

Technological and Pedagogical Aspects of a Communication Tool: An Immersive Learning Experience

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Abstract: The lockdown restrictions due to the coronavirus pandemic have resulted in educational institutions moving to remote teaching. Teachers needed to adapt their traditional face-to-face instruction to an online mode. The four week, hands-on workshop titled ‘Transition to Online Facilitation’ was launched under the aegis of National Programme on Technology Enhanced Learning in May 2020 to up-skill teachers with knowledge of technical tools and learner-centric pedagogical strategies. This paper highlights the manner in which design drivers like learner-centricity, immersivity, pertinency and transfer of ownership are embedded into the pedagogy design of the sessions on the Slack Platform. It documents and compares the orchestration of the instructor facilitated session and group-facilitated sessions where participants first experience the features of a tool as a student before using the features as a teacher. The level of adoption of design drivers is analysed. This study identifies three kinds of learner profiles namely, Innovators, Adaptors and Emulators. The research reports the Near Transfer of Learning as there was a high degree of similarity between the instructor facilitated session and the group facilitated sessions.

Keywords: Teacher training, ICT integration, Learner-Centric MOOC Model, Active learning, Immersivity, Pertinency, Transfer of Ownership, Collaboration

1. Introduction

To ensure that learning continues despite the lockdown imposed due to the pandemic, teachers who delivered instruction in face-to-face mode in brick-and-mortar institutions have had to engage in emergency remote teaching. The Pan-India lockdown began towards the end of March 2020 which was midway through the academic year. Apart from having constraints of bandwidth and access to gadgets, teachers who prior to the pandemic had limited use of multiple technologies, needed to adapt quickly to online teaching by learning features and pedagogical affordances of various technology tools.

In order to cater to this need and increase technology integration in teaching practice, a pilot workshop on ‘Transition to Online Facilitation (TOF)’ was launched under the aegis of National Programme on Technology Enhanced Learning (NPTEL) in May 2020 and spanned across four weeks. The workshop was conducted for educators from different geographical regions across India who were shortlisted from a pool of applicants. The workshop was structured around hands-on activities and encouraged learners to reflect on practices and tools they learnt and applied. During the workshop, learning was channelized through Slack, a channel-based communication platform developed by Slack Technologies.

This paper documents the process, design elements and the outcomes of the teacher training conducted through the Slack platform. We begin with a brief review of related work on design drivers used in developing professional development programs. Next, we present an outline of the Pedagogy Design based on the design principles of learner-centricity, immersivity, pertinency and transfer of

ownership and elaborate on its implementation. The paper also describes an evaluation rubric used to measure the design and orchestration of training sessions conducted on Slack. Further, the paper analyses the data mined from the communication platform to gauge participation level during the training session. The analysis of training sessions have helped in the identification of three learner profiles, namely, Innovators, Adaptors and Emulators. The characteristic features of these learner profiles are also presented. The insights gained during this study provide inputs to develop training programs for professional development in general and in particular refine the design of the next iteration of training using a communication platform like Slack.

2. Related work and background

For the teacher training to be pertinent, it needs to be in sync with what participants believe they can apply to their own job context (Uysal, 2012). Course designers need to keep this into account while designing faculty development programs. Due to the Coronavirus pandemic, teachers had to resort to usage of multiple technologies to engage classes and needed to be trained in this regard.

Learning to use ICT can be relevant and effective when it is centred on ‘meaningful learning activities’ involving technology (Howland, Jonassen, & Marra, 2012). Several studies on effective ICT integration in Teacher Professional Development recommend designing immersive, student-centric experiences for participant teachers where they can first engage with the content and can experience using a technology as a student (Banerjee, Murthy, & Iyer, 2015; Howland, Jonassen, & Marra, 2012). Including transfer of ownership from the instructor to participant teacher ensures that technology integration is the onus of the participant teacher (Warriem, 2018).

