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Using ICT for scalable, sustainable Teacher Professional Development

# Using ICT for scalable, sustainable Teacher Professional Development in Developing Country Contexts: An approach paper<sup>1</sup>

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**Abstract:** This approach paper introduces a methodology for structuring and providing online/hybrid teacher professional development that can scale, specifically designed for countries located in the Global South by utilising digital technologies. The paper draws on several large scale programmes for CPD mediated by ICT, piloted and implemented by the Centre of Excellence in Teacher Education (CETE) in a range of States in India and international contexts. The approach is developed with sustainability of CPD related changes at its core; for this professional development for teachers must seek to develop thinking, autonomous, and reflective practitioners who can adapt to different classroom environments, making learning active and inclusive by providing a support environment that fosters social learning and practice-integrated pedagogies. The paper develops the use of ICT mediation to achieve scale, which is continuous with this aim of CPD. It offers insights on design and practice of ICT use based on experience of what has been tried and what works. It concludes with recommended policy and practice strategies.

**Keywords:** Teacher Professional Development; ICT-Based TPD; Online Courses; Communities of Practice; TPD at Scale

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## 1.0 Introduction

Digital technologies offer new capabilities that are being extensively drawn upon by educational systems, particularly to design and offer learning experiences for children and adults in a range of institutional contexts, across diverse regions and with flexibility, and scale. These technologies include educational multimedia resources, learning management systems, and two-way synchronous and asynchronous communications.

This paper presents an approach to organising and offering scalable online/hybrid teacher professional development, suitable for countries in the Global South, leveraging digital technologies. Based on (i) goals of continuous professional development for teachers, and core principles established through international research and (ii) field action projects of the Centre of Excellence in Teacher Education, the paper outlines considerations that should guide policy and practice for designing and delivering high-quality continuous professional development using ICT and digital media.

## 2.0 Background

The traditional dominant approach to offering in-service teacher professional development at scale in the South Asian context has been the 'Cascade approach'. It is widely acknowledged that the cascaded training model has had limited success and impact on teachers

Affordances of technology offer the possibility of overcoming some of the recognised limitations of cascade training such as diminishing expertise of resource persons down the cascade, scheduling difficulties, limited opportunities during the workshop, and little or no post-workshop follow-up (see exhibit 1 below).

<sup>1</sup> The authors thank Freda Wolfenden for her extensive feedback and suggestions.

<b>Exhibit 1: Comparison of Traditional and ICT-Based CPD</b>		
	<b>Traditional CPD</b>	<b>ICT-Based CPD</b>
(1)	<p><b>Limited and diminishing expertise of resource persons down the cascade levels.</b></p> <p>Master resource persons usually receive the same training that they are supposed to provide to teachers.</p>	<p><b>Direct access to expertise:</b></p> <p>The expert can directly deliver training content online at scale. High-quality resources can be directly shared with participants. Interactivity is also possible</p>
(2)	<p><b>One size fits all</b></p> <p>Usually, the same training module is used across different groups as customisation at a local level is not encouraged on account of lower levels of expertise.</p>	<p><b>A variety of online courses/modules</b> can be offered centrally with the possibility of teachers selecting what best suits their needs.</p>
(3)	<p><b>Short duration:</b></p> <p>Given costs, and time required, trainings are mostly workshops of a few days. The logistics of organising follow-up meetings are complex and mostly avoided.</p>	<p><b>Longer duration of TPD:</b></p> <p>Modules running for several days/weeks/months are possible.</p>
(4)	<p><b>Limited Opportunities for Theory &amp; Practice Connection:</b></p> <p>There is limited opportunity to try out, and practice, new pedagogies during the workshop. There is limited support to try out new practices post-workshop.</p>	<p>Long duration enables the possibility of practice to follow theory and be brought back into discussion in the course of CPD. (also see below COP)</p>
(5)	<p><b>Limited or no follow-up and field-based/school-based support.</b></p> <p>The logistics of school-based follow-up are complex. Even where there are resource persons, regular school visits are difficult to schedule and maintain.</p>	<p><b>Online communities of practice</b> can enable expert and peer support for practice and facilitate exchange for the period of CPD modules and after.</p>
(6)	<p><b>Limitations of access to and difficulties in scheduling physical meetings.</b></p> <p>Fixed places and times for workshops often result in difficulty accessing workshops, especially for teachers working in rural and remote school locations.</p> <p>Scheduling is also complex and time away from school for training is a source of tension and leads to loss of working days in school.</p>	<p><b>Flexibility of Access and scheduling.</b></p> <p>Two-way asynchronous and synchronous communication using ICT enables flexibility to access professional development opportunities through online modules, webinars, and mobile messaging apps.</p> <p>Learners also need not be simultaneously present for all interactions and can engage at their own time and pace.</p>

However, recent experiences with technology-based training, in the form of online courses or webinars reveal new kinds of problems and difficulties in using this medium effectively:

- the impersonal nature of the experience
- absence of 'immersion in the workshop context'
- lack of interaction and engagement
- poor content quality with limited possibility of on-the-spot improvements
- Limitations on account of costs of devices and internet bandwidth.

