

# Designing learner centric MOOCs

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# Educational Technology, IIT Bombay



- Inter-Disciplinary Program, started 2010
  - Core faculty, also from depts of Engineering, Science, Design, H&SS

- R&D, PhD program

*Project TUET*: Teacher use of educational technologies

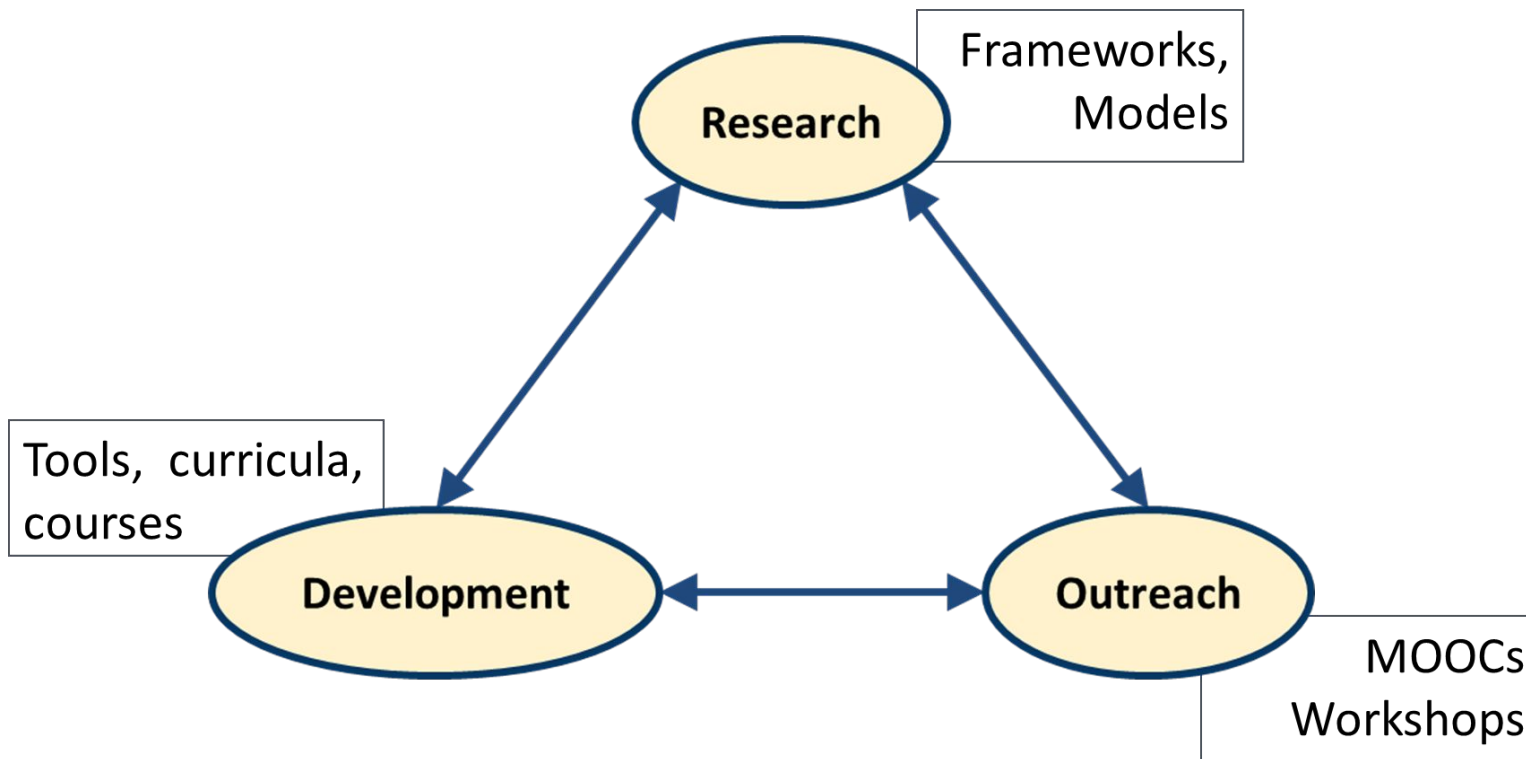
*Project TELoTS*: Technology enhanced learning of thinking skills

- Consultancy : Learner-centric pedagogy training & content-creation for industry
- Outreach: FDPs, MOOCs

# Project TUET



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# Scenario

In order to create a MOOC, an instructor creates lecture videos, provides exercises, clarifies queries on discussion forums and does assessment.

*What has this instructor missed?*

# What do you think – what has been missed?



\*

# What's missing

Attention to learner motivation

Getting learners to express their reasoning

Opportunities for immediate micro-application

Formative assessment and instant feedback

Explicit activities to foster peer-learning

Ensuring learner connect during the MOOC

Established theories of *How People Learn* is missing

# Traditional MOOCs



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Provide anytime anywhere access to learners for:

- Information – lectures, resources
- Assessment - activities and exercises
- Discussion – with peers and instructor(s)

# Implications

- Common MOOC problems may persist - low student engagement, low participation in discussion forums, low completion rates
- Problems of engagement worsen in a MOOC setting - distance, scale and diversity of learners are all high