There are models for learner-centric course design that recommend immediate practice after introduction of content (Murthy, Iyer, & Warriem, 2015; Murthy, Warriem, Sahasrabudhe, & Iyer, 2018; Warriem, 2018). The Learner-Centric MOOC (LCM) model “consists of a set of guidelines which help in conceptualizing, creating and conducting” a course and addresses the problems related to lack of learner engagement (Murthy et al., 2018). This model includes components called Learning by Doing (LbD) activities where participants get immediate practice on the concept that is being introduced and receive customised feedback and Learner eXperience Interactions (LxI) where a focussed discussion facilitates peer learning and encourages participants to reflect on their learning.

Critical enquiry is beneficial in enhancing one's own teaching practices (Norton, 2019). When participant teachers go through this experience, they are encouraged to reflect on their own usage of technology in teaching practices in order to increase their students’ learning outcomes.

Training activities on Slack were operationalized around the design drivers of learner-centricity, immersivity, pertinency and transfer of ownership as these factors enabled participants to experience the technology tool first as a learner and then create learning experiences based on various tools. This enabled Near Transfer of Learning (Woodworth, R. S., & Thorndike, 1901).

3. Our solution

The workshop focused on teacher training and community building through Slack and its integrated features. This section documents the manner in which the design drivers were integrated and implemented in the sessions on Slack.

3.1 Implementation of the solution

An introductory session on ‘Using Slack on Slack’ was designed in order to model the use of Slack as a teaching-learning tool. The objective behind this approach was to allow the participants to experience using Slack as learners and then as instructors. This session was conducted by the instructor and was moderated by the Teaching Associates (TAs) of the workshop. See Figure 1.

Pedagogy Diagram for session on Slack		
Roles during the instructor facilitated session on Slack	Features used	Step-wise tasks by instructor, TAs and participants on Slack
Instructor	Chat, Polls	1. Instructor conducts the session and posts questions for focussed discussions related to features and pedagogy of tool
	Video Conferencing Tool	4. Validate responses; Clarify doubts and Post facilitator summary
TAs	All features	2. TAs moderate the session; document the session
Participants	Chat, Polls	3. Reply to questions with threaded posts and reactions; Post Doubts
	Video Conferencing Tool	5. Request further clarification; Know future course of action

Figure 1: Pedagogy Diagram of Sessions on Slack

The session was designed to be useful for participants accessing Slack in a synchronous as well as asynchronous mode. It adopted components of the LCM model (Murthy et al., 2018). The session also included Think-Group-Share, an active learning strategy and a curated set of resources. Participants responded to questions, answered polls and reacted to the posts using different kinds of reactions. The process of responding to posts and answering queries by fellow participants were gamified. After participants posted their responses, the instructor included ‘facilitator summary’. Further, the instructor obtained participant feedback and introduced participants to group facilitation tasks.

After experiencing Slack as a learning platform, participants collaboratively worked in groups to choose a technology tool and facilitate a session using Slack. The tools ranged from technologies used in content curation, content creation, collaboration and assessment. This model for training was employed so that participants could immediately apply and adapt the techniques they experienced during the session on Slack. Participants were divided into ten groups and each group had a participant moderator. The participants were chosen as ‘Community Discussion Forum Moderators (cDFMs)’ on the basis of active performance and participation in the workshop Discussion Forum. The cDFMs were guided by the instructor and TAs on collaborative learning and community building. Further, in order to incentivize participants, 30% of the total course grade was based on the activities in Slack. Participants needed to attend at least two of the group facilitated sessions.

3.2 Utilizing Design Drivers for the solution

The design drivers for the introductory instructor-facilitated session on ‘Using Slack on Slack’ were: Learner-centricity, Immersivity, Pertinency and Transfer of ownership. The group-facilitated sessions reflected these design drivers in various degrees.

