

Transitioning to Online Instruction

(from face-to-face classrooms)



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Pankaj Chavan
IIT Bombay



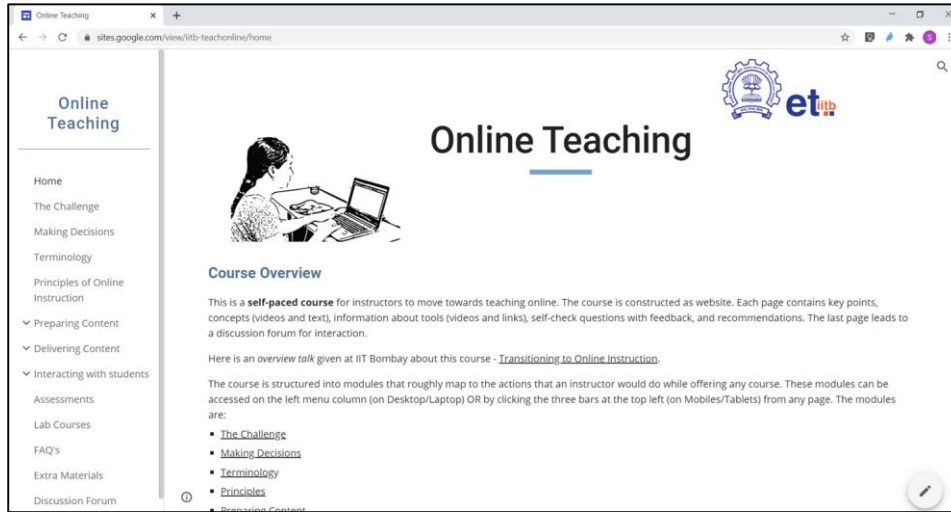
Webinar, July 2020



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Basis and details related to this talk



Online Teaching
Self-paced course developed at IIT Bombay
<https://sites.google.com/view/iitb-teachonline/>



Acknowledgements

Co-instructor of the course [iitb-teachonline](https://www.iitb.ac.in/teachonline) - Prof. Sridhar Iyer

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Organizer of TA training course - Pankaj Chavan

Co-creators of LCM model – Sridhar Iyer, Sameer Sahasrabudhe, Jayakrishnan M.

Post-docs on LCM – Gargi Banerjee, Veenita Shah, Mrinal Patwardhan

Tutorials on Tools – Yogendra Pal, Kameswari Chebrolu, P Sunthar, Bhaskaran

Raman, Kannan Moudgalya, Santosh Noronha

TAs - Narasimha Swamy and other EdTech PhD students



Inter-Disciplinary Program, started 2010

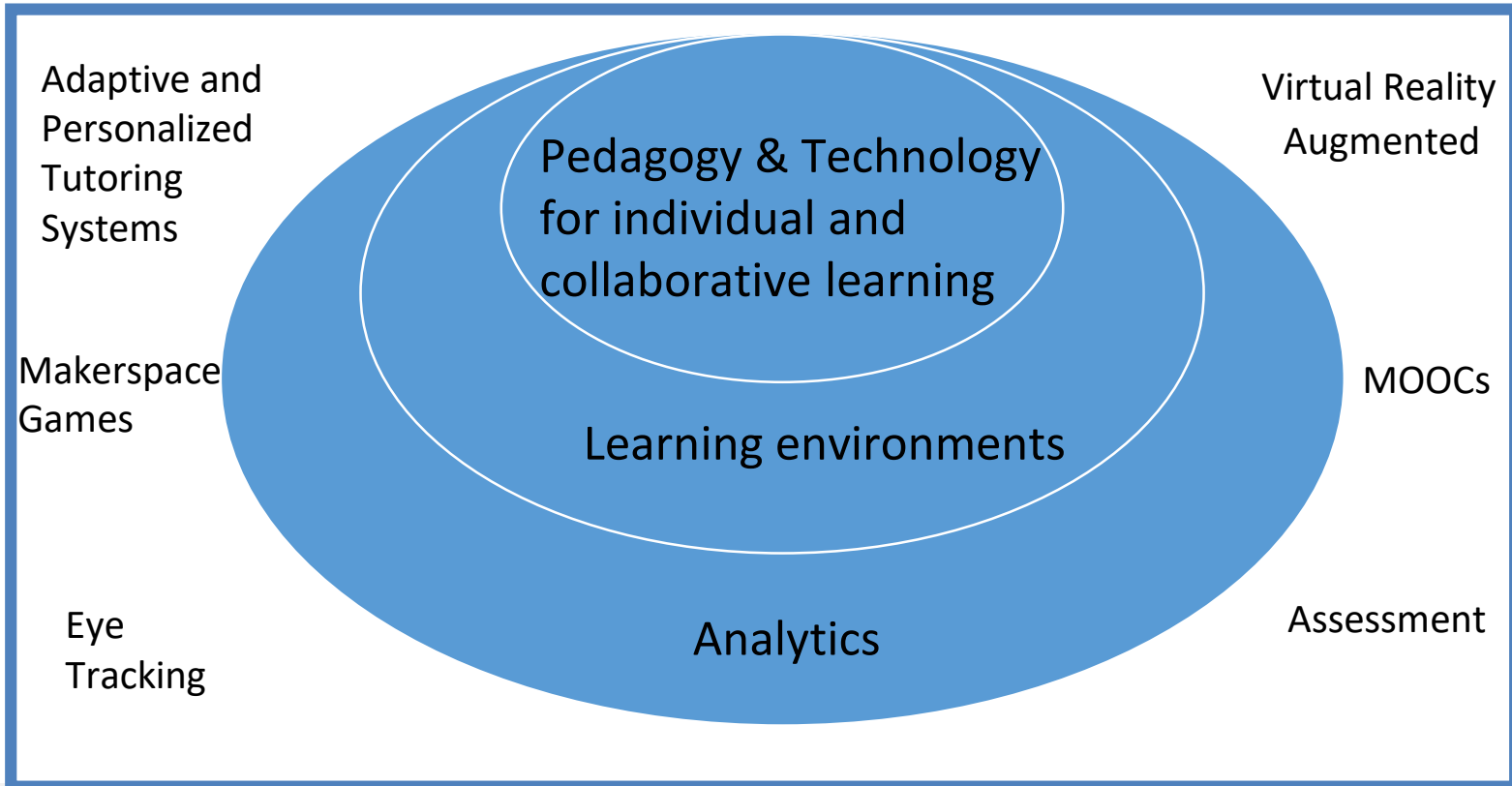
- 5 Core faculty
- Associate faculty from other departments
- 2 Post-docs
- 25 PhD research Scholars; 16 PhDs graduated
- Started an M.Tech program in 2019



See - www.et.iitb.ac.in



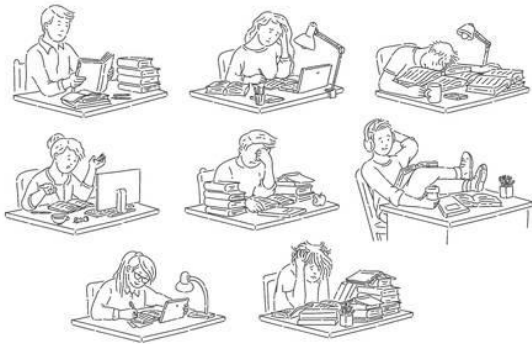
What we do in Educational Technology?





Online instruction

Face-to-Face vs Online classes



60%

70%

40%

30%

Course Materials



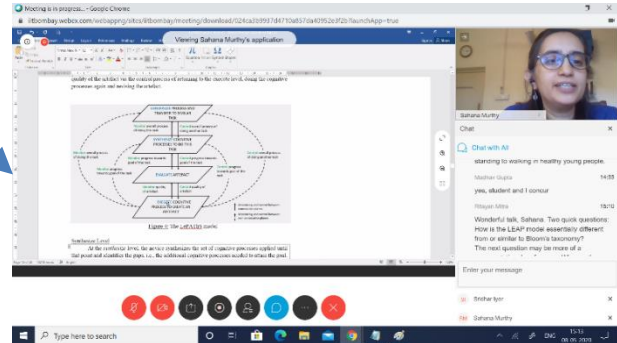
Any Time



Any Where



Any Device





Activity 1 – Each one say one

Your colleague says that for online instruction it is sufficient to give live lectures over a video conferencing software (such as Zoom), record the lecture and upload it somewhere. Students who were unable to attend the lecture can view the recording.



