

TECHNICAL GUIDANCE NOTE

STRUCTURING AND SUPPORTING SCHOOL- AND CLUSTER-BASED CONTINUOUS PROFESSIONAL DEVELOPMENT



SUMMARY
SLIDES



COACH TOOLS
AND RESOURCES



© 2021 International Bank for Reconstruction and Development / The World Bank

1818 H Street NW, Washington, DC 20433

Telephone: 202-473-1000; Internet: www.worldbank.org

Some rights reserved.

This work is a product of the staff of The World Bank with external contributions. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent. The World Bank does not guarantee the accuracy of the information included in this work.

Nothing herein shall constitute or be considered to be a limitation upon or waiver of the privileges and immunities of The World Bank, all of which are specifically reserved.

Rights and Permissions



This work is available under the Creative Commons Attribution 4.0 International license (CC BY 4.0) <https://creativecommons.org/licenses/by/4.0/>, with the following mandatory and binding addition:

Any and all disputes arising under this License that cannot be settled amicably shall be submitted to mediation in accordance with the WIPO Mediation Rules in effect at the time the work was published. If the request for mediation is not resolved within forty-five (45) days of the request, either You or the Licensor may, pursuant to a notice of arbitration communicated by reasonable means to the other party refer the dispute to final and binding arbitration to be conducted in accordance with UNCITRAL Arbitration Rules as then in force. The arbitral tribunal shall consist of a sole arbitrator and the language of the proceedings shall be English unless otherwise agreed. The place of arbitration shall be where the Licensor has its headquarters. The arbitral proceedings shall be conducted remotely (e.g., via telephone conference or written submissions) whenever practicable, or held at the World Bank headquarters in Washington, DC.

Attribution – Please cite the work as follows: World Bank. 2021. Structuring and Supporting School- and Cluster-Based Continuous Professional Development: A Technical Guidance Note. Washington, DC: The World Bank. License: Creative Commons Attribution CC BY 4.0 IGO.

Translations – If you create a translation of this work, please add the following disclaimer along with the attribution: *This translation was not created by The World Bank and should not be considered an official World Bank translation. The World Bank shall not be liable for any content or error in this translation.*

Adaptations – If you create an adaptation of this work, please add the following disclaimer along with the attribution: *This is an adaptation of an original work by The World Bank. Views and opinions expressed in the adaptation are the sole responsibility of the author or authors of the adaptation and are not endorsed by The World Bank.*

Third-party content: The World Bank does not necessarily own each component of the content contained within the work. The World Bank therefore does not warrant that the use of any third party-owned individual component or part contained in the work will not infringe on the rights of those third parties. The risk of claims resulting from such infringement rests solely with you. If you wish to reuse a component of the work, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright owner. Examples of components can include, but are not limited to, tables, figures, or images.

All queries on rights and licenses should be addressed to Coach, The World Bank Group, 1818 H Street NW, Washington, DC 20433, USA; e-mail: coach@worldbank.org.

Cover and interior design: Karim Ezzat Khedr, Washington, DC, USA

CONTENTS

Acknowledgments.....	iv
Abbreviations.....	v
What Are School- and Cluster-Based Approaches to PD?.....	1
In Which Contexts Might School- and Cluster-Based Approaches Be Most Appropriate?.....	3
What Are the Key Decision Points When Considering How to Structure and Support School- and Cluster-Based PD?.....	4
a. How To Group?.....	4
b. How Often To meet?.....	5
c. Who Facilitates?.....	6
d. How To Support?.....	7
e. How To Decide Content?.....	9
For Further Consideration.....	10
Appendix A: Key Questions and Supporting Level of Evidence.....	11
Appendix B: Key Characteristics of Referenced Programs That Provide School- or Cluster-Based Training.....	12
References.....	15

Acknowledgments

The *Structuring and Supporting School- and Cluster-Based Continuous Professional Development* guidance package was led by Elaine Ding and Aishwarya Khurana, and benefits from the input of Maryam Akmal, Jayanti Bhatia, Ana Teresa del Toro, Aline Hankey, Ezequiel Molina, Adelle Pushparatnam, Manal Quota, and Tracy Wilichowski. Numerous colleagues provided insightful comments, feedback, and inputs on the package. These colleagues include Andy Ragatz and Ellen Whitesides Kalisz.

