOOCs fail on completion Rate? An Analysis of SWAYAM Courses

Gaurav Singh

Assistant Professor, School of Education
Indira Gandhi National Open University, New Delhi
Email: gaurinedu@ignou.ac.in

Abstract

Massive Open Online Courses (MOOCs) have transformed the traditional open and distance learning (ODL) system and bridged the arbitrary distance between face-to-face and ODL in the last decade. Since their starting in 2012 (commonly known as Year of MOOC), MOOCs have gained momentum and attracted millions of learners worldwide, and India is not an exception. SWAYAM (a MOOC platform launched in 2016 by the Government of India) is the most prominent MOOC provider in India. While judging the success of any MOOC, there are two distinct criteria. One is enrollment (massiveness) and another is retention and completion rate (certification ratio). MOOCs offered on SWAYAM are also being judged on these two criteria. The average completion rate is approximately 4.60 percent on SWAYAM. To explore the reasons for the low completion rate, the researcher has collected, and analyzed the perception of 537 dropout learners from two SWAYAM courses and concluded that many learners are dropping out from SWAYAM MOOC because they have never joined the course with the intent of certification. Other important reasons identified in the study are course instructors' failure in sustaining the interest of learners and engaging them in class; non-availability of all modules at the same time; offering the courses in English and not in Hindi or other regional languages; lack of clarity in announcements, longer duration of lectures, and the challenge of sustaining learners' motivation such courses. The researcher has suggested the implications of these findings for course coordinators, host institutions, and policymakers.

Keywords: MOOC, SWAYAM-MOOC, Completion rate, MOOC Dropping out

Background of the Study

Massive Open Online Courses (MOOCs) have gained momentum in the past decade. Around the world, many universities/institutions have offered the MOOC; even The New York Times declared the year 2012 as "Year of MOOC" (Pappano, 2012) because of the hype. The first MOOC was offered in 2008; since then, MOOCs have seen phenomenal growth in the 21st century (Lederman, 2019). As MOOC has become an almost a decade old phenomenon and many big players at the international level and India are

offering thousands of MOOCs every year, this is a time to reflect on some critical issues. One of the most debated issues related to MOOCs is their retention and completion rate. While reviewing various popular MOOCs worldwide, retention and speed of completion have emerged as common issues.

There are two dimensions of looking at the success of any MOOC; one is enrollment, and the other is the rate of completion. Believers of both aspects have their arguments and reasons. MOOCs offered for knowledge

purposes are looked at in terms of enrolment figures. The term “Massive” in MOOC refers to it. A MOOC attracts people. Since starting, the considerable enrollment number has been a key determinant. The MOOC offered by Harvard and the Massachusetts Institute of Technology has attracted around 370,000 students in its first official course (Pappano, (2012). During 2017-19, the online programme offered by National Institution for Open Schooling for untrained in-service teachers through the Indian MOOC platform SWAYAM has attracted nearly 1.4 million learners. “Many students took MOOCs for knowledge or edification, rather than for a credential, (Reich and Ruipérez-Valiente, 2019)”. The statistics available with various MOOC platforms reflect the popularity of MOOCs in terms of numbers (Shah 2020), but some critics do not agree with it. They argue that many platforms do not provide enough learning progress data analytics; therefore, only considering the enrollment is not a good idea.

Reich and Ruipérez-Valiente (2019) show that during five years of MOOCs offered by MIT and Harvard MOOCs, the course completion rate did not increase substantially; instead, it fell. They also highlight that for participants who joined the MOOC from 2013-14 to 2017-18, only 3.13 percent of the participants completed their courses, a decrease of 4 percent compared to the figures from two previous years and a nearly 6 percent decrease from 2014-15. On the Indian MOOC platform SWAYAM, the completion rate is also around 4.61 percent at present. (SWAYAM, April 2021), anyone who starts a MOOC barely completes it (Murrey, 2019). If this is the scenario and worldwide data reflects it, it is urgent to investigate it. While reviewing the articles and reports, the researcher had come across many such instances. The researcher has also offered two MOOC courses on the

SWAYAM platform in which enrolment was 8311 and 2900, respectively, in July 2020 cycle. Still, less than 10 percent of learners have participated in all activities, and less than 3 percent have applied for certification. This decrease in the number of participants completing the course called for an in-depth study to explore the possible reasons for such a low completion rate.

