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Teacher collaborative learning at scale: governance and the role of school and system-level actors

Initial findings from the *Teachers Learning Together* study in Kenya and Rwanda

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Contents

Table of Figures

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ABSTRACT

Teachers Learning Together is an ambitious on-going research study (2018-21) looking at the impact of different models of teacher collaborative learning in two large scale UKaid-funded education programmes in Rwanda and Kenya. The search for effective models of teacher professional development (PD) is urgent: recent analysis by Popova (2016) shows that despite large expenditure in this area globally, there is a worrying variation in its effectiveness. A promising approach increasingly being used is teacher communities of practice (CoPs), based on the growing evidence that when teachers learn together as peers, their PD becomes more effective and sustainable (Cordingley, 2015).

CoPs place the teacher at the centre of educational reforms. But sparse evidence exists on how to make these teacher network structures effective at scale in low resource settings, or on the role of system level actors in facilitating these experiences, such as itinerant pedagogical coaches.

This study looks at the features of effective CoPs, with an explicit research focus on the relationship between teacher collaborative learning and different kinds of leadership, for example the role played by teachers as leaders, and by coaches, head teachers (HT) and subject leaders. It also compares two delivery models: a cluster-based delivery model in Kenya and a school-based model in Rwanda.

Preliminary findings from the baseline analysis show a positive correlation between CoP facilitation quality and the self-reported impact of communities of practice on teacher instructional quality ($r=0.518$ and 0.600, $p<.001$). In line with wider international evidence, this suggests that facilitation quality may be a key dependency for getting good outcomes from investment in CoPs.

We also find that the cluster- and school-based CoPs have a different governance and leadership structures. In the cluster model, instructional coaches play a dominant role as the main facilitator and subject leader. This model somehow undermines teacher leadership capacity, with teachers reporting less participation in setting the agenda and other elements of CoP governance and decision-making, compared to the findings in Rwanda.

In Rwanda we find that more diverse actors are involved in CoP leadership: teachers, school-subject leaders and HTs. Qualitative analysis shows a clear maturity model in CoP development, with teachers taking more leadership over time, accompanied by changes in HT contribution. Informed by this, we explored different leadership styles of HTs (directive and distributed). A directive HT style had a positive correlation with self-reported CoP impact for lower performing CoPs ($r=0.362^{***}$ $p<0.001$) but a negative one for higher-performing CoPs ($r=-0.229^{***}$, $p<0.001$). This suggests teachers may benefit from directive HT inputs when CoPs are struggling, but strong supervision may stifle teacher collaboration when CoPs are more established. The pattern is reversed for school subject leaders – high performing CoPs seem to benefit more from directive inputs from these actors. This is consistent with the literature on collaborative learning which emphasises the importance of high-quality subject-specific facilitation.

In conclusion we find that there is no one size fits all when it comes to effective leadership; good CoP leadership depends on the delivery model, the maturity of the CoP and the type of leadership required (general supervision and facilitation or subject leadership). This has important policy and practice implications for scaling CoPs. Careful design and preparation is needed for leadership roles at system and school level, so that their leadership helps teacher collaborative learning to flourish, and takes into account key contextual factors and dependencies.

Key words: teacher leadership, subject leadership, system actors, district actors, teacher collaboration, communities of practice, teacher networks, collaborative governance

SECTION 1 - BACKGROUND INFO

1.1 Context

The international donor community continues to prioritise teacher professional development (TPD) as an effective way of combating the 'learning crisis'. Despite large expenditure in this area, recent analysis[1] shows a dramatic and worrying variation in the effectiveness of TPD. One strategy increasingly being used is teacher communities of practice (CoPs), based on the evidence that when teachers learn together as peers, their TPD becomes more effective and sustainable.[2]

CoPs are collaborative networks that support professional practitioners in their efforts to develop shared understandings and engage in work-relevant knowledge building[3]. However, research in this area traditionally focuses on schools and educators in higher income settings and has little to say about the effectiveness of using CoPs to improve teaching and learning in lower income settings.

In addition, sparse evidence exists on how to make these teacher network structures effective at scale, or on the role of system level actors in facilitating these experiences, such as itinerant instructional coaches. Although evidence demonstrates the need for greater institutional investment in school-based teacher support, little is known about the role of change agents and actors within schools such as headteachers (HTs) and subject leads, who set the norms and expectations for ongoing TPD in schools.

The *Teachers Learning Together* (TLT) study is an ambitious ongoing research study (2018-21) which proposes to bridge the gap, and explore if and how CoPs can be used to facilitate teacher professional learning and improve their classroom practice as part of a complex educational intervention in the SSA region.

An important part of the TLT research is devoted to exploring the role of school and system-level actors in facilitating these experiences, such as itinerant instructional coaches and HTs. According to the wider literature on communities of practice, third party actors who do not form part of the group can offer helpful external inputs and neutral opinions in relation to CoP objectives[4]. In cultivating a culture of trust, Robbins and Alvy stressed the critical role of school leaders in promoting trustful, honest relationships with faculty members in order to establish a culture that satisfies the adult learners' needs and desires to improve, grow, and learn[5]. This paper intends to present preliminary baseline findings related to the role of governance and leaders in supporting and facilitating the work of CoPs and their success. This includes the role of school and system-level actors, and an exploration of the kinds of governance and facilitation associated with effective CoPs. Baseline data collection was completed in October 2019.

As these are baseline results, please note that a proxy measure for CoP impact was constructed, based on teachers' self-reported impact. Later on in the study, we will be comparing baseline and endline observations of teacher practice. Please note that the research methodologies for the Kenya and Rwanda studies were designed slightly differently due to differences in programme and

[1] Popova 2016.
[2] Cordingley 2015.
[3] Hara, 2009: 3.
[4] Wenger et al. 2002.
[5] Robbins and Alvy 2003

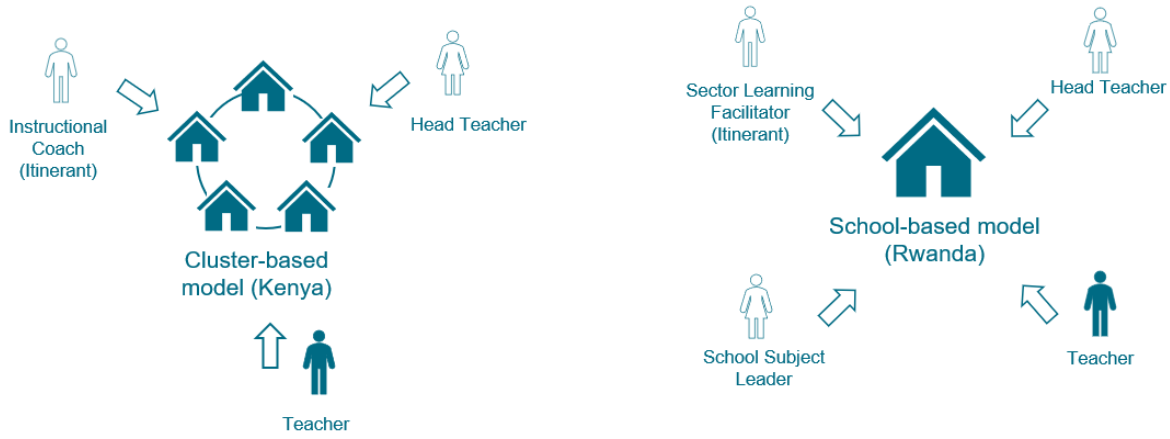
implementation design, and existing monitoring and evaluation requirements already in place to meet funders' requirements.