This package is part of a series of products by the *Coach* Team. Overall guidance for the development and preparation of the package was provided by Omar Arias, Practice Manager for the Global Knowledge and Innovation Team.

The package was designed by Karim Ezzat Khedr. Alicia Hetzner was the chief copy editor. Medhanit Solomon and Patrick Biribonwa provided administrative support.

Abbreviations

CBMP	cluster-based mentoring programme
CoP	community of practice
DRT	district resource teacher
FCV	fragile, conflict, and violence
HIC	high-income country
IIEP	International Institute for Educational Planning (UNESCO)
LMIC	low- and middle-income countries
MoE	Ministry of Education
MT	master trainer
OECD	Organisation for Economic Co-operation and Development
PD	professional development
RLL	Read-Learn-Lead
ToT	teacher trainers
TPD	teacher professional development
USAID	United States Agency for International Development
YEGRA	Yemen Early Grade Reading Assessment

The objective of this Guidance Note is to outline best practices to structure and support school- and cluster-based continuous professional development (PD). Although research on how to best design, deliver, and sustain school- and cluster-based PD programming has been limited, this Guidance Note aims to capture emerging lessons from the growing global evidence base. An overview of relevant programs and examples of implementation is detailed in brief in appendix B.

What Are School- and Cluster-Based Approaches to PD?

School- and cluster-based approaches to professional development (PD) are in-service continuous teacher professional programs. These programs are characterized by groups of teachers working together to improve their practice within a single school, across clusters of several schools, or in combinations of the two (Leu 2004; Mphahlele 2012). Common participants in school- and cluster-based PD include teachers, principals, and other pedagogical leaders.¹ School- and cluster-based training tends to be highly participatory and offers teachers an opportunity to learn within settings similar to their own school or classroom environments. SCB training frequently is carried out and facilitated by teachers themselves or by an externally appointed facilitator. Training sessions also tend to be supported with centrally developed² (at a subnational or national level) materials that provide guidance for the training sessions (Leu 2004).

School- and cluster-based approaches to PD offer an effective, participatory, and responsive alternative to the traditional cascade model. (McNeil 2004). The traditional cascade model of PD typically trains selected teachers from a predefined unit of geography at a central location, often taking place within conference or university settings with materials and resources that may vary from teachers' own classroom or school environment. After the training, these teachers are redeployed to their settings to train other teachers. This spillover often repeats over many levels until all teachers have received some level of training. Cascade training often can reach many teachers within a short time and at low cost (Gilpin 1997). However, research and implementation experience has shown that the model may be less cost efficient in the long term due to limitations in effectiveness, particularly in supporting untrained or under-trained teachers (Orr and others 2013). Other related weaknesses of cascade training are that it:

- 1. Is heavily predicated on the assumption** that the participants who attend the central trainings can, at the end of the training, train others in what they learned in a high-quality, high-fidelity way. This assumption rarely becomes reality (Hayes 2000; Dichaba and Mokhele 2012). The assumption relies on participants to translate trainings back to their own contexts with potentially less-available and lower-quality resources than in the training environment.
- 2. Concentrates expertise at the top among a small group of senior-level experts. This concentration often results in centralized, large-scale trainings that provide teachers with abstract information rather than concrete, practical strategies** (Hayes 2000; Boyle, Lamprianou, and Boyle 2005). As a result, these trainings offer content with little transferability to the classroom, encourage passive learning, and rarely change teachers' classroom practices (Hardman and others 2011; Orr and others 2013; Villegas-Reimers and Reimers 1996).
- 3. Can present severe logistical challenges related to convening a large group of teachers at central, regional, and subregional levels.** Any number of factors can contribute to these logistical challenges, ranging from low implementation capacity to countries with regions of instability or conflict.

