

# Achieving a better completion rate in MOOCs through a blended approach

Kalpana Kannan, Mahendra Parmar, Sajjan Dixit and Urmila Deshmukh  
[kalpanak@cse.iitb.ac.in](mailto:kalpanak@cse.iitb.ac.in), [mahendrap@it.iitb.ac.in](mailto:mahendrap@it.iitb.ac.in), [sajjan.dixit@iitb.ac.in](mailto:sajjan.dixit@iitb.ac.in), [urmilad@cse.iitb.ac.in](mailto:urmilad@cse.iitb.ac.in)  
Department of Computer Science and Engineering, IIT Bombay, Mumbai – 400076, India.

## Abstract

In the fast-changing globalised world, everyone needs to acquire new knowledge and skills continuously. Massive Open Online Courses (MOOCs) help achieve lifelong learning to a large number of people all over the world by providing the freedom and flexibility to learn anytime, anywhere, irrespective of age, gender, religion and ethnicity. Even though MOOCs are gaining popularity worldwide, there are some challenges. Low completion rate, lack of learner's motivation, the feeling of isolation and lack of interactivity in MOOCs are perceived as some of the challenges. To address these challenges, we experimented with blended MOOCs on IITBombayX (<https://iitbombayx.in>) MOOCs platform. The instructors made learning more engaging and interesting for learners through live audio-video interactions once a week. Learners could ask questions to the instructors using an internet-based video conferencing software called A-VIEW. These interactions could be heard and seen by all the learners located at different geographical locations in the country. Since all the learners join synchronously during the interaction sessions, they feel part of a larger peer group. In the last three years (2015-2018), more than 200,000 students and teachers have benefited from this blended approach. It helped improve the motivation levels and increased the completion rate to more than 80% in some of the MOOCs. The average completion rate for blended MOOCs was found to be 30%, which is much higher than the global average completion rate of 15%. In this paper, we explain how live interaction combined with online learning material made learning more engaging, entertaining and empowering to the learners.

**Keywords:** Blended MOOCs; Blended Learning; Synchronous Technology; Completion Rate

## 1. Introduction

Massive Open Online Courses or MOOCs is a relatively new concept in the world of education. MOOCs are changing the landscape of education by providing the freedom and flexibility to learn anytime, anywhere, irrespective of age, gender, religion and ethnicity. MOOCs were started with an objective to democratise education by providing free access to good quality learning material offered by renowned universities globally. MOOCs movement has made a significant achievement in the last seven years. According to 2018 statistics by Classcentral (2018), there are 101 million learners, 11.4K courses offered by 900 Universities worldwide. Hence, MOOCs have the potential to enable free and quality education on an enormous scale.

Even though the emergence of MOOCs has the potential to change the landscape of education, there are many limitations to it. Some limitations mentioned in the literature are: Pedagogical problems concerning assessment and feedback (Hill, 2013); the lack of interactivity between learners and the video content (Grünewald, Meinel, Totschnig & Willems, 2013); as well as high drop-out rates of course participants (Yousef, Chatti, Schroeder & Wosnitza, 2014). According to Hollands and Tirthali (2014) a major problem with MOOCs is the ignorance of the importance and benefits of face-to-face communication.

However, a major concern often raised about MOOCs is that although thousands enrol for courses, a very small proportion finally complete such courses. According to Jordan (2015), the average completion rate for MOOCs is approximately 15%. In literature, the completion rate in MOOCs is defined in two ways. Some consider it as the percentage of learners who earned a certificate or passed the course out of total enrolled for the course (Khalil & Ebner, 2014). Some argue that there are many people who enrol for the course but they do not show up or do not login subsequently, therefore, one should not consider them at all. In other words the completion rate is the percentage of active learners who complete the course and earn a certificate (Jordan, 2014; Gillani & Eyon, 2014). Therefore, wherever we had the data on active learners, we have considered that data for the completion rate calculation.