Review of the literature

The researcher has reviewed various articles/researches done on the issue. The review's objectives were to identify the possible reasons identified by other researchers and have an overview of the problem. Huntemann, in a report published by Murrey (2019), hinted that if the learners “struggle on a course section, it might be because the material is not worded clearly ... or videos are too long”. It indicates that issues related to course design are important. The video length is an issue as in many MOOCs, especially being offered on the SWAYAM platform, the video length is about 30 minutes each. As learners in India are not well equipped with ICT learning skills and their attention span is also less, the duration of the video can be an issue. Guest (2019) identified that one way to keep students engaged in the free classes offered by hundreds of universities is to provide a certificate of completion for a fee. He quoted S. Sriram, an Associate Professor of Marketing at the Stephen M. Ross School of Business, according to Sriram, “The act of paying for the certificate and the motivation derived from wanting to earn the certificate leads to a 10 to 12 percent rise in student engagement.” But certification asks for a fee. Sometimes, the cost is too high; it may not be affordable to many learners in India. Waters (2020) found that most people who signed up for any course for free never finished it. According to him, the course completion rates are around 10

percent, though he found that the paid courses had better completion rates. Leonard (2019) believed that though the number of MOOCs has increased, many MOOCs are not fulfilling the promises and completion and retention rates are very low, undermining the hype that MOOCs are for everyone. Newton (2020) has also reported that MOOCs had abysmal completion rates from the start, these courses have attracted tens of thousands of learners, but very few stuck around long.

This does not mean that there was no effort to increase the retention rates. Many course instructors have practised various strategies to increase the retention rate. But all are not successful. A comprehensive study by nine researchers, Kizilceca et al. (2020), found that efforts to put “interventions” at the front of MOOC classes did not boost completion rates, even though the authors had good reason to think they would. They went ahead and commented that MOOCs are mainly the “marketing tools and revenue sources” for “certificate” sellers. Ahearn (2019) reported that only 5 to 15 percent of students earn a certificate in a MOOC. But a contradictory finding was also reported by him about 2U with 88 percent completion rate, Harvard Business School with an 85 percent completion rate, and at Acumen with an 85 percent rate of completion, which was initially only 5 percent, which is a rare phenomenon in online courses and MOOC. He further highlighted his strategies like making students complete an application, imposing a final deadline, availability of learning materials for specific intervals, a series of “live” or synchronous events, integrating Platforms like Facebook Live, Zoom, Slack, and WhatsApp for continuous engagement, etc.

Reports available at class central (Shah, 2020) and other platforms suggest that contrary to the completion rate,

enrollment increases by the day in MOOCs. Every year, thousands of new courses are added on various platforms like Edx, Coursera, SWAYAM, Future learn, Udacity, etc. Analysis of the review gives two apparent signals. One, the low completion rate is a worldwide phenomenon, and two, there are encouraging examples, where efforts are consistently made to increase the completion rate successfully.

Statement of the Research Problem

Outcomes of the review and personal experience of the researcher as course coordinator of two SWAYAM courses has propelled the researcher to conduct a study with the dropout learners of the SWAYAM courses. The researcher has formulated the following research Statement: To study “the reasons for dropping out from the MOOC: Learners’ perception”.

Operational Definitions

- **Dropping out:** In the present context, dropping out means the learners who enrolled themselves in SWAYAM MOOC courses, but did not appear in the term-end examination, i.e., did not apply for the certification.
- **MOOC:** Though MOOC stands for massive open online courses, in the present context, MOOC means two courses offered on the SWAYAM platform by the researcher, i.e., Learning and Teaching and Pedagogy of Science.
- **Learners’ perception:** The learners who have enrolled themselves in the MOOC, but have not completed the course and left it without certification. The reasons enlisted by the learners to leave the course have been considered as learners’ perceptions.

Delimitations of the Study

- The study is delimited to only the learners of two SWAYAM courses, i.e., Learning and Teaching and Pedagogy of Science, in July 2020.
- The exact contact details of the learners were not possible keeping the privacy clause in mind; the sample was taken from informal telegram groups associated with the courses.
- The tool developed for the study was not the standardized one; it was an online tool developed using the Google Form.

Objectives of the Study

- To study the perception of dropout learners towards MOOC completion.
- To analyze the reasons enlisted by the learners for dropping out of a MOOC.

Research Design

The research is a qualitative survey conducted in post-facto settings, i.e., after dropping out from MOOC, learners' perception was collected.

Population and Sample

As already Stated, that study is delimited to the learners enrolled in two SWAYAM MOOCs, i.e., Learning and Teaching and Pedagogy of Science in the July 2020 cycle. The total enrollment in the course "Learning and Teaching" was 8133, and in the course "Pedagogy of Science" was 2990, i.e. total enrollment was 11,123. Only 252 and 128 learners have submitted their final assignment after completing all the tasks. The rest of the learners were considered to drop out. Hence, the population for the study is 10,743. As it was impossible to

use personal contact details available with the course coordinator due to ethical and privacy issues to collect the perception, the telegrams groups were used as the sampling frame. The number of learners in the telegram groups was 2059 and 731 for both courses.