1.2 Description of the two interventions: cluster-based *versus* school-based CoPs

TLT looks at the effectiveness and impact of different models of teacher collaborative learning in UK aid (DFID) funded education programmes in Rwanda and Kenya. Both programs are large-scale interventions with the combined reach of 3,000 primary schools, nearly 36,000 teachers and 2.6 million learners. Both programmes aim to improve foundational learning outcomes for all learners in challenging contexts by offering continuous and practical support to educators with CoPs at the heart of their TPD. Working closely with programme delivery teams and local education agencies, the TLT Research adopts a 'learning lab' approach to generate evidence on if and how different CoP models amplify the success of educational interventions and deliver TPD at scale.

The two programmes use very different models to deliver at scale, and the CoPs are institutionalised at school and system level through different system actors. In Kenya, they are delivered through multi-school clusters (hereby cluster-based model) and rely on support from itinerant instructional coaches. In Rwanda, they are school-based (hereby school-based model) and draw on support more explicitly from school leaders and school-based subject leader.

Figure 1 – Key actors at school and system level involved in delivery and governance of CoPs



In **Kenya**, the CoPs are **cluster-based**, with 100 CoPs operating across 500 schools, as part of the Girls' Education Challenge-Transition programme (Let Our Girls Succeed, *Wasichana Wetu Wafaulu*) led by Education Development Trust. CoPs are held at cluster level composed of a network of 4-5 adjacent schools. Teachers meet once per term and meetings are flexible and reflective to address emerging challenges. They combine mathematics and literacy teachers. The CoP is facilitated by an instructional coach who also works with teachers on a 1:1 basis. The coach identifies key challenges and good practice before each CoP, supporting teachers to discuss their practice. There is currently no major accountability role for school leaders in the model. However, teachers are obliged to report to their headteachers after CoP meetings Monitoring of CoPs is realised by regional coordinators and senior coaches.

In **Rwanda**, the CoPs are **school-based**. There is a mathematics and an English CoP in each of the 2,500+ schools (5,000+ CoPs in total), as part of the Building Learning Foundations programme led by Education Development Trust. Teachers meet three times per term and are led by teachers themselves supported by the facilitation of school subject leaders (SSLs). CoPs meeting are highly structured following guided activities in the toolkit (which is distributed by the programme). Headteachers are accountable for monitoring the performance of CoPs and ensuring meetings are

effectively conducted. Monitoring of CoPs is also enforced by the sector learning facilitator (SLF) under the guidance of the programme Monitoring and Evaluation team. CoP roll out in Rwanda is designed to happen in 3 waves over the course of one academic year. A second implementation phase in Year 2 will then deliver a more reflective approach for the facilitation of the CoPs.

Table 1 summarises the main characteristics of the two models.

Table 1 – Main features of the School-based Model and Cluster-based Model

	School-based model (Rwanda)	**Cluster-based model (Kenya)**
Implementation Strategies	• CoPs re held at school level with each school forming a CoP	• CoPs are held at cluster level composed of a network of 4-5 adjacent schools
	• CoP meetings held once/month (3 times per term)	• 1 CoP meeting per term
	• CoP meetings highly structured following guided activities as contained in the toolkit	• CoP meetings flexible and reflective to address emerging challenges
	• Monitoring of CoPs done by SLFs under guidance of MEL team	• Monitoring done by regional coordinators and senior coaches
	• There is a Mathematics and an English CoP	• CoPs combine mathematics and literacy teachers
Role of leaders	• There is direct accountability of HTs for monitoring performance of CoPs and ensuring meetings are effectively conducted	• No direct accountability of HTs. However, teachers are obliged to report to their HTs after CoP meetings
	• CoP meetings facilitated by school subject leaders	• CoP meetings facilitated by itinerant instructional coaches

1.3 The research

The research explicitly seeks to compare these two CoPs models and the system level support required, to generate new evidence and learning. The two main research questions are:

(i) What is the impact of CoPs on teacher outcomes (teaching practice, knowledge, motivation)?

(ii) What are the features of effective CoPs at scale (structures, processes and functions)? What is the role of the facilitator and coach in CoP effectiveness?

The research uses a mixed-methods approach, combining both qualitative and quantitative methods. The design will help to test the connection between various features of teacher collaborative learning and teaching outcomes over a year-long period, and to explore how and why CoPs support changes in teaching practice and motivation.

Since the CoP design differs across the two programmes, we had an exciting opportunity to apply different models of quantitative research to generate more robust findings on best practices in teacher collaboration. In Kenya the research uses an experimental design which compares treatment and control groups; in Rwanda, the research employs a quasi-experimental design which compares the impact of CoPs for participants with different exposure levels due to phased programme roll-out.

1.4 Theory of Change

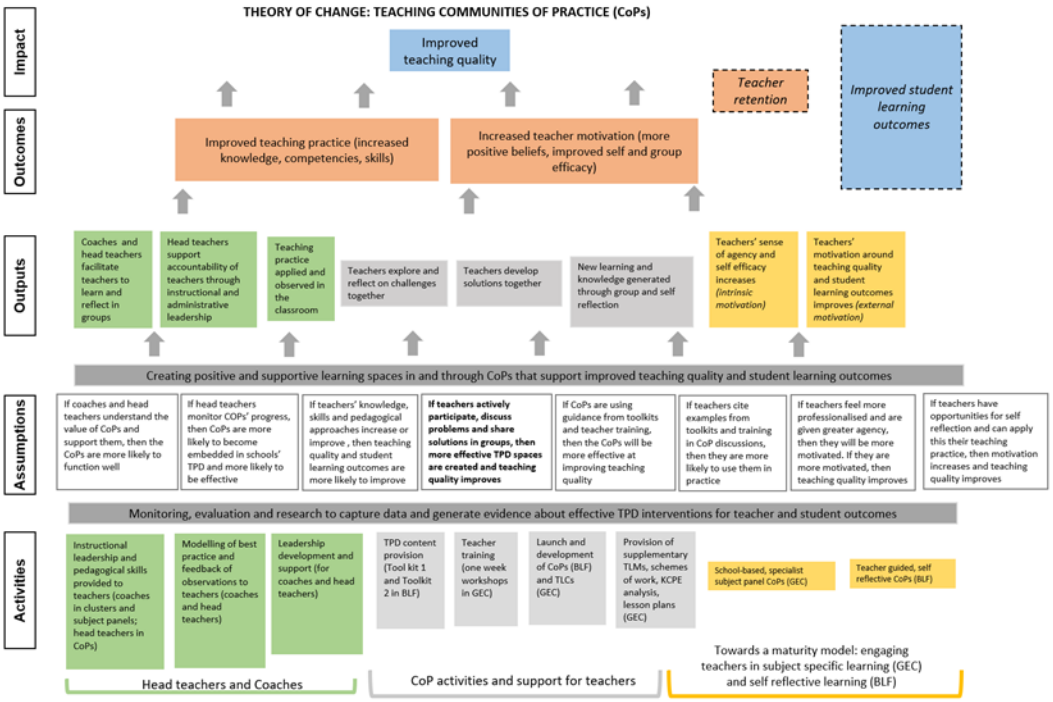
The TLT research design has drawn from a theory of change co-developed with the country teams in Kenya and Rwanda (Figure 2). It outlines the expected impact, outcomes, and outputs of the two programmes' CoP interventions, and details the assumptions driving the design and evolution of the CoPs, as well as the causal relationships that are likely to affect the interventions' results and various pathways to impact.

What is the context in which the interventions are being implemented? The two programmes are being implemented in contexts where a significant proportion of teachers are either untrained or have been poorly trained, where teachers lack basic language skills, subject knowledge, and pedagogical competencies, where management and coaching support for teachers is limited, and where teachers are poorly motivated to teach well. The programmes' CoP interventions have therefore been designed to respond to these contextual challenges that influence teaching quality and ultimately influence student learning outcomes in Kenya and Rwanda.