In order to address some of the limitations of MOOCs mentioned in the literature, we adopted the blended MOOCs approach on our MOOCs platform, 'IITBombayX' (<https://iitbombayx.in>). Blended MOOCs takes into account the advantages of face-to-face interactions along with the flexibility, openness and collaborative learning provided in the online learning platform (Yousef et al., 2014).

IITBombayX platform is built on Open edX and was launched on 26 January 2015. It is designed to empower students, teachers and lifelong learners in various domains through MOOCs. It is aimed at alleviating some of the issues of access and quality issues in higher education in the country. IITBombayX offers four types of MOOCs to meet

personalized requirements of learners in different phases of their lives. Courses for academics/education are offered through EduMOOCs, for working professionals and others desiring to pursue lifelong learning through LifeMOOCs, for skilling and vocational training through SkillMOOCs and for teacher training through TeachMOOCs.

Initially the MOOCs offered on the IITBombayX platform were regular MOOCs with only the online activities. We found that on an average the completion rate in these MOOCs were only around 15%. As a lot of time, effort and money is invested in making a MOOC, we wanted many more people to benefit from it. Therefore, we experimented with the blended MOOCs. Through this study, we try to find answers to the following research questions:

- 1) Did the completion rate significantly improve in the new blended MOOCs approach?
- 2) What was the experience of the learners who attended the blended MOOCs programme?

## **2. Literature Survey**

According to the New York Times (Wikipedia, 2019) the year 2012 was called 'the year of the MOOC'. During this year MOOCs started gaining momentum in education. Several MOOC providers emerged who were associated with top Universities in the world, including Coursera, Udacity and edX (Wikipedia, 2019).

When MOOCs were started its main aim was to democratise education with free access to good quality learning material. Many thought that this would bring disruptive changes in the education. But even after six years, MOOCs have not made a significant impact in the field of education. The biggest challenge in MOOCs is the low completion rate. The global average completion rate is around 15% (Jordan, 2015).

Reich and Ruipérez-Valiente (2019) analysed all MITx and HarvardX MOOCs taught on edX from the start of the initiative to May 2018. The dataset included 565 course iterations from 261 different courses with a combined 12.67 million course registrations from 5.63 million learners. The study revealed three important findings: i) a vast majority of MOOC learners never return after their first year, ii) the growth in MOOC participation has been concentrated almost entirely in the world's most affluent countries, and iii) the pain point of MOOCs – low completion rates have not improved over six years.

A low completion rate were also observed in other studies. According to Tamburri (2012), out of 104,000 students who enrolled in an online machine-learning class offered on Coursera, only 12.5% passed. In a study conducted by Belanger and Thornton (2013) on Bioelectricity MOOC of Duke University, out of 12,000 students enrolled in the course only 700 students passed the course, making the dropout rate 94%.

According to Khalil and Ebner (2014), the crucial factors for a low completion rate or a high dropout rate in MOOCs are: lack of time, lack of learners' motivation, feelings of isolation, lack of interactivity in MOOCs, insufficient background skills and hidden costs.

Our experience with MOOCs on IITBombayX platform was also similar. We had a very low completion rate of around 15%. In order to increase the completion rate we experimented with the blended MOOCs. The methodology of conducting blended MOOCs is explained in the next section.

## **3. Methodology of conducting blended MOOCs**

The blended MOOCs approach combines online learning with face-to-face sessions. The main online component is delivered using IITBombayX (2019) MOOC platform. A learner needs to spend between 6 to 8 hours per week, using the online content and to carry out the indicated online activities, such as assignments and quizzes. The understanding of the topics covered is assessed using machine graded quizzes and sometimes peer assessment. This part can be completed by the learners at any time and place convenient to them, within the prescribed time limit set for the topic. An active discussion forum permits the learners to ask doubts and questions, which are clarified by the course faculty and teaching assistants.

