LEARNING BRIEF

#06

How Do Communities of Practice Support Teacher Learning and What Role Can EdTech Play?

EdTech Hub

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Abbreviations and acronyms

CoL	Community of Learning
CoP	Community of Practice
DBIR	Design-based implementation research
LMS	Learning management system
MEWAKA	Mafunzo Endelevu kwa Walimu Kazini (Tanzania) translates as 'teacher continuous professional development'
NNP	National Numeracy Programme (Malawi)
OER	Open Educational Resource
TCPD	Teacher continuous professional development
TLC	Teacher Learning Circle
TPD	Teacher professional development

Why this question matters

In-service teacher communities of practice (CoPs) have become an important component of teacher professional development (TPD), creating spaces where teachers can share their knowledge and experiences, practice and reflect on pedagogical approaches, and support one another through classroom challenges. In so doing, CoPs engage with several of the characteristics that enable TPD to impact learning outcomes positively.[1, 2]

Yet, implementing these communities is not a straightforward task, requiring significant coordination with other aspects of the education system, including other teacher professional development components. It also often requires the sharing of teaching and learning materials, dedicated time and space, and recruitment and training of in-school facilitators.

This brief shares emerging insights from the work done by EdTech Hub and partners in leveraging technology to support, enable, and enhance CoPs.

What are communities of practice?

In a background paper to the 2023 UNESCO GEM Report, focusing on technology use for TPD, Hennessy et al.[3] define teacher CoPs as: "any informal or formal structure or system in which teachers have the opportunity to communicate with each other, share ideas, resources or effective practices, and brainstorm solutions to common challenges." Put simply, CoPs are "communities of teachers where knowledge is constructed through personal experience."[4]

Within this broad definition, CoPs can take many forms — in-person, virtual, or hybrid (using a combination of in-person and virtual modalities) relevant to both pre- and in-service teachers. They also go by different names in different contexts, for instance, Teacher Learning Circles (TLCs) in Malawi; Communities of Learning (CoLs) in Tanzania; and Teacher Group Meetings (TGMs) in Sierra Leone.

This brief uses the common abbreviation 'CoPs' and focuses on school-based, in-service communities of practice. It makes particular reference to current and ongoing research by EdTech Hub and partners in Tanzania, Malawi, and Sierra Leone, where in-service CoPs have been applied as a component of a national curriculum reform or TPD programme. These programmes provide teachers with access to training, and support governments in rolling out teacher continuous professional development (TCPD),[5] often with the support of technology.

The school-based models in the countries mentioned above have a few common characteristics:

- Teachers meet frequently (e.g., weekly or fortnightly) to go through semi-structured TCPD learning materials and discuss pertinent challenges arising in their teaching and learning.
- CoPs are typically led by a peer facilitator (i.e., a champion teacher or member of the school leadership) who has received some training or instructions on methods of facilitating these sessions.
- The peer facilitator is supported by the school's leadership team, which is, in turn, supported by the local and national government.

CoPs (and the tech modalities which can support them in being effective) are important for a few key reasons:

1. CoPs reinforce key elements of effective TPD

There is broad consensus[6] among researchers and practitioners about the key characteristics of effective TPD (see Box 1 below for a list compiled by Allier-Gagneur et al.).[7]

CoPs are designed to reinforce and catalyse a number of these characteristics, including enabling teacher peer collaboration and learning, sharing effective classroom practices through modelling, practice, and reflection, and providing a regular rhythm for consistent teacher learning and improvement, among others.

While these characteristics should "not be considered prescriptive, nor universal, but rather adaptive and flexible,"[8] the ability of CoPs to deliver on many of these aspects of effective TPD has made them a core component of many national reform programmes.