The online tool link was circulated with the learners in these groups, and request reminders were sent five times in a time of 15 days. A total of 537 learners have submitted their responses. These 537 learners may be considered as the sample for the study, from which responses were collected conveniently. The response rate is 19.25 percent.

Tool for the data Collection

The researcher developed an online tool for collecting the data. In the tool, some possible reasons identified by the researcher during the literature review were categorized under the six (06) broad categories, i.e., Course Design, Content and Language, Activity and Quizzes, Lack of Communication, Length and Duration, and Personal Reasons. Under each category, reasons already identified were listed, and learners were asked to identify the causes most suited to them for leaving the course in-between. With already listed reasons, learners were also asked to identify/give the grounds, that they found suitable, but is/are not listed in the tool.

The content validity of the tool was established by a review of the tool by experts, i.e., expert validity. Being a qualitative tool, there was no definite answer of any items; hence, the reliability was not established in any numerical value.

All the reasons given by the learners were collected; their frequencies and percentages were calculated to analyze the data.

Analysis and Interpretation of the Data

- **Reasons for enrolling in the courses**

The first item of the tool was

framed to find out why the learners preferred to enrol in the course. The six pre-identified reasons were given in the choice with an open-ended option under any other reason. The findings are tabulated as below:

Table-1: Reasons for attending the Course

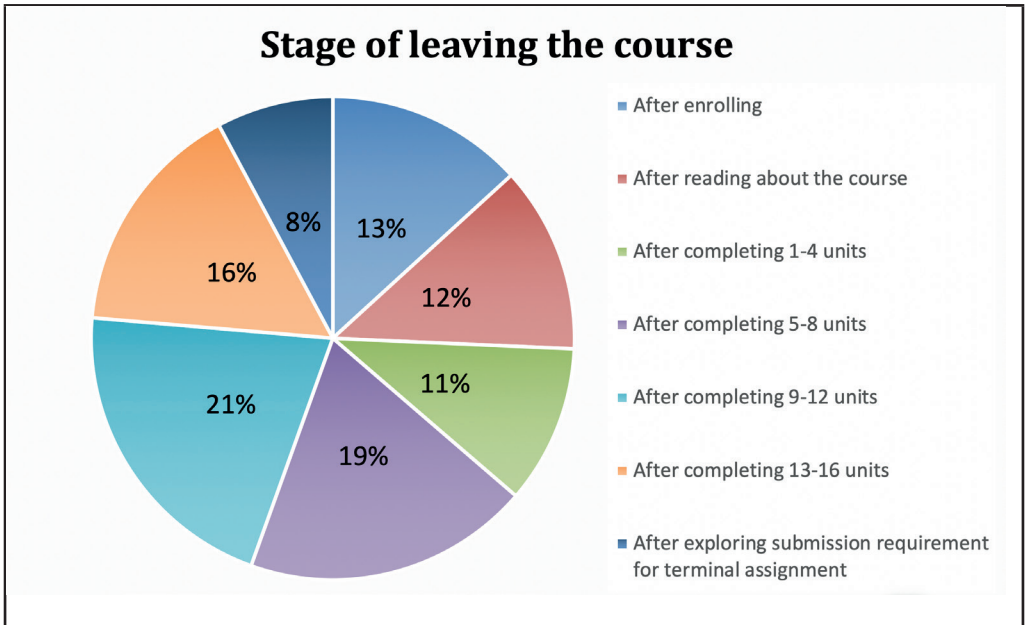
Reasons for attending the Course	N	Percentage
Interest in the Topic	34	6.33
Just for knowing about the SWAYAM platform	26	4.84
Excited to do a MOOC course	31	5.77
Earning certificate for Professional Development	12	2.23
Exploring the modules	63	11.73
Understanding about design and development of MOOC	27	5.03
Any Other reason: Part of B.Ed. Curriculum	201	37.43
Any Other reason: Preparing for competitive Examination	143	26.63

As shown in table 1, 37.43 percent of the learners have joined the course, because it was part of their degree programme, i.e., part of B. Ed, the curriculum at their university. But surprisingly, the second largest group was those learners preparing for any competitive examination like TET, which stands at 26.63 percent. The third important reason was that 11.73 percent of learners were only exploring the modules, which meant content exploration was their key motive, not the completion or certification. Though there were other reasons, these three are found as the most important reason for enrolling in the programme.