The face-to-face (F2F) sessions with the course instructors are generally scheduled on weekends for 3 to 4 hours. For the F2F session, an internet based Open Source video conferencing software called 'A-VIEW' (2019) is used. Many colleges in India have established the A-VIEW (2019) facility in their colleges. These colleges are called Remote Centres (RCs) of IIT Bombay. Currently, there are 572 Remote Centres in the country. Figure 1 shows the Hub and Spoke model that is being used for the F2F sessions. Figure 2 shows the location of these 572 RCs on the India map.

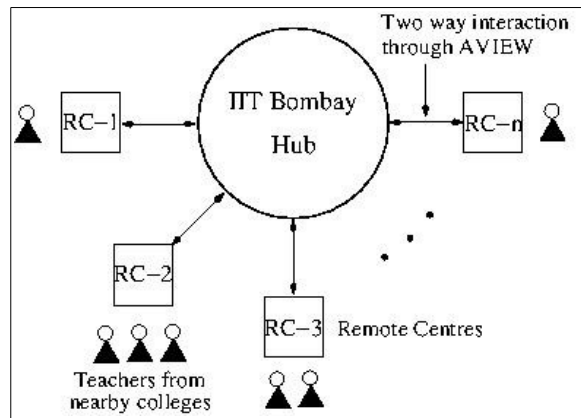


Figure 1: A hub and a spoke model used for face-to-face interaction with remote participants



Figure 2: Location of 572 Remote Centres in the country

In order to become a RC the college should satisfy some basic infrastructure facility. Some of the hardware that are required are: A good quality camera with connectivity for live streaming, LCD projectors, microphones, desktop/laptop, speakers and audio mixers. The RC should have a good bandwidth (about 1 Mbps) to receive live streaming. Each RC should have about 60-80 computers with internet connectivity in the computer laboratory. These RCs form a convenient and effective ecosystem for interactions between the college teachers, students and MOOC instructors. The RCs have a course coordinator and a remote centre coordinator. The course coordinators solve the learners' queries at the local level throughout the course duration. The remote centre coordinators handle the infrastructure facility at the RC during A-VIEW sessions.

Typically in any MOOC or a training workshop about 150 to 200 of these 572 Remote Centres express their willingness to participate in the programme. During the F2F session, these RCs make their infrastructure available to their own students/teachers and other participants from the nearby colleges. In this way, many participants get the opportunity to participate in the live interactive sessions with the course instructors. The A-VIEW software allows the participants to raise their hand electronically. Figure 3 shows the electronic hand-raise. The course instructor can select the RC that has raised hand and answer their questions. These interactions can be heard and seen by all the learners located at different geographical locations (RCs) in the country. Since all the learners join synchronously during the interaction session, they feel part of a larger peer group. They also interact face-to-face with their own college teachers and peers at their respective RCs when they assemble for the F2F sessions in the weekends. Thus, making the whole experience of learning as a social activity rather than an individual activity. Figure 4 shows how the remote participants interact with the course faculty using A-VIEW software.

