

MOOCs And Personalized Learning Experience

Presented by Subha Das Mollick
At OE Global 2020



1. A promise

“Big breakthroughs happen when what is suddenly possible meets what is desperately necessary.”

- Thomas Friedman in the New York Times

2012 was declared as the Year of MOOC

Coursera:

“Andrew Ng offers Machine learning class at Stanford every year and he has typically 400 students in his class. When the class was thrown open to the general public, there were 100,000 students registered.” – Daphne Koller

edX:

“155,000 students from 165 countries enrolled in a course in Circuitry in Electronics offered by MIT. It was the first course offered from the edX platform.”- Anant Agarwal

UDACITY:

Udacity is the outgrowth of free computer science classes offered in 2011 through Stanford University. *“I hope half a million students will enrol, after an enrolment of 160,000 students in the predecessor course at Stanford” – Sebastian Thrun*

Indian initiatives

- In 2015, the seven IITs and IISc Bangalore got together to form NPTEL (National Programme for Technology Enhanced Learning). NPTEL offers more than 950 courses in science, technology and engineering.
- SWAYAM (Study Web for Active Learners for Young Aspiring Minds), is an initiative of MHRD, Govt. of India. It was launched on 9th of July, 2017. Today SWAYAM runs 2000+ courses for advanced education, high school and skill sector.

2.

Doubts and roadblocks

It seems we are not ready yet



Some revealing statistics

For a particular course run by Coursera in 2014 – 15, 43,218 students had registered, of which 20,868 watched at least one lecture, 5,798 students submitted at least one exercise and 1,688 certificates were issued. That means only 3.9% of the learners finally qualified [1]

In a course run by this author on SWAYAM, out of 371 enrolled students, only 47 took the self assessment tests and 12 submitted assignments regularly. [2]

“Massive open online courses have gained renown among academics for their impressive enrolment figures and, conversely, their unimpressive completion rates”. – DFO Onah et al in *Dropout Rates in MOOCs: Behavioural Patterns* [3]

Few MOOCs have percentage completion which reaches a double figure.

Like the barriers in communication, causes for high attrition rate may be technical, social, psychological or cultural

- ❖ Poor connectivity
- ❖ Mismatch between expectation and actual course content
- ❖ Lack of motivation for completion
- ❖ Language problem – language of delivery, both verbal and written, may be too high flown for the learner
- ❖ Lack of peer dynamics
- ❖ Cultural mismatch between instructor and learner

The above factors are conjectural, based on experience of running three courses.

Many enrol; fewer start out; a small minority complete

Of the 61 courses hosted by Coursera, the average completion rate was just over 6%.

The Open2Study courses, of which there are 64, are all very short (4 week) and are automatically graded. The average completion rate for these is just under 30%.

The EdX courses included (19 in total) were generally longer in duration, with only one being less than 10 weeks, but all were automatically graded. These had average completion of around 8%. [3]

Quoted from Jordan, K. (2013). MOOC Completion Rates: The Data, Available at: <http://www.katyjordan.com/MOOCproject.html> [Accessed: 18/02/14].

Typical course design for a MOOC: The four quadrant approach

QUADRANT 1: Video recording of the lecture (25 to 30 min long) and its transcription.

QUADRANT 2: Course material in the form of text and PPT (Downloadable)

QUADRANT 3: Self assessment quiz and long assignments

QUADRANT 4: Reference and further study

Needless to say, this is a top down approach and learning is 100% on an asynchronous mode – self paced self learning anytime, anywhere.