What long term change do we want to see? Concerns about the quality of teaching are increasingly informing the design of educational interventions designed to improve student learning outcomes. Teaching CoPs have emerged as an intervention that aims to improve teaching quality, teaching practice and teacher motivation. There is an implicit assumption, supported by evidence, that improvements to teaching quality support student learning outcomes.

What is the process or sequence of change? CoPs support a communal approach to teacher development by providing a positive and supportive space in which teachers can learn and reflect. In these spaces, teachers can learn and develop with their peers - drawing from their support and experience - and with the support of more experienced teachers and/or headteachers who facilitate and support these CoPs of teachers to develop. The expectation is that teaching quality improves when teaching practice improves and teacher motivation increases. A communal approach is expected to support these improvements through shared practice and shared domains of interest among groups of teachers. Teaching practice includes knowledge (including subject-based competencies) and skills (including planning, student engagement, instruction, and classroom management). Teacher motivation includes new beliefs, self-efficacy and perceptions, and group efficacy.

Figure 2 – Theory of Change for the Teachers Learning Together *Research*



1.5 Quantitative Analysis

The overarching objective of the quantitative component is to provide an evidence base for the flagship programmes, Kenya GEC-T and Rwanda BLF, in regards to understanding what works and why, providing feedback lessons to inform future programmes' adaptive design, and to contribute to the wider international evidence base on effective TPD at scale.

The analytical framework is built upon several strategies, designed for each of the programme contexts. Many contextual considerations have driven the development of the two distinct approaches that will be applied in the two countries:

Kenya (GEC-T), cluster-based model

-To maintain a more rigorous design in the Kenya study, the study leverages a control group, which was sampled among existing schools that received all other programme interventions aside from CoPs. This is an existing control group, sampled initially for research purposes for the GEC's phase 1 evaluation. This control group consists of 36 schools (185 teachers). The study's intervention group is selected from the core GEC-T programme and consists of schools in receipt of all interventions including CoPs. These two comparison groups will enable an assessment of the impact of CoP on teacher outcomes. Specifically, the empirical comparison strategy will be in the form of multiple regression analysis with a rich set of teacher-level control variables as well as school-level fixed effect dummies.

-A new CoP Survey Tool has been designed to capture CoP features such as CoP logistics and duration, content and governance (see Section 1.7 for a fuller description of the tool). Correlation analysis will be used to assess CoP features against teacher outcomes, including teaching practice, knowledge, motivation. The empirical strategy here will be similar to the comparison listed above, such that multiple regression with rich teacher-level controls will be utilized.

Rwanda (BLF), school-based model

- A difference-in-difference empirical design will enable an analysis of the impact of the CoPs on teacher outcomes based on exposure levels in line with the existing planned programme rollout of the CoPs through three waves. CoP roll out in Rwanda happens in 3 waves over the course of one academic year (Year 1). A second implementation phase in Year 2 will then deliver a more teacher-led approach for the facilitation of the CoPs, which is less structured and more reflective. This analysis will be driven by a hypothesis around the differences in exposure level between teachers and teacher outcomes in Wave 1 and Wave 3.

- Through the CoP Survey Tool, the effects of different features of the CoPs will be assessed through correlation analysis, assessing these features against teacher outcomes, including teaching practice, knowledge and motivation. This will be done through a purposive sample of high, medium and low performing CoPs (see the following point).

- To capture the reasons behind the successful performance of CoP and understand which CoP elements influence their performance, the research explores the relationship between CoP features and teaching practice, knowledge, motivation. This methodology allows us to go beyond determining the impact of CoPs on teacher outcomes, allowing us to investigate the elements influencing their effectiveness. To this end, the performance of CoP is grouped into three categories: high, medium and low performing CoPs. The methodology applied to determine these three categories differs between the baseline and endline phases. During the endline, allocation to these three categories will be determined based on the improvement seen in teacher outcomes (teaching practice, knowledge and motivation). In contract, during the baseline, allocation to high, medium and low performing CoPs is based on teachers' perceptions of CoP performance. Teachers' perceptions of CoP performance were targeted in one section of the CoP Survey Tool. The answers from this section were used to build an index of high, medium and low performing CoPs and to categorise CoPs.

1.6 Qualitative Analysis

The qualitative research component is also structured around three frameworks: analytical, sampling, and measurement. The overarching objective of the qualitative component is to complement the quantitative research enabling a deeper analysis of the features and functionality of the CoPs beyond the quantitative assessment of impact on teacher outcomes. More specifically, the qualitative research addresses the following research question: Why and in what ways are our teaching CoPs influencing (i) teaching practice and knowledge, and (ii) teacher motivation? Through the development of comparative qualitative case studies, the research will explore the similarities and differences among CoPs to capture their peculiarities.

The use of ethnographic tools such as participant observation and the application of principles such as the observance of cultural dynamics support the development of a rich qualitative study.

Comparative process case studies focus on how the actions and outcomes of actors (e.g. attitudes/motivation of the teachers; teachers' interactions with each other) over a specified period are shaped by factors that act at multiple levels. The factors relating to teaching quality are analysed at several levels: school level: school environment; support structures in the schools; the role of headteachers and coaches; CoP level: CoP activities; and individual level: these relate to the motivations and actions of individual teachers who are active in the CoPs. Through the development of these qualitative case studies, the research explores the similarities and differences among different typologies of CoP.

1.7 Data Collection Tools

The study uses both internal (developed by Education Development Trust programmes) and externally validated international tools. Internal tools to be used are Teacher Key Informant tool, Head Teacher Focus Group discussion, CoP Survey Tool, Teacher Knowledge, Attitude and Perception (KAP), and School Leadership Tool. External tools are TEACH and Teacher Sense of Efficacy Scale (TSES).

TEACH Tool - The classroom observation endeavours to document teacher practices with a view of ascertaining linkages to the CoP functionality. In documenting classroom practices, the World Bank's TEACH tool will be used. The TEACH tool has successfully been used in developing country contexts to capture the quality of teaching and engagement to learners.

Teacher Knowledge, Attitude and Perception (KAP) tool - The KAP survey tool focuses on aspects of teachers' perception of their current teaching practices and subject knowledge.

School Leadership Background Tool - The tool aims at collecting demographic information of the school leaders and school statistics. Additionally, the tool collects data on other interventions realised in the targeted schools.

Teacher Sense of Efficacy Scale (TSES) - TSES is used to assess teacher beliefs in their capability to make a difference in student learning, to get through even students who are difficult or unmotivated. In completing the scale, teachers assess their capability concerning instructional strategies, student engagement, and classroom management. The teacher ratings will be correlated with ratings on various dimensions of the CoP.

CoP Survey Tool (see section 1.9 below)

Teacher Key Informant tool (KII) - The teacher KII tool is used to capture qualitative data on the functioning of various dimensions of the CoP. Through the tool, teacher perceptions on the CoP functioning, successes and challenges will be documented. Also, the tool will be used to document any support received in improving teachers' pedagogical practices. Recommendations on how to improve functioning the CoP will be collected through the KII tool.

Head Teacher Focus Group Discussion - HTs are engaged in a focus group discussion to document their views on the functioning of the CoP. Their roles in the organization of CoP meetings and kind of facilitation extended to teachers will be interrogated. Also, the HT FGD will document their recommendations for improving the functioning of the CoPs.

Under each expected impact and element targeted by this study, a list of the collected data was developed with a clear indication of data sources (Annex 2). A full list of data collection tools and variables and how these tools have been used to answer the research questions is provided in Table 2.