- **The stage of leaving the course**

The second item in the tool was related to the stage at which they have left the course. Though the modules were 16 weeks, the long curriculum is distinctly divided into four major areas, having 16 weekly modules. Hence, only seven options were given to the learners, i.e., after enrolling, after reading about the course, after completing 1-4 units, after completing 5-8 units, after completing 9-12 units, after completing 13-16 units and after exploring submission requirements for the terminal assignment. Responses have been shown in the graph below:

Figure-1: The stage of leaving the course



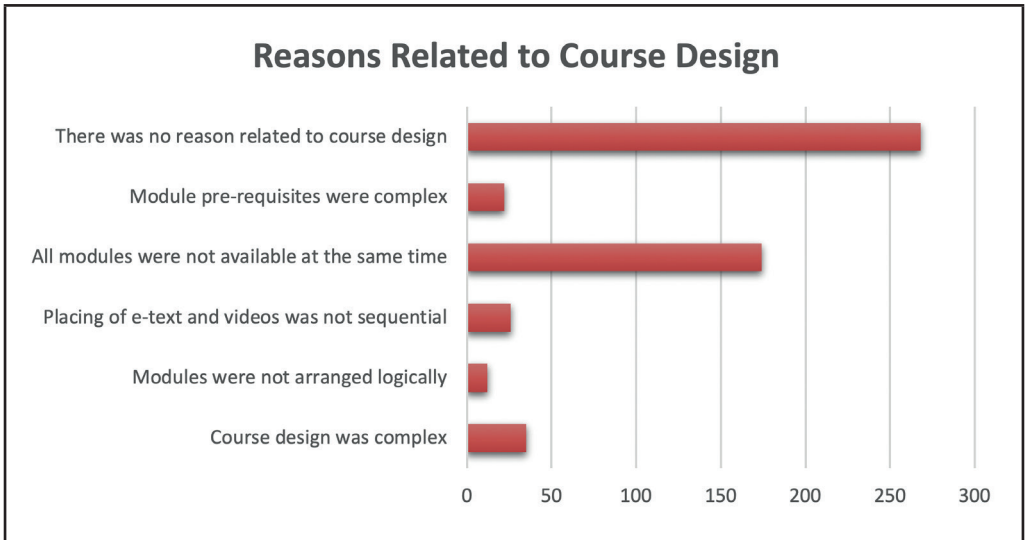
From figure 1, it is evident that most learners have left the course in middle sections, i.e., 21 percent after completing 9-12 units and 19 percent after finishing 5-8 units. But an important number of learners have left the course even after going through only 1-4 units, i.e., 16 percent. Only 8 percent of learners have reported leaving the course after going through the submission requirements of terminal assignments. The data is so distributed on this aspect that conclusive reasons cannot be extracted.

- **Reasons for leaving the course**

- **Course Design:** The first dimension of the study to identify the reasons for leaving the course was related to "course design." Total five options were given to learners in this section. One additional option was given if

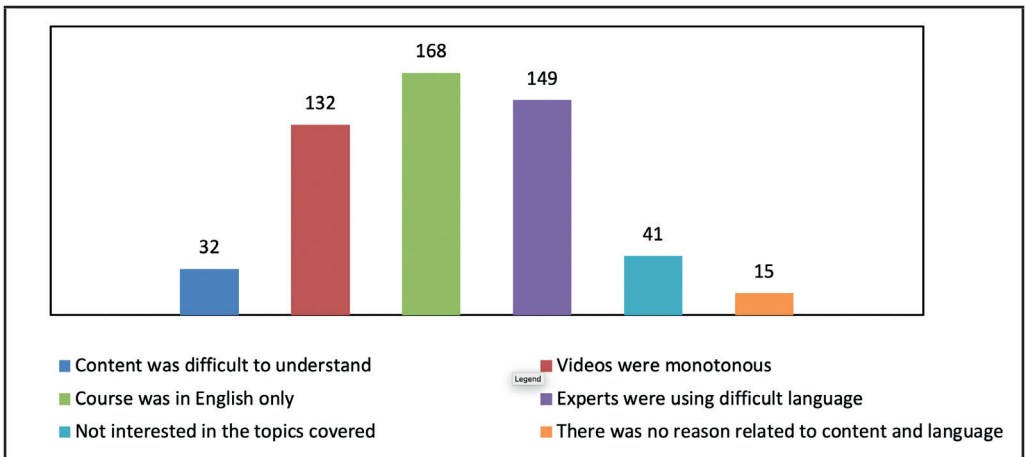
the learner did not find any reason for course design. As shown in figure 2, the analysis reflects that for 49.91 percent of learners, there was no reason related to course design, which has prompted them to leave the course in between. However, 32.4 percent of learners have cited why all modules were not available simultaneously. This observation is in tune with the finding that nearly 26.63 percent of learners have joined the course to prepare for competitive examinations. They may be looking to get all content in one go. But, as these were 16 weeks long MOOCs, modules were released weekly as per the schedule. Other reasons were not important in this section as only 6.52 percent of learners found the course design complex.