Moreover, engagement can remain limited, superficial, and easily gamed. Metrics that are used in promoting technology-based solutions such as the access and reach of the internet, affordability and ownership of devices, as well as registration and login metrics, usually provide inflated and unverifiable claims of efficacy.

The availability and affordability of Internet connectivity as well as access to not only smart mobile phones but also devices such as laptops and tablets with keyboards, enables shifts in how teachers use technology and how technology can be used for their CPD (Conole, 2007, Charania 2022):

- From information/content delivery to communication,
- From broadcasting to interactive engagement,
- From individual learners to socially situated learners in communities,
- From content consumers to producers.

### **3.0 Objectives of and Principles for CPD**

Using ICT effectively in PD contexts requires focus to be kept on the goals and principles that underlie professional learning and development in general. This paper follows a principles-based approach to develop guidelines for the design and implementation of ICT-based CPD for teachers. The paper draws on successful experiences of designing and delivering high-quality TPD at Scale, using new affordances of technology and technology access of school teachers in India and in the Global South. Namely, (1) Integrated Approach to Technology in Education (ITE), (2) Connected Learning Initiative (CLIX), (3) Connected Learning for STEM (CL4STEM), and 4) Multimodal Approach to Teacher Professional Development (MATPD) (see appendix for a summary of the CPD design of these programs).

Design principles and guidelines are drawn out in response to two key questions:

1. What should good TPD try to achieve? (Outcomes of TPD)
2. What features should good TPD designs have? (Core Principles of Design)

A multitude of technology-driven professional development courses have arisen, allowing teachers the opportunity to avail themselves of a diverse range of educational resources. This encompasses concise videos that augment conceptual comprehension or concentrate on pedagogical elements, comprehensive lesson plans and activity suggestions, worksheets and interactive materials for classroom implementation, and more. The availability of direct access to experts, the opportunity to communicate with them, the option to choose courses that may be completed at one's own pace, online mentorship, and the ability to learn within professional networks are all increasing. A key challenge yet to be addressed in all teacher professional programs is supporting and motivating teachers to engage with the content and activities of the professional learning process, enabling professional growth through the program, and supporting teachers to develop their practice.

#### **3.1 What should TPD try to achieve?**

Teacher professional development should be directed at some or all of the following:

1. Enhance teachers' autonomy, reflection, and ability to adapt to different environments.
2. Improve/Deepen/Strengthen teachers' knowledge, attitudes, and classroom practice
3. Facilitate the formation of professional learning communities and enable teachers to participate in them: providing interaction, exchange, and support through peer teachers, school leaders, resource persons, teacher educators, external subject matter experts, and other community members.
4. Enable teachers to deepen their knowledge and skills to further their career pathways.

**These are detailed below:**

**1. Increase teacher's autonomy, reflection, and adaptive expertise**

- a. Democratic professionalism views teachers as active agents of policy development and reform agenda to enhance student outcomes and achievement in a socially just environment.
- b. Teachers must experience their professional autonomy in planning their learning and development, teaching and assisting teachers in reflecting on their practice and education, and designing to develop teachers' autonomy as reflective practitioners.
- c. Teachers need to be developed as humane, socially just professional, and adaptive experts to teach a diverse student population in inclusive classrooms.

**2. Improve teachers' Knowledge, Attitudes, and Classroom Practice:**

- a. Pedagogy in India and the Global South needs to **shift from dominant rote-based and transmission-oriented teaching-learning methods to adopting active, interactive, and inclusive.**
- b. Teachers need to deepen their **content knowledge, pedagogical content knowledge (PCK)** (Shulman, 1986), **and Universal Design of Learning (UDL)**, which can enable them to focus the learning process and render content accessible to diverse learners.
- c. **Attitudes and beliefs of teachers regarding the inclusion and educability of students from socioeconomically and culturally marginalised groups to establish inclusive classroom environments** need to be addressed.

**3. Enable Teachers to participate in Professional learning communities**

- a. The CPD program must enable the **formation of teacher support networks** to enable sustained **cluster and school-based teacher professional development and academic/pedagogical support** with the active involvement of **local stakeholders**<sup>2</sup>.
- b. Enable access to peer teachers, school leaders, resource persons, teacher educators, external subject matter experts, and other community members from whom teachers may **seek support and contribute to the larger education discourse.**

**4. Provide Opportunities for Certification and Career Progression**

- a. Professional development leading to certification positions PD in relation to the teacher herself as a professional, delinking PD from limited and instrumental purposes of improving student learning outcomes or specific interventions. This can allow for CPD programs to incorporate rigorous evaluation and certification mechanisms, as this would empower educators to leverage these certificates for professional growth and progression.
- b. Certification and professional development are transparent means of assessing teachers when considering career progression. Linked with PD, **career mobility and compensation structures within education systems** can effectively serve as a means of motivating teachers and school leaders and seeing improvements in student learning.