# Need - Learner Centric MOOCs

Not sufficient to focus only on the technology features

Not effective to mimic a typical classroom

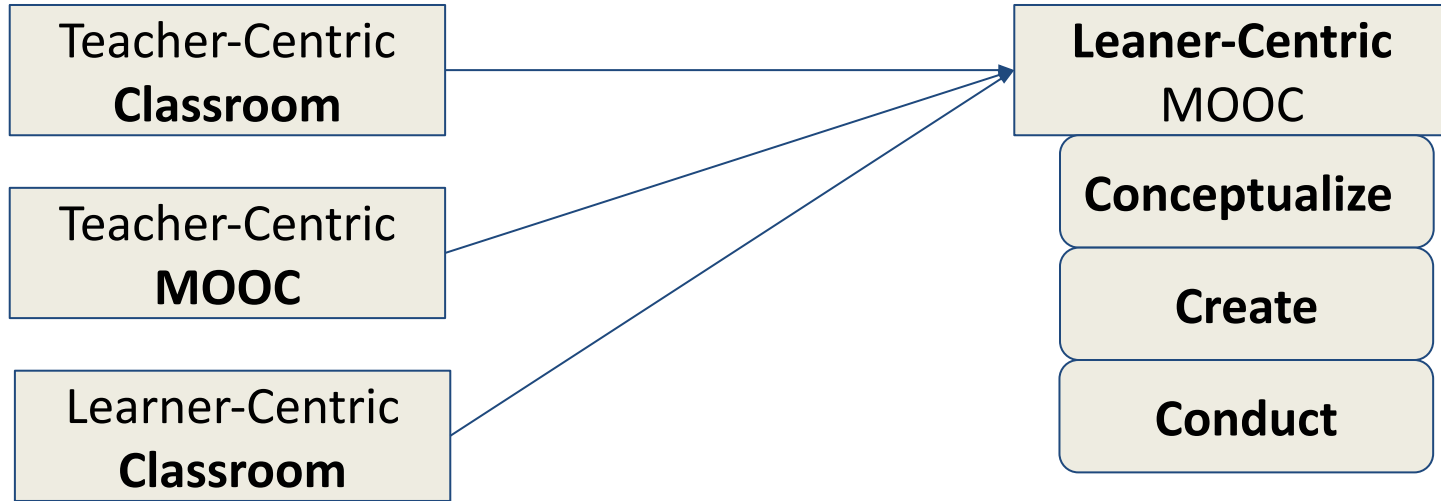
*Need:*

Incorporate learner-centric approaches  
using technology affordances



# Learner Centric MOOC Model

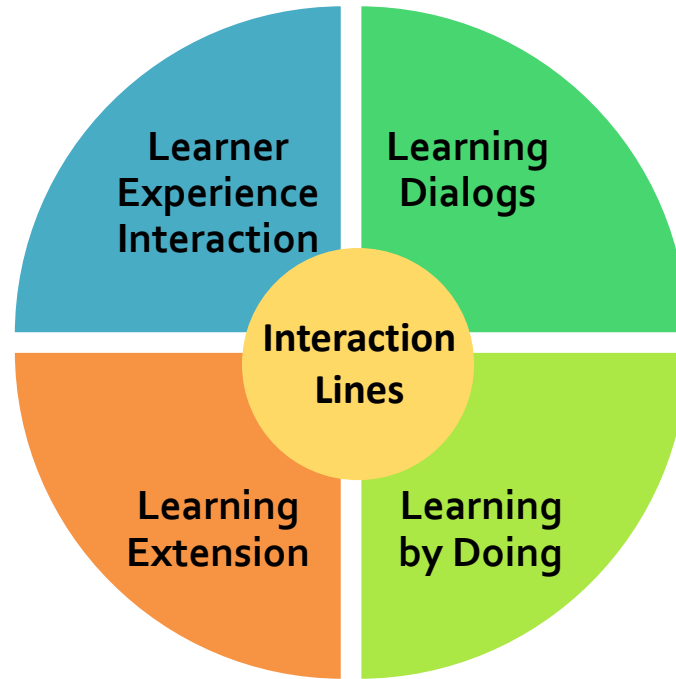
LCM MODEL HELPS AN INSTRUCTOR GO FROM



# Overview of Learner Centric MOOC Model



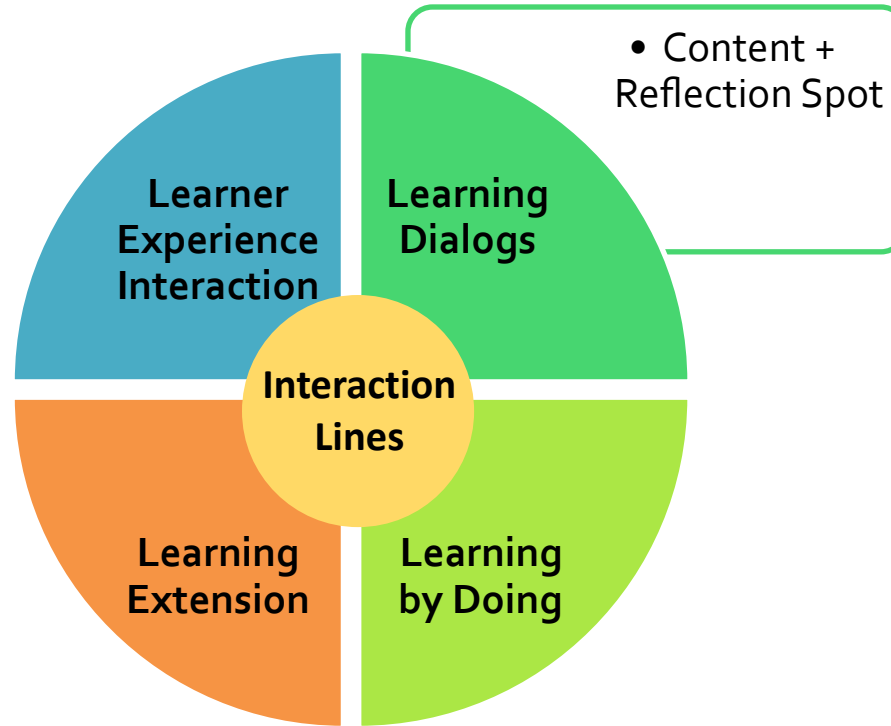
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# Overview of Learner Centric MOOC Model