2. CoPs can give teachers an opportunity for peer learning and collaboration while focusing on what is practical

Participation in CoPs enables teachers to benefit from collaboration with their peers and feel empowered; many report valuing a focus on the practical and the opportunity to keep learning themselves.[9] Hennessy et al. note CoPs' role in connecting teachers, stating that their value "to their peers (and TPD leaders, mentors, and coaches) cannot be overstated."[10] EdTech Hub's research on CoPs in Tanzania and Malawi and findings from the Tich Mi Ar Tich Dem programme in Sierra Leone all report similar positive findings regarding peer support and collaboration in CoPs and empowering teachers by giving them a voice in their own development.[11, 12, 13, 14]

This focus on practical, peer-based learning contrasts with other TPD models, such as 'cascade models' where trainers impart knowledge to or at teachers in a top-down, unidirectional manner. Instead, CoPs use a bottom-up approach, focusing on teacher experiences. A widespread criticism and acknowledged disadvantage of cascade models is the resulting 'dilution' of knowledge. Significant information or messages can be lost as they are conveyed down the line,

following a flow such as national trainers training regional trainers, who then train teachers.[15]

Box 1. *Characteristics of effective TPD*[16]

1. Encourage teachers to focus on their pupils' learning
2. Share effective practices with teachers using modelling
3. Acknowledge and build on teachers' existing knowledge, views, and experiences
4. Focus on developing practical subject pedagogy rather than theoretical general pedagogy
5. Empower teachers to become reflective practitioners and structure teacher education around practice-based cycles of trial and refinement
6. Incorporate peer support
7. Ensure teacher education programmes motivate teachers
8. Prioritise school-based teacher education
9. Schedule regular, ongoing teacher education
10. Provide supporting teaching and learning materials
11. Ensure support from school leaders
12. Create a coherent policy environment.

3. CoPs can provide opportunities for *ongoing* and *sustainable* support and training in LMICs

School-based CoPs have, in part, arisen out of a response to challenges encountered when implementing alternative models of TPD in LMICs, in particular, through one-off, face-to-face workshops and seminars.[17, 18] The approach of such models is often infrequent, with training and development events that are not sustained, meaning teachers have few opportunities to test new ideas and practices and receive feedback on these tests.[19] In addition, the costs and logistics involved in convening large numbers of teachers at conference centres or similar venues for training sessions make it difficult to deliver the training required at scale.

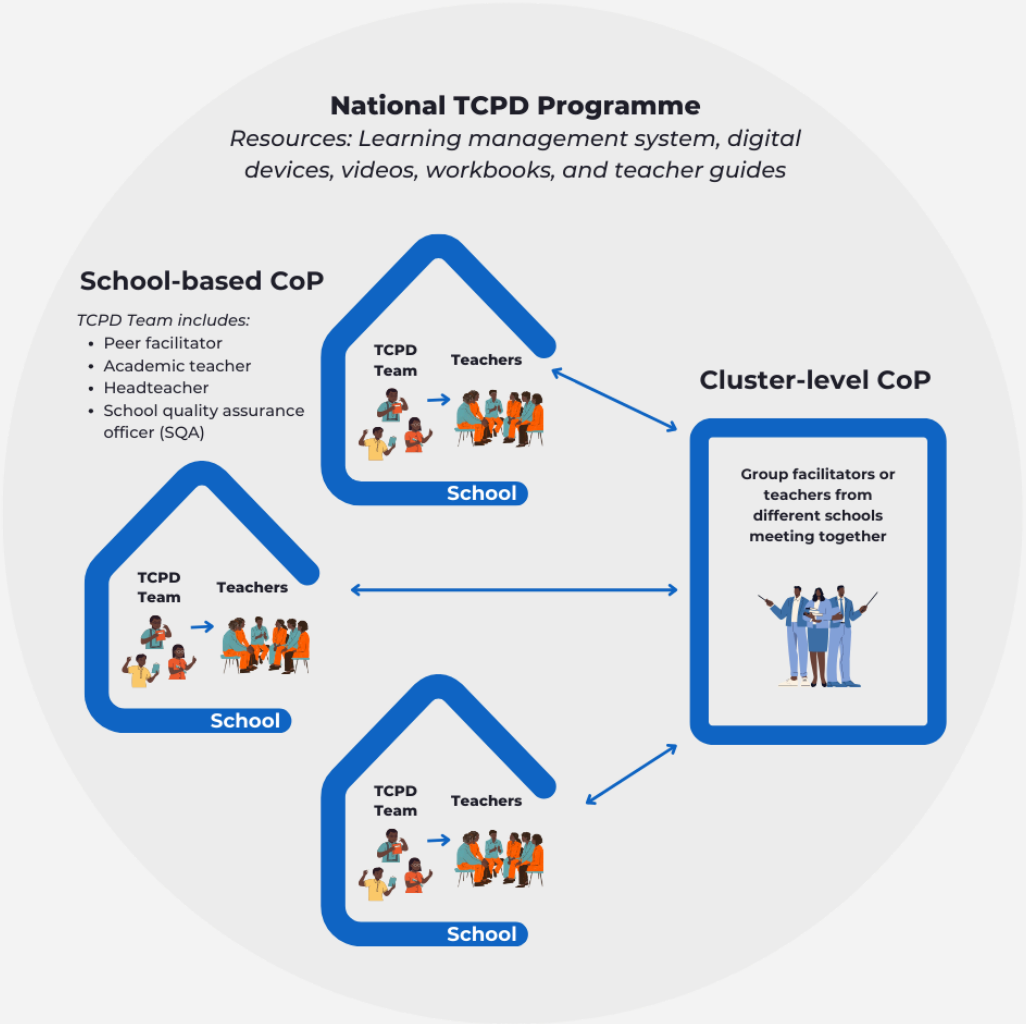
This all translates into scarce opportunities for ongoing TPD for teachers, especially for teachers in remote or rural areas.[20, 21] For example, in Tanzania,[22] just 24% of teachers responding to a survey participated in continuous professional development between 2021 and 2022, and in Sierra Leone, 36% of primary level teachers have no qualifications as an educator.[23] In these contexts, CoPs may have the potential to provide more regular and sustainable opportunities for professional development that are also cost-effective and scalable.[24, 25]