- What are some problems with this approach?
- Post your response in the chat window.



What if we mimic f2f instruction in online mode?

What if we do:

1. Go to a virtual classroom (e.g. Zoom meeting)
2. Do a live lecture with students who are able to attend

Virtual classrooms

1. Use the meeting software itself to record the lecture
2. Make the recording available to students who were not able to attend

Recorded virtual classes

1. Use Moodle to upload resources, give assignments, quizzes



Problems with virtual classrooms

Consider from students' point of view

1. Access issues

No smartphone

Shared device

Lack of flexibility in schedule

Power, Network

2. Hour-long lecture, and over a screen – engagement?



Problems with recorded virtual classes

Uploading recordings of live sessions may be useful

Not sufficient because

- **Glitches** in recordings (voice break, frozen frame) – lose student attention
- Even short lectures (~10 min) are not watched fully by most; high variability in student motivation
- Network **bandwidth** issues – connectivity, mobile data plan
- Lecture alone not enough – need activities for deeper engagement



Emergency remote teaching

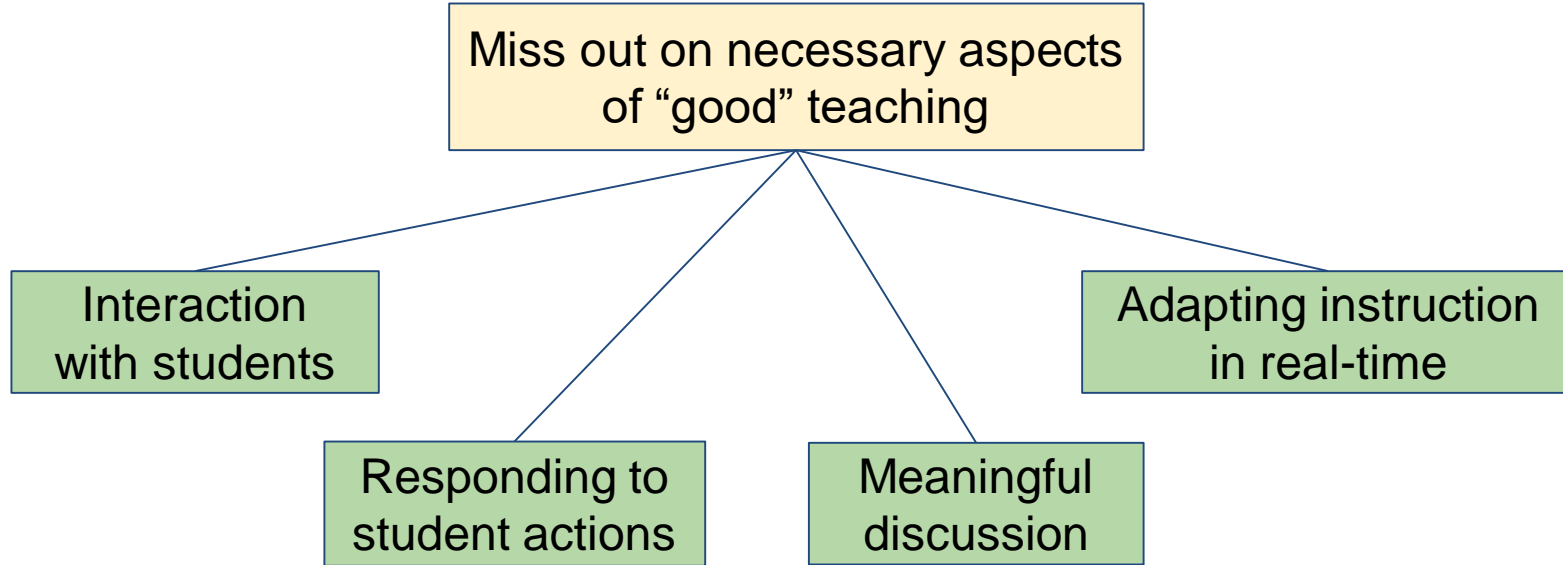
Give virtual lecture + Upload its recording + Provide assignments is a form of emergency remote teaching (ERT)

Objective - provide temporary access to instruction and instructional material that is quick to set up and easy to access

This mode should be used sparingly, and in emergencies (e.g. when the lockdown first hit)



Problems with emergency remote teaching





Problems with emergency remote teaching

What if we do:

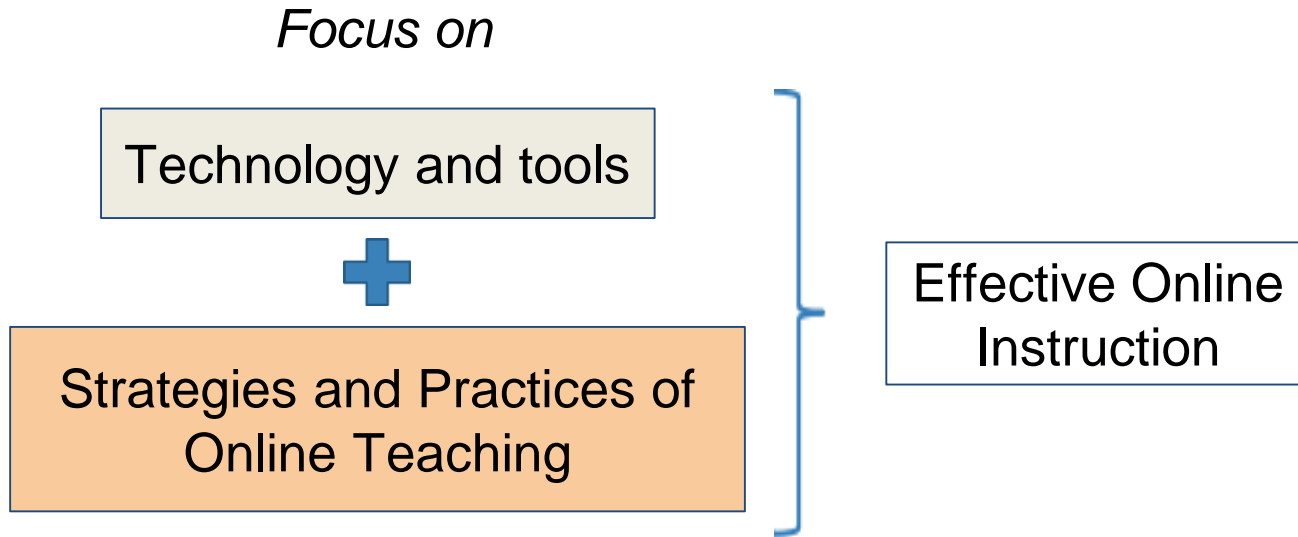
1. Go to a virtual classroom (e.g. Zoom meeting)
2. Do a live lecture with students who are able to attend
1. Use the meeting software itself to record the lecture
2. Make the recording available to students who were not able to attend
1. Use Moodle to upload resources, give assignments, quizzes

Focus is on

Technology and
tools



What makes online instruction effective?



Online instruction



The goal is to exploit the power of the online medium and utilize it to promote effective student learning



Activity 2 – Identify your concerns

Which aspects of online instruction do you think will make the **execution of the course in online mode challenging** for you?

Tick all the that apply.

1. Making videos
2. Time required to prepare for each class
3. Using the online platform (like Moodle features)
4. Doing online assessments
5. Interacting with students synchronously (like Zoom meetings)
6. Having to use technologies in general
7. Uncertainty of technology support from institute

Go to www.menti.com and use the code 77 10 15

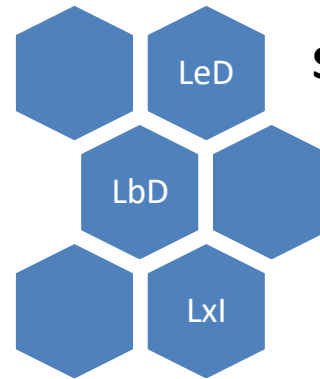


What does Online Instruction involve?