Windows of interactivity for the learner:

- ❖ Email for personal one to one communication with instructor
- ❖ Discussion forum for a public discourse

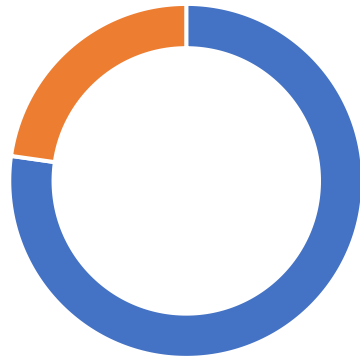
Nature of data generated

- ❖ Which learner has watched the video and for how long
- ❖ Which learner has engaged with study material
- ❖ Results of self assessment quiz – maximum, minimum & average scores, total number of learners attempting the quiz
- ❖ Assignments submitted and grades scored by each learner

The above data are very basic in nature. Using this data it is possible to arrive at certain conclusions about types of learners, but practically no conclusion can be reached about the quality of course content

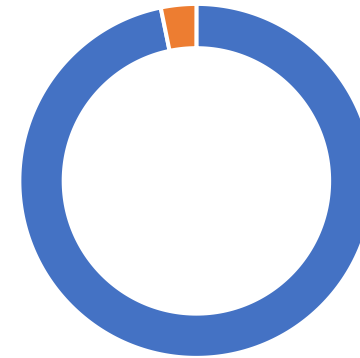
Insights from SWAYAM course *Penning for Frames* (Jan to May 2017)

Documents



■ Not accessed ■ Engaged ■

Video



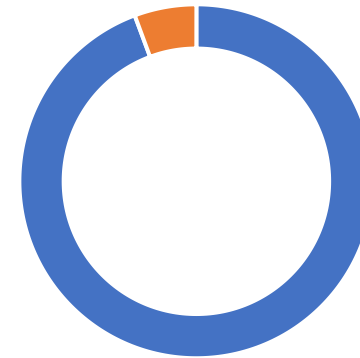
■ Not accessed ■ Engaged ■

Quiz



■ Not accessed ■ Attempted ■

Assignments



■ Not attempted ■ Submitted ■

About *Penning for Frames*

Among the 25 pilot courses started by the Consortium of Educational Communication on the SWAYAM platform in January 2017, one course was titled *Penning for Frames*. It is a script writing foundation course for beginners and caters to anybody who wants to develop the basic skill in scripting films of any genre. The language of instruction, like all other courses on the SWAYAM platform, is English. When the course started, a little more than 100 learners were enrolled. But enrolments continued till the last day of the course. When the course ended in May 2017, there were 371 learners enrolled.

Incidentally, the course *Penning for Frames* received a rating of 3.9

8 students gave it a 5 star rating, 5 students gave a 4 star rating, 1 student gave a 3 star and 2 students gave a 1 star.

Penning for Frames in second innings

Penning for Frames was repeated again in September 2017. This time the number of learners were 157.

The course got a rating of 4.5

31.85% learners engaged with the course material actively

11.5% learners watched the videos

9.55% learners submitted assignments

15.92% learners took the self assessment tests. Two students diligently submitted all the assignments and sustained their active engagement till the end of the course.

A course on *Television Journalism*

In July 2018, the author was the PI for another course called **Television Journalism**.

There were **486** learners in this course.