A significant advantage of school-based CoPs in this regard is that they can be held regularly and allow teachers to test and trial their learning in the classroom. School-based CoPs also mean that

support, training, development, and opportunities to trial new methods and ideas are available on-site and accessible.

Zooming out from the individual school setting, CoPs can also be expanded to off-site or cluster-based levels to provide opportunities for collaboration among teachers or groups of peer facilitators from different schools in a particular region.[26] These off-site sessions can then inform the ongoing facilitation of and participation in school-based CoPs. Figure 1 below shows how this might work.

Figure 1. Representation of school- and cluster-based CoP embedded in a national programme for teacher continuous professional development (TCPD) in Tanzania.



Given these important characteristics, CoPs hold significant promise as a means of implementing effective TPD in LMICs and, in so doing, catalysing improvements in learning outcomes. For this reason, they have become significant components in several EdTech Hub research engagements. This brief provides a summary of key insights related to effective CoP implementation, including highlighting the use of technology to support, enable, and enhance CoPs.

Key insights to improve practice

This section highlights lessons from EdTech Hub's current design-based implementation research (DBIR) in Tanzania and Malawi,[27] which is focused on investigating how to optimise school-based CoPs as part of national TPD programmes.[28] It also builds on work in Sierra Leone, where EdTech Hub partner, Open Development and Education, undertook similar research as part of the Tich Mi Ar Tich Dem TCPD programme,[29] as well as other programmes in Senegal and Sierra Leone.

Cross-cutting insights and similarities identified across these programmes relate to the best practices in designing and implementing CoPs, including the role of EdTech in enabling, supporting, or enhancing them.

For a more in-depth analysis of CoP effectiveness, please see reports on DBIR research listed below in the Resources section of this brief.

CoPs need to be designed in alignment with wider TPD plans

CoPs must fit into a national TPD strategy to ensure they are resourced and supported by the necessary mandates, including various mechanisms at the 'systems', 'school' and 'teacher' levels. This is because using school-based CoPs as part of a broader TPD programme is complex. Crawfurd et al.[30] discuss how education interventions can be straightforward, with limited learning gains (e.g., school feeding programmes), or complex, with the potential for high learning gains if implemented correctly.

The implementation of CoPs requires a combination of components and human networks that function well together within a broader TCPD programme. A school-based CoP model can be quite decentralised, and just one break in the system can result in significantly reduced impact (e.g., the learning management system

(LMS) used to host TLC modules going offline, or a district officer not effectively pioneering the initiative in their district due to other TPD obligations). Determining how to reduce complexity and dependencies can help improve the chance and magnitude of successful intervention.