Concepts overview



Six principles

One slide on each

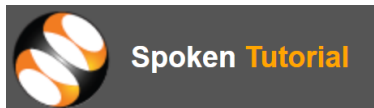


Principle #1



COMMONS

OPEN EDUCATIONAL RESOURCES



Curate before you create



Principle #2

Learning Dialog



Content



Reflection Spot



Content

Keep videos short,
and insert reflection spots



Principle #3

Learning by Doing

MCQs, short answer
Objective/Subjective

Activities

with



Customised
Constructive
Feedback

Give practice opportunity,
immediately and frequently,
and give feedback

Principle #4

Learning eXtension Trajectories

Resources for Trajectory 1



Weblinks



Documents



Activities



Videos



Others



Assimilation
Quiz

Resources for Trajectory n



Weblinks



Documents



Activities



Videos



Others

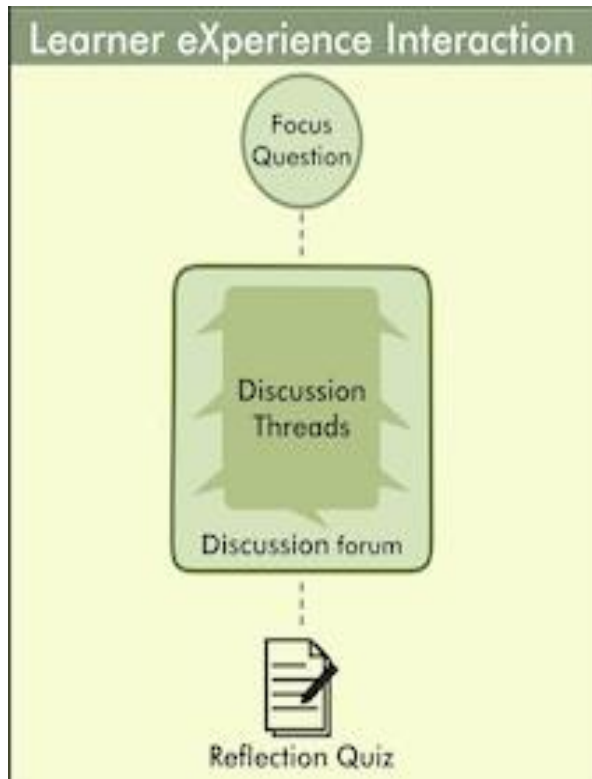


Assimilation
Quiz

Provide diverse resources to cater to different students, and incentivize the access to resources



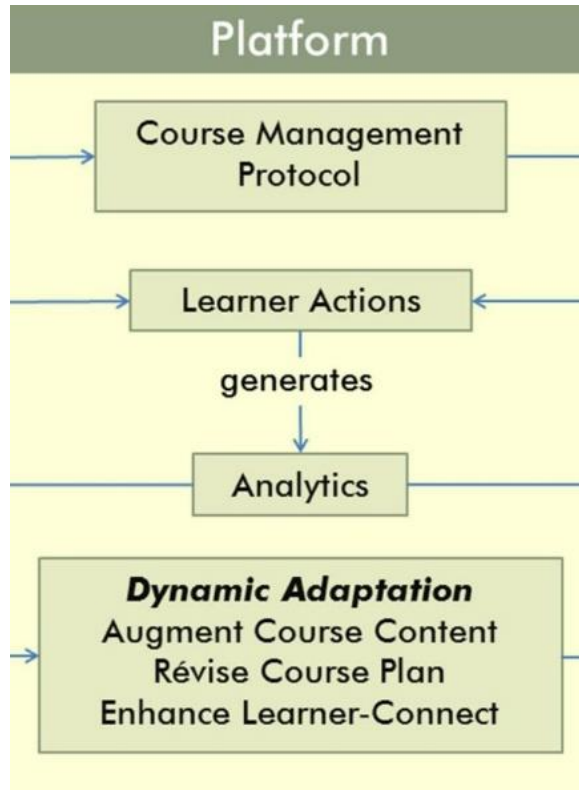
Principle #5



Leverage peer-learning,
to bring in diverse perspectives
and solutions,
discover additional resources,
and avoid isolation issues



Principle #6



Respond to student actions, in a timely and appropriate manner

Online instruction involves

- Making course materials available for asynchronous access
- Giving immediate practice activities and timely feedback to students
- Conducting synchronous meetings to address queries and do tutorials
- Providing a forum for learners to discuss the content with each other and the instructor

Course Materials



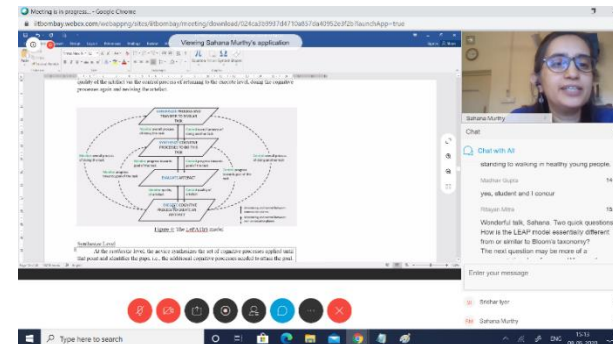
Any Time



Any Where



Any Device





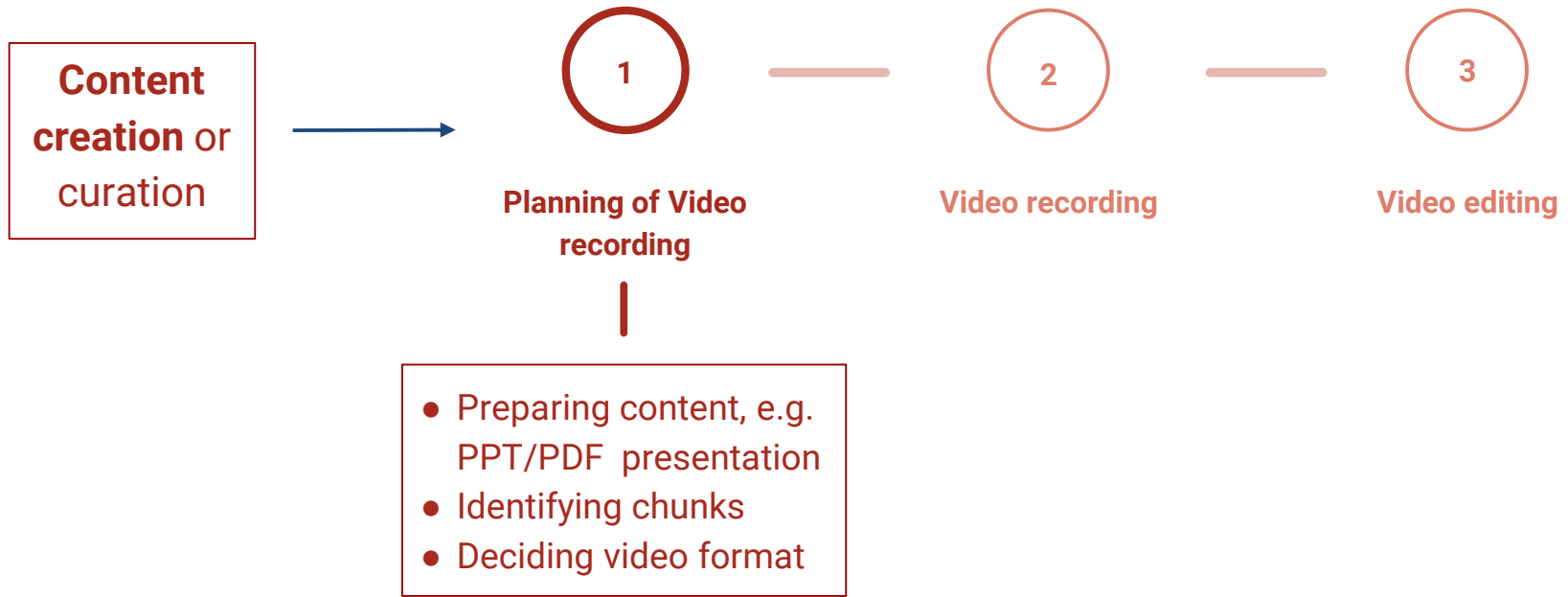
Tasks / aspects in online



Technology Tools: Content Creation



Content creation involves





Activity 3 - Quick poll

Specific to your course:

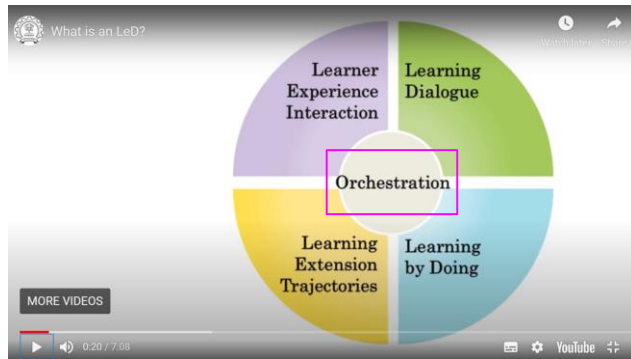
In which of the following ways you will be mostly required to teach the course topics in online mode?