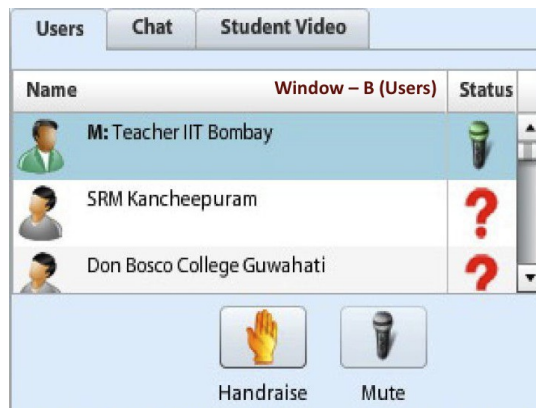


Figure 3: Screenshot of electronic hand-raise through A-VIEW

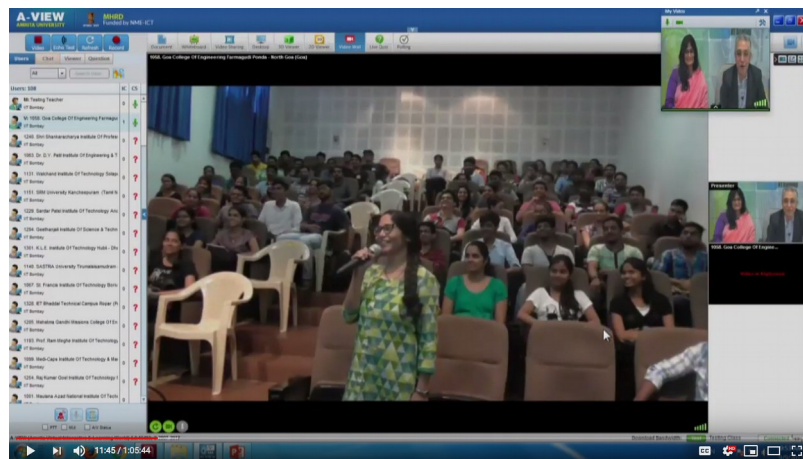


Figure 4: Screenshot of F2F interaction with remote participants through A-VIEW. A remote participant is asking question and the course instructors from IIT Bombay (seen in the small window) are answering. The interactions can be heard and seen by all the Remote Centres that are connected to IIT Bombay. The questions raised by other participating RCs appear as electronic hand-raise.

If some participants cannot go to these RCs, they can watch the live webcast of these interactive session on a specific YouTube channel. Participants can ask questions through the YouTube chat. Select questions from the chat also gets answered by the course faculty during the live sessions. In this way, the questions raised by remote participants who attend the session through YouTube also gets answered.

## 4. Research Methodology

This study takes the case study approach to answer the two research questions. To compare the completion rate of blended and non-blended courses, the enrolment data and certification data of 91 courses offered on IITBombayX MOOCs platform from January 2015 to March 2019 was used. For an in-depth analysis of blended MOOCs, data from two MOOCs: 'College-to-Corporate' (C2C) programme and 'Faculty Development Programme' was used. An online survey was conducted at the end of each programme to get the feedback from the participants.

## 5. Results and Discussion

### 5.1 Completion rate in blended MOOCs

On the IITBombayX platform, 91 MOOCs have been offered since January 2015. Out of these, 49 were offered as non-blended and 42 courses were offered as blended MOOCs. Initially, many courses were offered as non-blended MOOCs. The average completion rate for non-blended MOOCs was only about 15%. Later, the blended MOOCs approach was tried to see if this made any significant difference in the completion rate. We found that the completion rate significantly improved in the blended MOOCs approach. In fact, the average completion rate doubled to 30%. Figure 5 gives the statistics on enrolment, certification and completion rate for blended and non-blended MOOCs.

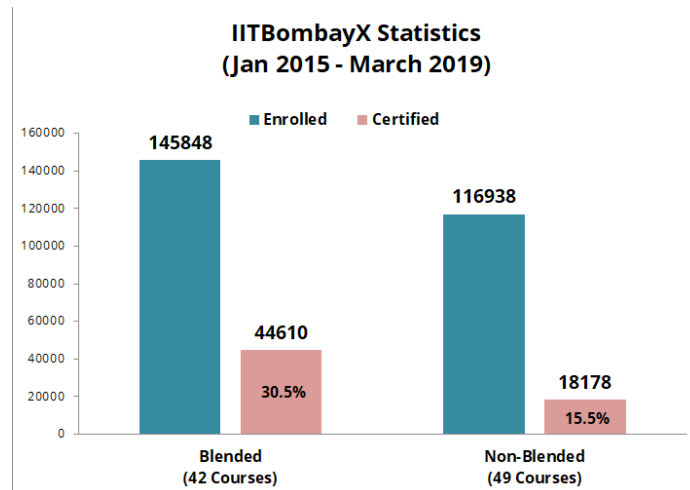


Figure 5: Statistics on blended and non-blended MOOCs, which includes all types of MOOCs offered on IITBombayX platform including the skill MOOCs discussed below.