Insights from DBIR in Malawi offer examples of the importance of connecting CoPs to the broader TPD efforts: the first iteration of CoPs developed by the National Numeracy Programme (NNP) were designed in a way that did not effectively connect to teacher guides and learner workbooks, and as a result were less directly applicable to classroom instruction. By working closely with the NNP team to ensure that topics covered by CoPs were directly linked to classroom observations and components of teacher guides, the CoPs were revised to be more effective.[31] CoPs should also aim to be consistent across programmes in a given setting that targets teachers. EdTech Hub is working alongside the Ministry of Education to ensure Malawi's two major foundational literacy and numeracy programmes (NNP and NextGen) coordinate their CoP format, training, and content to provide a similar experience to teachers.

CoPs should be designed with teachers' experience in mind and involve them directly

As discussed in other Learning Briefs,[32, 33] where possible, teachers should be involved in the design and implementation of TPD programmes. This is also true of CoPs.

Action research methods like design-based implementation research (DBIR) and sandboxes are useful ways to test and adapt features of CoPs before rolling them out as part of a more extensive TPD programme in ways that involve teachers' feedback directly (see the Resources section for more information on sandboxes. For example, the structural aspects of a CoP can vary in terms of the format of the CoP (e.g., length, frequency, content, topics covered etc.) and the materials used (e.g., facilitator guides, CoP modules, lesson plans). The mode of delivery and access to resources can include EdTech options such as LMSs, Open Educational Resources (OERs), tablets, videos, and phones. In addition to technical requirements, these aspects of CoP implementation depend heavily on a positive user experience to be effective, and therefore, they should be determined in consultation and testing with teachers, as has been done in several DBIR approaches from EdTech Hub, including in Malawi, Tanzania, and Sierra Leone.[34, 35, 36, 37]

For example, before implementing the CoPs as part of the MEWAKA TCPD programme in Tanzania and the NNP in Malawi, significant user research and consultation with in-country partners were undertaken to assess TPD needs in both countries. This included determining the demand for school-based TPD in

the first place, designing optimal access to resources and curricular materials, determining what, if any, technology could be used, defining the structure and timing of CoPs, assessing the training needs of peer facilitators, and defining the core objectives of the CoPs.

Tech-enabled features of TCPD should also be tested with users and key stakeholders of CoPs. The Senegal 'Lecture Pour Tous',[38] the MEWAKA programme, and the NNP all took steps to engage with users early in the design phase of their technological TCPD components to allow for sustainable, nationally supported interventions that have the buy-in of both teachers and senior government.

Technology can play an enabling and strengthening role in implementing CoPs

Various tech modalities have been instrumental in supporting teachers, peer facilitators, and school quality education officers in CoPs. These range from providing access to resources via LMSs or Open Educational Resources,[39] using feature phones for sharing information and training videos, and downloading teacher-facing resources.[40]

The section below describes some ways in which EdTech has been used to catalyse effective CoPs and notes evidence from in-country research which points to best practices in running tech-enabled CoPs.

LMSs can enhance teacher learning within CoPs, but accessibility challenges should be identified and considered in platform design

Tech-enabled components of TCPD, such as self-learning modules, digital coaching, and peer support groups and forums[41, 42] can provide varied modalities and opportunities for teacher learning.[43] LMSs are often developed to help disseminate digital resources to teachers, providing them with a structured platform for engagement and allowing CoPs to be guided by interactive resources.

However, when designing these platforms, it is essential to consider the frequently occurring challenges of implementing tech tools in LMICs, such as access to data, devices, power, and ease of use.

For example, the MEWAKA programme in Tanzania includes an LMS based on the Moodle platform, which provides teachers and facilitators with access to TPD materials. The system and materials underwent several rounds of design and customisation based on user testing, which sought to capture teacher needs. They were made available as a prototype in a testing environment.

Findings from user testing and use in CoPs in the MEWAKA model offer useful insights into what is required when designing an LMS.[44]

1. **Cost of internet bundles can limit access**—user testing revealed that data access to

the LMS was too expensive for most teachers, so exploring zero-rating options with service providers is advisable.

