

# Operationalizing the Learner-Centric MOOC model using Communities of Practice

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**Abstract**—Massive Open Online Courses (MOOCs) have been around for quite some time and have revolutionized the field of education. They have gained popularity and have grown exponentially during the COVID-19 pandemic. The challenge is to design and develop a MOOC which can engage the learners. In order to achieve this, the two important requirements are a robust MOOC creation model, and a collaborative team to orchestrate the design elements of the MOOC in an effective manner. In this research, we have selected the Learner-Centric MOOC (LCM) model and used the theory of ‘Communities of Practice’ (CoPs) to facilitate and implement the LCM model. We found that the collaboration focused around the LCM model has helped the model evolve in various dimensions. There is a modular adoption of the model in face-to-face, blended, and online learning sessions. The CoPs also resulted in capacity building, collaboration, and adaptation of the LCM principles to different teaching-learning environments. This mode of operationalizing the LCM model paves way for a larger, but organic reach out, systematic upgradation of its tenets, and evaluation of the model across domains.

**Index Terms**—Collaboration, Communities of Practice, Discussion Forum, Learner-Centric MOOC Model, Learner Engagement, MOOC Design, Teaching-Learning

## I. INTRODUCTION

For almost a decade, Massive Open Online Courses (MOOCs) have transformed education by their ease of access, flexibility, and diversity. MOOCs have also been changing education dynamics and student learning [1]. With the COVID-19 pandemic and more learners resorting to online education, MOOCs seem to have consolidated their position. This growth is similar to that of the Year of MOOC in 2012 [2]. The characteristics of MOOCs such as flexibility, autonomy, remote and anytime access confer benefits of MOOCs [3]. These advantages also give rise to a unique set of challenges. MOOCs are reported to have lesser engagement and reduced peer learning [4]. MOOCs report a high drop-out rate with an average completion rate of 10-12% [5]. The other charges that MOOCs face are ill-established teacher-learner relationships, a sense of isolation, and disconnect which is said to adversely affect the learning outcomes and course completion rates.

Multiple pedagogical designs have been used to offer MOOCs. These are not uniform across courses and each of the design

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features have strengths and weaknesses [6]. Models have been proposed to design MOOCs based on connectivist, intrinsic motivational, and social constructivist theories and enhance the content quality [3], [7]. To promote engagement and to improve MOOCs, strategies such as active learning, interaction of student and faculty, student interaction, immediate feedback, scoping for diversity, communication of time commitments and expectations, deep learning possibilities have been listed from successful MOOCs [6], [8]. However, universal acceptance and widespread adoption of such designs are limited.

The LCM model was developed as a prescriptive model that would guide planning, implementation, and design of MOOCs [4]. There has been active academic dissemination of the model which has led to a number of courses and online instructional initiatives that are based on the model. A wider reach of the learner-centric strategies of the LCM model were facilitated by establishing CoPs among interested members of the teaching profession. This was achieved by systematic collaborative opportunities and capacity building exercises. The structure of the LCM model and the operationalization of the model through establishment of CoPs forms the ensuing narrative.

### A. The LCM Model

The LCM model consists of Learning Dialogue (LeD), Learning by Doing (LbD), Learning Extension Trajectories (LxT), and Learner Experience Interactions (LxI), along with the dynamics of Orchestration [4]. Figure 1 shows the overview of the LCM model.

#### 1) Learning Dialogue (LeD)

A LeD is a short video which has a strategic pause point where a question is asked to the learner. This requires the learner to recollect, apply or evaluate the content and frame an appropriate answer. The instructor anticipates learner responses and summarizes answers in the subsequent part of the video. This pause point is called a Reflection Spot (RS), which prevents passive watching of the video.

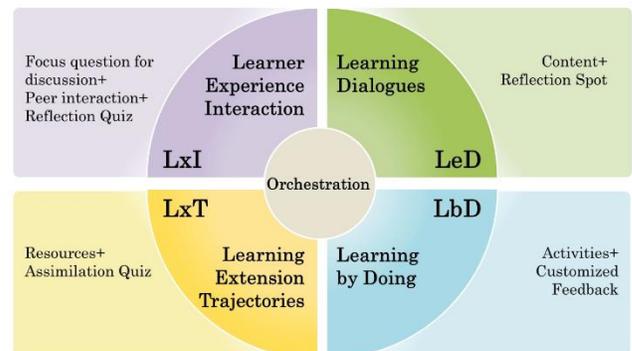


Fig. 1. LCM model overview.