3.2.1 Learner-Centricity

The sessions incorporated components from the LCM Model. The instructor used focus activities to guide participant discussions on particular aspects of online teaching- learning and communication tools. Think-Group-Share, an active learning strategy was employed to encourage introspection on teaching practices and facilitate peer learning. See Figure 2 where the cDFMs referred to as group leaders facilitated and moderated discussions related to the activities.

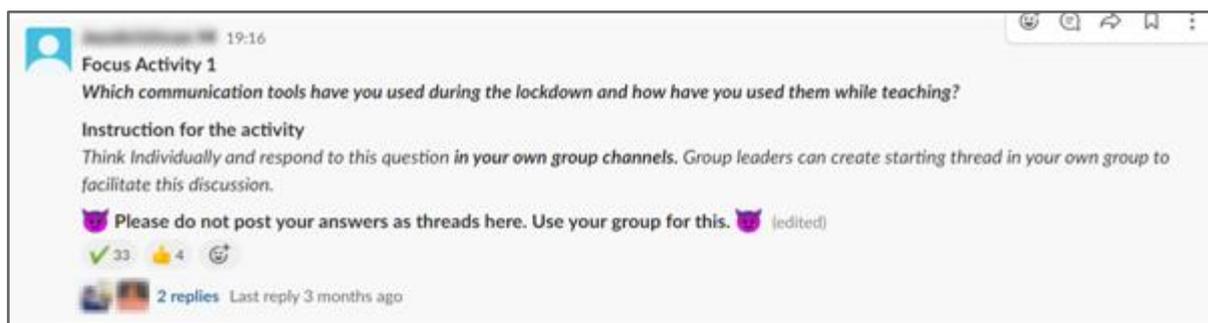


Figure 2: Focus Activity during instructor facilitated session

The instructor invited the cDFMs or a representative from the group during the session to share the points that were discussed in the private groups channels to all the participants. The session included a summary for each activity, where the instructor highlighted key points, summarised the discussions and closed the loop in a post. See Figure 3.

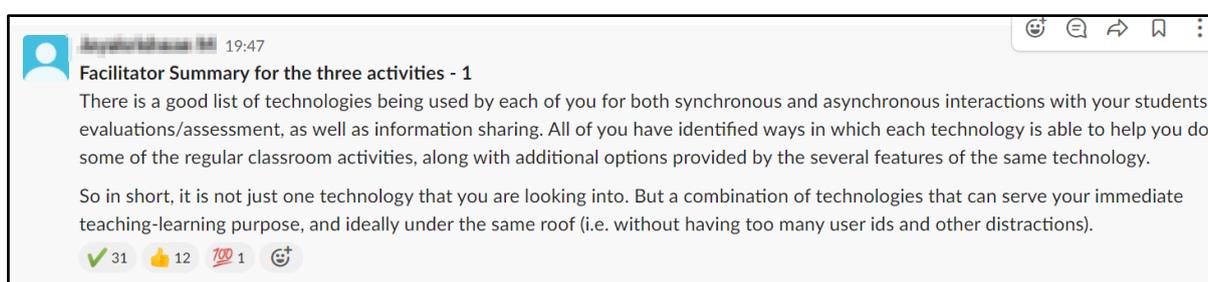


Figure 3: Facilitator summary during instructor-facilitated session

The activities were designed in such a way that it provided learners with an opportunity to immediately explore and practice various features of Slack. While participants were asked to reflect on their teaching practices, they needed to share their thoughts through Slack's thread feature in chat, and in private channels. In addition, they could explore reaction features as well as the features of the apps that were integrated into Slack like Polls and Jitsi. These LbD activities were accompanied by constructive feedback in the synchronous session that was provided by the Instructor and TAs.

3.2.2 Immersivity

The format of the introductory session on Slack was high on immersivity. As per the immersivity principle, through a series of guided instructions, participants were immersed in exploring various features like posting in a thread, using group channels. This learning by doing increased the level of immersion as participants could experience using Slack as students where they discovered various features and engaged in discussions with their peers based on the focused questions.

