Chapter 26
From Emergency Remote Teaching to Effective Online Learning: A Teacher Professional Development Case Study from Higher Education in India

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Abstract This chapter describes the design and implementation of an educational solution to prepare teachers and instructors in India for various pedagogical and technological transitions during the pandemic. The goal was to move from an emergency remote teaching approach towards adopting effective online teaching strategies. This solution had to address the key challenge of remote professional development for the online medium while accounting for the diversity in the Indian educational context, taking into account varying needs of learners, teachers, institutions, geography, availability of technology, prior experience, and goals. The solution had two parts: i) a web-based repository for self-learning, consisting of research-based principles, pedagogical strategies and tools for effective design and development of online courses, and ii) synchronous interactive workshops to support instructors in practical implementation of the principles, strategies and tools to make domain specific instruction design decisions. Overall, emphasis was paid to learner engagement, diverse learner needs, peer learning, providing effective feedback and meaningful interaction. The resource repository and workshops guided instructors through making decisions and evaluating trade-offs in their context. This article also provides a brief analysis of the data collected from workshops on teachers' preparedness at effective integration of technology, and the impact of the OTeach resource repository, which can found at Google Sites and has 25,000+ visitors so far. The article concludes with reflections and recommendations based on our experience.

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1   Introduction

As a response to the COVID-19 pandemic, India went into a lockdown in March 2020 leading to a closure of schools and colleges. This lockdown was implemented with a very short notice, so educational institutions had to adjust quickly. Following government guidelines, emergency remote teaching was immediately adopted nationwide. This measure was initially accompanied with skepticism of the online format but was regarded as temporary, as exemplified by Hodges et al. (Hodges et al., 2020): *"[…] emergency remote teaching is a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances".* By June–July 2020, it became evident that online teaching would be the norm for several months. Gradually the dialog shifted towards seeking systematic solutions for *effective online learning*, i.e. solutions that arise from carefully planned design, building on the affordances of the online medium and addressing the needs of the specific context.

1.1   *Context*

The design of such solutions had to prepare instructors for various types of transitions: moving from face-to-face teaching to online mode, adoption of new technologies, and importantly the pedagogical transition from lecture-based transmission to interactive and collaborative strategies. A solution for teacher professional development was needed, and it had to be conducted rapidly and in remote mode to begin with. An added challenge was due to the diversity in the requirements of the learners, their institutions and instructors, which is a key feature in the Indian educational context (Joshee, 2003). This diversity was seen in the subject matter taught, pedagogical strategies preferred, availability of technology, and instructors' prior experience in using tools and interactive learning strategies. On one end were schools and colleges in economically backward parts of the country where teachers were enthusiastic about teaching online but had limited access to technology, such as a desktop or sometimes just a basic smartphone. At the other end were faculty members from the top-tier universities with access to the latest technologies, institutional support for LMSs, and a workforce to manage such technologies. These instructors were eager to create high quality content and expected exposure to advanced tools and strategies.

The diverse needs of instructors led to a variety of perceived challenges that the solution had to address. Instructors who taught large classes felt daunted by engaging their class using technology. Others who were known to engage classes with a blackboard, were challenged by the online modality itself, and were expecting an approach that would allow them to replicate their in-class style of teaching. Many teachers and instructors were apprehensive about the technical expertise that would be required, or which tools to choose for their needs and how to customize them. Another issue was that the available self-help resources for a tool did not address

teaching-specific challenges, for example, existing video editing tutorials addressed a different purpose such as filmmaking. Further, many good quality resources were primarily in English which posed another challenge. Teachers were also struggling with pedagogical decisions, such as online strategies meaningful and specific to their domain.

The goal of this article is to describe the design and implementation of a solution that evolved from a rapid emergency remote teaching manual designed for a short period during online transition to now address the above needs with a focus on teacher professional development for a long run, and to analyze its impact. Use of varied, but relevant learning resources and activities, is one way to support different learning preferences (Bangert, 2004; Hew, 2016) hence this solution had to provide self-learning resources that could be contextualized and catered to diverse needs. At the same time, it was required to facilitate practical application of the principles, tools and pedagogical designs and support instructors with getting comfortable in their new role. Thus the solution had two parts:

 (i) *OTeach resource repository:* The foundation was provided by a Google Sites based repository of principles, strategies and tools for quality online teaching and learning. This was structured in the form of a self-paced course called Online Teaching (referred to by its popular nickname '*OTeach*' henceforth) for instructors wanting to learn on their own. This is available on Google Sites <https://sites.google.com/view/iitb-teachonline>

(ii) *Interactive workshops:* The application of the principles and strategies was supported by synchronous interactive workshops and talks. These workshops facilitated teachers and instructors in identifying teething problems and specific challenges such as promoting peer discussion online, building a comfort level with their available or desired technology, and making domain specific instruction design decisions.