Figure-2: Reasons Related to Course Design



- **Content and Language:** the second dimension of the study was to find out reasons related to content and language. The researcher has enlisted five reasons in this section with one option “no reason related to content and design”. The finding of the section is as follows:

Figure-3: Reasons related to the Content and Language



Graphs in figure 3 indicate that the most important reason related to content and language was that the content of the course was in the English language only. About 31.28 percent of learners have cited this as one of the reasons to leave the course. The second preferred reason was also related to language,

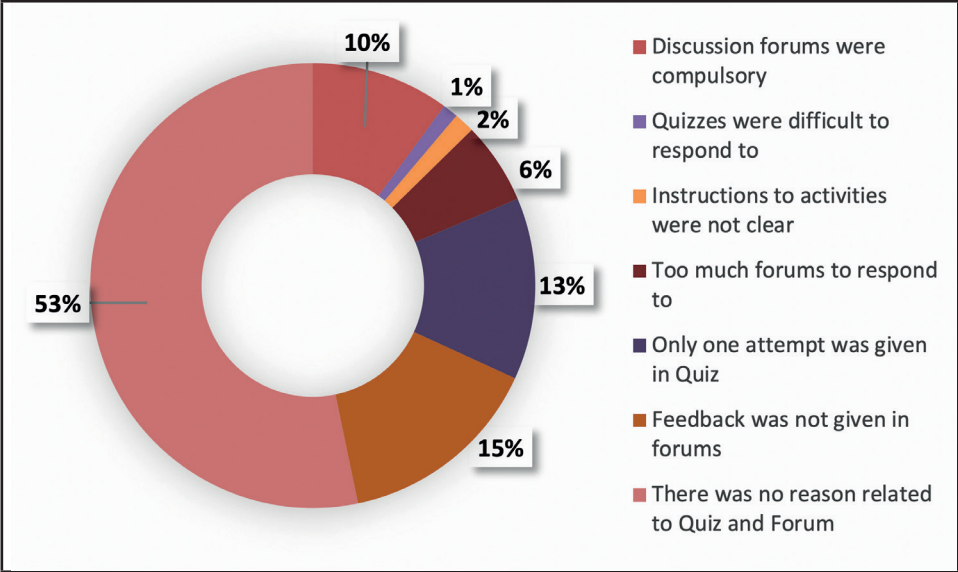
i.e., the language used by experts in the video was not easily understandable to 27.75 percent of the learners. The third important reason was the learners' monotonous videos (24.58 percent). This is well accepted and valid as most of the videos are talking heads without much interactivity. This sometimes makes

the video boring, and learners prefer to read the content despite watching the videos. The important finding can be concluded from this section that, in total, 97.21 percent of learners have cited at least one reason related to content and language, and most of these are associated with language. This reflects that course coordinators should look seriously at the language used in videos, and text should be compatible with the learners’ linguistic abilities.

- **Quizzes and Forums:** like most MOOCs, SWAYAM MOOCs also have two essential quadrants for continuous assessment and interaction, i.e., module end quizzes and discussion forums. Generally, after each module, a module end quiz is given to learners to respond; the

instructors post a discussion forum question for discussion, interaction (peer-to-peer and teacher-learner, both). In both the MOOCs, these components were given with every module. The researcher tries to find out if there is any reason related to these components that triggered the dropping out. The response on this aspect was collected with the help of six items, i.e., discussion forums were compulsory, quizzes were challenging to respond to, instructions to activities were not clear, too many forums to respond to, only one attempt was given in quiz, feedback was not given in forums along with an item that there was no reason associated with quiz and forum. The findings have been shown in the following pie-chart:

Figure-4: Reasons related to Quizzes and Forums



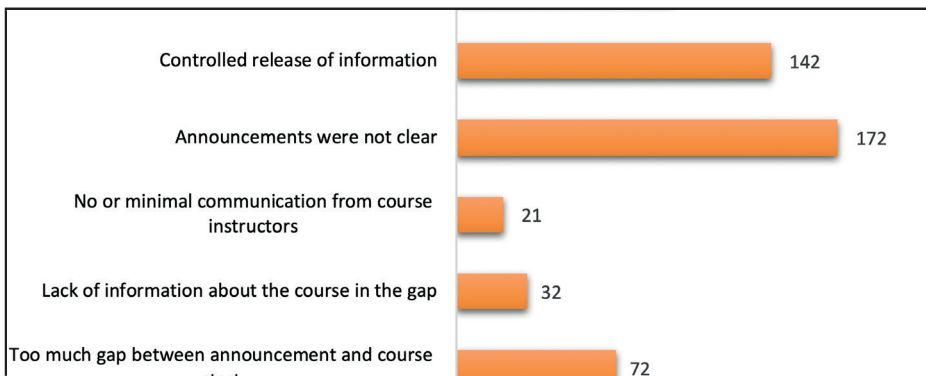
The pie-chart responses indicate that around 53 percent of the learners did not consider any reason related to quizzes and forums for dropping out from MOOC. Though, a few have reported some issues associated with these two aspects like for around 15 percent of learners, feedback not given

on the forum posts was a reason; for 13 percent, only one attempt was given in the quiz was a matter of concern. For nearly 10 percent, compulsory discussion forums were the issue. These three indicators are also essential and can be used in subsequent cycles for improvement.