1. Presentation using slides
2. Looking at learners
3. Writing/Sketching on a Digital Whiteboard
4. Presenting while looking at the learners
5. Writing/Sketching while looking at learners
6. Some combinations of the above options

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Recommended formats for videos

1. Presentation using slides: **Slidecast**



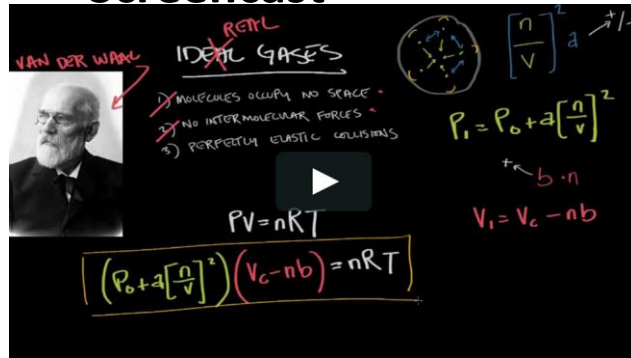
2. Looking at learners: **Talking Head**



Recommended formats for videos

3. Writing on a Digital Whiteboard:

Screencast



VAN DER WAALS' EQUATION
 IDEAL GASES
 1) MOLECULES OCCUPY NO SPACE
 2) NO INTERMOLECULAR FORCES
 3) PERFECTLY ELASTIC COLLISIONS

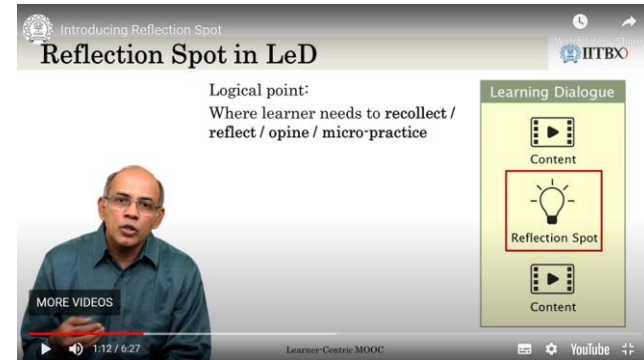
$$P_i = P_0 + a \left[\frac{n}{V} \right]^2$$

$$V_i = V_c - nb$$

$$PV = nRT$$

$$\left(P_0 + a \left[\frac{n}{V} \right]^2 \right) (V_c - nb) = nRT$$

4. Presenting while looking at the learners: Pic in Pic



Introducing Reflection Spot
 Reflection Spot in LeD
 IITBOM

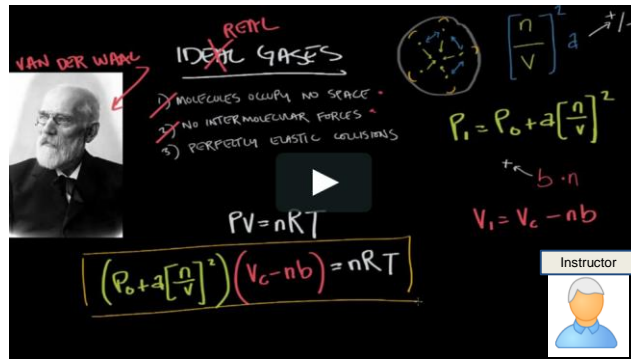
Logical point:
 Where learner needs to recollect / reflect / opine / micro-practice

Learning Dialogue
 Content
 Reflection Spot
 Content

MORE VIDEOS
 1:12 / 6:27
 Learner-Centric MOOC
 YouTube

Recommended formats for videos

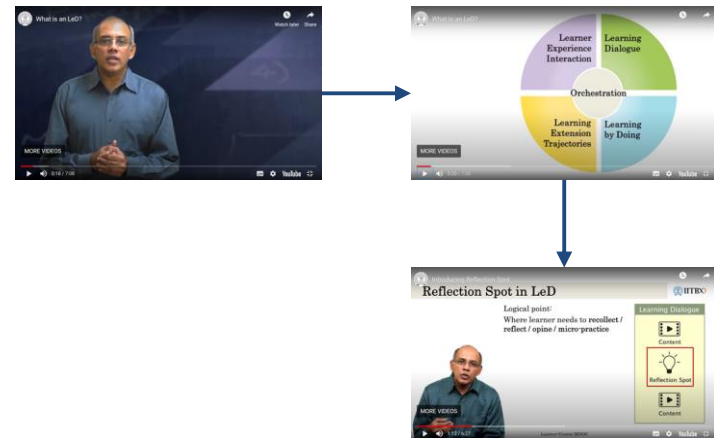
5. Writing while looking at learners: Pic in Pic



VAN DER WAALS **IDEAL GASES** **RTCL**
 1) MOLECULES OCCUPY NO SPACE
 2) NO INTERMOLECULAR FORCES
 3) PERFECTLY ELASTIC COLLISIONS
 $P_i = P_0 + a\left[\frac{n}{V}\right]^2 + b \cdot n$
 $V_i = V_0 - nb$
 $PV = nRT$
 $\left(P_0 + a\left[\frac{n}{V}\right]^2\right)(V_0 - nb) = nRT$

Instructor

6. Talking head → Screencast → Pic in Pic: **Transitions**



What is an LED?
 MORE VIDEOS
 1:17 / 1:22

Learner Experience Interaction
 Learning Dialogue
 Orchestration
 Learning Extension Trajectories
 Learning by Doing

Reflection Spot in LeD
 Logical point!
 Where learner needs to recollect / reflect / epine / micro-practice

MORE VIDEOS
 1:17 / 1:22



Video recording involves





Summary - Video format and resources

Video format	Resources (Hardware + Software)	Video Type
Presentation using slides	Laptop (Audio) + PPT File	Slidecast
Looking at learners	Camera Laptop (Webcam + Audio)	Talking Head
Writing on a Digital Whiteboard	IPad Screen + Writing Software Laptop (Audio) + Writing Software	Screencast
Presenting while looking at learners	Laptop (Webcam + Audio) + PPT File	Picture in Picture
Writing while looking at learners	Laptop (Webcam + Audio) + Writing Software IPad (Screen + Webcam)	Picture in Picture