Only **11.72%** engaged with the course material

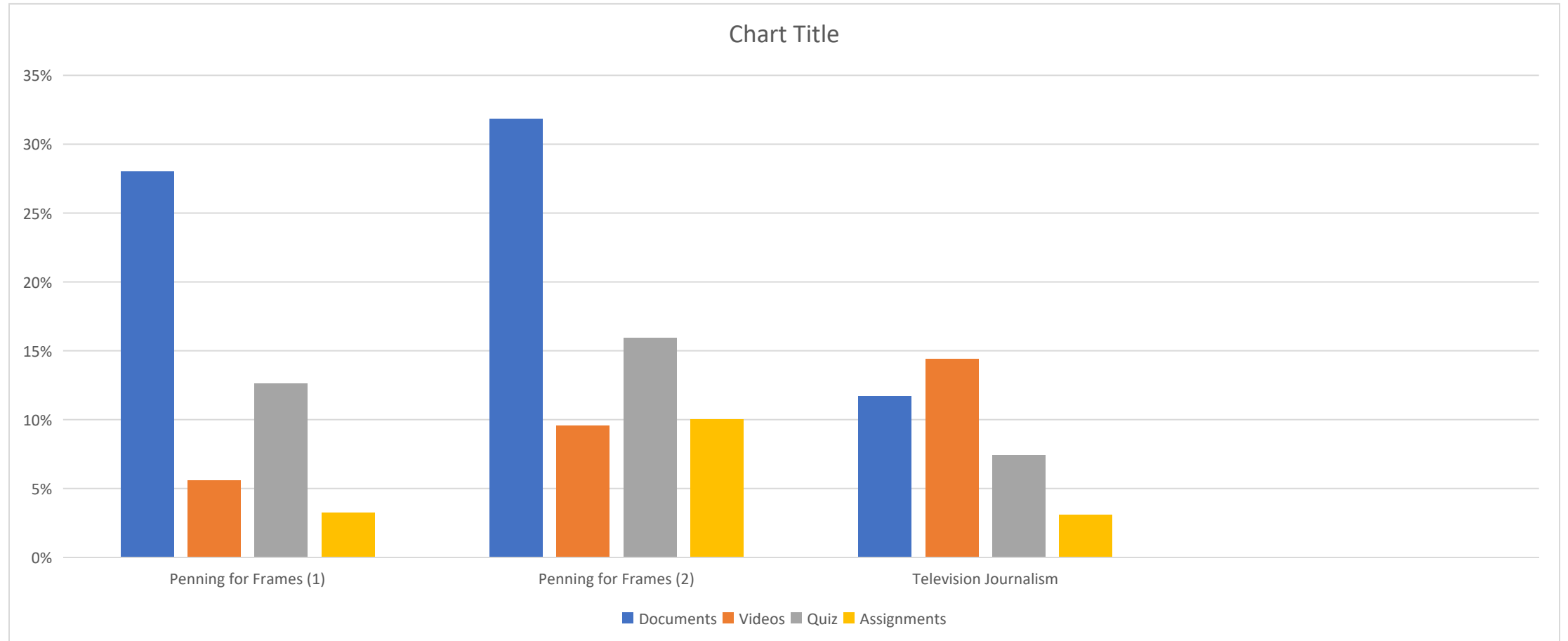
But this time **14.4%** engaged actively with the videos.

Only **7.4%** took the self assessment tests.

Only **3.08%** completed the assignments. The only redeeming fact about the last course is that out of the **15** students who submitted the assignments, almost all of them sustained their interest up to the end. **Television Journalism** got a rating of **4.2** out of **5**.

Learner engagements in the three courses

At a glance



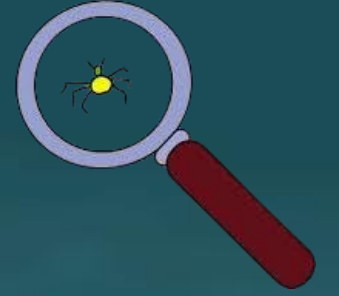
A reminder about Goal 4 of the 17 goals of sustainable development

“Ensure inclusive and quality education for all and promote lifelong learning.”

Quality education happens when there is quality transmission and quality reception. There has to be synergy between transmitter and receiver. The synergy can be created if there is a congenial learning environment.

How to enliven the learning environment of MOOCs?

Instructor and system, both play a vital role in enlivening the learning environment. Man and machine, human and artificial intelligence can collaborate to create the necessary environment



3. How to fulfill the promise?

Look for a **M**assive shift in approach

Solution may be sought in the '**S**mall'

Types of learners in a MOOC according to Stanford University's Learning Analytics

- ❖ **Auditors.** They sit through the course lectures, browse the course material but do not take the tests
- ❖ **Completers.** They engage with the course material as well as take the tests. They are the most motivated lot. Acquiring a certificate means a lot to them.
- ❖ **Disengaged learners.** They lose interest after a few days
- ❖ **Samplers.** They engage with the work from time to time – perhaps the chapters that interest them.