#### 2) Learning by Doing (LbD)

The LbDs are activities that would normally constitute the ‘homework assignments and practice activities’. LbDs follow every

LeD and are made up of practice questions that are ungraded. They provide an opportunity for immediate consolidation of content explained in the LeD. Constructive feedback is provided to the learners to enhance their learning. Feedback mentions where and why the learners went wrong and how they should progress ahead. Such feedback and individualized attention that is possible in an in-class session is facilitated through the LbDs that point the learner towards achieving learning goals.

### 3) *Learning Extension Trajectories (LxT)*

The LxTs correspond to extra learning materials in a normal classroom. Learners are provided with a wide variety of learning resources related to the course content such as videos, links to various web pages or even research papers. These selected resources are categorized into two or more trajectories, which learners can access based upon their interests. To assimilate concepts in the trajectories, learners attempt an Assimilation Quiz based on the chosen trajectory.

### 4) *Learning Experience Interactions (LxI)*

Discussion Forums (DFs) in MOOCs face problems such as conversation scatter [9], lack of meaningful participation and productive interaction [10]. The LxI, is designed to address this challenge. LxI helps in bringing in the learners into the DF with the help of Focus Questions (FQs) that prevent scatter and anchor discussions around a topic. FQs then drive the discussions by requiring the participants to share their perspectives and experiences and interact with other learners on the forum. Graded Reflection Quizzes (RQs) are based on the interactions on the DF, thus incentivising participation and perusal of the posts of fellow learners. LxI fosters collaborative learning and creates an added learning resource pool within the course that is monitored and moderated by the instructor, Teaching Associates (TAs), and Discussion Forum Moderators (DFMs) [11].

### 5) *Orchestration*

The orchestration of the MOOCs created using the LCM principles involves constant monitoring of learning trends using learner performances and reports. This allows periodical cognizance of challenges encountered by participants. Appropriate measures are instituted to address these challenges, such as extension of deadlines, flexible hours of live interaction when necessary, and personalized reminder emails and text messages that encourage more participation and also serve to overcome the transactional distance encountered in online learning courses.

The orchestration and implementation of the LCM model requires dedicated personnel and time commitments. This can be made possible by the collective efforts of a larger course team, comprising multiple focussed groups or communities.

## B. *Communities of Practice*

Communities of practice are defined as “groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” [12]. Members of this community spend time together, share information, insight, and advice. They ponder over common issues, help each other to solve problems, explore ideas, accumulate knowledge and become informally bound by the value that they find in learning together. They also develop personal relationships and established ways of interacting [12]. A Community of practice is evolved around three characteristics: Domain, Community, and Practice [13]. These are described as below:

*Domain:* The members have a shared area of interest and on common grounds, they inspire more members to participate, guide them and operationalize the activities.

*Community:* Based upon this interest, a strong community that continues these activities through shared and collective discussions is

built. The focus is to establish a working relationship that fosters interactions and shared learning.

*Practice:* Community members are actual practitioners in the domain of interest. They practice with a specific focus around which the community develops, shares and maintains the process of learning.

In the field of education, there already exist domain-specific networks of faculty members at departments and universities, ICT specialists, MOOC creators, instructional designers, moderators, demonstrators and so on, who facilitate the teaching-learning process. These networks have been leveraged upon to constitute CoPs, who are thereby involved in working with the LCM model. These CoPs work collaboratively to implement the LCM model at various levels, to achieve intended outcomes.

## II. OUTCOMES OF OPERATIONALIZATION

Unlike many other MOOC models developed, the LCM model has been evolving. One of the reasons for this perpetual evolution is its structure. LCM model doesn't restrict the entry point. It has a 'Low floor' for anyone to implement the model. Secondly, the model allows partial operationalization, where practitioners can implement any number of elements, without being constrained to implement ALL. This provides the 'high ceiling'. Finally, the model is generalizable across domains, which is because of its 'wide walls'.

We present some examples, where the application of the LCM model has been possible using 'low floor, high ceiling, and wide walls' feature.

### A. *Application of LCM Model*

The LCM model was developed by a team of researchers from a single institution, yet in a short time span, it has been internalized and implemented across multiple institutions and by multiple instructors in varied ways. This was achieved by the inherent nature of the model and the CoPs that ensured that the components of the model were applicable as a whole or module wise. They are practicable in school, college, faculty development courses, and in face-to-face, online and blended environments. The model is dynamic and open to interpretation by course creators looking to enhance learning outcomes and hence there is a scope for improving the model and evolution of the elements. The model lends itself to customization across multiple domains and diverse learners and has opened up research avenues. Listed below are some of the interesting applications of the model which are evident as the outcomes and artefacts of implementation.

#### 1) *Development of MOOCs*

Initially, courses and Faculty Development Programs (FDPs) from IITB were designed based on the LCM model. It was seen that outcomes such as course completion rates and learner reported engagement with the course were higher than that compared with traditional courses and FDPs [5].