The team working on this solution included faculty members and graduate students in the Educational Technology department at the Indian Institute of Technology Bombay. The primary members of this team are the authors of this article. Section 2 describes the design and implementation of the OTeach resource repository and the corresponding workshops. Section 3 analyses the OTeach webpage statistics and data collected from workshops. It discusses the impact and findings in terms of teachers' preparedness and adoption of effective online learning strategies. The article concludes with reflections and recommendations based on our experience, in Sect. 4.

2   Design of OTeach Resource Repository and Workshops

The goals of the OTeach repository and corresponding workshops are:

- To help instructors who are familiar mainly with face-to-face teaching mode to get started in online teaching.

- To address various aspects of the teaching and learning process in the online medium, beyond content delivery.
- To highlight key principles, strategies and tools for effective teaching and learning in the online medium.
- To provide recommendations that are based on evidence from research and practice in online learning.

Overall, a guiding principle has been the metaphor of low-floor (low entry barrier for getting started), high-ceiling (providing resources for going to advanced online techniques), and wide-walls (indicating multiple options for achieving a goal) (Resnick & Robinson, 2017). The recommendations in the OTeach repository and workshops have been designed based on existing research on effective online teaching and learning (Baran et al., 2011; Means et al., 2014). A rapid, iterative and spiral approach was used, which allowed a certain degree of experimentation such as identifying which tools and strategies are easy for novices to adopt, which online pedagogical techniques are suitable in the given context, and so on.

2.1   Topics and Organization of OTeach

OTeach repository has nine primary sections with a tenth section of FAQs added later. It begins with a discussion on the challenges of teaching online followed by a discussion on factors an instructor may consider while making decisions. An important early section describes research-based principles in designing online learning experiences to promote learner engagement and learning (Means et al., 2014; Zhang et al., 2006; Shank, 2017; Rovai, 2007). Subsequent sections delve into the methods and tools for online teaching. The section on preparing content discusses strategies for curating content as well as creating one's own videos and learning-by-doing activities. It includes concepts of chunking and designing in-video interactions. This is followed by a section addressing the methods of sharing content via asynchronous and synchronous media. It emphasizes the need to make resources available to diverse learner needs. The section on interacting with students includes active learning strategies during live interactions, effective orchestration, and facilitating meaningful discussion and peer learning. The section on assessments discusses formative assessment and feedback, rubrics for peer grading, technologies available for online assessments and logistics. A section on the roles of teaching assistants in online courses is included. One can go in sequence or directly go to the sections of interest via the cross-referencing.

Each section begins with key concepts, followed by an in-depth dive via videos and text. Self-check questions appear immediately after the concept with customized feedback. Practical aspects such as how-to videos for tools and links for further exploration are provided. Each aspect of online teaching includes a toolkit for instructors to explore, compare and choose appropriate technologies, and make

decisions. For a given pedagogical purpose, OTeach provides information about a range of technologies, in order to address the diversity of platforms used and availability of tools for different instructors.

2.2 Workshops Design and Implementation

While the OTeach repository attempted to address a range of instructional needs, the diversity of queries received made it evident that a more customized solution was required. This was addressed by hands-on workshops. Table 26.1 provides a summary of the workshops and talks for different audiences. All workshops and talks were delivered in remote mode on an online platform.