- **Communication with learners:** In any long-duration MOOC, continuous communication with learners is a key consideration. In SWAYAM MOOC, announcements are the main communication tools. Though discussion forums are also there to maintain two-way communication, the communication through discussion forums is mainly academic, and most of the time, it is related to the content. The researcher also used a parallel

medium of communication in the Telegram Channel. Still, all learners have not joined the channels, as it was officially integrated with the SWAYAM platform. The researcher asked the learners about issues related to communication with the help of five items, along with an article citing no reason related to communication is an issue. Outcomes on this dimension as presented graphically as under:

Figure-5: Reasons related to communication with the Learners

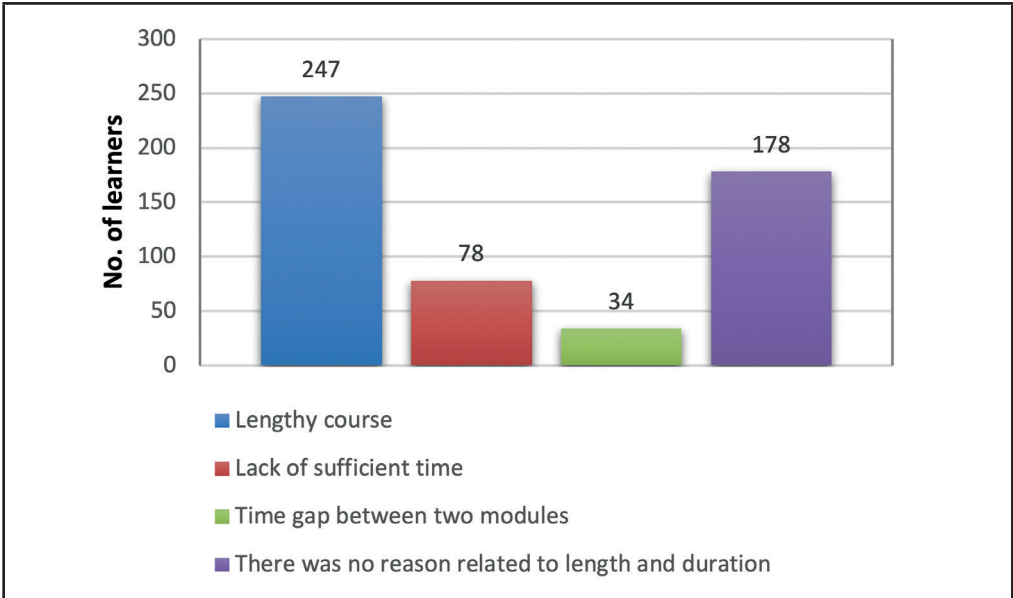


Analysis of the data related to the aspect of communication indicates that lack of clarity in announcements (32.03 percent) was the key issue followed by controlled release of the information (26.44 percent) and too much gap between the course announcement and course start (13.41 percent). However, 18.25 percent of learners have reported no reason related to communication. This result is expected as the announcement section was not functioning correctly due to some technical glitch at SWAYAM central, and course instructors were releasing only necessary information. The announcement section was never used

for informal communication with the learners; a telegram channel replaced it, but hardly 25 percent of learners subscribed.

- **Length and Duration:** As both, the MOOCs offered on SWAYAM were of 16-weeks duration. Four (04) weeks gap between course announcement and course publishing and one month time was enhanced due to unforeseen situations arising due to Covid-19. Learners were also asked about this aspect, because the review has suggested that short duration MOOCs have better retention rates.