A total of 15 MOOCs based on the LCM model have been offered on platforms like Swayam (National MOOC platform of India), IITBx (Online platform developed by IIT Bombay) and edX. MOOCs based on the LCM model have been created and offered in the diverse domains of education, chemistry, computer teacher training and skill based courses such as animation. Basic 3D Animation using Blender, Designing Learner Centric MOOCs, Demystifying Networking, Open Educational Resources are a few examples. The feedback and performance analytics of these courses are encouraging and show higher completion rates and learner engagement and interaction.

The LCM model was also used to deliver faculty development courses. For instance, the Education Technology Department, IIT

Bombay collaborated with TAs from various institutions to design and conduct a MOOC based on the LCM Model that was offered to faculty of engineering colleges nationwide. The MOOC was titled ‘Digital transformation in the Teaching-Learning process’ (DTITLP) and focussed on pedagogical and technical use of smart boards to deliver learner-centric instruction. A total of 5954 participants across 184 institutions participated, spread over four offerings of the course, with completion rates ranging from 59-85%.

2) *Research Ideation and Innovation*

The LCM practitioners in different domains have contributed to the research on application of LCM model. The role of the LxI was studied through participation in DFs. Positive results were reported and a majority of surveyed participants acknowledged the positive impact of the DF in the course on their learning [14]. Different modes of participation that progressed beyond superficial posts were described in a LxI [11]. Application of the LCM model principles in augmentation of OERs enhanced interactivity and engagement [15]. The collaborators also used their experience in creating learner-centric content in offering faculty development programs and short-term training to faculty members [16]. These were delivered with the intention of increasing the use of learner-centric video dialogues, LbD activities, LxT resources, and enriched LxIs among teachers using the online and blended modes of instruction.

3) *Modular Adoption in LIVE Sessions*

Online and blended LIVE teaching were conducted by modular adoption of the LCM model. LIVE sessions have their own unique challenges. In order to meet them, RS of the LeD component was introduced in live sessions with the prime aim to gauge the understanding of the audience or to seek their opinions. RSs were included at strategic spots in the session where instructors anticipated less engagement. RSs were implemented in real-time by conducting polls, quizzes with the help of various technology tools. This gained the attention of participants during the conduct of the sessions, allowed active learning and micropractice. This was well-received as seen from participants’ feedback who indicated that the sessions were very interactive and engaging. More than 40 such sessions were held to carry the message to ten thousand faculty from varied domains.

The far reach of the model to multiple institutions, individual faculty members and beneficiaries of learner-centric MOOC pedagogy, is attributed to the specialized hubs of practice, that were the CoPs, whose domains, practices and community were tailored for the LCM model.

B. *CoPs: Establishment and Best Practices*

Course designers created specific CoPs to implement the LCM model. They included participants and proponents of the LCM model. Figure 2 shows how the LCM based CoPs were developed and progressed. All members were stakeholders in optimizing the use of Information and Communication Technology (ICT) enabled teaching using learner-centric methods, and also had interests in associated research. The members were involved in team based activities related to operationalizing the LCM model, such as developing LeDs, preparing LxTs, monitoring DFs, etc.

Participation in the Community of Practice (CoP) led to an inherent learning experience for self-improvement. The collaboration allowed for further capacity building, and co-creation of other MOOCs and online learning modules that followed the LCM model. The model was taken up by faculty in association with the creators of the LCM model, leading to value addition and proportionate increase in adoption of the model. This contributed to the constant evolution and improvement of the model.

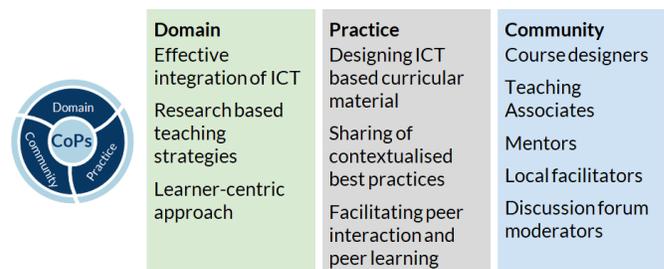


Fig. 2. Framework of LCM based CoPs.

Multiple CoPs operated with specific task specializations. CoPs such as those of course designers, TAs, local facilitators, and DFMs were functional. This enabled effective deployment of skill sets to meet the varied task requirements that are part of MOOCs. However, these roles were not rigid and allowed for members to work on their interests and strengths and move to a CoP where their talents found a niche. While overall orchestration of the MOOCs were overseen and mentored by the CoPs of the course creators, the moderator and facilitator CoPs were instrumental in the micromanagement of the LCM model components of courses and sessions.