Note: The baseline analysis presented in this paper makes use of the CoP Survey tool and the two qualitative tools.

Table 2 – Overview of the data collection tools and how they have been used within the research design

Research Questions	Main Research Design	Data Collection Tool

1. What is the impact of CoPs on teacher outcomes?	Difference in Difference; control group design; case study analysis	CoP Survey Tool KAP tool School Leadership Background Tool TEACH TSES KII FGD
2a. What are the features of effective CoPs? What is the impact of different CoP features?	Correlation Analysis; case study analysis	CoP Survey Tool KAP tool School Leadership Background Tool TEACH TSES KII FGD
2b. What is the role of the facilitator and coach in CoP effectiveness?	Correlation Analysis; case study analysis	CoP Survey Tool (Sections E and B) School Leadership Background Tool KII FGD

1.8 The sample and sampling strategy

The study benefits from large sample size to detect intervention benefits: 610 teachers drawn from 157 schools across the 2 programs.

In Kenya (cluster-based model), we involved 435 teachers from 99 schools, distributed in treatment and control schools. Teachers are dispersed across 9 districts (Kilifi, Kwale, Marsabit, Mombasa, Nairobi, Samburu, Tana River and Turkana) in rural and urban areas. Treated schools belong to 14 different CoPs clusters and include an equal percentage of English and mathematics teachers (see Annex 1 for more details about the demographic characteristics of the sample).

In Rwanda (school-based model), 278 teachers from 97 schools participated in the research. Schools were distributed across all the Rwanda provinces and involve the same proportion of English and Mathematics teachers (see Annex 1 for more details about the demographic characteristics of the sample).

1.9 CoP Survey Tool: Analytical Framework

An integral component of the TLT research was to develop a tool to grasp information on the functionalities of CoPs and how these functioning elements influence teacher practice. The inception phase of the TLT research was dedicated to developing and testing a bespoke suite of instruments including the CoP Survey Tool. The initial selection of the domains addressed by the CoP Survey Tool was based on the findings from the literature review, later these domains and the whole instrument were tested and refined in a short pilot study conducted both in Kenya and Rwanda.

This section provides an explanation for the set of functionalities and components included in the CoP Survey Tool and why they could be crucial in determining the effectiveness of CoPs. The CoP Survey Tool is designed to assess four main functional areas of CoPs. These functional areas are drawn from the literature, and in particular from the three functional areas as identified by the first

scholars on CoPs[6] and, further developed by the literature.[7] Building on the three-layered model proposed by Hadar and Brody[8], our model includes an additional functional area dedicated to governance. For Hadar and Brody, support and facilitation are part of the first layer of their model ('breaking of isolation') since these function to enhance the level of trust and respect among CoP members.[9] Our model has included governance as a stand-alone functional area: it has been given prominence since this is anticipated to be a key design consideration for policymakers and practitioners wanting to implement at scale.

Our model includes the following functional areas:

1. Enabling Conditions – the assessment of how teachers meet together[10] and create a space[11] conducive for learning.

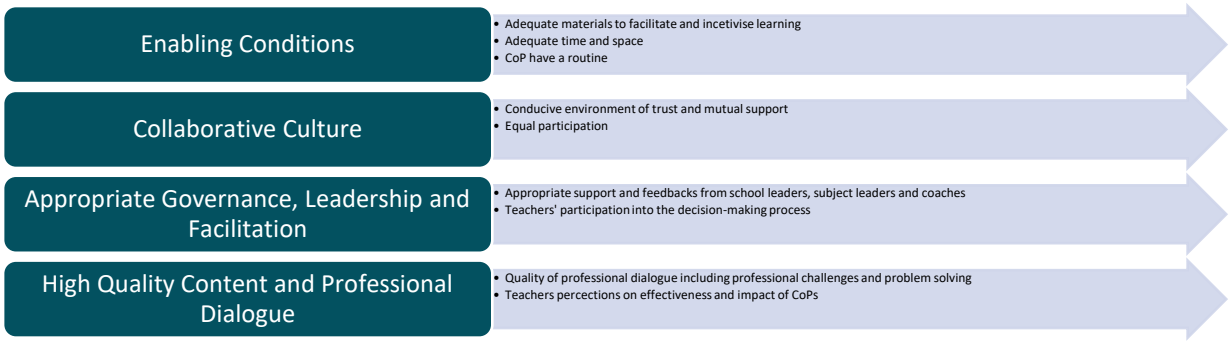
2. Collaborative Culture – the evaluation of how teachers foster a collaborative culture conducive for building relationships of mutual trust[12] and respect.

3. Appropriate Governance, Leadership and Facilitation – the examination of how the work of CoPs is governed and facilitated by different actors (e.g. school leaders, subject leaders, coaches) and the extent to which CoP governance affects teachers' ownership, participation and CoPs' effectiveness.

4. High-Quality Content and Professional Dialogue – the examination of people connections[13] (by communicating and sharing on a set of common problems and topics[14], including how the professional dialogue translates into concepts[15], innovations and new ideas.[16]

Based on the literature, the CoP analytical framework includes these four functional areas, each with a set of dimensions anticipated to improve teacher outcomes. Figure 3 presents the CoP analytical framework.

Figure 3 – CoP Survey Tool - Analytical Framework



[6] Wegner 1998.
[7] Hadar and Brody 2017; Barab et al. 2004.
[8] Hadar and Brody 2017.
[9] Tannehill 2015.
[10] Wegner 1998.
[11] Hadar and Brody 2017.
[12] Usaro et al. 2007; Tannerhill 2015.
[13] Hadar and Brody 2017.
[14] Wegner 1998.
[15] Ibidem.
[16] Reiner and Urbanowski 2009.

1.10 Limitations

The TLT study and this initial publication have two main limitations. Firstly, this initial publication is only based on baseline data. In the absence of the endline data, the findings of this study can provide interesting insights but are far from any attribution reasoning. Due to this limitation, we have opted for analyses which explore the nature of the datasets and the correlations between different dimensions that we investigated. More robust attribution analyses will be run as soon as the endline line data is collected and analysed.

The second limitation relates to the wider study, which had to take account of the different implementation strategies of the two programmes that we investigate: BLF and GEC. The different implementation arrangements of the two programmes do not allow for genuine comparability of the data, particularly at the baseline phase. During the endline data analysis, we will be better positioned to mitigate the different implementation arrangements and draw general conclusions.

SECTION 2 - GOVERNANCE, LEADERSHIP AND FACILITATION

This paper shares initial findings on the governance, leadership and facilitation of CoPs in the TLT study, including the role of school and system-level actors, and an exploration of the kinds of governance associated with effective CoPs.

2.1 How does governance work in school- and cluster-based CoPs?

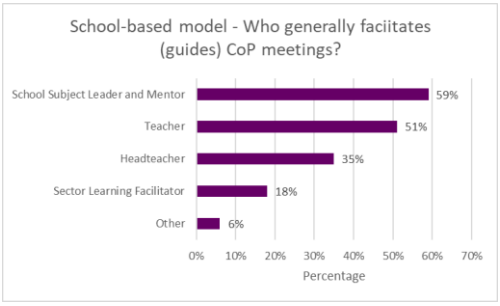
Relationship building, trust and respect are at the heart of CoPs. Usoro et al.[17] highlight the importance of trust as a predictor of knowledge sharing in CoPs. According to the authors, trust may take multiple dimensions but crucially competence-based trust, which is the confidence of members in the particular expertise of others, is key. Equally, institution-based trust is key in cultivating confidence in institution-based structure[18]. In cultivating a culture of trust, Robbins and Alvy[19] demonstrate how critical is the role of school leaders in promoting trustful, honest relationships with faculty members to establish a culture that satisfies the adult learners' needs and desires to improve, grow, and learn.