2.3 A Walk-through of an Illustrative Workshop

The detailed example below describes the workshops in Row 9. Each workshop spanned over 5 days, with synchronous sessions on Google Meet of 90–120 min on each day. Sessions were centred around various topics in OTeach such as content design, advanced multimedia, active learning strategies in online synchronous

Table 26.1 Summary of OTeach-based workshops and talks

	Audience	Duration and mode	Participants
1	Faculty members at a top-tier research intensive STEM focused institute	2 h synchronous talk	200
2		5 day workshop, blend of synchronous + asynchronous	120
3	Video editing staff in the above institute	3 day workshop blend of synchronous + asynchronous	30
4	Graduate teaching assistants	5 day workshop, blend of synchronous + asynchronous	1000
5	Faculty members at research intensive, STEM focused universities	5 synchronous talks each of 2 h	540
6	Faculty members at a national engineering institute	2 day workshop, blend of synchronous + asynchronous	100
7	Training staff at a national bank	2 day workshop, blend of synchronous + asynchronous	60
8	Computer science college instructors at a professional society event	2 h synchronous talk	200
9	College instructors from various disciplines across India	4 workshops, 5 days each, blend of synchronous + asynchronous	290
10	Teachers from government schools, vernacular medium of instruction	3 workshops, 2 days each, blend of synchronous + asynchronous	300

Table 26.2 Assignments for instructors to create materials for their own online courses

Day 1	Apply chunking on your topic and prepare a 5-slide presentation on one chunk
Day 2	Use *draw.io* to prepare an illustration relevant to a topic in the Day-1 assignment. Update Day-1 presentation and include a slide containing diagram created using *draw.io*
Day 3	(a) Record a 2-min slidecast based on the topic of your choice using *OBSStudio*. Add two different video sources to the screencast. (b) Edit the video—trim the video as required using *OpenShot* and use *Handbrake* to reduce the size
Day 4	Prepare a mind map relevant to a focus question in topic of your choice. Use *VUE* for preparing the mind map
Day 5	Use h5P, to add interactive reflection spots at relevant places to the video you created in Day-3 assignment

sessions, communication, collaboration, instruction delivery and tools. Each session contained a warm-up activity based on the previous day's assignment, a session discussing principles and guidelines for effective online teaching, related tool demonstrations and a hands-on assignment for the next day. A crucial part of the workshop was providing instructors a set of tools and guiding them to select ones appropriate for their context. Open-source and simple to use tools were chosen in order to get instructors started immediately. This allowed installation and use of tools without worrying about license expiry and subscription cost. Troubleshooting assistance was provided to build confidence to explore advanced tools.

Moving to advanced online instruction methods would have been overwhelming for teachers who were used to classroom-instruction methods and had basic or no online teaching experience. To bridge this gap, assignments were designed to incrementally build on previous knowledge, thus helping participants to gradually transition from basic to advanced levels (Table 26.2). Participants were expected to create small and meaningful artefacts (for example, a recorded video with an in-video activity) for a topic of their choice by installing or configuring the technology. Feedback was given based on rubric-based evaluation criteria, aligned with best practices. This gave them the opportunity to make suitable corrections and improvisations in their work.

3 Impact and Findings

3.1 OTeach Webpage Statistics

The OTeach webpage was published on May 20, 2020 with an announcement of the launch on Twitter and Facebook. A total of 8000+ users were recorded in the first month. In a year's time the course had grown to 30,000+ sessions and 18,000+ active users. The current number of active users (as of September 30, 2021) are close to 25,000. 64% of active users accessed the course via direct links or bookmarks. We interpret these as users who are regularly accessing the course as a repository or a reference. 22% of the users visited from links inside our Institute's

network. 13% of the users accessed the course via organic search and 1% via social media. The most accessed section was *preparing content* among which *creating videos, chunking* and *curating content* were the most accessed subsections.

3.2 Data Collection and Analysis from Workshop

Data from one of the workshops were collected and analysed. Data sources included participant-created artefacts in hands-on assignments, results of pre-session and end of course quiz, workshop feedback form, and post-workshop emails. The post workshop feedback form included 17 questions to which 85 out of 114 participants submitted feedback. Select findings are given below:

- **Active participation**. 97% (111) participants attended all sessions and 89% (102) participants submitted all 5 artefacts as part of hands-on assignments. More than 70% have expressed interest in attending an elaborate version of the workshop.
- **Preparedness for using active learning strategies.** Participants displayed an increased awareness and reception for transition towards active learning strategies. 89% mentioned 'Adding interactivity to video' as the most useful topic and H5P for interactive videos was among the top three most useful tool. In the following quote, one participated described her experience of the transition: *"[…] students are disinterested if teaching is monotonous. Now, I would use the tools learnt in the workshop to break the monotony in my classes"*
- **Usefulness of hands-on assignments.** 81% of participants felt that hands-on assignments were useful to apply the principles and gain experience in using technology.
- **Preparedness and confidence in using tools**. 91% of participants found the tool sessions as the most useful component of workshop structure. The following two quotes are from participants who reflect on their experience with using technology:

  "I have never tried so many tools in 5 days and due to assignments I downloaded all the tools on my laptop and make an attempt to use it on the same day. This gave me hands-on experience and confidence." "I have learned a lot from workshop which is going to help me teach my students. It has also polished my skills and built confidence to conduct online sessions for students in current situation."