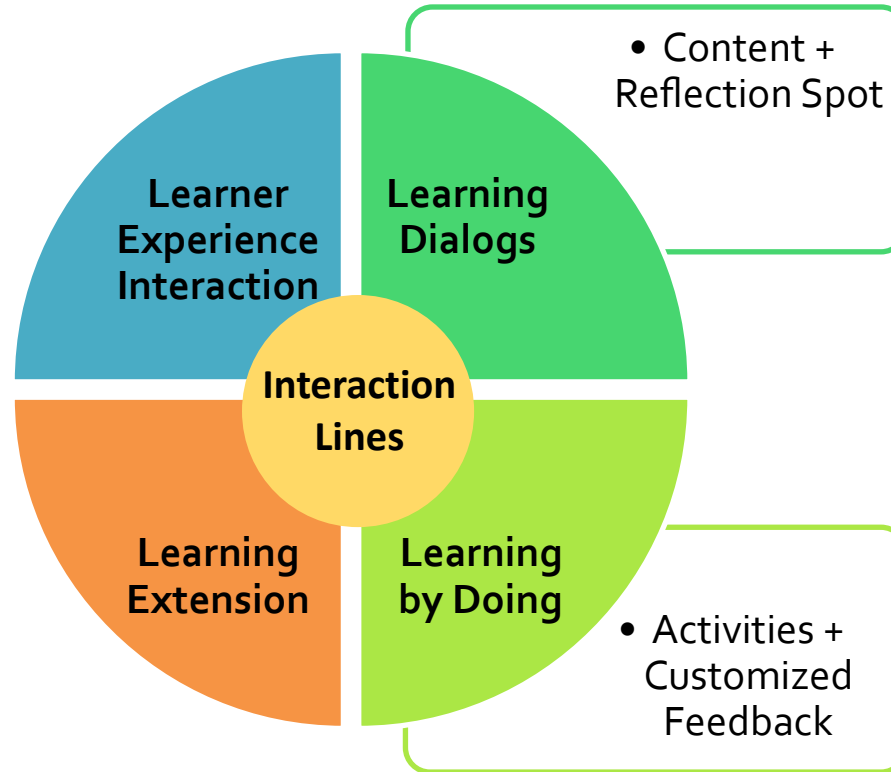
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# Overview of Learner Centric MOOC Model



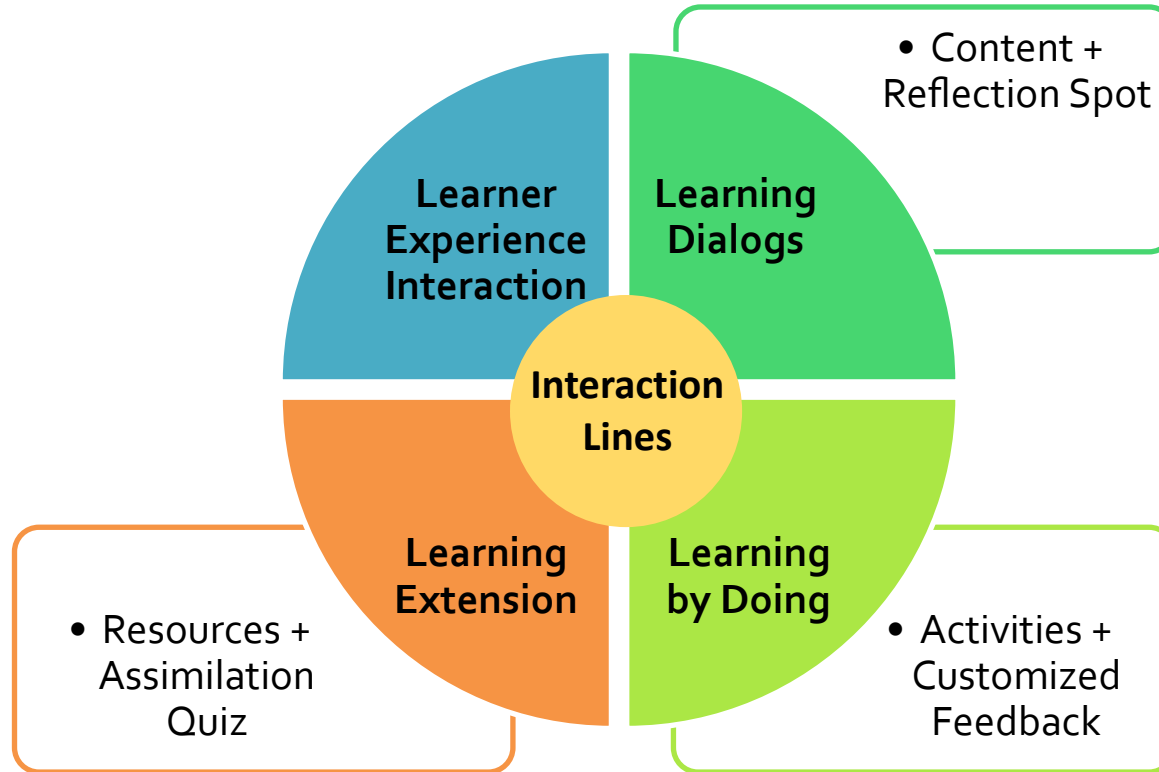
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# Overview of Learner Centric MOOC Model