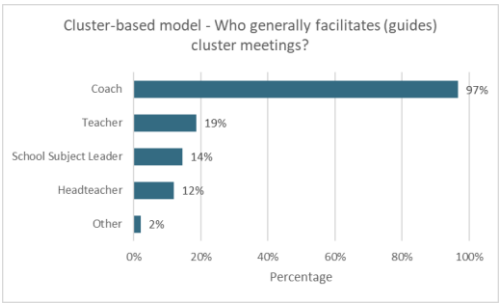
Support and facilitation were dimensions that TLT research explores through the CoP survey tool. Indeed, a set of questions aimed at determining who is supporting and facilitating CoP meetings (e.g. HTs, sector learning facilitator, teachers, SSLs and coaches), the frequency of participation of these supporting actors, how this facilitation and support is provided (e.g. how the discussion is organised, how often leaders intervene in the discussion, etc.) and the effectiveness of this support and facilitation based on teacher perceptions. To assess CoP governance systems and structures, the CoP survey tool explores the extent to which teachers are active actors in CoP governance by participating in the decision-making process for the organisation of CoP meetings (e.g. selection of the agenda, topics of discussion, duration and organization of the meetings). The extent to which members are likely to be engaged in finding appropriate ways to work together is a prerequisite for CoP functionality and the creation of an appropriate environment and collaborative culture[20].

[17] Usoro et al. 2007.
[18] Tannehill 2015.
[19] Robbins and Alvy 2003.
[20] Hadar and Brody 2017; Tannehill et al. 2015.

In school-based (Rwanda) and cluster-based (Kenya) CoPs, facilitation and support are provided by different actors. In the school-based model, facilitation is shared by several actors. In the cluster-based model, the dedicated coach takes the helm (Table 3).

Table 3 – Who are the leaders and facilitators in school- and cluster-based CoPs?



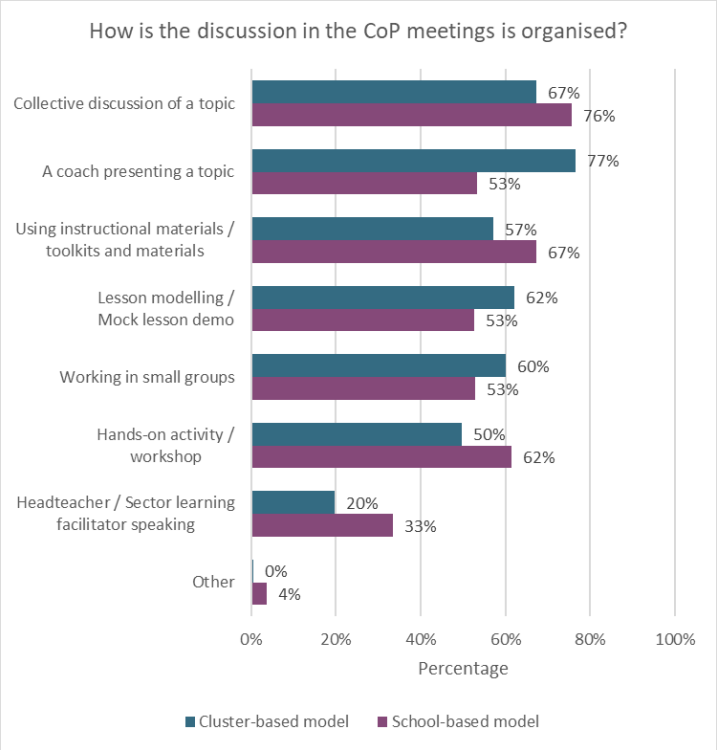


Cluster-based CoPs are facilitated by an instructional coach who also works with teachers on a 1:1 basis. The coach identifies key challenges and good practice before each CoP, supporting teachers to discuss their practice. Within the GEC programme, coaches have been trained on the subject matter. Coaches undertake classroom observations and they can use teachers practices as an example to be discussed during CoP meetings. Each CoP cluster includes several schools, and only the host headteacher is likely to attend, and they may only join to greet the attendees. It is, therefore, no surprise that headteachers are not the primary facilitators at CoPs. There is currently no major accountability role for school leaders in the model. However, teachers are obliged to report to their headteachers after CoP meetings Monitoring of CoPs is realised by regional coordinators and senior coaches.

School-based CoPs are facilitated by school subject leaders (SSLs). HTs are directly accountable for monitoring the performance of CoPs and ensuring meetings are effectively conducted. Monitoring of CoPs is also enforced by the Sector Learning Facilitator (SLF) under the guidance of the programme Monitoring and Evaluation team. Their itinerant role can provide support to CoP functionality as a connection between different experiences and sharing ideas from some CoPs to another. SLFs might facilitate the first session of CoPs only to demonstrate the model.

CoP governance influences also the way the discussion is organized which reflects the dynamics between teachers and their facilitators/leaders. Table 4 shows how, whole collective discussion is common both in the cluster- and school-based CoPs, it is less frequent in cluster-based CoPs, where the discussion is more likely to be led by the instructional coach. The use of instructional material, in turn, is more common in school-based CoPs given the more structured nature of meetings around BLF toolkit. Working in small groups is more common across cluster-based CoPs than in school-based CoPs, which may be due to the higher heterogeneity of teachers coming from different schools. Lesson modelling and mock lesson demo are more frequently used by coaches in cluster-based CoPs as a follow-up of the undertaken classroom observation. On the contrary, practical activities and workshops are more frequent across school-based CoPs (Table 4).

Table 4 – How the discussion is organised in school- and cluster-based CoPs

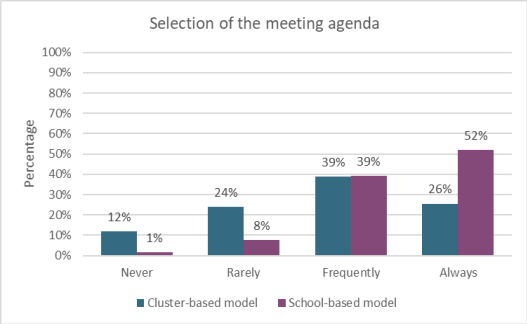


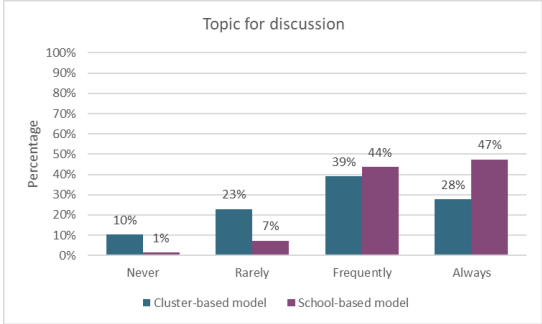
Our analysis also looked at teacher participation in the decision-making process of CoPs, as an important aspect of CoP governance. This includes looking at teacher participation in deciding aspects of the overall organization and functioning of the meetings such as selection of the agenda, topics of discussion, duration and the way the discussion is organised (Table 5). Interestingly, teachers in the school-based model are more likely to participate in establishing all the examined elements related to CoPs meetings. This data shows a high level of participation of teachers in the school-based model that their counterparts in the cluster-based model.