1) *Course Creator CoPs*

The creators of the LCM model envisioned that MOOCs would be co-created by a team of instructors. Accordingly, the team comprised members who were subject matter experts, content developers and designers. Roles and responsibilities were assigned to members who worked on formulating the content of the course which included the LeDs, LbDs, LxTs, and LxIs. They were reviewed by fellow members of the CoP. This ensured quality of content which is a pivotal factor in the success of a MOOC. The CoP was instrumental in establishing a safe environment for ideation, contribution, discussion and materialisation. Individual strengths of CoP members in the use of LCM components were fostered. However, role reversal within the team was implemented following a period of observation and guided work. This allowed the members of the CoP to gain experience in all aspects of MOOC creation. Liaison tasks such as working with the technical support team and the administration were also part of the responsibilities shared by CoP members. Real-time orchestration of the MOOC was made possible by this CoP. Course progression was monitored and appropriate timely corrective measures were instituted through personalised reminders, extension of deadlines for quiz submissions and so on.

2) *Moderator and Facilitator CoPs*

Interested and meritorious participants from the previous run of LCM course were invited to contribute as DFM and Facilitators. Their participation was voluntary and tasks were based on teamwork and interaction with other members, guided by course designers and mentors. Scaffolding was used for capacity building that ensured greater autonomy with practice. Online communities were formed which allowed brainstorming and rapid problem solving. This also led to peer learning among members. Different levels of participation of the members were accepted, in order to balance time constraints. The diversity of members ensured a wider range of shared expertise which helped in building the learning environment of the DF.

3) *Integrated Role of CoPs in Operationalizing the LCM Model*

The various CoPs worked together to achieve a single goal, which is operationalizing the LCM model. The following is an example that describes how this was accomplished and specific teaching-learning outcomes were achieved.

The course creator CoPs designed the DTITLP course on the usage of smart boards, based on the LCM model. The members collaborated to integrate multiple components of the LCM model in

the course. When the course was offered, the CoPs of course instructors and TAs appreciated good responses and constructive feedback given by the learners on the DF. In addition, the instructors also introduced a strategy where the ‘best post of the week’ was highlighted on the forum. This encouraged more participation in the forum. Participants created innovative content such as demonstration videos and FAQ repositories. These were uploaded on the course platform and video aggregator sites such as YouTube. Such participants formed part of the newer CoP of DFMs who worked to involve and encourage learners from subsequent offerings of the course. They ensured further spread of this model among their institutions and domains. The members helped to localize the content of MOOCs by translating content and providing institution-wise learner support by forming communities of local facilitators. This CoP of moderators and facilitators trained further DFMs and facilitators. Based on their interests, they also formed part of Instructor and TA CoPs, creating their own LCM based courses.

This is an exemplar of learner engagement and achievement of higher order learning outcomes, such as synthesis, that was made possible through the LCM model facilitated through CoPs. In order to scale up, and expand the scope of the model and its mode of community supported implementation, there is a need for multiple collaborators who can contribute, by bringing in their own range of expertise and perspectives.

### III. COLLABORATION POSSIBILITIES

The LCM model lends itself to customization and multiple interpretations by users to suit various platforms. These LCM-based projects are validated by several research communities who have reiterated the robustness of the model. The involvement of collaborators who are willing to proactively participate in relevant teaching and research activities will further enrich the model. So we are looking for collaborators to:

- Implement each element of the model in diverse learning environments, thereby devise methods for easier and user-friendly adoption.
- Use ICT tools in developing templates for adoption of LCM elements. This can include development of self-assessment rubrics which help in scaffolding the transition to learner-centric methods.
- Identify data parameters to evaluate ‘learner-centricity’ in MOOCs and publish the research findings of the studies.
- Design instructional activities based on LCM model to enable learners to attain the course outcomes.
- Document and publish experiences of collaboration regarding the challenges faced and best practices implemented during the creation of courses.

The findings of the collaborators would help us to gain valuable insights and contribute in making the LCM model more robust and universally applicable.

### IV. DISCUSSION

CoPs established a strong collaborative support network that facilitated efficient workflow and a constructive review process. The collaboration resulted in the usage of various ICT tools (Online platforms such as Moodle, Mentimeter, Padlet, Google drive) and creation of various online communities (using WhatsApp, Slack, Facebook) exclusively for building the community. Various ICT based curricular materials were also designed by CoPs.

The manner in which the LCM model was implemented through CoPs has resulted in amplification of the intended outcomes. This is

evident in the examples shared in the article. This has led to organic growth and sustainable practices that has led to evolution of the model. Each CoP has contributed towards honing the methodology of practice of each element and the model as a whole inclusive of the orchestration dynamics. Further validation and evolution of the model requires additional research in order to universalize the adoption of LCM principles.

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