Then in group-facilitated sessions they needed to facilitate similar sessions on any technology tool, based on the design drivers used. The group facilitated sessions also reflected this immersivity principle as participants could discover features of tools as learners through a series of reflection questions and activities.

Once learners witnessed how to conduct a session on Slack from the instructor, they applied similar techniques and design drivers in the group sessions that they facilitated. In the group facilitated sessions, the facilitators followed the pedagogical design seen in Figure 1. Near transfer of learning could be observed as the Slack training session and the trained behaviour are similar to that emulated by the participants in the group facilitated-sessions.

3.2.3 Pertinency

The design drivers of pertinency were woven into the choice of the communication tool for conducting

the session as well as the kind of questions used for focused discussion. The free version of Slack with its multiple features and integrated tools to facilitate discussions, collaborations, track learners activity would be appealing to learners (Ross, 2019). As compared to Google Groups, this channel-based messaging platform has a more vibrant User Interface which would be appealing to students. Unlike Whatsapp, and similar to Telegram, it is a cloud-based tool that also enables users to keep certain information private.

During the instructor facilitated session, through a series of focus activities, participants needed to reflect on how they used various communication tools during the lockdown while teaching See Figure 2. As in a class, where active learning strategies are implemented, participants brainstormed with each other in their group channels and posted summaries in the main training channel. Group leaders could take charge of facilitating the discussions in their groups.

According to the design principle of pertinency, participants would need to generate artefacts for their own context. After the instructor's session on using Slack, the group-facilitated sessions on Slack are artefacts of the course. The manner in which groups have integrated design drivers shed light on the degree of adoption.

While the group leaders played a major role in rallying their teams to plan and facilitate the session, a shared sense of responsibility was observed among the members of the group. Different members took on ownership of various components required for the session like designing announcement, content and questions for the session, feedback form etc. At the end of the group sessions on various tools, the participants in turn needed to create an artefact based on the tool for their own courses.

3.2.4 Transfer of Ownership

During the instructor-facilitated session, the transfer of responsibility of driving discussion in the group to designated cDFMs was a driving force behind interactions. See Figure 2. Having smaller group discussions also ensured that those intimidated by larger groups also participate. Apart from initiating discussion in their groups, the cDFMs were tasked with the responsibility of on boarding the groups mates onto Slack, providing constructive feedback to their team based on various course activities. Group members were simultaneously encouraged to add to the comments given by the cDFMs.

After the instructor-led session, the ownership of conducting further sessions on technology tools shifted to the groups. Each of the ten groups conducted at least one session over the course of two weeks. They could choose any tool of their choice and they needed to conceptualize the session, curate and create resources.

4. Research method

The research question that this study attempts to answer is: What aspects of the instructor facilitated session on Slack did participants emulate in their collaborative session on tools during the workshop? To answer this research question, we have used a mixed-method study to evaluate the training sessions on Slack.

4.1 Sample

A total of 200 participants from various educational institutions across India registered for the pilot run of the workshop. Out of 160 participants who joined Slack, 86 were active participants. Active participants are those who have posted at least once or have reacted at least once in the public channel of Slack.

4.2 Instruments used

We used a variety of instruments to collect data on actual engagement in the training and adoption in

the training. To gain an understanding of the rate of participation and engagement, we analysed the data from the public channel of Slack where the training sessions were conducted. To ascertain the level of adoption of aspects in group-facilitated sessions, we used a design and orchestration rubric.

5. Results

We have used the data mined from the Slack to observe the level of participation during the training sessions. At the basic level, this data is reflective of the workability of the instructional strategies employed during the training sessions on Slack. In addition, we present an evaluation rubric employed to perform qualitative analysis of the training sessions.

5.1 Quantitative analysis

During the workshop, a total of ten group sessions were conducted by the participants on Slack. On certain days, multiple group training sessions were conducted. However, to spot the trends in the learner participation and engagement during the sessions conducted on the Slack, we focussed our analysis only on the days when a single session was conducted. Group 5 volunteered to conduct the first collaborative participant-facilitated session on 31st May 2020. Mid-way through the training, Group 4 conducted their session and Group 9 facilitated a session on the last day of the training.