Role of the instructor/ facilitator in a MOOC

In asynchronous MOOCs, the instructor/ facilitator can directly interact with the learners through emails, in the feedback to assignments and in the discussion forum. However, if the learners are inactive in the discussion forum or in submitting assignments, then the instructor has limited scope of turning them into active learners. Attempts to seed a discussion in the discussion forum have failed in the MOOCs run by this author. Thus, the instructor's desire to understand the thought process of the learner often ends in frustration. The instructor has very little to do except wait for the submission of assignments.

Without the necessary feedback, the communication chain gets dried up.

To motivate the learner to actively participate in the learning process, the instructor can create different types of assignments for different kinds of learners. The learner can choose the kind of assignment that he/she wants to attempt.

An alternative course design

MООСs need not be 100% asynchronous. A blend of synchronous and asynchronous methods is always more effective. A synchronous session brings the instructor and the learners face to face on a common platform. The learners get to know each other and the instructor gets an opportunity to address the learners directly and engage them in different activities. The activities may be designed to trigger multiple intelligences of the learners.

During these synchronous sessions, some of the learners may be asked to give presentations or a guest speaker may be invited. In other words, synchronous sessions can bring in the surprise element in the course. Learners will begin to look forward to these synchronous sessions.

X MOOCs and C MOOCs

Before the mentor centric xMOOCs became dominant, there used to be cMOOCs, that relied more on connectivity factor and openness.

cMOOCs are based on principles from “connectivist pedagogy”, indicating that material should be *aggregated* (rather than pre-selected), remixable, *re-purposable*, and *feeding forward* (i.e. evolving materials should be targeted at future learning). cMOOCs instructional designs connect learners to each other in problem solving and participation in collaborative projects. cMOOCs are more constructivist in their approach and emphasize on knowledge building. While xMOOCs focus on scalability, cMOOCs focus on community and connectivities.

Two case studies

1. Prior to MOOCs, the course in script writing had been run twice by Consortium of Educational Communication as an online course on Edusat. Learners from all across the country had been enrolled through newspaper advertisements. In addition to three lectures a week run on Vyas Channel, there used to be live interactive sessions once a week. These live sessions always had good attendance and high level of participation. The learners submitted assignments on time. Many of them are still in touch with me.

2. The author recently conducted two SPOCs as OE courses. All the modules were run in the synchronous mode. In one the number of learners was 80 and in the second one, which was a hands on course in filmmaking, there were 25 learners. In the first course, 52 learners earned certificates. In this second course, at the end of the course, each learner made a small film. So the completion rate was 100%.

In both these cases the learners had a greater sense of participation. They also developed an ownership of the course when their assignments were discussed with the group and they had a chance to make presentations.

Can the personal touch of SPOCs be replicated in MOOCs?

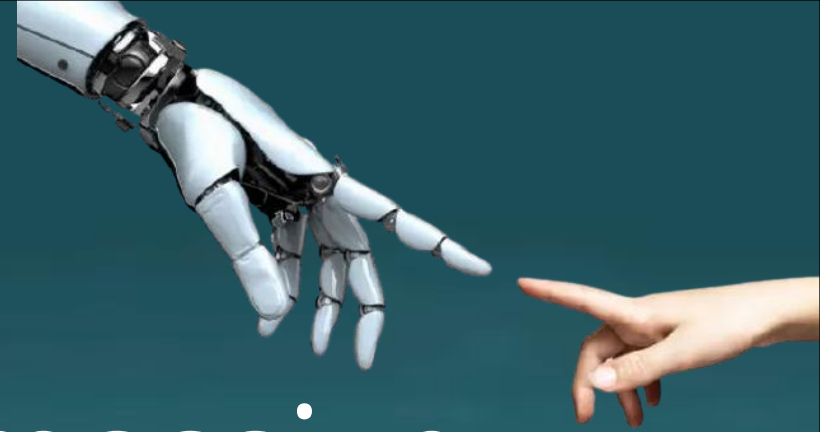
As the two case studies have shown, personal attention of the facilitator makes all the difference. Passive learners or non learners can be turned into active learners through the influence of not only the facilitator but also the peer group.