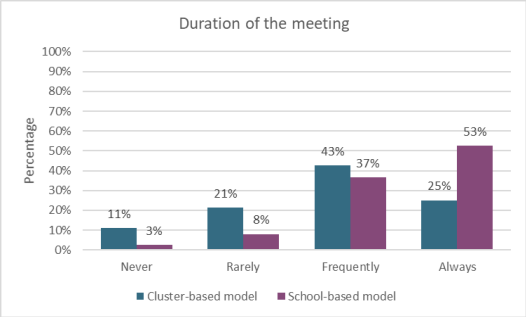
Qualitative findings confirm this trend. In interrogating how cluster-based CoP meetings are organized, it was established that communication on the date of the meeting and venue usually originates from the coach. The agenda is also prepared by the coach and shared with teachers on arrival at the meeting venue. Although the agenda is usually prepared by the coach, teachers are given the freedom to decide on how facilitation will be done and this at times varies from meeting to meeting. Teachers interviewed stated that in most meetings, there are distinct sessions for small groups/pair activities as well as plenary where a lesson is modelled, and feedback is solicited from the audience.

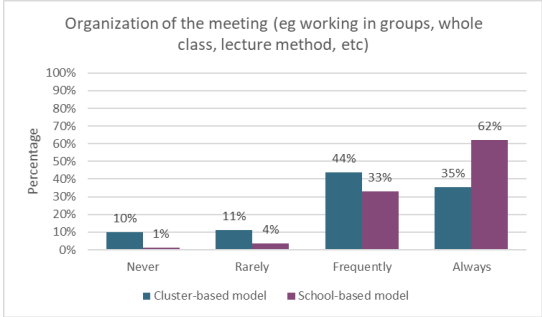
In contrast, in school-based CoPs, the qualitative analysis shows that three key actors (teachers, school-subject leaders and headteachers) with different roles are involved in the organisation of CoP meetings. Roles of the actors are largely differentiated by level of respective schools in the implementation of CoPs. While some CoPs have reached a "maturity level" with teachers making decisions when to meet, others look up to the school subject leader and headteacher for direction in organizing CoP meetings. CoPs that have attained maturity level are clearly distinguished by the process of organization of meetings. In such CoPs, members take a lead role in designing agenda and moderating meeting discussions. Importantly, the teachers decide among themselves who will take up the key roles and this is done on rotation to ensure equity.

Table 5 – Teacher participation in the decision-making process in school- and cluster-based CoPs









2.2 How much does facilitation matter in CoPs?

TLT research verified the extent to which facilitation matters in the impact of cluster-and school-based CoPs. To this end, we created two independent indexes[21] for the cluster-based and school-based models of items related to:

- Effective elements of facilitation[22] and
- Overall CoP[23] impact based on teachers' perceptions.

[21] Data from the CoP survey tool were used to create an index by using a Principal Component Analysis (PCA). PCA is a multivariate statistical technique that allows reducing the number of variables into smaller dimensions. In mathematical terms, from an initial set of n correlated variables, PCA creates uncorrelated indices or components, where each component is a linear weighted combination of the initial variables. While analysing CoP variables individually implies to assign equal weight to variables, PCA assigns 'weights' to variables according to the eigenvectors of the correlation matrix (or co-variate matrix).

[22] Facilitation effectiveness has been measured by creating an index combining the following questions: are you satisfied with facilitation provided (i.e. guidance and organisation of the discussion)?; are you satisfied with contribution provided by coaches (cluster-based) / headteacher (school-based) in cluster/CoP meetings? (i.e. guidance and organisation of the discussion)?; are you satisfied with the facilitation provided by subject leaders during cluster/CoP meetings? (i.e. guidance and organisation of the discussion)?; the feedback (i.e. inputs, comments/observations) I get on my teaching from the facilitator during the cluster/CoP meeting is relevant to my needs; the feedback (i.e. inputs, comments/observations) I get on my teaching from the facilitator during the cluster/CoP meeting is useful for my needs.

[23] CoP impact has been measured by creating an index combining the following items: I implement in class what I have learnt during the cluster/CoP meetings; participation in the cluster/CoP meetings has improved my knowledge as a teacher; participation in cluster/CoP meetings has improved my practice as a teacher; the cluster/CoP meetings help me feel more confident about my teaching; participation in the cluster/CoP meetings has encouraged me to reflect on my teaching practice; participation in the cluster/CoP meetings has encouraged me to experiment and innovate in the classroom; the cluster/CoP meetings are helping to improve learning outcomes for my students; participation in cluster/CoP meetings has improved the ability of teachers in my school to work together to solve problems; participation in cluster/CoP meetings has improved teaching practice in the whole school; I'd like the cluster meetings to continue after the programme finishes.

Table 6 shows that there is a moderate positive correlation[24] between CoP impact and an index of facilitation (r=.600, n=271, p<.001 for school-based model – Rwanda- and r=.518, n=235, p<.001 for cluster-based model - Kenya). This data means that when the index of facilitation has a high score it reflects a high score in CoP impact, and vice versa, when the index of facilitation has a low score it mirrors a low score in the CoP impact index.

Table 6 – Correlation between perceived CoP impact and facilitation in School- and Cluster-based CoPs

Cluster-based model	r=0.518 p<.001 n=235
School-based model	r=0.600 p<.001 n=271

2.3 How much do the roles of leaders and facilitators matter in CoPs?

Section 2.2 above establishes that the quality of facilitation matters for CoP impact. This section looks at the role of different actors – HTs and school subject leaders – in effective CoP facilitation.

2.3.1 Head Teachers' Role

Our baseline study investigates the role of HTs in CoP facilitation and governance. To investigate this, we look at HT engagement and its association with CoP impact. Our findings suggest that there is no single model for successful HT engagement with CoPs. HTs need to act differently, depending on context, including whether the CoP is cluster- or school-based. We also see that HTs need to act differently, depending on how mature the CoP is.

HT engagement is measured by a simple average compound variable consisting of two metrics: frequency of HT participation in CoPs and the frequency of their feedback on CoPs.

CoP impact is measured using 10 impact metrics in the CoP tool, measuring the extent to which CoPs have an impact according to teachers' perceptions, to create a simple average compound variable: CoP Impact. [25]

In cluster-based CoPs, there is a statistically significant positive correlation between HT engagement and CoP Impact. In school-based CoPs, there is a significant positive correlation between HT engagement and CoP Impact (Table 7).

Table 7 – Correlation between head teacher engagement and CoP impact in school- and cluster-based CoPs

	Cluster-based CoPs Kenya (n=58)	School-based CoPs Rwanda (n=97)
CoP Impact	rho = .303 p<.05	rho = .233 p<.05

These findings suggest that HT engagement is important for CoP impact.

Our qualitative findings explore this further, and show how HT engagement looks different in cluster vs school-based CoPs. In cluster-based CoPs, meetings are usually held in one of the schools forming a cluster. This requires teachers from other schools to move to the school hosting the cluster

[24] We run a non-parametric correlation because of the ordinal data in the CoP tool.

[25] See footnote 23 for the 10 metrics. Teacher level data is then aggregated to produce school-level variables.

meeting. The distance travelled varies and may imply distance travelling which is possible largely due to facilitation by headteachers.

> "*Most of the time we attend our cluster meetings in Wamba town, and our headteacher helps us to get transport to get there. He makes sure that we have teaching/learning materials like the manila papers", (teacher, Samburu county) …. "The headteacher supports me with fare sometimes, they give me fare…He comes to class to supervise me… and also the headteacher convenes a meeting with other teachers and then we teach them what we were taught in cluster meetings so that they use that method to teach the learners. Yes, they follow up what we were taught*", (teacher, *Nairobi county, Kenya*).

In cluster-based CoPs,HTs rarely attend CoP meetings. However, in cases where HTs also double as subject leaders, they attend CoP meetings. As subject experts, their attendance enhances effectiveness as teachers can find solutions to challenges facing them.