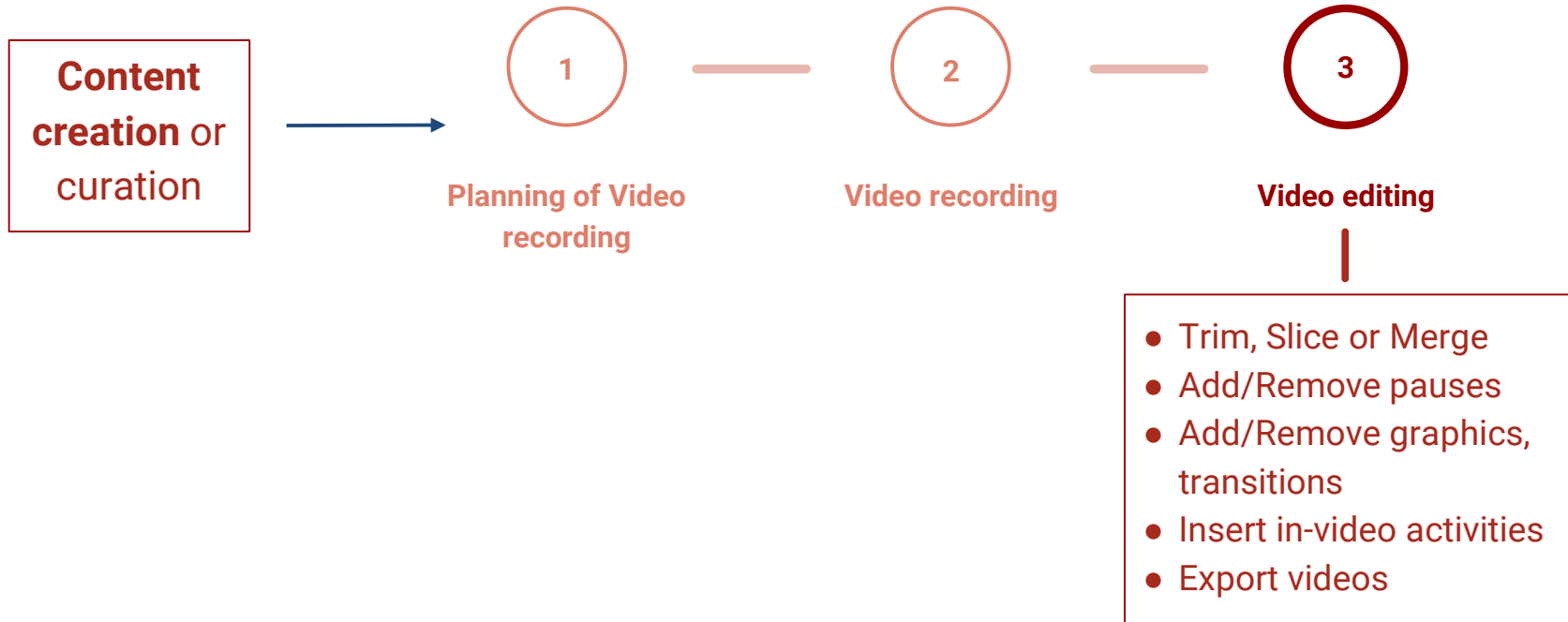


Video recording tools/software

- Slidecast/Screencast
 - Screen recorder - Xbox Game Bar, FlashBack Express, QuickTime player (Mac), RecordMyDesktop (Linux)
- Talking head
 - Webcam, Smartphone, Tablet
- Pic in Pic
 - Screen recorder - FlashBack Express, Screencast-o-matic
- Transitions - Talking head → Screencast → Pic in Pic
 - Lot of post processing - Trimming, Joining, Removing unwanted pieces
 - OBS (Open Broadcaster Software) Studio

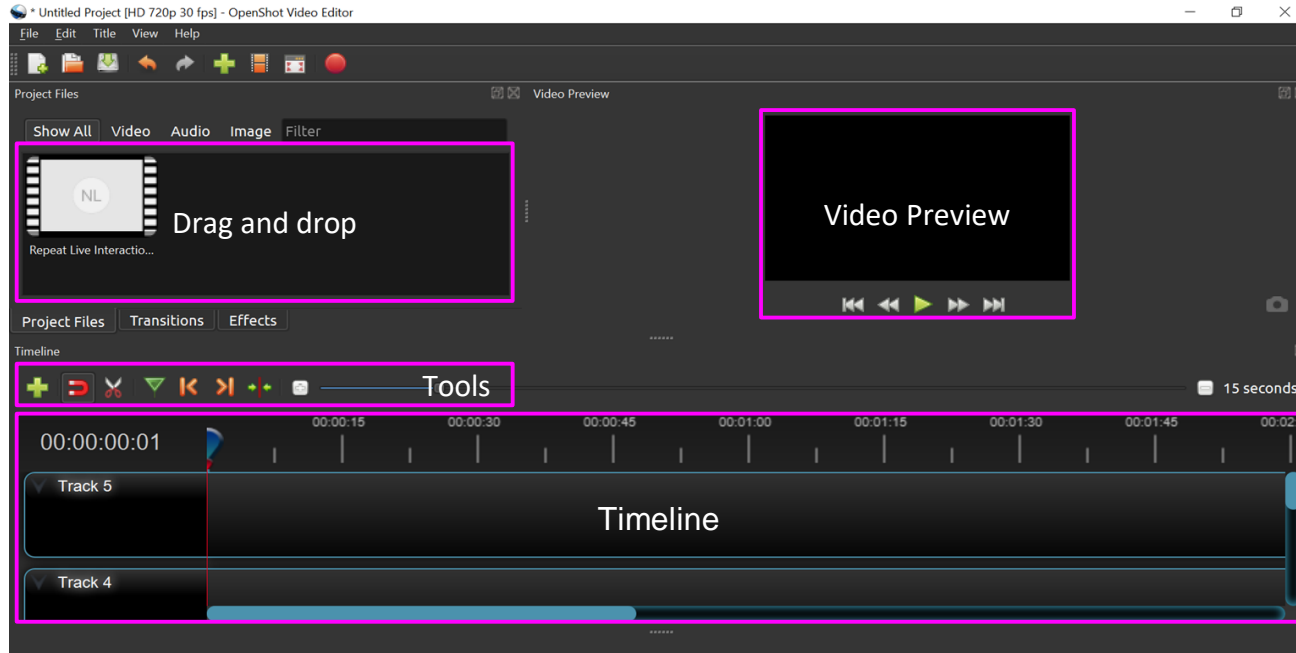


Video editing involves



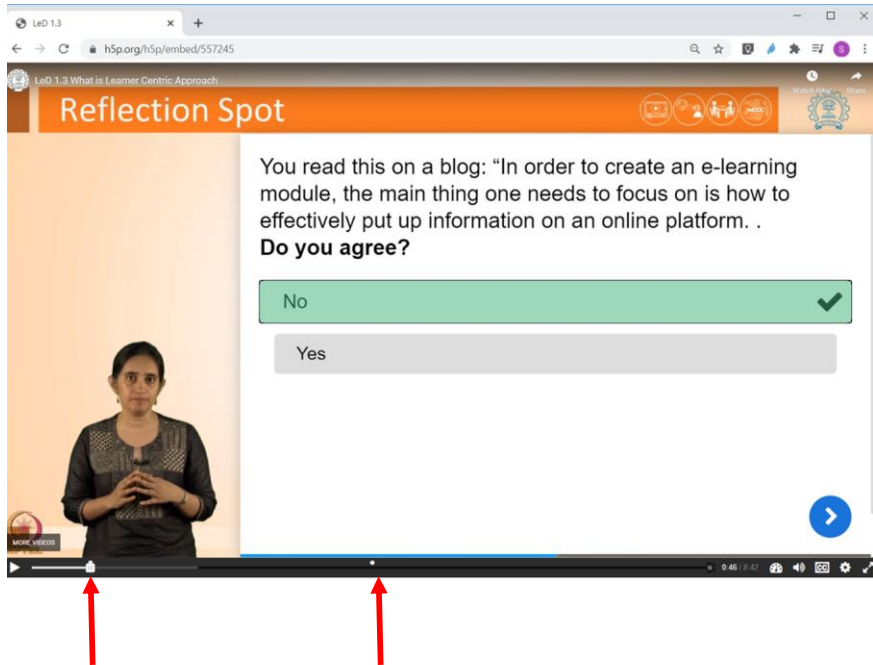


Video editing -(e.g. OpenShot)



- Trim, Slice, Merge
- Add/ remove pauses
- Add/ remove graphics
- Include transitions
- Export videos

Insert in-video activities / quizzes (e.g. using H5P)



Why?

- Make videos interactive
- Engage students in content
- Quick practice & check within video

How?