The data presented in Table 1 is based on the data obtained through the ‘Analytics’ feature of Slack. The data obtained from the public channels of Slack was further processed to dig deep into the participation level. Table 1 presents three attributes, namely, the number of posts, replies and reactions which are being used to gauge the level of participation on the days of sessions. Figure 4 graphically presents the day wise data of number of posts, replies and reactions for the entire period when training was conducted on Slack.

Table 1. *Number of Posts, replies and reactions*

Date of Session	Group Number	Session	Posts	Replies	Reactions
May 27, 2020	-	Using Slack on Slack*	19	35	458
May 31, 2020	5	Google Classroom	17	110	161
June 2, 2020	4	Audacity	43	112	224
June 6, 2020	9	Audio FM	27	28	58

*The session on ‘Using Slack on Slack’ was conducted by the instructor.

The session facilitated by the instructor saw 19 posts, 35 replies and 458 reactions. Out of the three session days shortlisted for analysis, the highest activity in terms of number of posts, replies and reactions was seen for the session conducted by Group 4. The sessions conducted by the instructor recorded a relatively low number of replies but the highest number of reactions in the public channel. This was due to the fact that during the instructor-led session, some group activities involved participants posting and having discussion in their private group channels that were created by the instructor rather than the public channel. Only data generated from the public channel on Slack can be tracked. The cDFMs had to summarise points discussed in their own private channels and reply to the instructor’s post. As indicated in the polls taken for attendance, 51 marked that they attended the session synchronously or asynchronously. Participants used the reaction feature of Slack to reply to the instructor’s group activity post as the instructor wanted them to only post in the private groups for those activities. The participants-facilitated sessions on the other hand didn’t require attendees to work in groups.

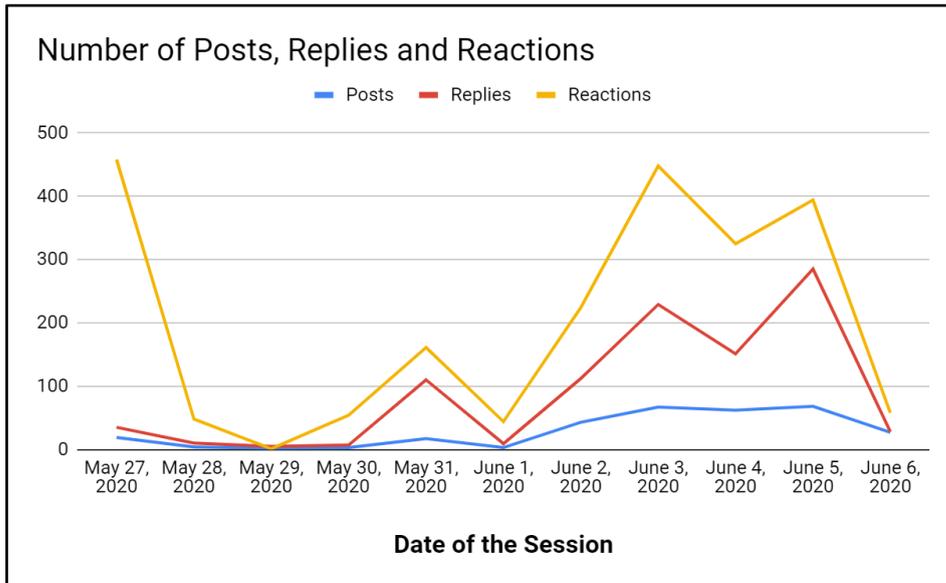


Figure 4: Graph representing the day-wise number of posts, replies and reactions on Slack

5.2 Qualitative Analysis

The group sessions were evaluated qualitatively based on a rubric which was designed by taking the introductory session conducted by the instructor as a benchmark.