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<sup>2</sup> District and sub-district level stakeholders such as District Institute of Education and Training (DIET) faculty, Block Resource Persons (BRPs), Cluster Resource Persons (CRPs) / School Complex Leaders and Resource Persons (RPs), school leaders, mentors and other community

### 3.2 Ten Design Principles:

- 1. Explicitly focus on scaling from the beginning.** That is not to add scaling later but think about scaling from the start: scaling for depth, sustainability, spread and shift in reform ownership, embedding in local ecosystems, and involving systemic integration.
- 2. Anchor professional development in practice and reflection cycle.** Give time and opportunity to implement and share experiences of practice change, success, and failure, and provide opportunities to model practice. Enable collaborative lesson planning and review
- 3. Offer variety, and flexibility within structure for pacing and access.** Cater to diverse interests and local languages, local concerns.
- 4. Ensure authenticity and rigour.** Hold teachers to professional expectations and provide access to research-based theoretical ideas, and provide feedback during the process of experimenting, innovating, and reforming pedagogy.
- 5. Address why and how** questions for teachers by justifying the rationale of designs based on research-based findings and theoretical ideas.
- 6. Keep social learning and interaction as the central focus,** where participants build relations with the CPD lead and other participants; where teachers are supported and can give support, in a community of experts and peers, school leaders, and mentors. Encourage collaboration in the learning process. Support the formation of subject-based CoPs (professional identities), Manage CoPs intentionally, enable diverse participants to participate in CoP, providing vertical and horizontal linkages between peers for more reflection on local and contextual solutions and local language use.
- 7. Recognise and develop professional identity, strengthening teachers' sense of purpose,** agency, and professional judgement. Draw teachers into discussing and reflecting on policy and wider educational platforms.
- 8. Adapt CPD to meet teachers where they are,** in response to their needs and contexts, drawing on local resources and experiences. Avoid deficit views of teachers.
- 9. Signal and call out competencies being developed.** Make learning achievable, with teacher competencies as the first-order outcomes and classroom practice and student learning as second-order outcomes. Draw out and relate CPD learning to enhanced teaching competencies and new career pathways.
- 10. Recognise achievements/specific learning through PD** (for self, peers, and the system) feedback in CoPs. Grading and certification are ways to provide recognition.

### 4.0 What has been tried and works: Four Scalable CPD designs

In this section, four scalable CPD designs implemented at CETE are described. The cases present various approaches and characteristics of scaling inside India and in international developing country contexts. The four scenarios involve online courses/modules, online Communities of Practice (CoP), scaling in international contexts, master trainer/mentor capacity development, and micro-credentials as models for scaling TPD leveraging digital technologies.

#### 4.1 Connected Learning Initiative CLix: online courses and CoPs

CLix initiative ([Phase 1:2015-2020; www.clix.tiss.edu](https://www.clix.tiss.edu)) aimed at developing a scalable programme for under-resourced context. to offer high-quality modules to develop understanding and higher-order thinking in mathematics and science, using ed tech and hands-on learning, with students working in collaborative groups and promoting active learning, in Indian languages. 13 modules mapping onto the middle and secondary school curriculum were designed. The subject teacher was envisioned as drawing and combining CLix resources in her pedagogy. Teachers' professional development was designed to strengthen teachers' knowledge and understanding of ICT and subject pedagogy.

The CLix TPD program adopted MOOC-based online courses and an online Communities of Practice (oCoP) to develop an ICT-based scalable teacher professional development program.