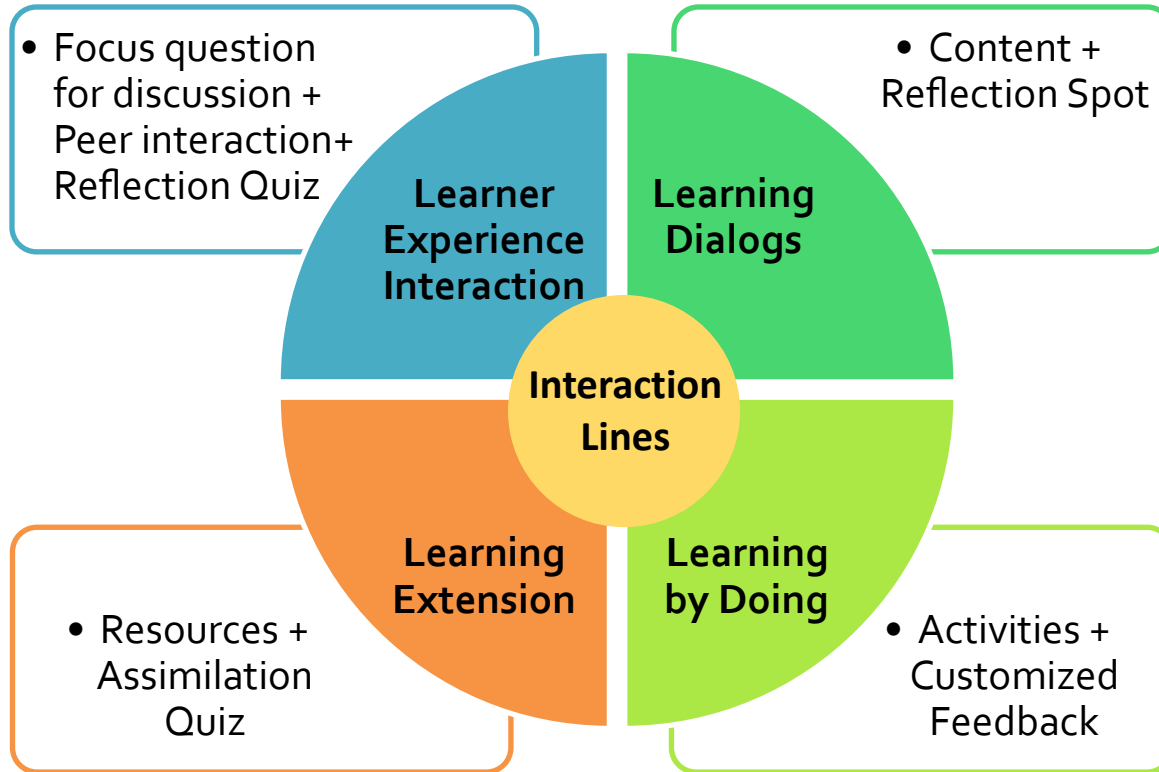


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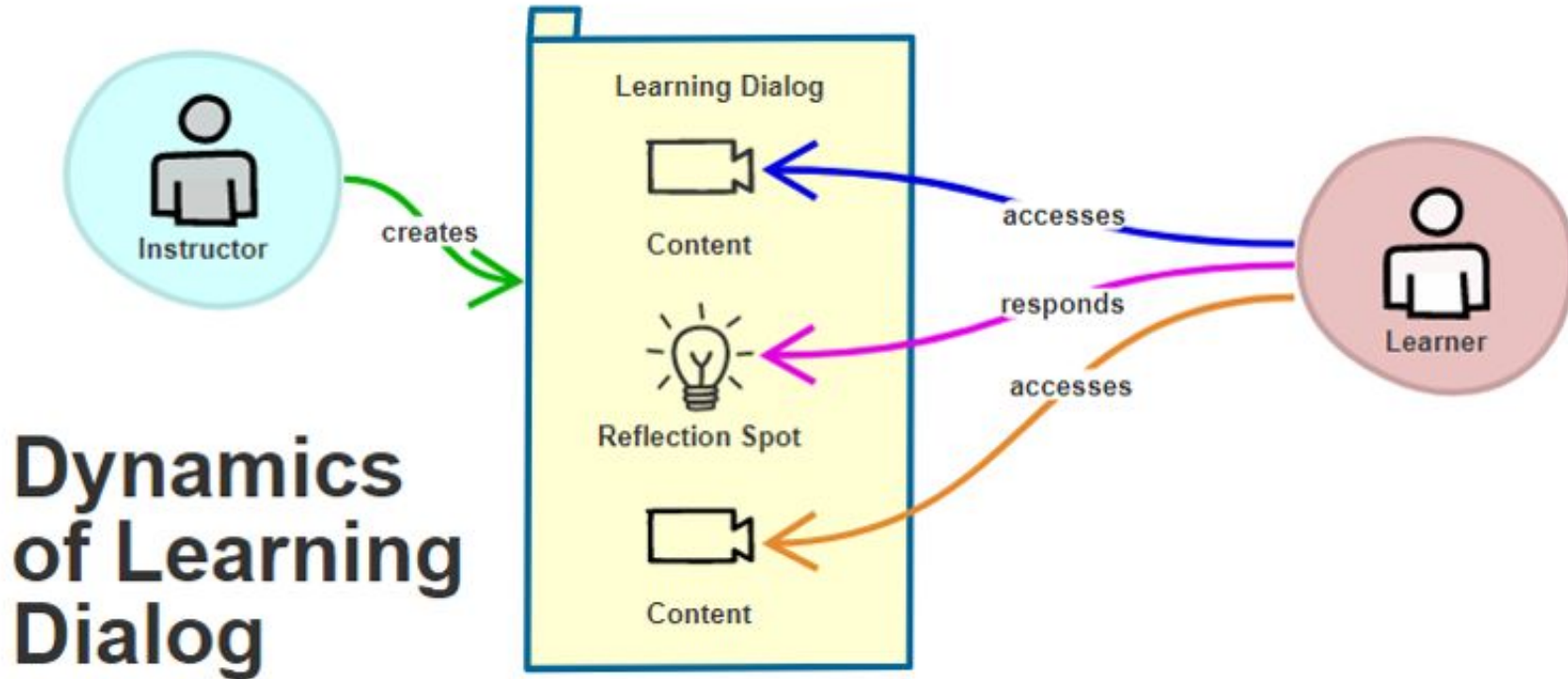
# Overview of Learner Centric MOOC Model



# LeD Dynamics



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## Dynamics of Learning Dialog



# LeD Example in IITBombayX



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ET612Tx S102 CS Pedagogy Computer Fluency IIT Bombay

## Reflection Spot: Think and decide

*Which teacher's students are likely to create effective presentations?*

- A. Teacher A
- B. Teacher B

*Why?*

Write the reason in your Journal.