Table 2: Rubric for the evaluation of Design and orchestration of Group sessions (N=10 groups)

Criteria	Target	Satisfactory	Inadequate
Level of application of design drivers of Immersivity, Pertinency and Transfer of ownership	Effective application of design drivers (4 groups)	Acceptable application of design drivers (4 groups)	Very limited application of design drivers (2 groups)
Learner centricity of instructional strategy based on LCM principles	Instructional strategy employed majority of LCM principles (8 groups)	Instructional strategy employed some of LCM principles (2 groups)	Instructional strategy employed none of the LCM principles (0 group).
Orchestration	Tasks presented in a timely manner, sufficient time given to perform various tasks, queries from participants answered. Efficient use of technology for delivery of content and	Most tasks presented in a timely manner, sufficient time given to perform most of the various tasks, most of the queries from participants answered. Adequate use of technology for delivery	Tasks presented in a haphazard and un-coordinated manner leading to confusion among participants. Inadequate use of either too few or too many technology tools and platforms for delivery of

	engaging participants (6 groups)	of content and engaging participants (4 groups)	content and engaging participants. (0 group)
ICT Integration	The group employed innovative ways for ICT integration during the session. For example, use of Slack features for TGS activities, Wordpress with interactive activities (4 groups)	The group used a wide range of ICT for useful but standard tasks. For example showcasing submission of artefacts, Demo videos (5 groups)	The group used only video conferencing tools to deliver sessions. (1 group)

From Table 2, we can infer that:

- 40% groups effectively applied design drivers of immersivity, pertinency and transfer of ownership.
- Majority of the groups have consciously used learner centric principles while designing their sessions.
- Most of the groups orchestrated session activities efficiently.
- 40% groups used innovative ways of ICT integration during their session while 50% groups primarily used ICT resources for performing standard tasks.

For deeper analysis, we focus on content analysis of the collaborative sessions conducted on the days when a single session was conducted i.e. session conducted by Group-4, 5, 9. The sessions included a number of components. To illustrate the similarity and difference with the participant-led sessions and the instructor-led session, the kinds of posts were analysed and three common types emerged.

- Polls
The instructor introduced interactive polls during the session as a means for recording attendance. While Group 5 made use of polls in a similar manner, Group 4 displayed innovativeness by designing their session around the multiple interactive polls. A pre-session poll activity was conducted to elicit responses. During the session, polls were used to gauge participant engagement and to obtain feedback of session activities. Group 9 exhibited similar use of polls as displayed in the prior sessions.
- Facilitator Summary
During the session the Instructor summarized each activity. While Group 4 built on the type of facilitator summary and added analysis of kinds of replies by participants, Group 5 provided only an end of session. Group 9 did not include this feature in their session.
- Learning by Doing
The instructor introduced features of Slack through LbD activities to provide an immersive learning experience. All three groups used this feature and included activities where participants needed to put the features of the respective technology tool into practice. Some groups also included metacognitive questions as LbD. Constructive customised feedback was provided during the synchronous session on Slack. Some groups extended this and provided feedback asynchronously till a particular due date.



Figure 5: Learning by Doing activity designed by Group 4

6. Discussion

The results of this study shed light on the level of adoption of design drivers and strategies used in group facilitated sessions. Based on the analysis of sessions facilitated by the group members on the Slack, we have identified three learner profiles.

- **Innovators-** It is apparent that for the session conducted by Group 4, the group facilitators took inspiration from the instructor led session and employed innovative strategies to enhance learner engagement.

This category of learners is identified as ‘innovators’ as they improvised their instruction style with a balanced mix of activities and pedagogical strategies which lead to innovation. The activities and learning path that was designed by them helped to enhance participant engagement, motivation and attainment through the session.
- **Adaptors-** Group 5 adapted the instructor’s style of engaging the learners during the session. Unlike the instructor-led session, this group utilized their Wordpress site as an additional platform to share resources with the participants. Like the instructor-led session, certain group members performed the role of the moderators to handle queries during the session.