- **TPD was designed in the form of online courses, with evaluation and certification.**
  - Certification intended to develop a model of TPD that is not merely instrumental to delivering an aspect of the curriculum but can be recognised by teachers as leading to the development of proficiency in professional competencies, related to but not limited to the curricular intervention. It was proposed that a series of certifications could be acquired by teachers, leading eventually to a 'Certificate in Reflective Teaching with ICT (20 credits). These courses were presented to the TISS Academic Council and AC approval was obtained.
  - The evaluation was aimed at setting expectations of engagement with the module and learning from it.
- **The courses were designed to be offered online using high-quality content authored on a platform.** This was intended to achieve a scalable model and lengthen the period of engagement. The idea was to be able to develop and deliver the courses using high-quality resources and thoughtful design and to be able to reuse the resources
- Initially, the courses were designed as '4-credit' courses—with the expectation that they would be completed over 12 weeks. Subsequently, they were reduced to **2 credit courses, running for about 6 weeks.** This was done to make course completion more achievable while extending engagement.
- **The courses were designed around subject teaching**—mapping to the CLix curriculum requirement and core identities of teachers as subject teachers. The course content was informed by research on pedagogical content knowledge linked to curricular topics. They were oriented to classroom practice and student learning, mapping to experiences and issues relevant to the practice of teaching.
- **The courses included exemplary student-facing resources** (CLix resources) that had elements of research-based PCK, interactivity, and hands-on learning. Experiencing student resources and using these to teach and then reflect was integrated into the course design: this was the **practice-based** dimension of the course/module. The student resource designers shared their own thinking on why the resources were designed in a particular way and how they supported student experience, making the why of the resource available to teachers to also think about.
- In the course of the six weeks, teachers had the opportunity to experiment with educational approaches in school ICT laboratories and classrooms. The course required teachers to interact with their context and practice and respond to queries and prompts designed for the course.
- The TISSx platform (open EdX), was used and customised given the type of digital devices and internet access teachers would have. A mobile-based app with asynchronous content giving access more easy access to the course was developed.
- The discussion forums on TISSx were enabled to create a social learning environment. The course was paced and required teachers to come onto the platform to share ideas with other teachers and with the course facilitators.
- **The course included a range of assessments** to test teachers' grasp of PCK and their ability to apply that understanding in practice, including an obligatory practice-based assessment that required teachers to conduct lessons and produce a reflective report. Facilitators were kept busy with responding to dialogue on the forum or trying to motivate it, and also with correcting and giving feedback on assignments submitted. The assessment tasks made the learning process more interactive. The responsiveness of facilitators proved to be important and something that teachers expected.
- Course completion ended with the award of a certificate which also included the grade earned by the teacher.

### Online Communities of Practice

- Within each state, the group of subject teachers was also enrolled in a mobile phone community of practice. The 'telegram app' was used for this. (henceforth CoP)
- The CoP was meant to foster a social learning environment. The CoP was to be the forum for ongoing professional discussion and exchange through which teachers would interact with each other and with the faculty. This forum was meant to make professional practice, experience, and reflection more visible to each other, to serve both as a source of motivation, and a form of peer pressure to translate course and workshop learning into the classroom.

- The mobile messaging app was used as more accessible than the TISSx forum which is tied to a course. While the TISSx forum could enable threaded discussion, it was more difficult to access on the go. Moreover, the mobile phone app enabled easy access and participation. Teachers were easily able to post pictures, write texts, and share links and resources.
- The CoPs were not a spontaneous dialogue forum but were managed systematically by university faculty (teacher educators) to provide teachers with pedagogical support and facilitate PCK discussions by posting weekly prompts. This did not rule out spontaneity but the culture of the forum and its forum of discourse was actively nurtured by the CoP manager.
- The CoPs provided a forum for teachers to seek technical assistance while using the school computer labs, showcase their practice and student's work, and seek peer and teacher educators' recognition and feedback.

## Gains

- The courses facilitated a longer duration PD enabling the course lead to get to know participants to some extent and for participants to engage with ideas over a longer period.
- The practice component of the course required teachers to use their learning in the classroom/with learners. The fact that they had to come back and report also created some peer pressure and motivation actually to try out things and experience new pedagogy/resources.
- The course content and assignments were designed to encourage teachers to contextualise, select, and adapt pedagogies or resources and ways of carrying out activities. This feature has enabled us to offer the same course in different state contexts and also subsequently in open runs.
- The CoP enabled continuous academic support and developed a strong university-school connection. It took time to get used to sharing professional learning/experience on the CoP, and the CoP allowed a range of modalities of engagement including photographs, text, and voice/video to be shared. The range of practices that were shared and also affirmed as accepted good practices gave other teachers confidence that flexibility in adoption is valuable and acceptable as a relevant response to intervention.
- Teachers working in remote and rural locations often in isolation were heard and their school contexts became visible in the CoPs. This led to the recognition of active teachers as pedagogic leaders.
- Initially, fewer teachers were able to fully engage and earn the course certificate—those who did value the University credential.
- Over 18 courses developed in the course of CLix and subsequently are being offered by CETE in the form of 'open runs' for a fee. Over the last three years over 4000 teachers and teacher educators, etc have enrolled and completed these courses. The completion rate is about 50-60%.

### Teacher Autonomy



Through the teacher modules, the design principles and PCK associated with the CLix student modules were made explicit to teachers. This allowed teachers to adapt the pedagogical principles of the modules to contexts outside of the computer lab, such as classrooms, to achieve similar learning goals.

The teacher in the photograph has adopted the CLix Proportional Reasoning Module into the classroom.