So, at this reflection spot, you need to think and decide

0:33 / 7:49

Educational Technology, IIT Bombay



[Weblink](#)



# LeD Details

- Content - part of short video / text
- Reflection spot:
  - Objective: learner engagement with content (not assessment)
  - Connected to the immediate preceding content in the LeD.
  - Learner needs to express their ideas via poll or MCQ or free form writing

*Takeaway: Include reflection spots in content (videos/text)*

# Evidence

- Average retention rate in FDP101x:
  - LeD videos : 69.9%
  - Regular videos : 55.73%
- Participants highlighted relevance and usefulness of LeD.
- 5000+ course journal submissions (out of 7000 participants) highlighted Reflection Spot activities.

# From traditional to Learner-Centric MOOC



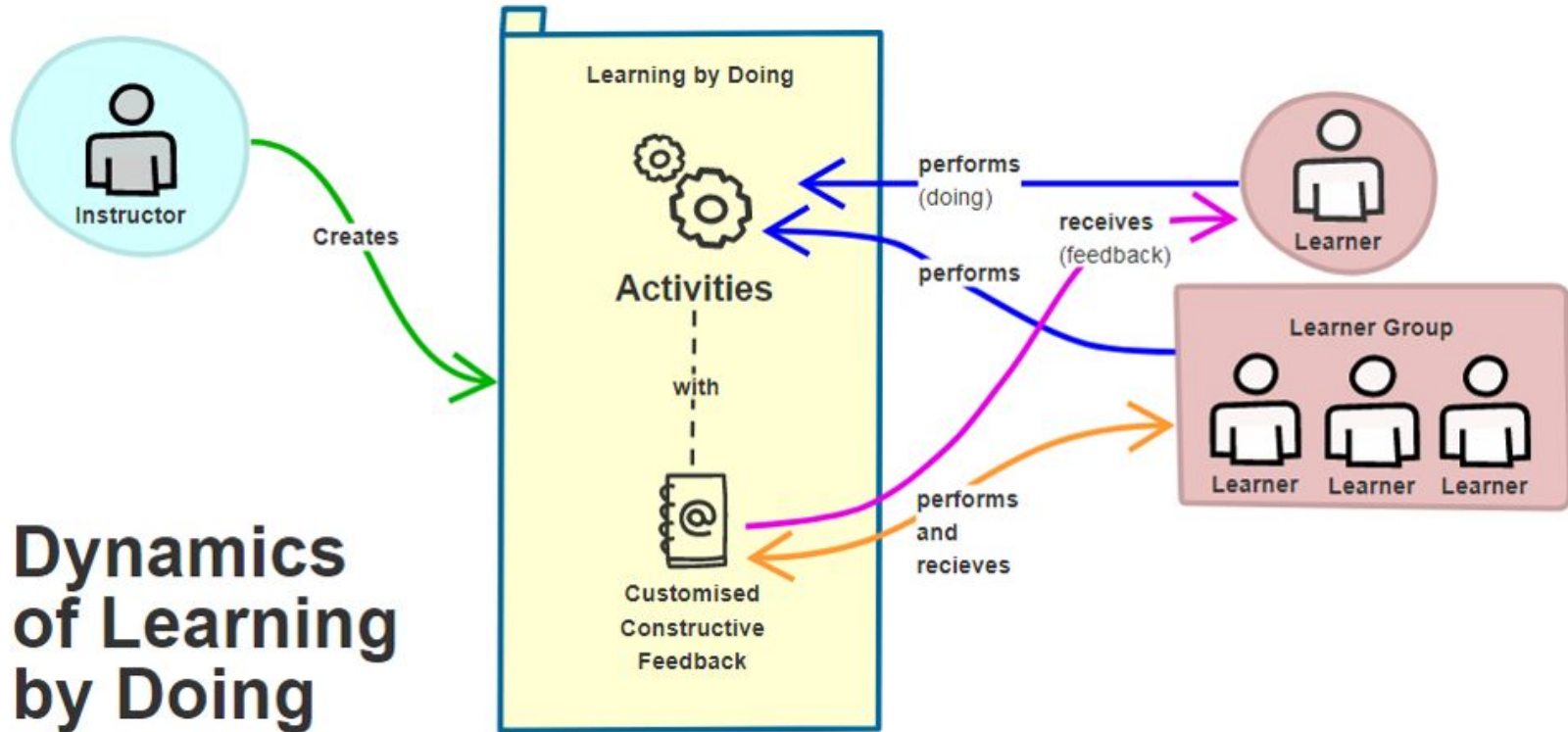
Lectures and demos → **Learning Dialogs**  
One or more units of  
**[Content + Reflection Spot]**

*Takeaway:* Include reflection spots in content (videos/text)

# LbD Dynamics



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## Dynamics of Learning by Doing



# LbD Example in IITBombayX

**LbD Activity:**  
Design a flipped classroom for a topic in your course.

## Rubrics for peer-assessment

You will be evaluated on the basis of below rubric criteria:

| Criteria/Scale                                | Missing (0)                      | Inadequate (1)  | Adequate (2)  | Exemplary (3)   |
|---|----------------------------------|---|---|---|
| Learning Objectives for Out-of-class activity | Learning Objectives are missing. | Learning Objectives have been stated, however they are not properly constructed or are addressing higher order thinking skills.<br>For e.g. Students will be able to understand DeMorgan's theorem<br>Or Students will be able to design circuits using NAND and NOR gates. | Learning Objectives have been stated using specific and measurable action verbs at Lower Cognitive levels.<br>For e.g. Students will be able to explain DeMorgan's Theorem. | Learning objectives have been stated using specific and measurable action verbs with needed qualifiers to increase the clarity.<br>For e.g. Students will be able to explain DeMorgan's Theorem using Truth tables. |
| Length of the Video                           | No video link is present.        | The video is longer than 20 minutes.<br>For e.g. providing links to an hourlong NPTEL lecture on Digital Logic Circuits.  | The video length is between 3~15 minutes. If the total video is more than this time duration, then it has been split-up into multiple parts to                              | The video length is around 10 minutes. If the original video was having more length then it has been split into separate parts to satisfy 10 minute   |