It is not impossible to bring this personal touch in a MOOC. And that can be achieved through AI. Algorithms are already in place to track the progress of learners and analyse their performance. But algorithms can also be written to nudge a passive learner into an active mode, to bring like minded learners together and to reward learners for good performance.

In other words, artificial intelligence can be the foster facilitator for the learner.

4. Personal touch in a massive course

Through a synergy between human and artificial
intelligence



Generating higher order data for AI

M00Cs are inclusive. A M00C is an open course, in which anybody can enrol. There is no pre qualification required. So this heterogeneous learner base will have heterogeneous data in terms of age, qualification, mother tongue, interests, motivation to join course and much more. The registration form, instead of being a two line form as it is now, should be an elaborate form of about 20 to 25 questions. Some of the questions can test the intellectual level and creative bend of mind of the learner.

The algorithm can scan through these questions and categorize the learners into types. The learners need not know what type they have been categorized under. The learner can be informed that he/she is in group A or B, without being told what group A or B signifies.

The purpose of dividing learners into groups is to engage them at different levels with assignments and study material. **"One size fits all" cannot work for M00Cs.**

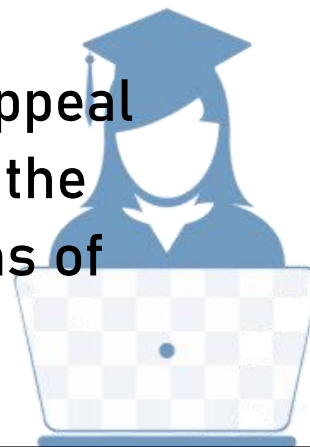


A note to MOOC developers

When we get down to developing MOOCs, we usually have our own student community in mind as our target group. But in a MOOC one is likely to get learners from diverse backgrounds, with diverse motivation levels and intellectual abilities. So the developer has to train himself/ herself to think wider. There is no shame in striking a popular note – at least in the first few modules – to hook the learners and get them interested in the course.

Language plays a very important role in striking a popular chord with the reader/ listener. Instead of a strictly academic language, the language of discourse can be less formal, more engaging.

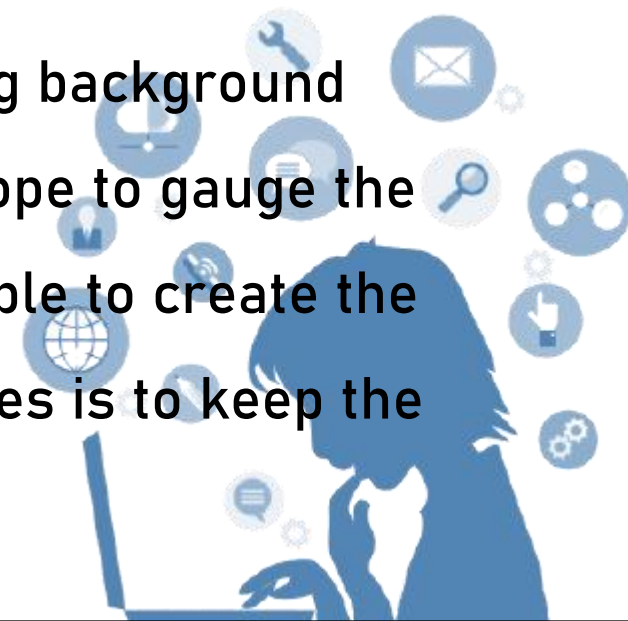
The other factor that can boost up the popularity of the course is the visual appeal of the course content. Today's generation communicates in images. So both the video lecture and the text material should have ample visual support in terms of graphics, illustrations, photos, cartoons, memes etc.



Gradually take learners to higher levels of learning

After creating a foundation in the first three or four modules and making the learners comfortable with the course, the developer can gradually make the course content more challenging. This gradual upgradation of course content works well for longer courses having one month or longer duration.

In any successful course, the teacher/ facilitator builds on existing background knowledge of the learner. In a MOOC the facilitator has limited scope to gauge the background knowledge of the diverse learners. Hence it is advisable to create the background knowledge. The challenge in these foundational modules is to keep the advanced learners equally active.