## 4.2 CL4STEM: Adaptation to scaling CLix TPD model to new international geographies

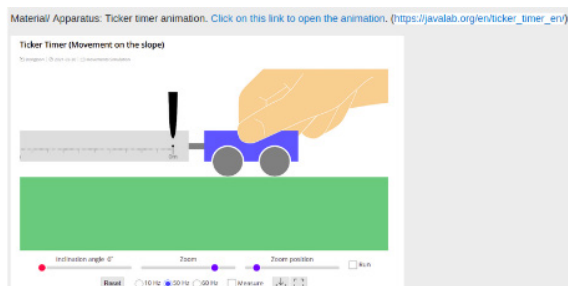
CL4STEM (2020-2023) aims to pilot scaling CLix TPD in mathematics and science education to three new international geographies: Bhutan, Nigeria, and Tanzania (<https://www.connectedlearningforstem.org/>). Core elements of CLix-TPD innovation identified as scalable included: locating PD in the University, designing courses with teaching-learning-mentoring and certification (2) drawing on the University to deemphasise PD as instrumental to curriculum reform and strengthen the link with long-term PD for the teacher as a professional (2) online courses and (3) mobile-based communities of practice. Additionally, the scaling was guided need to adapt to context, guided by adherence to principles rather than fidelity to the CLix TPD model.

- The first phase of **“knowledge transfer”** was a process during which teacher educators from University partners experienced the CLix TPD approach which included the courses and the CoP. They **experienced aspects of course-long engagement, evaluation, practice, and participation in CoP.**
- As in the case of CLix, subject-based groups were formed which included subject pedagogy teacher educators from all three countries and TISs/India, strengthening and drawing on the **academic identity and professional community of pedagogy educators.**
- In addition to experiencing RTICT, which is primarily PCK referenced, excerpts were drawn upon to introduce ‘university design in learning’ as an approach to addressing inclusion. Importantly, this initial experience culminated in a **design thinking process where each pedagogy group took up the question of identifying requirements of their country context and developing or adapting CLix TPD to context. As courses were now developed they were contextualised with appropriate examples and local resource usage—these were reviewed and revised.**
- Technological requirements and availability were reexamined in each country’s context and appropriate platforms that enabled easy access were used. For example, Moodle was the platform of choice for delivering the teacher modules because of the availability of content in an offline mode.
- The **costs of technology proved to be an important consideration**, especially the cost of internet bandwidth and data usage which was and is quite high in many contexts; data package support had to be provided to participants. **Asynchronous offline resource** access proved to be crucial.
- The online CoP on the Telegram App continued to be used as the main platform for collaboration between teachers and teacher educators.

## Gains

Contextualising the design keeping the realities of the partner countries’ context in the centre, allowed the CLix methodology to be successfully piloted across three new geographies, in the midst of the COVID-19 pandemic.

- Technology was strategically leveraged to provide access to high-quality resources (online modules) and experts (through oCoPs), instead of using it to replace the experts. This ensured that participants (TEs and teachers) received good quality PD without going in the cascade model.
- Using locally available resources, and local examples maintained the authenticity and rigour of the online modules, while online CoPs provided a space for teachers and teacher educators to jointly discuss the teacher experience of participating in the project. From all three partner countries, there were examples seen of teachers and teacher educators reflecting on the CL4STEM modules, and their relevance in their teaching and learning in the classrooms.
- Due to contextualised implementation in the pilot itself, gathering government and other stakeholder support to scale CL4STEM within the countries became easier, as the intervention was ready to be scaled as is.
- Fidelity to principles rather than product enabled more flexibility in the process of adaptation leading to higher adoption



## Contextualisation in CL4STEM

In the physics teacher module on Force and Motion, the Nigeria team used a physical ticker timer to conduct an experiment on non-uniform acceleration. However, in Bhutan, due to the non-availability of the physical apparatus, the teacher educators used ticker animation to engage teachers on the same concept (an image from the module is show).



### 4.3 ITE: helpline, evidence, and recognition

Integrating Technology in Education (ITE) 2012 To 2018 <https://tiss.edu/view/11/projects/integrated-approach-to-technology-in-education-ite/> was an initiative to promote project-based learning using technology among rural and marginalised communities. ITE involved building teachers' capacities to develop project-based learning lesson plans for their students involving the use of ICT applications such as spreadsheets, presentations, video/audio making, etc. Teacher professional development was designed in the form of a course titled "constructivist teaching using ICT" which was offered in the form of a certificate course (approved by the TISS academic council). The course included practice: of designing lesson plans which were self-evaluated using a rubric. This was followed by having to share one's learning with at least ten other teachers in one's local context and bring back evidence of this. The ITE programme provided teachers with which they could in turn use to work with fellow teachers. The programme was oriented to state departments of education, especially the Samagra office, recognising teachers who had completed the course as 'master teachers' able to impart ICT skills to fellow teachers. The programme was recognised for further scaling up with UNICEF support to over 800+ teachers and for this, the course and help line were provided in several regional languages.