[Link to course](#)

# LbD Details



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- Customized constructive feedback:
  - MCQ – Each wrong option should have corresponding feedback – what is wrong with that option, how to get to the correct answer.
  - Assignments – Have rubrics for self- and peer-assessment.
- Peer assessment – Learning happens for both the receiver and giver of the feedback.

# Evidence



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- 91.8% people found LbD activities useful [N=695]
- *“LbD activities and resource creation activities were very useful and regular practise of the same help a teacher to improve quality in teaching and learning process”*
- *“ LeD and LbD helped me to understand the minute difference between standard practices and my own practice of lesson design.”*



# From traditional to Learner-Centric MOOC



Assignments → **Learning by Doing**

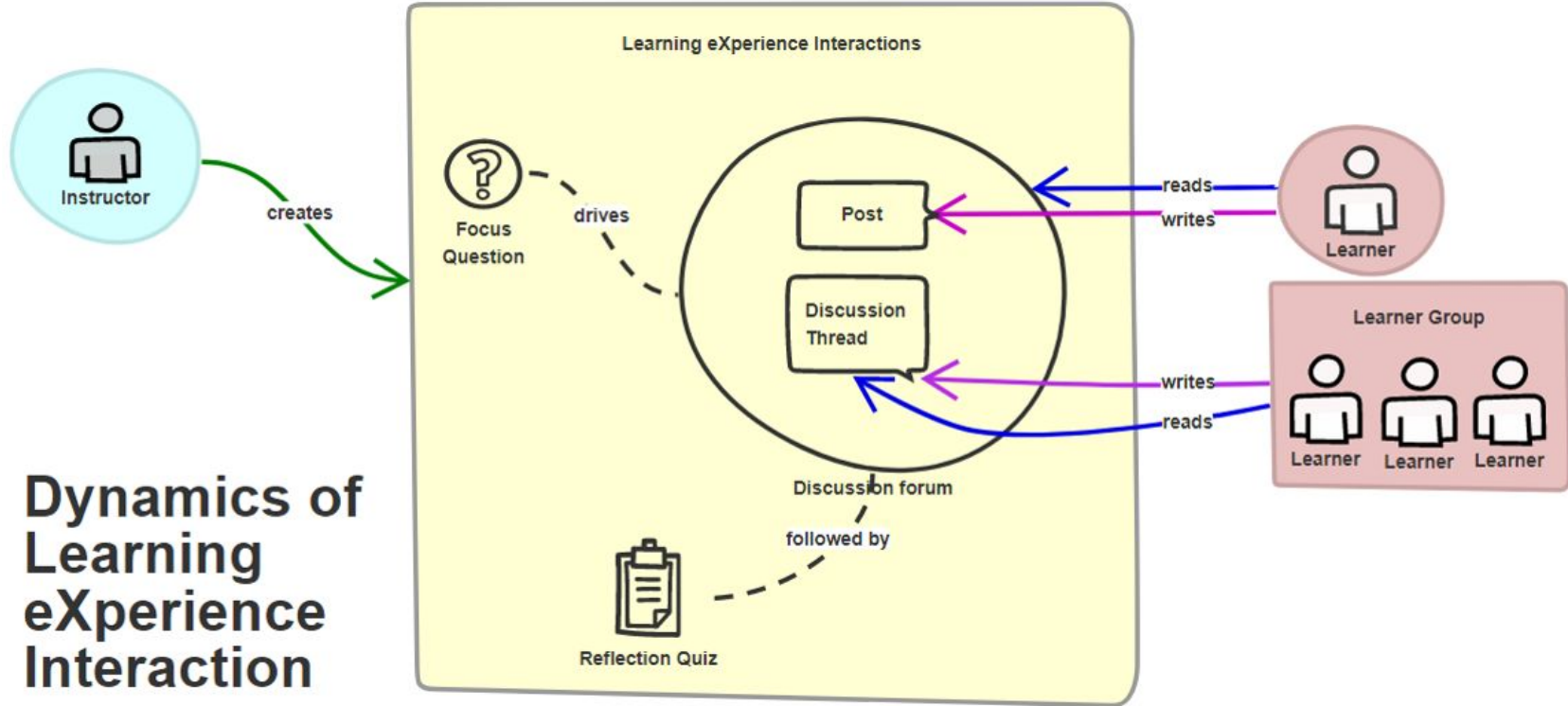
Activities consisting of  
**[Concept attainment, Apply knowledge  
+ Customized feedback, peer review]**

*Takeaway:* Follow up each LeD with a corresponding LbDs.

# LXI Dynamics



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## Dynamics of Learning eXperience Interaction



# LxI Example in IITBombayX

Secure | <https://courses.iitbombayx.in/courses/course-v1:IITBombayX+ET611Tx+2017T1/courseware/bf0aaf2bee5a4b679ef218b0faa3d294/2ef37ebc00c94568a4807b...>

Pedagogy Primer

- Module 2 : Active Learning and Classroom Strategies
- Active Learning : Why? What?
- Peer Instruction: What? How?
- Think-Pair-Share: What? How?
- Learning Extension Resources
- Assimilation Quiz 2 [GRADED]  
Assimilation Quiz due Jun 1, 2017 00:00 IST
- Summary
- LxI and Reflection Quiz 2 [GRADED]**  
Reflection Quiz due Jun 1, 2017 00:00 IST
- Addressing your concerns
- Knowledge Quiz 3 [GRADED]  
Knowledge Quiz due Jun 1, 2017 00:00 IST
- Resource Creation Assignment 1 [GRADED]  
Resource Creation Assignment due Jun 1, 2017 00:00 IST

Discussion Forum

Bookmark this page

ABOUT THIS UNIT

- In this unit, you will do a D...  
purpose of this activity is f...  
Learning with your course...