2. **Login options can affect accessibility**—teachers often did not check email regularly and/or forgot their email credentials. Alternative options for LMS logins include using phone numbers as usernames or token-based authentication, whereby users receive a unique access token instead of a password.
3. **Devices available to teachers should be considered when developing resources**—most teachers preferred using smartphones to download materials (the condition of school-owned tablets was unreliable). This had implications for the design of CoP content, as small screens require material to be bite-sized or short. Responsive user interface design is necessary for content to be usable across multiple screen sizes.
4. **Consider offline accessibility for inclusivity, including download options for resources**—user studies indicated a preference for the mobile app over the web browser and a preference for offline access. However, some users could not download the app because of a lack of memory on their devices. Memory size had implications for the design, size, and format of materials and their offline access. Teachers in three schools expressed a desire to download and store soft copies, but at the time of writing, this was not possible with the LMS.[45] Fully offline systems do, however, have significant drawbacks, as accessibility and use cannot be tracked easily. Likewise, nor can new content be uploaded easily. Semi-offline modes can address both of these issues, but are more complex to install and maintain.

By identifying these challenges early in the LMS design phase, the MEWAKA team was able to anticipate potential barriers to access before scaling up its LMS platform.

OERs can be leveraged to support CoPs, but implementers should ensure these are contextually relevant

OERs can provide quality-assured teaching materials mapped to particular skills and competencies to support CoPs, reducing the need to create new materials from scratch.[46] An example is Kolibri Studio, an 'offline-first' platform offering a library of resources and training toolkits that can be adapted for use in a range of countries and contexts.[47, 48]

There is an abundance of OERs and resources from non-governmental TCPD initiatives within countries that can be leveraged for use in CoPs. However, caution should be taken

when using material from outside a given country's context to ensure these are appropriate. Since CoP resources often need to align with the education strategy, curricula, and cultural contexts, some resources (videos, textbooks, guides, and so on) may need to be adapted to fit a new implementation setting. For example, OER videos from Zambia could not be used in the MEWAKA programme because the teacher in the videos was wearing a T-shirt instead of the more professional attire required by teachers in Tanzania. However, materials on interactive pedagogy from the same OERs were adapted for DBIR for the Tich Mi Ar Tich Dem programme in Sierra Leone.[49]

Once again, this demonstrates how user testing can play a key role in helping implementers better understand whether OERs can be used in a new context or if they must be adapted.

Digital resources (videos) and social media can be used alongside CoPs to foster peer learning and model effective practice, but challenges to access and appropriate use should be addressed

TPD programmes have used digital resources, including teaching and learning materials and videos, social media platforms, and virtual working groups, to share teaching and learning materials, foster discussion and connection, and support in-person CoPs.

Relatively low-tech options such as using WhatsApp on personal devices can have a significant role in TPD as many teachers have access to social media, and its use is increasingly common. Teachers and local government authority (LGA) officers in the MEKAWA programme in Tanzania reported using WhatsApp for peer support, and researchers suggest "TCPD facilitators could leverage social media such as WhatsApp and make it an official learning space. Social media could be adopted at the system level and be used to disseminate learning materials across CoLs."[50] Videos can also be a powerful training tool within TPD to model pedagogical approaches and activities for interactive practice and self-reflection.[51]

However, the use of these tech modalities needs to be carefully considered and tested to avoid challenges to access and appropriate use. For example, videos were originally a core component of the NNP's CoP programme in Malawi and served as a stimulus for discussion, and were used to model teaching practice during CoP sessions.[52] However, access to the videos in the CoP group setting proved to be challenging—technical problems included incompatible formats and poor audio and video quality.[53] Ultimately, school-provided devices proved unreliable and made watching videos as a cohort untenable. The use of videos in the classroom was also a focus of one CoP in the MEWAKA programme, but lack of infrastructure, such as

issues with power supply or suitable surfaces for projection, hampered the ability of teachers to be able to use this technology.[54] In the Tich Mi Ar Tich Dem programme in Sierra Leone, observers noted discrepancies between what the videos were intended for and how they were being used, with facilitators focusing on content rather than the interactive strategies the videos were modelling.[55]

Where tech modalities like social media and videos are considered for use alongside CoPs, these should be followed with adequate user testing to identify and address potential before scale-up and help the development of detailed guidance and use of instructions for peer facilitators.