- Use tool like H5P during editing
- Or use slide during recording and ask students to pause

Terminology

Reflection Spot (in video activity)

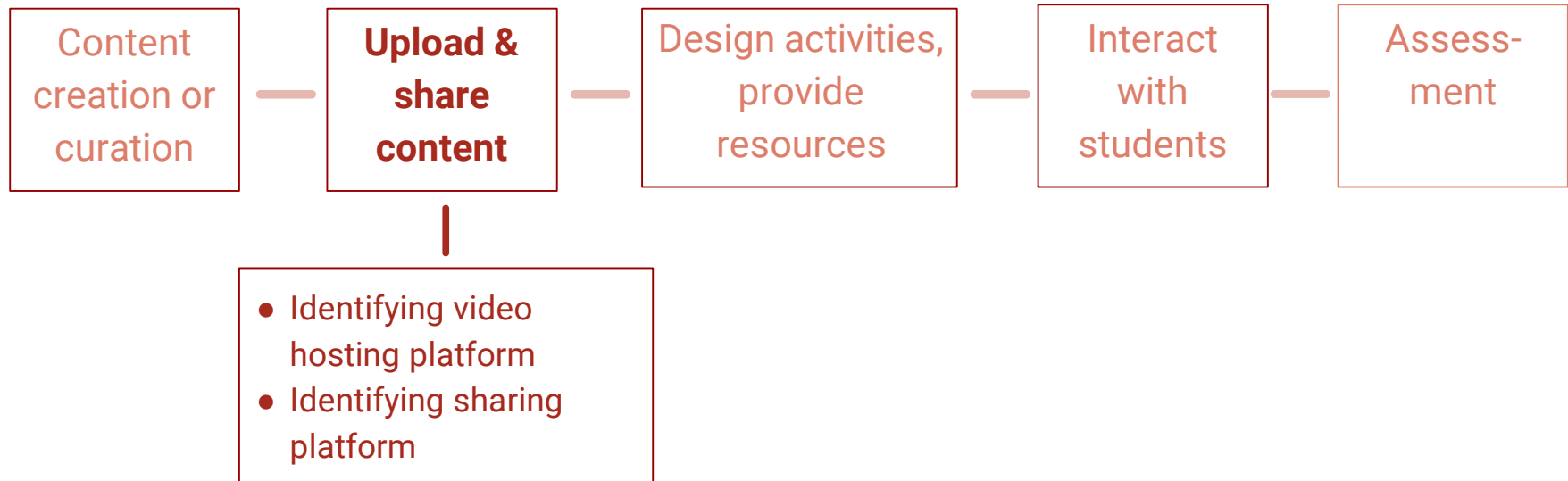
Learning Dialogs (interactive video)



Technology Tools: Uploading & Sharing



Uploading and sharing content involves





Quick clean & upload

1. Trim the video, chunk if required, remove any long pauses
2. Export videos; compress if required (Handbrake)
3. Upload on video hosting platforms like YouTube:
 - a. Public vs Unlisted vs Private

Sharing content



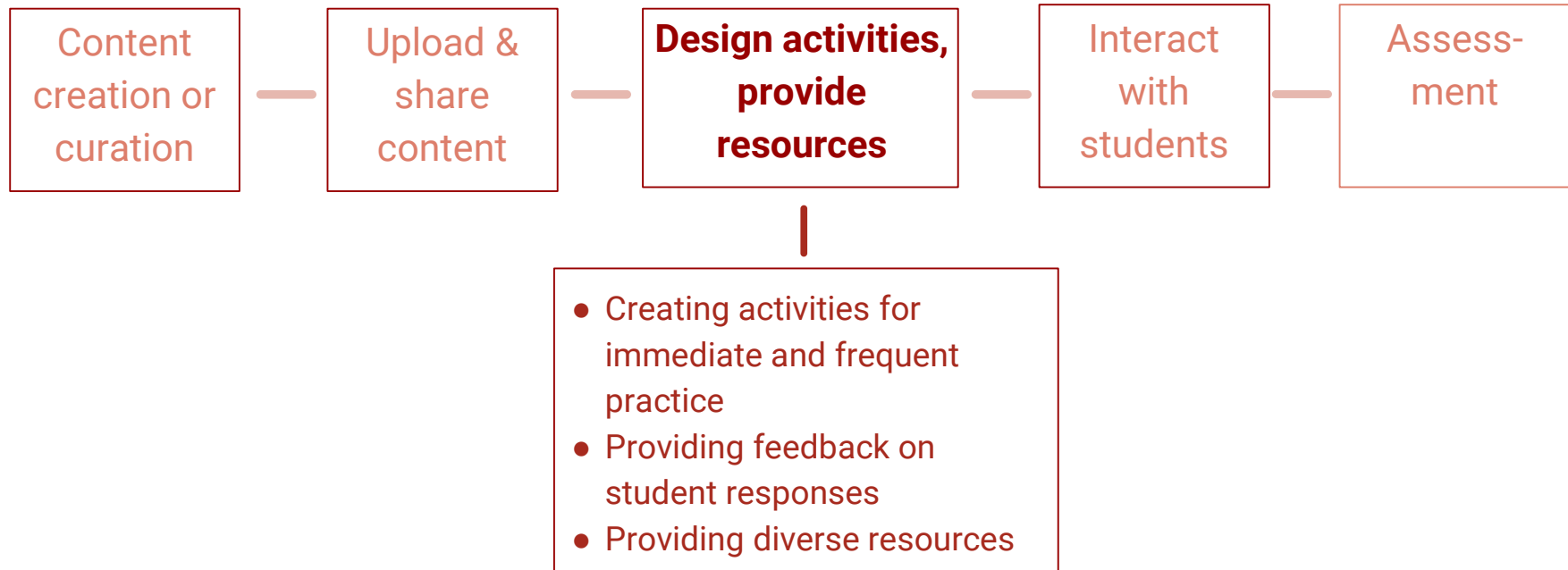
1. Sharing platform: Moodle or other LMS, Google Sites, BodhiTree,
2. Embed videos from Youtube, Vimeo
3. Write wrappers
4. Embed quizzes / activities



Technology Tools: Creating activities

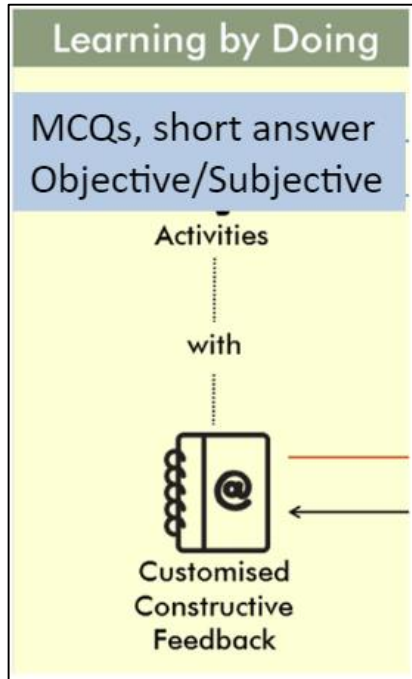


Creating activities involves





Learning by Doing (LbD) activities



Recommendations

- Don't push all LbD activities to the end to module
- Intersperse them between videos
- Give feedback -
 - Customized to MCQ options
 - Using rubrics for long answers, problems



LbD Activities on Moodle - Example

Add an activity or resource

- H5P
- Hot Question
- Interactive Content
- Journal
- Lesson
- Quiz
- SCORM package
- Survey
- Wiki
- Workshop
- Zoom meeting

Each attempt is marked automatically, with the exception of essay questions, and the grade is recorded in the gradebook.

The teacher can choose when and if hints, feedback and correct answers are shown to students.

Quizzes may be used

- As course exams
- As mini tests for reading assignments or at the end of a topic
- As exam practice using questions from past exams
- To deliver immediate feedback about performance
- For self-assessment

[More help](#)

Add Cancel

Choose a question type to add

- Multiple choice
- True/False
- Matching
- Short answer
- Numerical
- Essay
- Calculated
- Calculated multichoice
- Calculated simple
- CodeRunner
- Drag and drop into text
- Drag and drop

Select a question type to add to the question description.

Choose a question type to add

- Drag and drop into text
- Drag and drop markers
- Drag and drop onto image
- Embedded answers (Cloze)
- Formulas
- Random short-answer matching
- Select missing words

OTHER

- Description

Select a question type to add to the question description.