**What you have to discuss:**

**Step 1** - Post your response...  
posted by your course-mate...

**Focus question** - You have...  
and Think-Pair-Share (as par...  
forum about :

- (i) What challenges did you f...
- (ii) What new thing did you l...

**Step 2** - Go to the Discussion...

**Step 3** - Respond to answers...

**Step 4** - After participating in...

## Reflection Quiz

SUBMISSION HISTORY

STAFF DEBUG INFO

You would have seen many people share their experience of designing active learning activities for their own course.

Select the most common problem your course-mates shared in the discussion forum.

- I found it very difficult to create active learning activity questions for higher order learning objectives
- I had to spend more time to think and create these activity questions than I normally do
- I had difficulty in identifying common student misconceptions in the topic while creating these activity questions
- Other

# LxI Details



Focus question: purpose – ensure discussion does not scatter

Examples: Post experience of implementing active learning

Reflection quiz: purpose - ensure learner participation

Examples: What were the common posts? What is your main learning?

# Evidence



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- “In your FDP, discussion forum is the best feature where I can interact with like minded teachers from institutes all over India. ”
- “Discussion with other people about the subject, and TPS and PI activities are very interesting that motivated me a lot to complete the course.”

# From traditional to Learner-Centric MOOC



Learner-learner  
interaction



**Learning Experience Interaction**

Activities consisting of  
**[Focus question for discussion +  
Peer Interaction + Reflection quiz]**

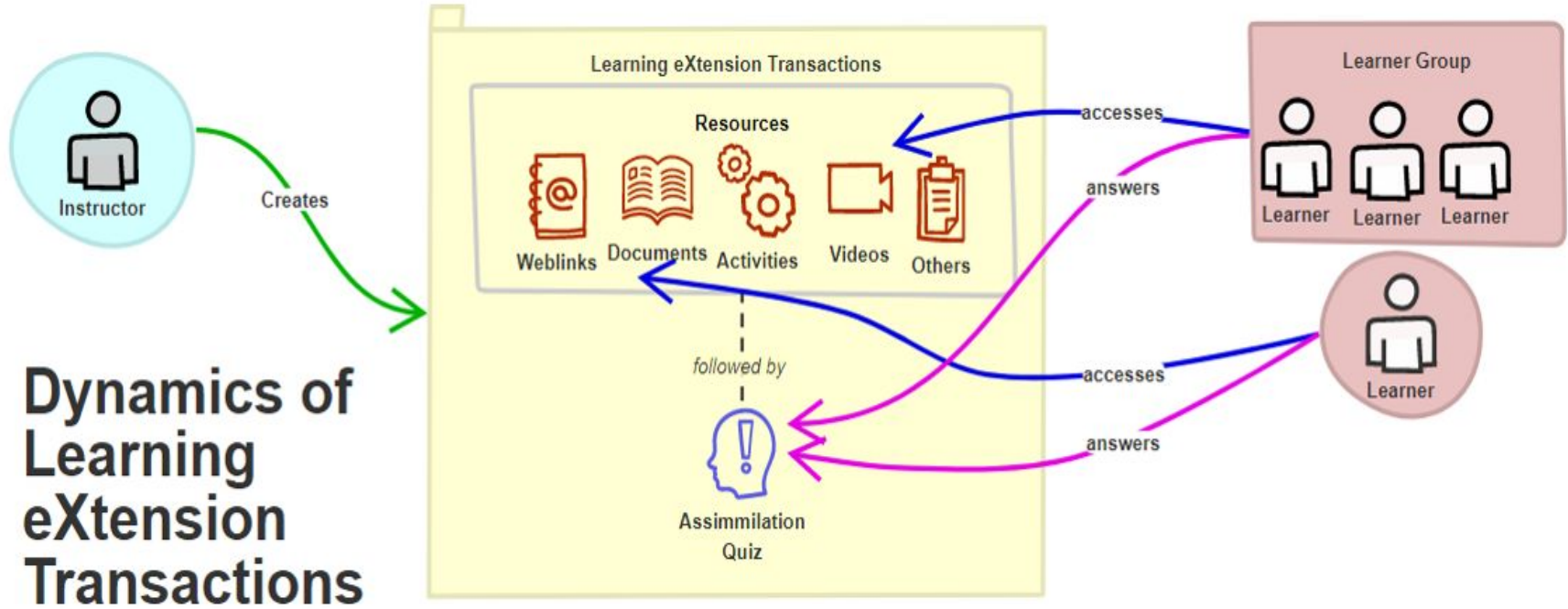
*Takeaway:* Exploit peer learning; create discussions centered  
around a focus question.

Ensure learner participation through reflection quiz.

# LxT Dynamics



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## Dynamics of Learning eXtension Transactions



# LxT Example in IITBombayX

- Week 1: Flipping the Classroom with Technology
  - Check before starting Week1
  - About this week
  - Case of Two Classrooms
  - Flipping the Classroom: Why?
  - Flipping the classroom: What?
  - Flipping the Classroom: How?
  - Learning Extension Resources**
  - Office Hours
- Week 1: Graded Activities
- Week 2: Active Learning Inside The Classroom
  - Week 2: Graded Activities
- Week 3: Graded Activities
- Week 4: Putting it all together

## LxT Resources - Week 1

VIEW UNIT IN STUDY

[Bookmark this page](#)

Watch this video by Jackie Gerstein where she provides a full picture of flipping classroom with technology



This video has a [Creative Commons Attribution](#) license.