Targeted use of video content and other tech modalities can be used to train and support CoP peer facilitators

Both the MEWAKA (Tanzania) and NNP (Malawi) programmes noted the variable access to training for peer facilitators.[56, 57] This created gaps in understanding about how the CoPs should be run, how important they were, or regarding facilitation style. For example, before the implementation of revised CoPs in the NNP, findings indicated CoP sessions had become "a routine with limited opportunities for interaction and reflection."[58]

With some exceptions, peer facilitators often relied heavily on lecture-based delivery styles in CoP sessions and inconsistently used interactive methods "in encouraging discussion, reflection, collaboration, and peer feedback."[59] Similarly, during Cycle 1 of the DBIR of the MEWAKA programme, observations found the discussion during CoPs tended to focus more on subject content rather than practical teaching strategies.

While using videos as a core component of NNP CoPs proved challenging (as previously noted), the programme is now experimenting with developing videos exclusively to help CoP peer facilitators prepare. CoP facilitator videos were developed in partnership with EdTech Hub to model exemplary CoP facilitation and specific curriculum-aligned CoP activities. While video accessibility and guidance on the effective use of such videos remain a challenge, the NNP team is testing several dissemination methods to ensure CoP facilitators can individually access videos promptly as they prepare for CoPs, including through their own personal devices via WhatsApp, through the school-provided tablets, or as a part of the Malawi government's electronic CPD platform. Early feedback by CoP facilitators on their experiences with these videos has been positive.[60]

Further use of digital content and tools to support CoP facilitators could be a promising and sustainable approach to the training and preparation challenges often faced by programmes implementing in-service CoPs.

Embed regular monitoring through CoPs and classroom observations to support individual teacher needs and understand impacts on practice

While CoPs may play a key role within a TCPD intervention or programme, other components, such as coaching and self-learning modules, are necessary to provide holistic support and meet the differentiated needs of individual teachers.[61, 62] Offering teachers self-learning modules or 1:1 coaching options alongside CoPs is one way of addressing differentiated needs.

Adequate monitoring and coaching can also help facilitate understanding of a CoP and ensure its impact in improving classroom instruction. While teachers and TCPD teams in the MEWAKA (Tanzania) and NNP (Malawi) DBIR programmes noted some positive developments in student responses and teacher practice as a result of teachers' participation in CoPs, significant gaps existed between how teachers perceived the impact of CoPs on learning and what was found through classroom observations. In particular, classroom observations did not indicate high levels of interactive learning; in one school in the MEWAKA programme, observers noted a need for greater awareness of and for creating equal gender opportunities in the classroom.[63] Such gaps are inevitable in any TPD programme. The key to mitigating them is building the capacity to embed ongoing monitoring and feedback to support learning and development.

Technology can also support these TPD modalities, for example, observation and coaching apps like Tangerine[64] have been used to support TPD programmes and provide guidance on improving classroom instruction based on observation data. Basic video use for recording classroom observations and reflection in a CoP setting has also been used to further enable reflection and peer learning within CoPs.[65]

Adapt CoP materials, resources, and schedules to fit teacher needs

Teachers in LMICs are often overworked and have to manage extremely large classes. While they may want to improve their teaching methods, TPD, in general, may feel like an added burden. This underlines the value of basing CoP guides and topics on teachers' needs, which can be determined through conducting teacher needs assessments and designing semi-structured CoP modules that address the challenges teachers face.

CoP modules can range from general pedagogy (e.g., 'teaching at the right level') to more subject-specific topics. For instance, CoP sessions in the NNP (Malawi) specifically focused on particular aspects of the numeracy curriculum, in terms of developing teachers' understanding of concepts and strategies and methods on how to teach them. A core element of EdTech Hub's work with CoPs in the NNP has been to focus on existing

teacher guides in CoPs and explore, co-design, and develop the guides with teachers and peer facilitators. Each iterative cycle of DBIR revealed areas where more scaffolding or guidance was needed and guided the development of TLC guides. Classroom monitoring data was also leveraged to identify key curriculum topics to be reinforced in CoPs.[66] Demand-led CoP module development also occurred in the MEWAKA programme in Tanzania. For example, a module focusing on "managing large classroom sizes" was developed for CoPs responding to a needs assessment conducted with teachers.[67] Building in flexibility and feedback loops to enable the adaption and iteration of CoP resources based on need, monitoring, and evaluation is crucial to keeping them relevant.