LbD Activity - Assimilation quiz: Giving customized feedback

Add an activity or resource

- H5P
- Hot Question
- Interactive Content
- Journal
- Lesson
- Quiz
- SCORM package
- Survey
- Wiki
- Workshop
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- To deliver immediate feedback about performance
- For self-assessment

[More help](#)

Add Cancel

Question 2

Not yet answered

Marked out of 1.00

Flag question

Edit question

Which of the following should be included in feedback to be given for an LbD activity in multiple choice format? [Tick all that apply]

Select one or more:

- a. Explanation of why a particular option is correct or wrong
- b. Attractive animation and sound corresponding to the correct and wrong options
- c. Explanation of how to improve to get to the correct answer in case a wrong option is chosen
- d. Whether the chosen option is correct or wrong



LbD Activity - Assimilation quiz: Giving customized feedback

Add an activity or resource

- H5P
- Hot Question
- Interactive Content
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Quizzes may be used

- As course exams
- As mini tests for reading assignments or at the end of a topic
- As exam practice using questions from past exams
- To deliver immediate feedback about performance
- For self-assessment

[More help](#)

Question 2

Incorrect

Mark 0.00 out of 1.00

[Flag question](#)

[Edit question](#)

Which of the following should be included in feedback to be given for an LbD activity in multiple choice format? [Tick all that apply]

Select one or more:

- a. Attractive animation and sound corresponding to the correct and wrong options **✘**
- b. Explanation of how to improve to get to the correct answer in case a wrong option is chosen
- c. Whether the chosen option is correct or wrong
- d. Explanation of why a particular option is correct or wrong

Your answer is incorrect.

The correct answers are: Whether the chosen option is correct or wrong, Explanation of why a particular option is correct or wrong, Explanation of how to improve to get to the correct answer in case a wrong option is chosen



LbD Activities on Moodle - Example

Add an activity or resource ×

- Journal
- Lesson
- Quiz
- SCORM package
- Survey
- Wiki
- Workshop
- Zoom meeting

RESOURCES

- Book
- File

The workshop activity module enables the collection, review and peer assessment of students' work.

Students can submit any digital content (files), such as word-processed documents or spreadsheets and can also type text directly into a field using the text editor.

Submissions are assessed using a multi-criteria assessment form defined by the teacher. The process of peer assessment and understanding the assessment form can be practised in advance with example submissions provided by the teacher, together with a reference assessment.

Students are given the opportunity to assess one or more of their peers' submissions.

Submissions and reviewers may be

Rubric for grading student responses to long answer questions - Grading criteria

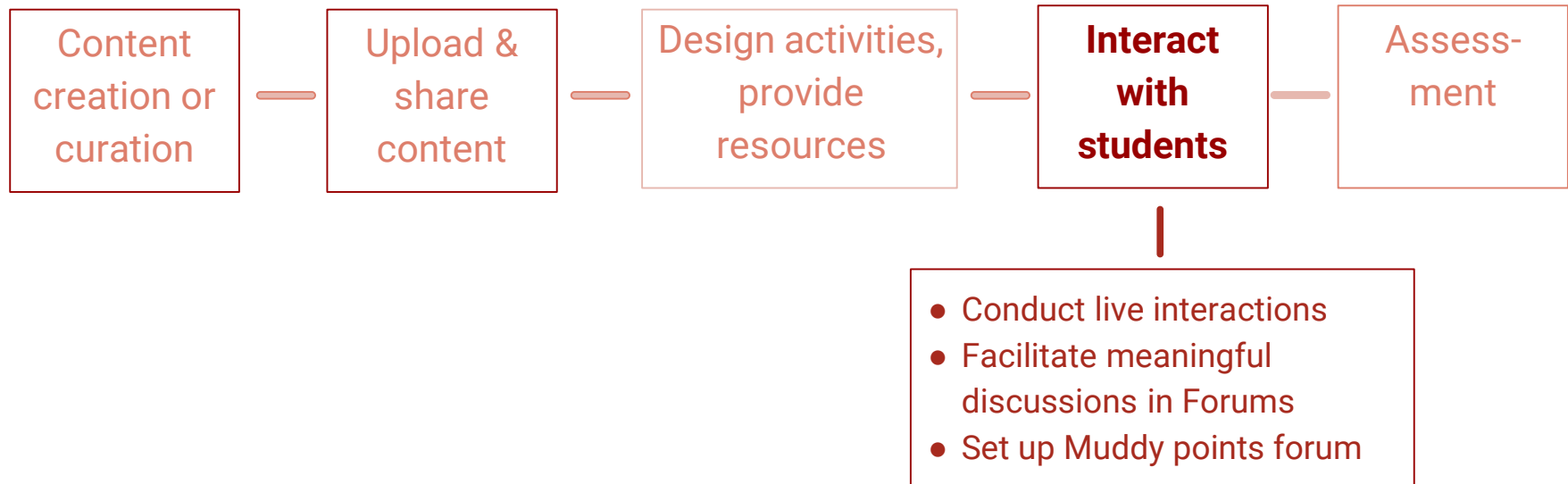
Criteria iRubric				
20 %				
	Unsatisfactory 5 pts	Needs Improvement 10 pts	Satisfactory 15 pts	Outstanding 20 pts
<div style="border: 1px solid black; padding: 5px; display: inline-block;">Set of criteria</div>	<p style="text-align: center;">Unsatisfactory</p> <ul style="list-style-type: none"> - Content is incomplete. - Major points are not clear. - Specific examples are not used. 	<p style="text-align: center;">Needs Improvement</p> <ul style="list-style-type: none"> - Content is not comprehensive and /or persuasive. - Major points are addressed, but not well supported. - Responses are inadequate or do not address topic. - Specific examples do not support topic. 	<p style="text-align: center;">Satisfactory</p> <ul style="list-style-type: none"> - Content is accurate and persuasive. - Major points are stated. - Responses are adequate and address topic. - Content is clear. - Specific examples are used. 	<p style="text-align: center;">Outstanding</p> <ul style="list-style-type: none"> - Content is comprehensive, accurate, and persuasive. - Major points are stated clearly and are well supported. - Responses are excellent, timely and address topic. - Content is clear. - Specific examples are used.
<div style="border: 1px solid black; padding: 5px; display: inline-block;">Description of performance levels</div>	<p style="text-align: center;">Unsatisfactory</p> <ul style="list-style-type: none"> - Organization and structure detract from the message. - Writing is disjointed and lacks transition of thoughts. 	<p style="text-align: center;">Needs Improvement</p> <ul style="list-style-type: none"> - Structure is not easy to follow. - Transitions need improvement. - Conclusion is missing, or if provided, does not flow from the body of the paper. 	<p style="text-align: center;">Satisfactory</p> <ul style="list-style-type: none"> - Structure is clear and easy to follow. - Transitions are present. - Conclusion is logical. 	<p style="text-align: center;">Outstanding</p> <ul style="list-style-type: none"> - Structure of the paper is clear and easy to follow. - Transitions are logical and maintain the flow of thought throughout the paper. - Conclusion is logical and flows from the body of the paper.
Grammar, Punctuation & Spelling	<p style="text-align: center;">Unsatisfactory</p> <ul style="list-style-type: none"> - Paper contains numerous grammatical, punctuation, and spelling errors. 	<p style="text-align: center;">Needs Improvement</p> <ul style="list-style-type: none"> - Paper contains few grammatical, punctuation and spelling errors. 	<p style="text-align: center;">Satisfactory</p> <ul style="list-style-type: none"> - Rules of grammar, usage, and punctuation are followed with minor errors. - Spelling is correct. 	<p style="text-align: center;">Outstanding</p> <ul style="list-style-type: none"> - Rules of grammar, usage, and punctuation are followed; spelling is correct.



Technology Tools: Interacting with students



Interacting with students involves





Conducting live interactions

- Online platform - Meet students synchronously
 - Establish personal connect with students
 - Only asynchronous interaction - May lead to isolation and disinterest
- After giving students enough time - asynchronous materials
 - Live interaction is useful to address their doubts
 - Get feedback on content
- Address questions systematically or do a tutorial (TAs/Instructor)
 - Ask students to post their questions in advance



How **not to** do live interactions?