You can visit the following websites of flipped classroom practitioners.

- [Flipped Learning Network](#)
- A [note](#) on flipped classroom from Jackie Gerstein

STAFF DEBUG INFO

## Assimilation Quiz

[Bookmark this page](#)

In the LxT resource, "An Illustration of Flipped Classroom: The full picture", the presenter Jackie Gerstein talks of personal connections with the content and \_\_\_\_\_

- Instructor
- Learning Management System
- Community of Learners
- Expert videos

Submit

You have used 0 of 1 attempt

Show Answer





# LxT Details

- Handling diversity: examples / resources for different
  - Domains
  - real-life applications
  - voices from the field,
  - advanced topics, languages, ...
  
- Assimilation quiz: keep it simple
  - Objective – Ensure that learner has “seen” one LxT of his/her interest from the given.

End of course survey:

- *“Having the assimilation quiz following the LxT resources made us look into those resources [...] we realized that the LxT resources gives you details about strategies and their uses at different places”* [ET611Tx participant]
- *“Watching videos of Prof. Mazur made me realize that students in my class may also be nodding their heads without really understanding the concept”* [ET601Tx participant]

# From traditional to Learner-Centric MOOC

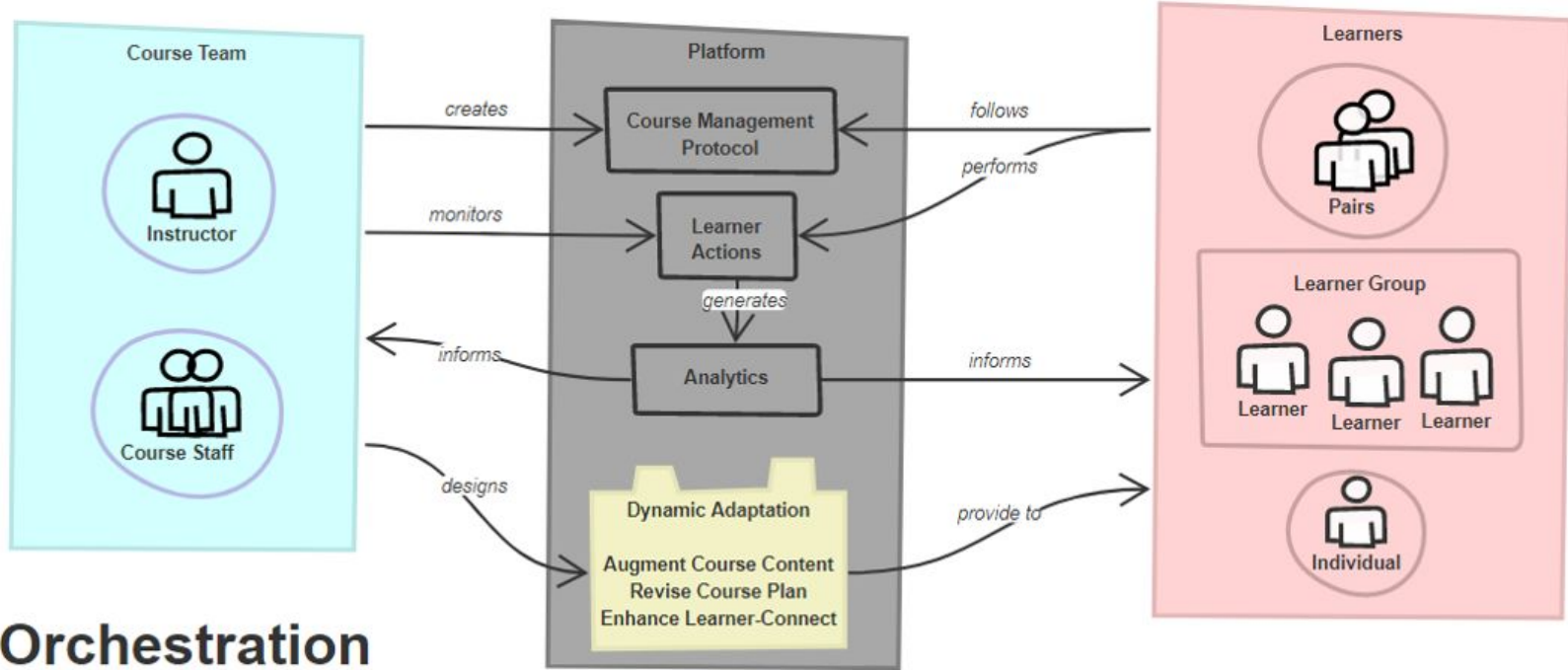


Additional material → **Learning eXtension Transaction**

[Links to resources for diverse cohorts  
+ Assimilation Quiz]

*Takeaway:* Provide a rich set of LxT resources, and close the loop with Assimilation Quiz.

# Orchestration Dynamics



## Orchestration Dynamics

# Did it work?

***ET601Tx*** : Jan- Mar 2016, 5500 participants, engg instructors

- Active participants: 67%

(participated in at least one activity – LeD, submit LbD, LXI post, quiz ...)

- Persistence rate: 37%

(completed all activities / active participants)

- Completion rate: 23%

(completed all activities / registered participants)

# Final summary

## TRADITIONAL MODEL

Lectures and demos

Assignments and activities

Discussion forums

Additional materials

## LCM MODEL

—————> Learning Dialogs (LeD)

—————> Learning by Doing (LbD)

—————> Learning eXperience Interaction (LxI)

—————> Learning eXtension Transaction (LxT)

Incorporate learner-centric approaches in your MOOC.

Apply LCM model to design a MOOC for your platform.



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*Thank you!*

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In IITB, July 9-13: ICALT 2018

IEEE International Conference on Advanced Learning Technologies

<http://www.et.iitb.ac.in/icalt2018/>

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Click on 'Talks'

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