A scope for course correction

It has been seen that success rate for shorter MOOCs is higher. Longer MOOCs that continue for one month or more, typically have success rates less than 10%. [3]. One way to ensure that students do not drop out at an early stage, is to make them stakeholders in the development of the MOOC. This means that based on their feedback and suggestions, new modules may be added or existing modules may be modified. So X MOOCs have to come out of their rigid curriculum structures and adapt some of the flexibility of C MOOCs. The developer has to remain alert and proactive through out the course duration of the MOOC.



Learners may post their suggestions in the discussion forum, but a more sure shot way to get learners' feedback is through a mid course survey. If this survey has short answer type questions, algorithm can be developed for scanning the key words in these answers and sharing with the developer.

Discussion forum



All MOOC platforms have a discussion forum to facilitate peer learning and catalyse the formation of learning communities. According to a 2018 research paper based on Coursera log files by Anat Cohen et al,

“Only 20% of the learners were collaborating in the forums throughout the entire course and were responsible for 50% of the total posts. A portion of them earned the name “Super Active.” The analyses not only demonstrated the volume of activity and its pattern but also revealed the content of the discussions, which helped to highlight the needs and reasons for students' usage of the forums.” [4]

Indeed, an active discussion forum gives a lot of insight into the learners' ways of thinking. However, this author's experience of activating a discussion forum has been far from satisfactory. She suspects that it has something to do with teacher student relations prevalent in India. Students feel inhibited to discuss freely in the teacher's presence.

Collaborative learning



A beautiful example of collaborative learning is OER4BW's invitation to contribute ideas for an open picture book on open education. Those of us who have volunteered to be a part of it have filled out a form that has interesting questions like "When you think of open education, which animal comes to your mind and why?" "What makes this character/ her vulnerable?"

The final product, once it is out, promises to be quite exciting.

Such an exercise can be initiated in MOOCs too. So, through a MOOC, learners will not only learn, they will also be creators of resource material.



Assignments and rewards



Assignments in the foundational chapters can be less challenging and more like fun assignments. Diverse learners can be kept in mind while designing the assignments. Visual, kinaesthetic and auditory learners can be engaged with appropriate assignments designed for different learners. Exemplary assignments can be showcased in the discussion forum. This will give a tremendous boost to the learner. Once they taste success in assignments and quiz, they will feel motivated to move on with the course.

While the developer's role will be to set exciting assignments, the role of AI will be to reward the successful learners with badges and stars.

Assignments can also be peer reviewed. Algorithms can be drawn up to forward assignments at random to members of the peer group. Special rewards can be set aside for the best reviewers. If criteria for reviewing are carefully calibrated, then best reviewers can be shortlisted by the AI.

As the course progresses, the modules and assignments can gradually become more challenging.

Quizzes



By now it is an accepted fact that in MOOCs, learners are inclined to take up the self assessment quizzes. All available statistical data shows that participation in quizzes has been relatively high. The developer can set quiz questions in such a way that most learners score something, but the really good learners score 100%.

That means, in a set of 10 or 20 questions, at least 2 questions should be challenging, that will help to sift the best from the rest.

After the developer sets the quiz questions, quizzes are completely handled through algorithms. Algorithms can be coded in a way to ensure that good performers in each module receive badges by email. 100% scorers in each module should receive special badges. Special rewards can also be set aside for those who correctly answer the really tough quiz questions.