- Do not use it as primary mode of delivering content: *Caution!!*
 - Using it as 'substitute' for f2f is not effective
 - Access issues
 - Student engagement - Attention span, Distraction
- Live lecture + Recording + Make it available to students
 - Large file size
 - No activities to actively engage students
- **Mantra!** Not too many, Not too little - Do it periodically

Activity 4



You might have attended different talks, webinars, interaction sessions etc. in the last 2-3 months. And, due to that you might have got familiar with different video conferencing platforms such as Zoom, Webex, Google Meet, MS Teams etc.

List your top two features of such platforms which you think makes the live interactions most effective and engaging.

Go to www.menti.com and use the code 19 48 53



Effective live interaction - Strategies and technology tools

- Have a moderator
- Chat, Hand raise, Poll (Yes/no questions, Thumbs up/down)
 - Encourage students to speak up or participate
 - Gather feedback from students
- End by asking students to post muddiest points on chat
 - Address these on course platform by providing supplementary materials, if possible
- Ask TAs to write summary of the key points for those who were unable to join

Video Conferencing
Software

Effective live interaction - Strategies and technology tools



Mentimeter

Activity 2 – Identify your concerns

Which aspects of online instruction do you think will make the **execution of the course in online mode challenging** for you?

Tick all the that apply.

1. Making videos
2. Time required to prepare for each class
3. Using the online platform (like Moodle features)
4. Doing online assessments
5. Interacting with students synchronously (like Zoom meetings)
6. Having to use technologies in general
7. Uncertainty of technology support from institute

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Ask different types of questions or do activities during live interaction to

- Encourage students to participate
- Get an idea about students' progress with asynchronous materials
- Gauge in real time students' level of understanding/ misconceptions

What types of questions?

- MCQs, Yes/No, Polls, Word Cloud, ...



Example - Conceptual MCQ using Mentimeter

Course: Fluid Mechanics

Mode: Online

Instruction

Week 1, Topic: Fluid Statics

Asynchronous materials

Imagine holding two identical bricks under water. Brick A is just beneath the surface of water, while brick B is at a greater depth. The force needed to hold the brick B in place is the force required to hold brick A in place.

1. larger than
2. same as
3. smaller than

See technique called [Peer Instruction](#)



Making decisions, Closing thoughts

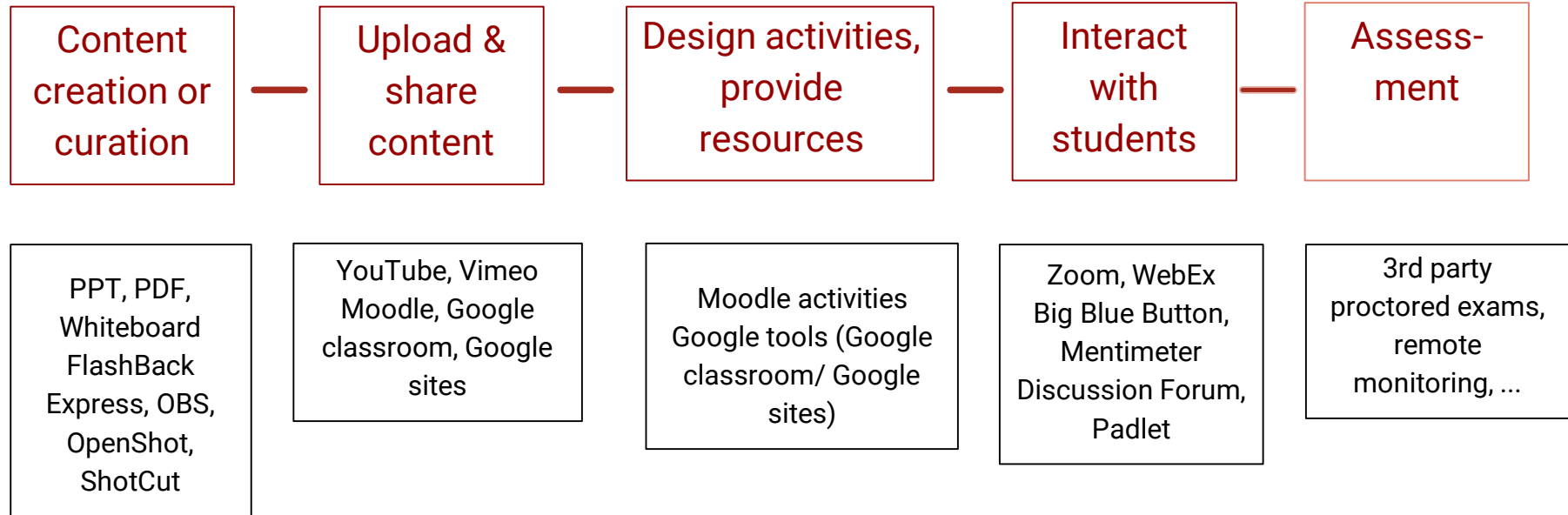
Website walkthrough flashthrough



<https://sites.google.com/view/iitb-teachonline/>



There exist many many technology tools



How do we select?



What to compare in technology tools?

- **Video creation** – Video type, Ease of use, Rendering time, Filesize, ...
- **Video hosting** – Availability (anytime-anywhere), Security, Privacy, ...
- **Activity creation** – Ease of creation, giving feedback, Ease of doing, ...
- **Platform** – Ease of use for faculty and students, Support for learner-centric strategies, Grading and assessments, Analytics, ...
- **Live interaction** – Scaling, Sharing, Breakout rooms, ...
- ...

Availability of tech-support - within Institute and elsewhere
Institutional policies



Time management

Content creation for online instruction takes at least 4X times as compared to the corresponding face-to-face class

Hence:

- Curate resources
- Give activities to assimilate the content
- Get TAs to help with technology
- Consult colleagues who have used the technology



Take-away

- There is no single correct way of conducting online courses, just as in face-to-face teaching
 - It is not necessary for all faculty to have the same approach
- Be aware of the trade-offs and take considered decisions, not to mimic face-to-face teaching as a *default*
- It is sufficient if you start wherever you are comfortable and go up the levels gradually



Topics not covered in this talk

- What to do about physical labs
- How to incorporate Virtual Labs

- How to conduct remote exams
- What to do about proctoring

- What about learning analytics
- How to use analytics meaningfully
- ...



Over to Q & A

Please enter your questions into the chat window
Speak as directed by the moderator

Questions from this talk are on next slide



Questions discussed

From IISER Thiruvananthapuram Webinar, July 23

- How many short videos would serve as equivalent for 1 hour f2f lecture?
- Is having a group project good for peer learning?
- What kind of assignments can be given for group learning?
- Online or offline, teaching 200-400 students may be a difficult task. One way to overcome this problem is to use teaching assistants. For how many students would you suggest one TA?
- Can online learning replace traditional schooling?
- Which of the modes of presentation is the best for effective teaching?
- Are there recommended tools for editing video and audio of you recorded video lecture !!
- For students with poor or no connectivity, how LbD can be exercised effectively and provide feedback?
- For assignment or exam, mathematics students need to write lots of questions, any suggestions in this direction?
- There may be copyright issues when curating content. Pointers for handling/avoiding them?
- What should be the ratio of asynchronous to synchronous mode of teaching per week?
- Is there any way to do live drawing/writing as we do in the board
- In mathematics, students has to write equations in their answers to assignment questions. How do we that?
- What about the students who do not have good bandwidth?
- Student may not have large local storage in their mobile devices. How to take care of this issues?
- For some specific topics, doing live lectures is very important. So, why not to do live lectures?



Questions discussed

From IIT Kharagpur Webinar, July 28

- How to get permission for reuse (of content if we are curating)?
- Is there a possibility of your course getting diluted due to curation?
- Are there any principles for creating activities for graduate level courses where research component is more?
- In my own limited experience, i notice a quick drop in student participation in such discussion forums. is there a way to incentivize it (not via grading credit!:))
- Is there any open source video tools in which we can embed quiz?