- An opportunity was provided for teachers to complete a **certificate course** on ICT and Education, which was aimed at enabling them to become recognised as master trainers for other teachers.
- The program required teachers **to practise what they were learning as a part of the course itself** and not only as an outcome after the course was completed, in that they developed and implemented lessons using ICT and project-based learning.
- Assessment in the course promoted the use of rubrics and gathering evidence for one's claims. Evaluation criteria and expected competencies were forefronted making the competencies being gained more evident to teachers.
- Teachers received **recognition**. They were awarded their certificates in a well-publicised event presided over by state officials. They received professional recognition among their peers to whom they had provided PD and as master trainers in the state.
- **A helpline** to handhold participants was found to be an essential part of the offering. Teachers participating from rural and remote areas needed frequent handholding and guidance with handling ICT: aspects such as login, assignment uploads, and other technical issues they encountered, needed swift and friendly solutions to enable them to surmount unfamiliarity and engage.

### Gains

- Apart from becoming better skilled with a deeper understanding of the role of technology in teaching and learning and critically evaluating the use of ICT applications and programs, these master trainers were also perceived to be more influential in impacting the practice of the other teachers.
- These teachers have emerged as local champions with the capacity and understanding to use ICT in pedagogy, enabling their own students to use ICT, and supporting other teachers to do so.
- Their increased influence was also supported by the fact that the government bodies not only sponsored the mentor trainer graduation ceremony, as well as the training by these mentor trainers but also supported the mentee teachers financially, ensuring that they could attend these training.
- The ITE TPD design of building capacity of master trainers was adapted, piloted, and researched in Afghanistan, Maldives, and Nepal through the Multi-Modal Approach to Teachers Professional Development (MATPD) programme. In MATPD capacity building of Fellows in ICT and Education, Mentoring for TPD, and Action Research enabled them to mentor and guide teachers in action research studies.

### 4.4 Digital Badges: micro-credentials

TISS in collaboration with the Open University piloted offering online 'Micro-credentials' <https://oro.open.ac.uk/85097/> leading to digital badges (2020-2022) each of two weeks duration, and designed around a specific competence/set of competencies.

- Micro-credentials were planned for teachers to self-monitor TPD by incremental steps, demonstrating progress in TPD, building self-confidence as practitioners, increasing engagement in learning, motivating to complete, share achievements, and use in their teaching.
- Each badge had two levels, “ Accomplisher” and “ Expert” acknowledging the depth of engagement with the micro-courses of a 2-week duration.

## Learnings

- The digital badges helped reposition TPD into the digital space, as they are more achievable and potentially more scalable, with greater ease of adoption.
- The badges promoted a theory-practice connection encouraging teachers to try out their learnings in classrooms.
- Digital badges promoted teacher agency in digital learning and helped build a community of practitioners.
- Digital badges require technical support for implementing and learning how to share accomplishments.



## 4.0 Implications for Policy and Practice

**Some common learning and implications arising from these above engagements and their policy implications and practice are outlined below.**

**4.1 Balanced Workload:** The teachers’ long workdays and hectic school schedules make it difficult for them to engage in professional development activities outside school hours/on their own time. Even if online access is available, teachers should ideally be able to schedule professional development activities during working hours. Similarly, teachers identified as resource persons or mentors should be allowed to reduce their school responsibilities to engage fully in their roles as mentors and resource persons.

**4.2 CoP Management:** To function as professional learning communities, CoPs, especially online CoPs need to be managed. A CoP manager facilitates learning within the community, monitors exchanges, ensures that teachers’ questions and responses are addressed, and collaborates with teacher educators and subject matter experts to post discussion prompts regularly.

**4.3 CoP Structures:** To strengthen district and sub-district level pedagogical innovations, **hybrid CoP networks** must be established linking online and local CoPs. Local CoPs are optimally located in District Institutes of Education and Training (DIETs), Block and Cluster Resource Centres, and School Complexes, allowing for the development of local expertise among teacher educators and mid-level functionaries, as well as the linking of pre-service and in-service teacher education.

**4.4 Digital Infrastructure for Teachers:** To enable teachers to experiment and innovate with new pedagogical ideas, teachers must be aware of policies such as “Bring your own device (BYOD)” and data costs they may incur if the state education system or schools are not making these provisions. In many geographies, data costs and connectivity may not be easily affordable; hence, asynchronous models and access to TPD must be planned.

**4.5 Creating Conditions for Practice:** In most cases, scaling is achieved by leveraging digital communication and learning technologies. It is essential to plan for adequate digital infrastructure that is accessible to both teachers and students so that a lack of accessibility does not hamper the program’s implementation. It is essential to plan for cost-effective digital infrastructure that takes contextual realities such as Internet accessibility, type of devices available to teachers and students, and technical support into account and to have it available at the outset of program implementation.

**4.6 Assessment and Feedback during TPD:** Assessment and feedback to large cohorts is the most time-consuming part of CP online at scale, but also among the most important dimensions that establish expectations and rigour and set the stage for completion. The demands of assessment and feedback need to be factored into costing and setting fees for different kinds of courses. Modalities such as credible peer assessment and meaningful AI-driven assessment require experimentation and more innovation.