In the next section, with the help of two examples of blended MOOCs 1) College to Corporate programme and 2) Faculty Development Programme (FDP), we try to answer the learner's experience and also look at the completion rate for these blended MOOCs programme.

### 5.2 College to Corporate (C2C) Skill MOOCs

The College to Corporate (C2C) skill MOOCs programme in the blended MOOC format was conducted for college students in the academic year 2017-2018 and 2018-2019. This MOOC was primarily targeted towards pre-final and final year undergraduate students from engineering domain, to help them prepare and perform better in the recruitment process. In this blended approach, participants learnt online and also through F2F interactions via A-VIEW (2019). The course content was made available on the IITBombayX (2019) platform. The students were required to perform online activities before and after the F2F interaction. In each course, the F2F interactions were conducted during the weekends. In addition, the students were required to complete weekly activities in their own colleges (Remote Centres).

The C2C programme had six short courses which were offered during the academic year 2018-19. In the first semester (September to November 2018) three courses 1) Soft Skills 2) Workplace Communication and 3) Effective use of IT in professional activity were offered. In the second semester (February to April 2019) another three courses 4) English for Oral Communication 5) Financial Literacy and 6) Handling Large Projects were offered. The students paid a nominal registration fee for these courses. Students from diverse domains such as, Computer Science and Engineering, Electrical Engineering, Mechanical Engineering, Civil Engineering, MBA and Commerce attended these courses.

Table 1 gives the statistics of the courses that were offered in the first semester. There were 154 Remote Centres (RCs) that took part in the programme. Each course had a set of assignments and quizzes. In order to get a certificate, participants had to score a minimum of 50% in the graded quizzes. From Table 1, we observe that the completion rate, the ratio of students who were certified (C) to the students who were active in the course (A) was significantly higher than the global average completion rate of 15%. The completion rate was 96.49% (highest) for 'Soft Skills', 90.84% for 'Workplace Communication' and 60% for 'Effective use of IT in professional activities'.

Table 1: Statistics of 'College to Corporate' courses offered during first semester. Unlike the traditional MOOCs, the completion rate is very high.

	Soft skills	Workplace Communication	Effective use of IT in professional activities
Students Enrolled (E)	3718	3064	3050
Students Active (A)	2340	2140	2057
Students Certified (C)	2258	1944	1233
Completion rate in percentage (C/A)	96.49%	90.84%	60%
Gender ratio (Male: Female)	66:34	61:39	62:38

There was a large representation of female participants in all the course. On an average, 37% were female participants and 63% were male. The participants of this programme came from various geographical locations in the country. 47.6% came from urban areas, 22% from rural, 15.4% from metropolitan and 15% from semi urban. The location distribution of participants is given in Figure 6. Thus, the reach of this programme was very good in the country covering all the locations.

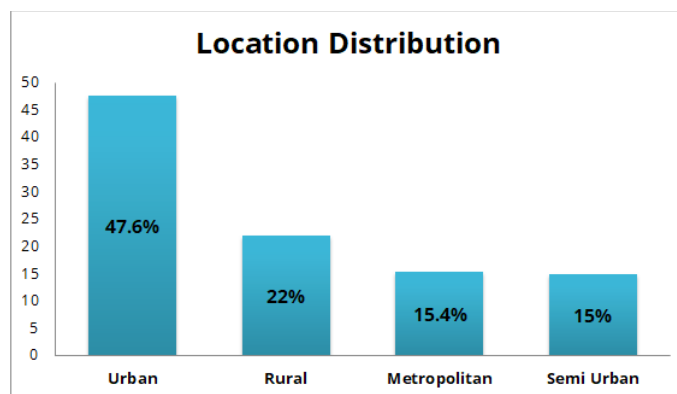


Figure 6: Location distribution of participating students in 'College to Corporate' programme

Table 2 gives the statistics of the courses that were offered in the second semester (February to April 2019). There were 101 Remote Centres (RCs) that took part in the programme. In order to get a certificate, participants had to score a minimum of 50% in the graded quizzes. From Table 2, we observe that the completion rate was 96.44% (highest) for 'Financial Literacy', 80.97% for 'Handling large projects' and 62.29% for 'English for oral communication'. The English course had 40% participation from female, the other two courses had 22%.