Redefine completion

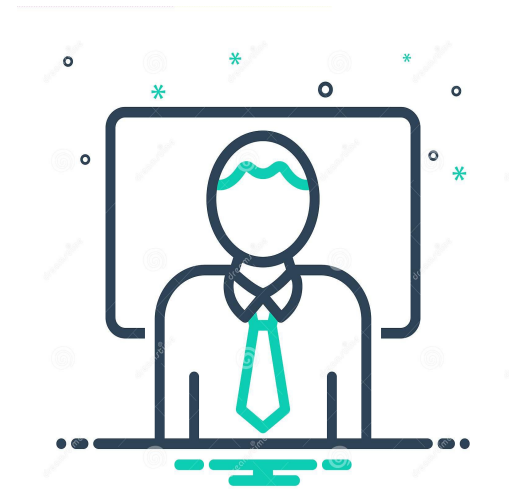


At present, the yard stick for course completion for MOOC is taken as the learner earning a certificate at the end of the course. But there may be many learners who do not need the certificate and so they do not participate in the final assessment. Yet they remain active through out the duration of the course. Keeping this in mind, different levels of completion may be defined for a course – specially a long course.

If participants keep receiving stars and badges for their performance in quizzes and assignments, then levels of completion may be defined in terms of points accumulated through these badges and stars. In this hierarchy of completion rates, the highest position will be for those who earn the certificate (with a grade) after the final assessment.

Suggested role of developer in personalizing learning experience in MOOCs

- ❖ Keep a wide and varied learner community in mind
- ❖ Strike a popular chord with appropriate language and visual tools
- ❖ Keep the foundational modules relatively simple
- ❖ Create a bouquet of assignments for diverse types of learners
- ❖ Be ready for mid way course correction



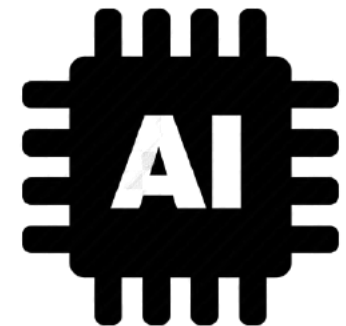
Suggested role of instructor/ facilitator in personalizing learning experience in MOOCs

- ❖ There is no alternative to 'live' sessions. Have synchronous modules at least once a week
- ❖ Create space for presentations by learners
- ❖ Share exemplary assignments with all learners
- ❖ Invite guest speakers in some synchronous sessions
- ❖ Initiate group activities through which learners can create content for future learners



Suggested roles for AI in personalizing the learning experience in MOOCs

- ❖ Dividing learners into groups by processing their registration forms
- ❖ Forwarding different sets of assignments to different groups
- ❖ Layered processing of quiz performance to track the progress of learners
- ❖ Awarding stars and badges to learners
- ❖ Processing a mid course survey
- ❖ Tracking responses in discussion forums



In conclusion

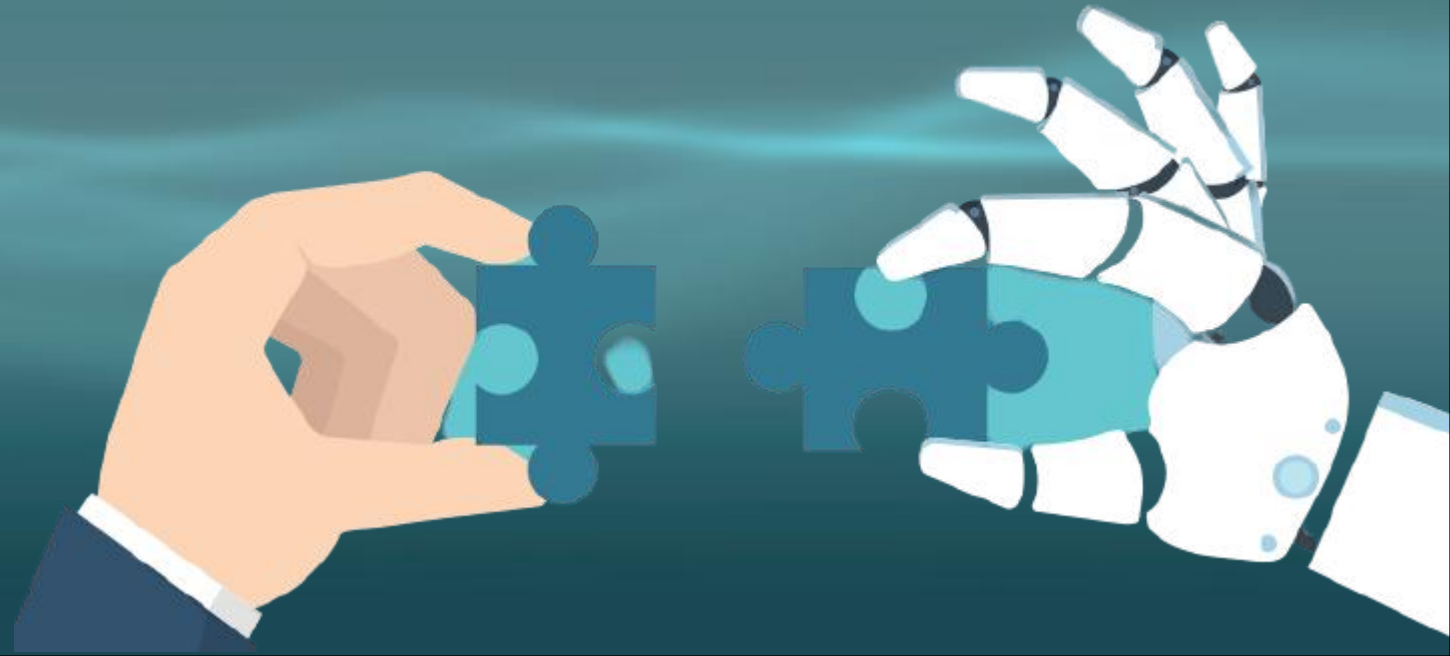
At present, the term Massive in MOOC has three major connotations:

- Massive enrolments
- Massive number of courses offered
- Massive drop out rates

Some people believe that massive drop out rate is a corollary to massive enrolment. This belief has more than a grain of truth if we continue to perceive MOOCs as conventional courses. But if we remind ourselves that MOOCs are inclusive and open, then developers have to take a completely different approach in creating a MOOC. And service providers who create platforms for MOOCs have to code algorithms to create a congenial learning environment for diverse categories of learners.

The technology is available, the human mind set has to change.

A creative collaboration between human and artificial intelligence can transform MOOCs into a truly disruptive technology in the field of education.



Reference

- [1] Patrick Mukala, Joos Buijs, and Wil van der Aalst, *Uncovering Learning Patterns in a MOOC through Conformance Alignments*, Department of Mathematics and Computer Science, Eindhoven University of Technology, Eindhoven, The Netherlands
- [2] Subha Das Mollick, *Inclusive Education through Technology: Are MOOCs the Ultimate Solution to Address India's Higher Education Challenges?*, Paper presented at MCSD Seminar at Viswa Bharati University in February 2019
- [3] D.F.O.Onah, J.Sinclair, R.Boyatt, *DROPOUT RATES OF MASSIVE OPEN ONLINE COURSES: BEHAVIOURAL PATTERNS*, Univ. of Warwick, UK
https://www.researchgate.net/publication/273777281_Dropout_Rates_of_Massive_Open_Online_Courses_Behavioural_Patterns
- [4] Anat Cohen, Udi Shimony, Rafi Nachamias, Tal Soffer, *Active Learners' Characterizations in MOOC forums and Their Generated Knowledge*, British Journal of Educational Technology (27 August, 2018) <https://doi.org/10.1111/bjet.12670>

Useful links

Quality Education: Why it Matters <https://www.un.org/sustainabledevelopment/wp-content/uploads/2018/09/Goal-4.pdf>

<https://swayam.gov.in/About>

Dr. Doug Gutheire (April 27, 2013), *The future of higher education: MOOCs and disruptive innovations*, George Washington University.

<https://youtu.be/hw1ryTd-J1I>

Daphne Koller, (2012), What we are learning from online education, Ted Talk,
<https://youtu.be/U6FvJ6jMGHU>

Anant Agarwal, (Jan 27, 2014), Why massively open online courses still matter, Ted Talk,
<https://youtu.be/rYwTA5RA9eU>