**4.7 Digital platforms:** The background paper for the GEM 2023 report on state initiatives and innovations indicates that while ICT and education-related policies are well formulated in South Asian contexts, the planning and implementation of these policies have yet to have a quality and inclusive impact on the ground. We must test, investigate, and evaluate the technological platforms, portals, content, and applications designed for TPD vis-à-vis research-based frameworks to determine how to maximise their impact during implementation. The teacher education faculty and the teachers themselves need to become more digitally literate to support TPD using digital platforms.

**4.8 Financial Aspects:** There are numerous costs associated with online TPD and large-scale TPD implementation. The initial expenditures of producing online courses are costly since they need the **creation of multimedia materials**. However, once the course has been built, it can be offered for a fee several times. To transform CoPs into learning environments, funding a CoP manager is required to monitor replies and support learning. Additionally, **technical helplines** may be required to provide technical support to teachers to access and engage in the course management platform. Funds must be set aside for the ongoing **maintenance and support of the online course administration platform**. The online environment contains a large amount of data for analysis and research. The financial consequences of **data storage, processing, and reporting** must be considered while adopting online TPD programs.

Production of Courses : Costs & Licensing	
The cost of developing an online course can range from approximately ₹10,00,000 to ₹50,00,000 and includes video production, instructional design and other resource costs to create the course and depends on the sophistication and quantity of multimedia production. Additional platform and data analytics costs are required for running the courses.	
Multimedia Type	Approximate current costs
Education Videos	₹1,500 to ₹10,000 per minute
Infographics	Freelancers charge between ₹3,000 to ₹10,000 per infographic
DIY Tools such as Canva , Pictochart etc	Subscription costs range from ₹2,000 to ₹4,000 per month
In general, the course material may be accessed through Open Educational Resources (OERs). It is also possible to produce the course material under an open licence - <a href="https://creativecommons.org/share-your-work/ccllicenses/">https://creativecommons.org/share-your-work/ccllicenses/</a> . Nonetheless, the activities, assignments, and interactives—which can be the intellectual property of the organisation or person creating the course—are the fundamental pedagogical components of an online course.	

State governments in large countries such as India must bear digital infrastructure with technical support for teachers and fees associated with recurring teacher professional development. The long-term implementation of TPD programs, which is necessary for the diffusion of ideas into the system, requires state funding.

**4.9 Hybrid and blended modes of delivery:** **Hybrid** lessons are taught synchronously online and in-class or workshops simultaneously. Setting up hybrid modes of delivery requires consistent, high-quality technology support. Students are learning both online and face-to-face in classrooms. Teachers may be in the classroom or teaching virtually. For example a workshop could be set up at a district level with a local coordinator facilitating classes and a teacher educator or experts joining online and contributing to the sessions.

**Blended** modes of delivery include using multiple pedagogical approaches and learning experiences considering in-person, field and online experiences. The tasks and assignments in an online course may be used to develop a blended learning experience. For example, a variety of tasks such as discussion forum prompts, writing case-studies, analysing classroom videos, practice-based reflection assignments and online quizzes could make for a blended experience. A blended pedagogy also enables contextualisation of the courses.

### Contextualising Online Courses

**Discussion Forum:** Providing prompts that ask learners to share their experiences of teaching-learning activities with peers. All learners are able to see the discussion forum responses and learn from each other's experiences.

**Case-based tasks/assignments:** Providing an exemplar case (connecting theory with practice) and asking learners to write a case using their institution/classroom contexts.

**Practice-based tasks/assignments:** Asking learners to implement a plan/resource in their institution/classroom context and sharing pictures/videos and reflective notes on their experiences of implementation.

**Short/long Answer Questions:** Learners must provide examples from experience to connect theoretical ideas with their practice.

**4.10 Measuring impact:** The primary objective of any professional development program for teachers is to promote student learning gains. However, measuring TPD outcomes is complex, and linking student learning outcomes to teachers' professional development is particularly challenging. To understand the impact or change in teacher pedagogies, classroom teaching-learning, and student learning, however, a multidimensional approach to TPD evaluation is necessary. To comprehend changes in teachers' knowledge, attitudes, and practices, it is necessary to employ a mixed-methods strategy that combines quantitative data collected through surveys with qualitative data gathered via interviews and classroom observations. In addition, continuous research must be conducted on the processes of professional development to comprehend the challenges and adoption at each stage of implementation relative to the intended program objectives. Self-reporting mechanisms and evaluation processes that are well-designed effectively motivate teachers, foster collegiality, develop teachers as reflective practitioners, and respect teacher autonomy. This may be achieved through a competency-based framework to evaluate teacher performance; however, the teacher standards must evolve in collaboration with teachers and other stakeholders.

### CETE Course Completion Statistics

Open runs: Any graduate may sign up for our online courses, which are periodically made available for enrollment. Usually, students enrol in these courses just out of personal interest.