Figure-6: Reasons related to Length and Duration

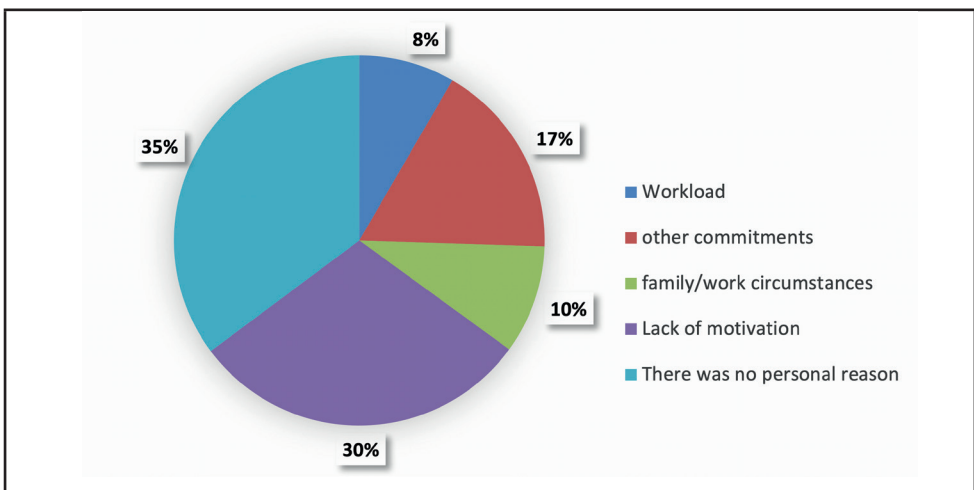


The graph in figure 6 indicates that the course length was the biggest reason for this dimension, contributing to dropout. Nearly 46 percent of learners have cited this reason, though 33.15 percent did not consider length or duration of the course as a reason to drop out from the system. 14.53 percent of learners have cited the lack of sufficient time to study as a reason for dropping out. This finding supports the argument

that MOOCs should not be of longer duration.

- **Personal Reasons:** Despite the reasons enlisted in sections 1-5, the researcher also collected personal reasons (if any), contributing to leaving the courses without completion. The distribution of learners' responses is shown in figure 7.

Figure-7: Personal Reasons contributed to Dropping-out



The chart in figure 7 indicates that 35 percent of learners cited their workload as a primary reason, contributing to their decision to drop. Still, researchers also found that lack of motivation is an important contributor to dropping out as well with 30 percent responses. 17 percent of learners have cited other commitments, whereas, for 10 percent of learners, family/work circumstances contributed to their decision to drop out from the course. This finding indicates that sustaining learners' motivation in a MOOC is still a challenge for course instructors.

- **Other reasons:** Apart from the listed grounds in the tool, learners were asked to cite any other reason they found a vital contributor to their decision to drop out of the course. Though, most learners have not cited any reason in this category, a few have mentioned the reasons like high examination fee for certification (62), non-availability of courses in Hindi/regional language (38), no approval of credit transfer at their institution (32), not matching with their curriculum (16), etc.

Major Findings and Discussion

- In the present study, it was found that there is no single reason, which can be pointed out as a contributor to the decision of learners for dropping out from the course. But, the analysis of their responses has indicated a few important points.
- Most of the learners joined the courses, as they were part of their formal teacher training programme (37.43 percent) or were preparing for competitive examinations (26.63 percent). Only 2.23 percent have said that they have joined the course for certification purposes. This finding indicates that viewing the success of a MOOC with a viewpoint of completion rate or certification rate

cannot be the sole criteria. Most learners join such learning courses and not for certification purposes.

- The rate of dropping out from the course is higher in the middle of the course. This reflects that course instructors fail to sustain learners' interest and engage them in the course after a course of time. The study found that most learners have dropped out of the course between 5-12 weeks.
- The most important reason for the course design-related aspects was the non-availability of all modules simultaneously (32.4 percent). This also supports the study's first finding, as many learners join the courses for competitive examination/self-study purposes; they look for all the content of courses at the same time.
- On the language-related aspect, the study has indicated that availability of the content of the courses in only English language (31.28 percent), language used by experts not easily understandable (27.75 percent), and monotonous videos (24.58 percent) are found to be the most important reasons. This finding reflects in a multilingual country like India; courses are needed in Hindi and other regional languages. There are not many takers for the courses in the English language.
- Though there was no important reason highlighted by the learners related to quiz and discussion forum, few have hinted that these were not giving the feedback on the forum posts (15 percent), only one attempt for the quiz (13 percent) and making discussion forum compulsory (10 percent) are some of the reasons. This finding shows the ways to improve the practices while running the course. The course instructors' more meaningful and continuous

involvement can improve on all such aspects.

- On the aspect of communication, the research has indicated that reasons like lack of clarity in announcements (32.03 percent), controlled release of the information (26.44 percent) and too much gap between the course announcement and course start (13.41 percent) are some areas of concern. These sometimes contribute to the dropout of learners from the MOOC. This also demands continuous communication and interaction between the course instructor and learners.
- A very important finding from the study is that learners do not prefer a lengthy MOOC. Longer duration courses attract a higher dropout rate; nearly 46 percent of learners have confirmed this assumption in the survey.
- Longer duration courses demand more time for learning engagement, which many learners find difficult. The finding also confirms that 35 percent of learners cited their workload as a reason for dropping out and lacking motivation (30 percent). Sustaining learners' motivation in longer duration courses is always a challenge for the course coordinators. Course instructors need to find the ways and means to sustain learners' interest and motivation. There are some strategies suggested by researchers like Ahearn (2019), including making students complete an application, imposing a final deadline, the learning materials available only for specific intervals, a series of "live" or synchronous events, integrating Platforms like Facebook Live, Zoom, Slack, and WhatsApp for continuous engagement, etc., which the course instructors can practice in future cycles.