Table 2: Statistics of 'College to Corporate' courses offered during second semester. Unlike the traditional MOOCs, the completion rate is very high. Also see Table 1.

	English for oral communication	Financial Literacy	Handling large projects
Students Enrolled (E)	1385	1159	1249
Students Active (A)	1151	956	1030
Students Certified (C)	717	922	834
Completion rate in percentage (C/A)	62.29%	96.44%	80.97%
Gender ratio (Male:Female)	60:40	78:22	77:23

### 5.2.1 Students' Experience on C2C programme

Overall the students had a very positive experience. About 250 students responded to the online survey. 57% of the responded said that their overall experience of the programme was very good, 37% said it was good, 3.5% said it was average and 2.5% said that the programme needs improvement.

Given below are some sample feedback from the survey:

- *“Before joining these courses I had no idea how to face the corporate world. But I have got a lot of confidence due to these courses. I would like to say thanks to all the video instructors and all others who are behind them to make these courses happen and made it successful.”*
- *“My overall experience was good with IITBombayX MOOC platform course. It is really helpful for my personal growth and for improving skills. Thank you.”*
- *“This course is different from conventional courses we see, and I liked this course as it gave some insights to common mistakes done by undergraduates in interviews and at professional organization.”*
- *“A-VIEW interactive sessions were a good part about this course. F2F [A-VIEW sessions] is very useful to increase the confidence and communication skill. It was a good motive to educate students like this and it was interactive too, which made the lectures interesting.”*

- *“This course gave me a good knowledge about the technical things which we were unaware of, also it provided a platform for us to speak face-to-face with the faculty, who are expert in their fields. This course really helped me a lot.”*

### 5.2.2 Feedback from Remote Centres on C2C programme

An online survey was conducted after the programme. 92 remote centres gave their feedback. About 90% of the remote centres indicated that there is an overall improvement in the students who completed these courses. About 83% agreed that these courses will help improve the placements of their students.

Some sample feedback are given below:

- *“This program was excellent for students to improve themselves for their future. This type of programme should be continued in future as well.”*
- *“The programme should run every semester so that final year students would be benefited for campus recruitment.”*
- *“The workshop and instructors were very knowledgeable. Thank you IIT Bombay and teams to organize such college to corporate workshop. This workshop is very effective for our students.”*
- *“The College to Corporate Programme has contents of real applications to the students and hence it must be a continuous process for the benefit of students. The teaching pedagogy of the course is really appreciable and IIT Bombay can plan such type of programme for faculty members as well.”*

### 5.3 Faculty Development Programme (FDP)

Faculty Development Programmes (FDPs) in blended MOOC format were conducted for the college teachers in autumn 2017, spring 2018 and autumn 2018. The target audience for these programmes were college teachers from various disciplines. The FDP had two parts: the first part was the 'Foundation Programme in ICT for education' – (FDP101x) and the second part was 'Pedagogy for online and blended teaching-learning process' (FDP201x).

These two courses were designed to provide awareness to both technology and effective practices of technology integration. Participants of these courses were expected to use these technologies during the course, to design materials and activities for teaching-learning in their own subjects. The FDPs were designed to make the teacher informed and to tackle teaching-learning problems competently. The participating teachers learnt online and also through F2F interactions through A-VIEW (2019). The F2F interactions were conducted during the weekends similar to C2C programme as shown in Figure 4.