Cohort-based runs: Teachers are nominated to enrol in courses by an organisation (NGO/Chain of Schools) or a State Education Department, and the courses are exclusively offered to that particular cohort.

#### CETE Short-term Programs 2018- 2023

Type of Run	Enrolled	Completed	% Completed
<b>Open</b>	3161	1712	54%
<b>Cohort-based</b>	6540	3468	53%

**Supporting learners to achieve higher levels of course completion:** Students are inspired to finish their courses in the following ways:

- weekly emails with updates and encouraging phrases should be sent to learners.
- forming groups on mobile messaging apps, keeping in contact with students, and allowing them to share their experiences—particularly with regard to the practice-based assignments—with the group. This is useful for runs that are cohort-based.
- putting on synchronous webinars at least twice in the duration of the course.
- putting together webinars and in-person workshops as hybrid modes of course delivery. For cohort-based runs, the in-person workshops are quite effective.

**4.11 Expectations from learning and 'fidelity':** When teacher professional autonomy is kept centre stage, expectations regarding outcomes and impact are modulated from narrow fidelity to product to broader fidelity to principles. This shift enables PD to take a more incremental and contextual approach, focussed on the teacher first, her classroom practice next, and finally its translations into learning outcomes of students. In a well managed CoP, such adaptations and contextual adoption of pedagogies and curriculum would be shared in the CoP and receive professional feedback from peers and experts who are part of the CoP.

**4.12 Linking PD and Certification to Career Pathways:** Certification and professional development as career advancement criteria are among the most transparent methods for evaluating teachers. However, institutions' eligibility to offer certification programs and the quality of these programs must be regulated. Specialised capacity building and professional development as criteria for horizontal career advancement are more effective, especially for those assuming leadership responsibilities, such as mentors, resource persons, and principals. Providing teachers with a balance of autonomy, support, and collaboration opportunities facilitates their career advancement. Teacher evaluations should not be directly linked to student performance, as this can result in unintended consequences such as teachers teaching to the tests/examinations. Providing opportunities to build expertise in teachers to become mentors not only increases the reach of the innovation but also builds capacity in teachers as middle-level functionaries.

**4.13 'Digital EdTech lab' space:** Through the TISSx platform, an Open Edx course platform, the CETE has been able to design and implement online modular courses for teachers and educators at scale, which has led to the development of an understanding of practices and pedagogies, technical features and affordances that work at scale for TPD. TISSx (<https://www.tissx.tiss.edu>) has also informed the affordability and efficiency aspects of platforms while integrating high-quality pedagogical features for TPD. Universities need to maintain platforms such as TISSx as a lab space for experimenting with innovations and developing good practices for online TPD that enable the delivery of high-quality CPD at scale in Global South contexts.

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**Appendix: CETE's ICT-Based TPD Interventions and Programmes:  
An overview**

<b>TPD Approach</b>	<b>Connected Learning Initiative (CLIX)</b>	<b>Integrating Technology in Education (ITE)</b>	<b>Connected Learning for STEM (CL4STEM)</b>	<b>Multimodal Approaches to Teacher Professional Development (MATPD)</b>
<b>Reach</b>	14753 Teachers 463 Teacher Educators 6 States in India	5196 teachers directly ~8000 teachers through outreach	230 Teachers 60 Teacher Educators 3 Countries	283 Teachers 45 Teacher Educators 3 Countries
<b>Active Learning Pedagogies</b>	Research-based PCK Pedagogical Pillars: peer learning or collaboration, risk-taking and learning from mistakes and relevance and authenticity of learning	Project-Based Learning, integrating technology using the TPACK framework	Research-based PCK	Research-based PCK incorporated in classroom-based action research
<b>Blended teacher education pedagogy</b>	Adopted by all the programmes			
<b>Continuous teacher academic support</b>	Through online CoPs managed by CETE faculty	Field staff, mentors and online CoP	Through online CoPs, managed by teacher educators in each country.	Country-specific field mentors, academic mentors from CETE and CoP
<b>Hybrid modes of delivery</b>	In-person workshops Telegram CoPs	In-person workshops WhatsApp CoPs	Synchronous webinars Telegram CoPs	In-person workshops Synchronous webinars Telegram CoPs
<b>Recognition</b>	Certificates, recognition through CoPs	Certificate course to become master trainers	Certificates and digital badges, encouragement in CoPs, academic credits for preservice teachers	Celebration of encouragement in formal convocation ceremony
<b>Contextualization</b>	Contextualisation of modules through the DBR approach	Projects selected were of local issues and themes	Contextualization of modules with local, relevant examples and resources.	Action research was the tool for contextualisation. Design was common and was contextualised in choice of action research focus.
<b>Scaling design</b>	CoP and online TPD modules Systemic integration with SCERT as implementation partner	Scaled up into three phases: in-person, blended, and online professional development delivery mode	Scale-up of CLIX to different countries: Local capacity building of PCK & UDL concepts for teacher educators	N/A