This category of learners adapted their instruction by modifying the activities and engagement strategies that they designed for the session. The session activities were similar to but not an exact replica of the strategies followed in the session conducted by the instructor.
- **Emulators-** Group 9 emulated the instructional style followed by the instructor as well as embraced the style of instruction of other groups.

This category of learners replicated the learning pattern and pedagogical techniques learnt through the prior sessions.

7. Conclusion and Future Work

The idea discussed in the paper about providing an immersive learning experience and then offering opportunities for applying what is learned, is an important principle while designing Faculty Development Programs with the use of Technology. Hence, the Pedagogy Design and Rubric attempt to showcase that when participants are trained to use the technology as learners and then are able to practice it as instructors, the affordances of technology are properly used. The Pedagogy Design and accompanying rubric have three primary functions:

- to facilitate ‘learner-centric’ practices in design and development of training programmes,
- to facilitate orchestration/operationalization of training with demarcated tasks to course instructors, TA’s and DFMs,
- to provide feedback to instructors about the level of performance of participants given the course design choices made.

Using the rubric provides information beyond that available from the Slack Analysis tool. The Slack Analysis tool provides data about the quantity of interactions such as number of threaded posts, reactions and so on. The rubric taps into participants' intellectual efforts, skills, performance, and

participation. Further, using the design and orchestration rubric for Group sessions, it is observed that different profiles of groups emerged. However, from these groups, further analysis of individual data logs is required to be able to identify individual innovators who can assist in further developing professional learning activities.

In addition, a larger and more diverse sample size would enable us to make more generalised conclusions. There is also a need to assess participants' individual course journals to be able to accurately characterize them and get a better indicator of behaviour involved. Rubric further needs to be validated and inter-rater reliability needs to be established.

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References

- Banerjee, G., Murthy, S., & Iyer, S. (2015). Effect of active learning using program visualization in technology-constrained college classrooms. *Research and Practice in Technology Enhanced Learning*, 10(1), 15. <https://doi.org/10.1186/s41039-015-0014-0>
- Howland, J. L., Jonassen, D. H., & Marra, R. M. (2012). *Meaningful learning with technology* (4th ed.). Boston, MA: Pearson Education
- Murthy, S., Iyer, S., & Warriem, J. (2015). ET4ET: A Large-Scale Faculty Professional Development Program on Effective Integration of Educational Technology. *Journal of Educational Technology & Society*, 18(3), 16–28. JSTOR. Retrieved from JSTOR.
- Murthy, S., Warriem, J. M., Sahasrabudhe, S., & Iyer, S. (2018). LCM: A Model for Planning, Designing and Conducting Learner-Centric MOOCs. *2018 IEEE Tenth International Conference on Technology for Education (T4E)*, 73–76. Chennai: IEEE. <https://doi.org/10.1109/T4E.2018.00022>
- Ross, S. M. (2019). Slack It to Me: Complementing LMS With Student-Centric Communications for the Millennial/Post-Millennial Student. *Journal of Marketing Education*, 41(2), 91–108. <https://doi.org/10.1177/0273475319833113>
- Norton, L. (2019). *Action research in teaching & learning: A practical guide to conducting pedagogical research in universities*. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=1926353>
- Uysal, H. (2012). Evaluation of an In-service Training Program for Primary-school Language Teachers in Turkey. *Australian Journal of Teacher Education*, 37(7). <https://doi.org/10.14221/ajte.2012v37n7.4>
- Warriem, J. (2018). A model for large-scale, in-service teacher training on effective technology integration in engineering education. Retrieved from <https://www.cse.iitb.ac.in/~sri/students/jk-thesis.pdf>
- Woodworth, R. S., & Thorndike, E. L. (1901). The influence of improvement in one mental function upon the efficiency of other functions. (I). *Psychological review*, 8(3), 247. (3), 247–261.