4 Reflection and Recommendations

Based on our experience of designing the OTeach resource repository, conducting the workshops and response received, we synthesize our reflections and put forth the following recommendations:

- **Include resources for instructors at a variety of preparedness levels and needs.** We cannot expect all instructors to follow the same materials and strategies for teaching, hence provide resources at a variety of levels from basic to advanced. Also provide a range of options to cater to differing needs of instructors based on domain, learners, infrastructure etc. In workshops, bridge the gap between participants at different stages of expertise. Facilitate participants to work in their zone of proximal development. Incorporate measures such as discussion forums, buddy system and group mentors. Also reassure instructors that it is okay to start wherever they are comfortable and go up the levels gradually.

- **Provide support for teaching in synchronous as well as asynchronous online modes.** In an emergency situation, students need the comfort of synchronous interactions. Since many university instructors primarily use lecture method along with some discussion, they may find it challenging to move to an asynchronous mode. Also due to lack of time or issues of technology or perceptions, instructors may hesitate to focus on creating asynchronous learning materials. However, research studies and best practices of effective online teaching point to both well-designed asynchronous learning activities and actively engaging learners in synchronous sessions (Zhao et al., 2005). Hence support for both modes need to be provided, such as in the form of guidelines, design plans, teaching strategies, relevant tools and so on.

- **Contextualize the use of technology tools and pedagogical strategies**. While there exist several technology tools and pedagogical strategies for teaching online, instructors need help to use and apply them in their specific context. The context can involve knowledge about the learners, instructors' experience, domain (subject), available infrastructure, institutional culture etc. Hence it is important to understand the context of the instructor, test these tools and strategies in the given context, and create resources such as how-to videos, or guidelines so that are meaningful to the context.

- **Design opportunities for practice, and follow with self- or peer-assessment.** Practice and feedback lead to better application (Shank, 2017). Provide instructors with frequent activities for applying online teaching strategies or getting hands-on experience with tools. Instructors can be asked to create content videos, in-video quizzes, activities for synchronous interaction, discussion prompts, etc. Provide rubrics based on research guidelines for self- and peer-assessment, and ensure that the feedback is specific and actionable.

- **Be aware of the negative perceptions regarding online teaching and learning, and address the beliefs surrounding it.** There indeed are serious challenges in moving online, especially in an emergency. For example, preparing students and instructors, making infrastructure available, conducting labs, fair assessments and many others. These issues do need wide discussion and systematic studies. However, perceptions and incomplete understanding abound on online teaching and learning (Allen & Seaman, 2010). Some are related to the nature of online courses, such as conflating a temporary online shift in an emergency situation with planned online learning. Others stem from assumptions such as poor student engagement in online learning compared to face-to-face

classes. Predictions such as online teaching will lead to ill-prepared students and poor quality outcomes tend to be made. Beliefs such as online teaching is not 'real' teaching are expressed. All these need to be acknowledged and addressed. Some ways of doing so are to examine underlying assumptions on what it means to teach or learn, provide alternate solutions, disseminate research findings and share best practices from similar instructors. Overall, it is important that the support provided to instructors be motivational as well as practical.

The above points arise from our key learning, that for online education to be effective in a country like India, we need to design solutions situated in the diverse needs of the instructors. Solutions need to be designed to address instructors' cognitive, social and affective requirements first. Instead of a universal solution, we need a flexible and adaptive set of solutions which guide instructors towards options that cater to their expectations and facilitate the application of principles in their teaching context. An educational solution during an emergency situation will have a chance of succeeding when it manages to secure buy-in from students, instructors and administrators, individually as well as collectively. In our case, this led to efficient adoption and a more effective transition accompanied with good practices.

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