The course content were made available on IITBombayX (2019) platform. The participants were required to perform online activities, before and after the F2F interaction, in each course. Participants were expected to put 6 to 8 hours of efforts per week for the course for the online activities. Focused F2F interactive sessions with the participating teachers were conducted by the course faculty from IIT Bombay during the weekends for 3 to 4 hours. Participants were asked to attend these sessions in their chosen or designated Remote Centres (RCs), established across the country by IIT Bombay. The discussions and local tutorial sessions were moderated by the course coordinators appointed at each RC. The criteria for certification was a minimum 50% aggregate score in online quizzes and active participation in face-to-face sessions. Table 3 gives the statistics on FDP conducted in the years 2017 and 2018.

Table 3: Statistics on Faculty Development Programme conducted in the years 2017 and 2018

	2017 (Autumn)		2018 (Spring)		2018 (Autumn)	
	3 August – 30 December		8 March – 30 May		13 Sept. - 31 December	
	FDP1	FDP2	FDP1	FDP2	FDP1	FDP2
No. of participants registered (R)	7506	5308	3316	4618	2016	2161
No. of participants certified (C)	5308	2956	2337	1571	1793	1333
Completion rate in percentage (C/R)	71%	56%	70%	34%	83%	62%
No. of remote centres	167	161	103	103	106	106
Gender ratio (Male:Female)	59:41	55:45	60:40	59:41	53:47	53:47
New OER (Open Education Resources) created and submitted	1100		664		616	

From the Table 3, we find that the average completion rate in FDPs was around 63%, which is much higher than the global average completion rate of 15%. On an average, there were 43% female participants in these FDPs. In every course run, more than 600 OERs were created by the participants. These OERs were subjected to a regress plagiarism check and then approved.

An online survey was conducted after each FDP course. The results of all the surveys were very encouraging. A total of 1382 participants responded to the end of course survey in December 2018. The participants were extremely satisfied with the FDP. On a scale of 1 to 5 (Not satisfied with the course to extremely satisfied) 49.8% of the respondents gave the rating of 5, 43% gave the rating of 4, 6.7% gave the rating of 3, 0.5% gave the rating of 2, 0.1% gave the rating of 1.

Some sample qualitative feedback from the FDP participants are given below:

- *“New learning techniques improved my way of teaching. Acquiring the knowledge of Screencast, MOODLE and WordPress helped me enhance my teaching quality. It effectively improved the very base of teacher-student interaction. The knowledge gained is useful for updating the overall teaching procedure.”*
- *“The learnings from FDP 201x has transformed me in working with a functional classroom, live interactions inside the classrooms through different modes of deliveries and outside the classroom by means of Padlet, wikis...”*
- *“I was very excited to learn everything. How technology can be used to reach students who are absent from the class? Before the course ended, I organised online quiz using Moodle for students. The activity was enjoyed and was highly appreciated by the students.”*
- *“The techniques were new to me. But I found them useful to learn and use them in my teaching learning process. So I tried to gain knowledge. The videos and resources available were very useful also the activities to be completed were challenging as well as interesting to help me.”*

## 6. Conclusions

This paper presents the blended MOOCs approach used in the IITBombayX MOOCs platform. We found that some of the challenges in MOOCs i.e., low completion rate; lack of learner's motivation; the feeling of isolation and lack of interactivity could be addressed through this approach. Through the examples of two MOOCs 'College to Corporate' and 'Faculty Development Programme' we answered the research questions.

We found that the new blended MOOCs approach significantly improved the completion rate in MOOCs from an average of 15.5% in non-blended MOOCs to 30.5% in the blended MOOCs. The completion rate was found to be as high as 96.4% in one 'College to Corporate' course and 83% in one of the FDPs. The survey result shows that the learners had a very good experience in the blended MOOCs. The live interaction combined with the online learning material made learning more engaging, entertaining and empowering to the learners. We conclude that for running a successful MOOC, a blended MOOCs approach is highly recommended for the universities and organizations that offer MOOCs.

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