> *"Sometimes they do because they are also subject teachers but sometimes, they have got their forums where they discuss issues and then they are passed to us. Yes, their attendance is 100% it becomes effective because you don't have to go and ask another member what was discussed. After all, we will have first-hand information other than getting information from another person, sometimes the information can be distorted when it comes from one person to another", (teacher, Nairobi county, Kenya).*

In school-based CoPs, HTs go beyond basic management and their participation is more constant. They:

- Put in place accountability structures to ensure CoPs function well. This might include making classroom visits for instructional support and to track the implementation of meeting action points: "There are times like in a trimester he attends my class twice to see how we are teaching and how students are doing and give feedback (teacher, Karongi District, Rwanda)
- Help teachers overcome time constraints by incorporating time for CoP meetings in school routine; an important initiative towards sustainability: "We have a timetable as you can see them on the walls and most of the times these CoPs are chaired by the school subject leader", (school leader, Kayonza district, Rwanda).

Teachers attending school-based CoPs stated that HTs make follow-ups in class to track implementation of action points agreed during CoP meetings:

> *"I feel very supported by school leadership, first of all, if they allow you to meet that is one way of showing that they are supporting your CoP, another thing is when our HT was here, he attended the first CoP now he had been promoted higher to like a secondary school we are now with the school D/HT and he is also very supportive, he attends when he has time another thing he does I can't say he comes to my class to supervise whether I'm implementing what I have learnt in the CoP but he is always urging us to apply what we have talked about in the CoP", (teacher, Rutsiro district).*

The second step of our analysis explores the importance of different leadership roles played by HTs in supporting CoPs. This analysis was possible only for school-based CoPs. The structure of the BLF programme in different phases allows to appreciate the variation between different maturity level across CoPs. We created an index for identifying two different categories of leadership style:

- **Directive Leadership Style Headteacher** - whose presence is more frequent and the number of feedbacks provided is higher.
- **Distributed Leadership Style Headteacher** - who does not participate frequently and does not provide feedback.

We then correlated[26] these different leadership styles against CoP performance (based on teachers' perception) to understand the relationship between leadership style and CoP performance. The results are interesting: there is a positive correlation between high performing CoPs and distributed school leadership style (rho = .362 p < 0.001) and a positive correlation between low performing CoPs and directive school leaders (rho = .265 p < 0.001) (Table 8).

Table 8 – Correlation between Leadership style and CoP performance in School-based CoPs

	Directive Leadership Style - Headteacher	Distributed Leadership Style - Headteacher
High Performing CoPs	rho = -.229 p < 0.001	rho = .362 p < 0.001
Low Performing Cops	rho = .265 p < 0.001	rho = -.317 p < 0.001

These findings are reinforced by the qualitative analysis. The differences in management are largely distinguished by the duration of exposure to CoPs. During the inception phase, HTs virtually control all aspects of the organization of CoPs. However, with time, they step back and take more strategic leadership roles as teachers are given more leeway in taking control of CoPs.

> *"When the CoP first started, our presence in the CoPs was key, but now that the system has strengthened, we do not need to be in CoPs for them to happen or for the teachers to put the effort in it the system is now stronger, we don't need to supervise these CoPs whether you are there or you are not the CoPs happen effectively", (teacher from Kayonza district, Rwanda).*

Teacher interviews corroborated HT views about their roles especially in CoPs that have not attained the maturity level. In Nyamagabe district, interview with one of the teachers revealed high-level involvement of HTs in the organization of CoP meetings with HTs chairing some of the sessions.

> *"In this meetings, we meet and sometimes the HT is around he chairs this meeting or the deputy of studies and we are two teachers in mathematics and two other teachers in English so our communication is not that difficult like we agree on the time to meet, actually we have a timetable here so we know when to meet", (teacher from Nyamagabe district, Rwanda).*

As CoPs evolve, so do HTs' roles into more strategic functions often entailing putting in place accountability mechanisms. The accountability structures are designed to provide oversight and mitigate any possible threats/blockers to the functionality of CoPs while providing to HTs updates on CoP meetings as well as action points for follow-ups.

> *"They make a summary of what they have talked about, discussed about and then they attach the attendance of those who came it's the same in all schools, (headteacher, Kayonza district, Rwanda).*

[26] We run a non-parametric correlation because of the ordinal data in the CoP tool.

2.3.2 School Subject Leaders

School Subject leaders (SSLs) play a very different role to HTs, providing subject-specific expertise to school-based CoPs. According to the qualitative findings, SSLs:

- Organise CoP meetings.
- Support teachers in finding answers to challenging areas encountered during CoP discussion.
- Undertake lesson observations.

Our findings show that a more intrusive role of SSLs is more likely to occur when CoPs are more mature and technical guidance is required to support CoP discussion. As we did for headteachers, we created an index to identify two different categories of leadership style:

- **Directive Leadership Style - School Subject Leaders** - whose presence is more frequent and the number of feedbacks provided is higher.
- **Distributed Leadership Style - School Subject Leaders** - who do not participate frequently and do not provide feedback.

Technical support is less likely to occur when CoPs are less advanced and technical discussions are at an early stage. Indeed, the support provided by SSL had a reverse relationship to CoP effectiveness and maturity. High performing and more mature CoPs are shown to benefit from a more directive style of SSL leadership (rho = .231 $p < 0.001$). There is a positive correlation between the directive style of SSL facilitation and high performing CoPs. This suggests that once the CoP is established and teachers are settled to this routine, more assertive subject leadership style can help with learning and its classroom implementation (Table 9).

Table 9 – Correlation between head teacher engagement and CoP performance in School- and Cluster-based CoPs

	Directive SSL	Distributed SSL
High Performing CoPs	rho = .231 $p < 0.001$	rho = -.213 $p < 0.001$
Low Performing Cops	rho = -.293 $p < 0.001$	rho = .228 $p < 0.001$

2.3.3 Instructional Coaches

In cluster-based CoPs, the instructional coach plays a similar function to the School Subject Lead. They are most likely to take on a facilitator role and is highlighted in 97% of cases (Table 3). We were not able to undertake the same analysis of HT and Instructional Coach leadership styles for the cluster-based model in Kenya, based on CoP performance levels. This was due to less variation in teacher reported CoP performance because there was no staged roll out of CoPs in Waves of implementation in the Kenya programme, unlike the Rwanda programme design. However, we investigated the role of instructional coaches and their role in enhancing the impact of CoPs based on teachers' perceptions.

Instructional coaches in cluster-based CoPs are in charge of:

- Communicating the date of the meeting and venue.
- Setting the agenda.
- Reviewing what was learnt during CoP meetings and to what extent the learnings are put into practice.
- Provide feedback on teaching quality.
- Facilitating the discussion during CoP meetings.

The role of instructional coaches is crucial in cluster-based CoPs. Indeed, interviewed teachers confirmed having a close working relationship with their coaches which facilitates a culture of constant support and consultation:

> "*My coach is good. I am saying from my heart she is someone who doesn't get tired of questions. We always ask questions personally to her. I ask very many questions, whenever I am stuck, I always go to her, I ask and she explains what I am supposed to do*", (teacher, Kilifi county, Kenya).

Our analysis shows that participants' satisfaction with their CoP coach is strongly correlated with the CoP impact[27] they reported (Table 10).