The language used for CoP materials and conducting CoPs also plays a crucial role. In line with the education strategy, Kiswahili was chosen as the language of materials for the MEWAKA programme, and all CoPs are conducted in Kiswahili. In Sierra Leone, English was used for the Tich Mi Ar Tich Dem programme, as it is the official language of instruction.[68] Co-creation with teachers early on in a programme can help determine the most appropriate language for CoP materials.

Finally, incentives and scheduling of CoPs also need to be considered to ensure they draw adequate engagement from teachers. Programmes in multiple contexts (Tanzania, Malawi, Sierra Leone)[69] all note the need to create incentives for teachers to attend. Non-financial incentives can include ensuring recognition through official letters, school notice boards, public announcements, and certificates. Recommendations from the DBIR in Malawi include "a system of meaningful TPD certification that duly acknowledges and rewards teachers who consistently participate in and contribute to TLCs with certificates, plaques, or public recognition."[70]

Questions regarding when and how often to hold CoPs are also crucial. If CoPs are held outside of regular working hours, teachers view the sessions as an additional burden to their already heavy workloads. This is compounded by the fact that they do not receive remuneration for attendance. Creative potential solutions proposed to address CoP scheduling issues include adding 15 minutes to the school day four days a week and sending pupils home early on the fifth to allow an extra hour for CoPs.[71]

Related to scheduling is the frequently cited request by teachers for food and refreshments to support CoPs, especially if CoPs are held during their lunch break or after school. Where possible, this kind of support for CoP sessions can increase teacher engagement.

Areas for further exploration

The key insights above demonstrate the promise of CoPs to support effective TPD. However, further work is needed to better understand their impact and how best to leverage technology in their delivery.

Measuring the impact of CoPs for improved classroom instruction and learning outcomes

While the DBIR study on the MEWAKA programme in Tanzania has been an effective approach to exploring and refining the nature of school-based TPD, the focus thus far has been on teachers' and government stakeholders' experiences of the programme and highlighting successes and areas for adaptation to the government from these stakeholders. The impact of CoPs, specifically as it relates to improved classroom instruction and outcomes for learners, needs further investigation. This suggests the need for longitudinal studies which embed learner assessment in their design and include mixed-methods, experimental, or quasi-experimental approaches to more precisely understand the specific added value of CoPs on learning outcomes. Phase 2 of the research in Tanzania (ongoing at the time of writing) follows a quasi-experimental, difference-in-differences method to more precisely explore the impact of MEWAKA on learning outcomes. Results of Phase 2 of this will be published, using both 2024 and 2025 national examination data when this data is released.

Measuring the cost-effectiveness of CoPs in comparison to other training and learning modalities

Sims and Fletcherwood have suggested that governments favour TPD that emphasises peer support, as it is cheaper than providing one-to-one support.[72] Peer-supported modalities may be cheaper, but that does not necessarily mean they are cost-effective. For example, digitised materials may be more affordable, but a lack of printed materials may reduce access and, thus, the overall effectiveness of the TPD programme. There is minimal information on the cost-effectiveness of CoPs, and specifically on the use of technologies within them. CoPs merit further research, especially given indications that they are crucial to creating scalable and sustainable models for TPD in low-income contexts. For example, how might video-supported CoPs differ in cost-effectiveness from ones that require more hands-on training and coaching for peer facilitators? How might tech-enabled coaching and monitoring further the impact and sustainability of CoPs? Such questions will require further

research to inform future TPD programme design.

Understanding how to support peer facilitators to be effective and inclusive

Research on how technology can support teacher educators, including peer facilitators, remains scarce. More testing could be done to better understand facilitators' training and support needs and their level of ease with implementing their CoP roles. Another similar area meriting investigation is the upskilling of teachers to involve them not just in the design and implementation of technology for teaching and learning, but to enable them to produce their own resources.[73] Another issue identified by Hennessy et al. as 'under-researched' within TPD and CoPs is the need for a better understanding of inclusivity and equity within CoPs for teachers with special needs, noting that there is "no literature relating to the use of technology to assist TPD for sign language" or other sensory and neurodivergent needs.[74] This is already relevant in some of the Hub's research. In Tanzania, resources produced for teachers were deemed inadequately inclusive of teachers with visual impairments. A more focused approach is necessary for developing inclusive CoPs and related content and exploring how technology can support this.