- The study also highlighted a few other important reasons like high examination fee for certification, non-availability of courses in Hindi/ regional language, no approval of credit transfer at their institution, not matching with the curriculum, etc. about which course instructors have to think and find a solution. If there is nothing new in the MOOC, very few takers will sustain themselves in the course.

Educational Implications

Though this study is delimited to only two SWAYAM courses, which were offered in the first cycle, the study's findings have broader implications. The educational implications of the study can be categorized as below:

• Implications for the Course-instructors

The study suggests that course instructors need to find a solution for sustaining learners' interest and motivation. Various strategies indicated by many researchers need to be incorporated or new strategies can be identified, practised, studied, and shared. Linguistic aspects in videos and interactivity need to be looked upon—continuous and precise communication with learners is very important. Discussion forums should be replied to continuously, and learners should be engaged through announcements.

• Implications for Host-institutions

The institutions offering MOOCs should ensure the updated curriculum, preferably the model curriculum, to match most institutions/universities. Institutions should encourage MOOCs in Hindi and other Indian regional languages. If possible, bi-lingual MOOCs can be experimented with to some extent.

- **Implications for Policy-makers**

The monotonous structure of SWAYAM MOOC needs to be revisited. It will be better if freedom is given to the course instructor to decide the number and length of videos and not a fixed duration imposed based on credits. SWAYAM platform requires a user-friendly interface with attractive templates. A single template is not fit for all types of courses. At present, learner

analytics is not given to course coordinators, due to which they are unable to track the progress and engagement of learners in the course. More learner analytics should be at the disposal of the course coordinators, which will help them, strategize the inputs to be added for engagement and sustainability of learners in the courses.

References

- Ahearn, A (2019). *Moving From 5% to 85% Completion Rates for Online Courses*, June, 06, *EduSurge*, <https://www.edsurge.com/news/2019-06-06-moving-from-5-to-85-completion-rates-for-online-courses>
- Guest, G. (2019). *Research shows certificates boost MOOC completion rates*, *Michigan News, The University Records*, August, 23, <https://record.umich.edu/articles/research-shows-certificates-boost-mooc-completion-rates/>
- Kizilceca, R. F., Reichb, J., Yeomansc, M., Dannd, C., Brunskille, E., Lopezf, G., Turkayg, S., Williamsh, J. J., & Tingleyf, D. (May, 2020). *Scaling up behavioral science interventions in online education*, <https://www.pnas.org/content/pnas/117/26/14900.full.pdf>
- Lederman, D. (2019). *Why MOOCs Didn't Work, in 3 Data Points, Inside Higher Education*, <https://www.insidehighered.com/digital-learning/article/2019/01/16/study-offers-data-show-moocs-didnt-achieve-their-goals#:~:text=Among%20all%20MOOC%20participants%2C%203.13,percent%20the%20two%20previous%20years.>
- Leonard, W (2019). *So why did MOOCs fail to live up to the hype?* *University World News*, February 08, <https://www.universityworldnews.com/post.php?story=20190207110446568>
- Murray S. (2019). *MOOCs struggle to lift rock-bottom completion rates*, *Financial Times*, March 04, <https://www.ft.com/content/60e90be2-1a77-11e9-b191-175523b59d1d>
- Newton, D. (2020) *The "Depressing" And "Disheartening" News About MOOCs*, *Forbes*, June 21, <https://www.forbes.com/sites/evangerstmann/2021/01/02/at-least-12-republican-senators-vow-to-challenge-bidens-election-when-congress-counts-the-electoral-votes-on-wednesday/?sh=35a215b44571>
- Pappano, L. (2012). *The Year of the MOOC*, *The New York Times*, Nov, 02, <https://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html?action=click&module=RelatedLinks&pgtype=Article>
- Reich, J and Ruipérez-Valiente, J. A. (2019). *The MOOC pivot*, *Science*, 363, (6423), 130-131 DOI: 10.1126/science.aav795
- Shah, D. (2020). *By the Numbers: MOOCs During the Pandemic*, August 16, The report by Class Central <https://www.classcentral.com/report/mooc-stats-pandemic/>
- SWAYAM Central (2021). *National Coordinators*, https://swayam.gov.in/nc_details/
- Waters, M. (2020). *MOOCs are getting the last laugh*, May 27, The Hustle, <https://thehustle.co/05272020-moocs-are-back/>