Table 10 - Correlation between satisfaction with Instructional Coach and CoP impact in Cluster-based CoPs

	Cluster-based CoPs (n=58)
CoP Impact	*rho*= 0.618 (p<0.01)

SECTION 3 – CONCLUSIONS

Our research has highlighted that cluster- and school-based CoPs have a different governance structure. In cluster-based CoPs, instructional coaches play a predominant role and represent the main facilitator and technical leader of CoPs. Indeed, HTs play a small role in facilitating the functionality of CoPs with some basic management such as providing permission to teachers to attend meetings or facilitating travelling. CoPs are guided and facilitated by instructional leaders who play a role in managing CoPs (e.g. setting the agenda and venue) and, at the same time, as technical and subject specialists by providing teachers with feedback on their teaching performance. The cluster-based model and the dominant role of instructional coaches somehow undermine the capacity of teachers in taking part in the decision-making process of CoPs. Our findings show that teachers in cluster-based CoPs are less likely to participate in establishing key elements of CoPs organisation.

In contrast, school-based CoPs rely on several actors who participate in the organisation and implementation of CoPs at different levels and in together with more diverse roles: teachers, school-subject leaders and HTs. HTs have direct accountability for monitoring the performance of CoPs and ensuring meetings are effectively conducted. Monitoring of CoPs is also enforced by the sector learning facilitator under the guidance of BLF Monitoring and Evaluation team. Teacher participation is high across all the examined dimensions related to the decision-making process. However, teacher participation seems to be differentiated according to the maturity level of CoPs. While some CoPs have reached a "maturity level" with teachers making decisions when to meet, others look up to the school-subject leader and HT for direction in organizing CoP meetings. CoPs that have attained maturity level are clearly distinguished by the process of organization of meetings. In such CoPs, members take a lead role in designing agenda and moderating meeting discussions. Importantly, the teachers decide among themselves who will take up the key roles and this is done on a rotational meeting to ensure equity.

[27] We use 10 impact metrics in the CoP survey tool to create a simple average compound variable: CoP Impact. See footnote 23 for the metrics used.

Both facilitation models are positively associated with the impact of CoPs as it is perceived by teachers. Despite the differences between the two models in the role of HTs, our correlation analysis demonstrates how HTs are crucial for the success of both models, school- and cluster-based CoPs. Indeed, we found a positive correlation between HTs' engagement in both school-based and cluster-based CoPs.

However, further analysis also shows some interesting differences in the contribution that HTs can make in the impact of CoPs, depending on context. Indeed, in the case of cluster-based CoPs, qualitative analysis shows that when the role of the HT is supplemented by subject experts, the contribution of the HT is more relevant and more incisive. In the case of school-based CoPs our analysis reveals how the HT is instrumental for mature CoPs but there is a danger of too much involvement which can obstruct CoP performance. It likely prevents participating teachers from developing a sense of ownership and collaboration, who see it as an additional accountability mechanism rather than a learning community. In contrast, the HT can be more directive in less mature CoPs, where he or she may support and incentivise the participation of teachers in CoPs until their maturity.

Our analysis shows that the opposite is true for a different actor: the school subject leader. In school-based CoPs, our analysis shows that that more mature CoPs benefit from more 'directive' style of school subject leader. There is a positive correlation between the directive style of SSL facilitation and mature CoPs. This suggests that once the CoP is established and teachers are settled to this routine, more present and intrusive subject leadership style can help with learning and its classroom implementation. Concerning instructional coaches, our analysis shows that participants' satisfaction with their CoP coach is strongly correlated with CoP overall impact. By comparing the findings between the role of HT and instructional coach, it appears clearly that, despite both of them playing an important role in the impact of cluster-based CoPs, the correlation of instructional coach shows a stronger association.

This is consistent with the literature on collaborative learning that emphasises the importance of building a sense of ownership by teachers (for motivation) and of having high-quality subject-specific facilitation (to ensure professional learning).

Overall, the findings suggest that careful design and preparation is needed for CoP leadership roles. Early evidence from this TLT study suggests that successful leadership roles and facilitation models need to be adapted to context, in terms of CoP maturity and the overall delivery model (such as school or cluster-based). In addition, successful leadership may look different, depending on whether they are general leadership roles or technical specialists. There is no 'one size fits all' to design effective CoPs at scale, but these preliminary findings from TLT shed light on some of the likely considerations.

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Annex 1 – Teachers' Demographic Information

Cluster-based CoPs, Kenya, GEC-T

435 teachers in 99 schools from eight areas in Kenya. 250 teachers from 14 CoPs. 185 control teachers.

Area

	Frequency	Percent
Kilifi	47	10.8
Kwale	52	12.0
Marsabit	29	6.7
Mombasa	89	20.5
Nairobi	126	29.0
Samburu	28	6.4
Tana River	34	7.8
Turkana	30	6.9

Age

	Frequency	Percent
Missing	12	2.8
18-25	59	13.6
26-35	160	36.8
36-45	109	25.1
46-55	74	17.0
56-65	21	4.8

School Type

	Frequency	Percent
Private	118	27.1
Public	317	72.9

Cluster

	Frequency	Percent
Babadogo	34	7.8
Bubisa	19	4.4
Galole East	20	4.6
Kamukunji	12	2.8
Kayole	7	1.6
Kibra 2	18	4.1
Likoni A	24	5.5
Lokorkor	21	4.8
Makadara	6	1.4
Mombasa3clusterD	12	2.8
Mombasacluster4	11	2.5
Mtwapa	27	6.2
Naimirimo 2	13	3.0
Ndavaya	26	6.0
Control	185	42.5

School Location

	Frequency	Percent
Rural	218	50.1
Urban	217	49.9

Teacher Gender

	Frequency	Percent
Missing	12	2.8
Female	174	40.0
Male	249	57.2

Subject

	Frequency	Percent
Missing	1	.2
English	205	47.1
Mathematics	229	52.6

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School-based CoPs, Rwanda, BLF

278 teachers in 97 schools from five provinces in Rwanda.

Province

	Frequency	Percent
East	57	20.5
Kigali city	14	5.0
North	59	21.2
South	46	16.5
West	102	36.7

Subject

	Frequency	Percent
English	132	47.5
Mathematics	146	52.5
Missing	0	0.0

School Location

	Frequency	Percent
Rural	266	95.7
Urban	12	4.3

Teacher Gender

	Frequency	Percent
Male	77	27.7
Female	185	66.5
Missing	16	5.8

Age

	Frequency	Percent
18-25	21	7.6
26-35	88	31.7
36-45	101	36.3
46-55	42	15.1
56-65	26	9.4
Missing	0	0.0

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Annex 2 – List of Collected Data and Source of Information

Survey Blocks	Measurement Tools	Main Measurement Domains/List of Variables
Background Characteristics		
Principal Information	Leadership Background Tool	Head teacher qualifications and demographic information, school statistics, other interventions implemented in targeted schools, geographic location of the schools
CoP features and teachers' perceptions of CoP effectiveness	CoP Survey Tool	Main domains: 1) CoP functionality, 2) External support and facilitation 3) CoP resources 4) Content and language 5) Teachers' perceptions of the effectiveness of CoP.
Teacher Characteristics		
Teacher Background Information	KAP survey	Teacher profile: demographics, subject, educational attainment level, prior training, experience
Teacher's Prior Knowledge, Attitude, Practices	KAP survey	Main domains: subject competence, teacher development, planning lessons, managing lessons, questioning pupils, developing and adapting resources, assessing pupils, inclusive practice, using ICT, understanding pupils, and support from school leadership and the community
Teacher Instructional Practice	TEACH Teaching Practice Tool	Total and sub-category score the following domains: 1) Instructional Support 2) Student Engagement 3) Emotional Support 4) Classroom Organization
Teacher Beliefs	Teacher Sense of Efficacy Scale (TSES)	Total and sub-category score the following domains: 1) Efficacy in Engagement 2) Efficacy in Instruction 3) Efficacy in Management