Resources

Resources on user-testing for TPD including CoPs

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Resources on DBIR in TPD

DBIR in Malawi:

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5. TPD and TCPD are both used in this brief, with the latter referring to programmes with an emphasis on continuity. The premise is that continuous learning is embedded in the CoP model.
6. Hennessy et al., 'Technology Use for Teacher Professional Development'.
7. Allier-Gagneur et al., 'Characteristics of Effective Teacher Education'.
8. Hennessy et al., 'Technology Use for Teacher Professional Development'. This systematic review includes several references to illustrate the consensus view, detailing sources by characteristics. The characteristics listed in the systematic review are broadly similar to those listed in Box 1.
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10. Hennessy et al., 'Technology Use in Teacher Preparation and Professional Development', p. 17.
11. In Tanzania, EdTech Hub is undertaking design-based implementation research (DBIR) in a study entitled 'Impact of a Tech-Supported, School-Based Teacher Continuous Professional Development Model on Learning Outcomes in Tanzania' in partnership with Aga Khan University, Aga Khan Foundation, and Tanzania Institute of Education. The study is part of MEWAKA (Mafunzo Endelevu kwa Walimu Kazini, or teacher continuous professional development [TCPD]), a school-based teacher professional development programme being implemented nationally by the Government of Tanzania. See https://edtechhub.org/evidence/edtech-hub-research-portfolio/impact-of-tech-supported-tpd-model-on-learning-tanzania/. Retrieved on 22 March 2024.
12. Koomar et al. 'MEWAKA'.
13. Correa de Oliveira et al. 'Designing Teacher Learning Circles'
14. Lurvink, Anne-Fleur, Zainab Bangura, Alhaji Fortune, Alex H. George, Katie Godwin, Miriam Mason-Sesay, David Moseray, et al. 2022. 'No Teacher Is an Island: A Case Study on the Enablers and Barriers for Effective School-Based Teacher Professional Development in Sierra Leone'. OpenDevEd. https://doi.org/10.53832/opendeved.0284.

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16. Allier-Gagneur et al. 'Characteristics of Effective Teacher Education', pp. 6–7.
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27. In Malawi, EdTech Hub is currently conducting design-based implementation research to support the refinement of school-based teacher learning circles under the National Numeracy Programme. For

more information, see the two reports by Correa de Oliveira et al. referenced in this brief.

28. Correa de Oliveira, André, Charity Kanyoza, Anne-Fleur Lurvink, Violet Boilo, Esme Kadzamira, and Björn Haßler. 2024. 'Teaching and Learning of Mathematics in the Context of the National Numeracy Programme in Malawi: Findings from a Rapid In-Depth Qualitative Study'. Working Paper. EdTech Hub. https://doi.org/10.53832/edtechhub.0156. Available at https://docs.edtechhub.org/lib/B8SQMMBA.
29. Open Development and Education undertook research on CoPs in Sierra Leone as part of a TCPD programme known as Tich Mi Ar Tich Dem ('Teach me to teach them'). For more information, see https://opendeved.net/2022/10/31/no-teacher-is-an-island/. Retrieved 22 March 2024.
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34. Chachage and Jay Thakrar, 'Teacher Continuous Professional Development in Tanzania'.
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36. See https://edtechhub.org/2022/08/18/using-technology-to-support-teacher-continuous-professional-development-in-sierra-leone/. Retrieved 27 March 2024
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43. Adam, et al. 'The Use of Technology in the CPD Implementation Plan in Tanzania'.
44. Kondoro, Aron, Salome Maro, Joel Mtebe, Björn Haßler, Jamie Proctor, and EdTech Hub. 2023. 'Usability Testing of a Mobile-Based Learning Management System for Teacher Continuous Professional Development in Tanzania'. The International Journal of Education and Development Using Information and Communication Technology 19 (August):75–92. https://www.researchgate.net/publication/373523617_Usability_Testing_of_a_Mobile-based_Learning_Management_System_for_Teacher_Continuous_Professional_Development_in_Tanzania.
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66. Correa de Oliveira et al. ‘Designing Teacher Learning Circles’.
67. Chachage and Jay Thakrar, ‘Teacher Continuous Professional Development in Tanzania’.
68. Lurvink et al. ‘No Teacher Is an Island’.
69. Lurvink et al., ‘No Teacher Is an Island’.
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