Unlike traditional cascade structures, when done well, school- and cluster-based training offers PD opportunities that are naturally continuous and collaborative. In these training opportunities, teachers can meet regularly to focus on practical skills tailored to their needs. Drawing from the evidence of what works in teacher PD to improve student learning (Darling-Hammond, Hyler, and Gardner 2017; Kraft, Blazar, and Hogan 2018; Popova, Evans, and Arancibia 2016), effective teacher PD centers on four main principles: tailored, ongoing, practical, and focused. Table 1 describes key characteristics of school- and cluster-based training and highlights their alignment with evidence of effective teacher PD:

1. In this note, a pedagogical leader refers to any individual who provides ongoing support to teachers. Most commonly, this role is filled by a coach. However, individuals such as specially trained master teachers, researchers, school support officers, or inspectors also can play the role of pedagogical leaders (Darling-Hammond, Hyler, and Gardner 2017).

2. Centrally developed and/or structured resources may be appropriate in some, but not all, contexts depending on setting, familiarity with cluster- or school-based approaches, and the extent to which local capacity is in place.

Table 1. School- and Cluster-Based Training and Alignment with Evidence of Effective Teacher PD

Key Characteristics of School- and Cluster-Based PD	Alignment with Evidence of Effective Teacher PD
School- and cluster-based training aligns naturally with the principles of tailored and ongoing PD.	
<p>Tailored: School- and cluster-based training provides a natural opportunity for teachers to engage in reflective thought and reactive problem-solving on the real issues that they face day to day. This training model also enhances teachers’ autonomy to propose (and co-create) PD targeted to their needs.</p>	<p>Effective teaching should include adjusting to students’ learning needs. Similarly, effective PD should target the areas for which teachers need the most support. PD models associated with gains in student learning often are characterized by providing dedicated time for teachers to receive input on their practice and to reflect on that feedback (Darling-Hammond, Hyler, and Gardner 2017). Such activities frequently are found in one-to-one (1-1) coaching sessions (Allen and others 2015; Powell and others 2010); in school- and cluster-based environments facilitated by a trainer (Johnson and Fargo 2010; Lara-Alecio and others 2012); or among teachers themselves (Gallagher, Woodworth, and Arshan 2017; Johnson and Fargo 2010).</p>
<p>Ongoing: School- and cluster-based PD is continuous. It involves structured training sessions that teachers attend weekly, biweekly, or monthly to work together to improve instruction.</p>	<p>Teacher PD programs yield the best results when they are long-term and sustained, as opposed to “one-shot” workshops (Cohen and Hill 2001; Desimone 2009). Encouraging teachers to return to school- and cluster-based PD settings over time enables teachers to refine and apply their understanding of the material in their classrooms between sessions. Promoting sustained learning over time--within and between sessions--leads to many more hours of learning than is indicated by “seat time” alone (Darling-Hammond, Hyler, and Gardner 2017).</p>
To be effective, school- and cluster-based PD needs to be practical and focused . School- and cluster-based approaches provide opportune venues for these principles.	
<p>Practical: When done well, school- and cluster-based trainings center on providing practical guidance on content-specific classroom instruction. School and cluster settings should be venues for teachers to simulate real issues that come up in class, revise planned instruction/activities based on others’ feedback, design lessons together, and use collective data to target student instruction.</p>	<p>Situating the content of PD in teachers’ specific everyday instructional needs makes it more likely that teachers will modify their teaching habits (Lemov, Woolway, and Yezzi 2018). Opportunities that enable the hands-on application of pedagogical knowledge, such as modelling new practices or reflecting on new strategies, are important for uptake (Garet and others 2001; Penuel and others 2007; Saxe, Gearhart, and Nasir 2001). Hands-on, active learning strategies that enable teachers to transform their teaching (and not simply layer new strategies on top of the old) are hallmarks of adult learning theory (Trotter 2006; Darling-Hammond, Hyler, and Gardner 2017).</p>
<p>Focused: School- and cluster-based trainings should be focused on small, concrete tasks linked to teachers’ everyday practices. This focus is greatly facilitated by the provision of structured materials, where appropriate, such as teacher’s guides or a common schedule developed at a central or district level (Leu 2004; Schweisfurth 2013).</p> <p>Note: Structured resources offer a valuable support in some, but not all, contexts. The need for structured resources may depend on setting, existing local education capacity, and familiarity with the implemented training approach.</p>	<p>Teacher PD, particularly in-service PD, needs to be selective and strategic (Garet and others 2016; Desimone 2009; Powell and others 2010). Trying to cover too wide a range of skills is less likely to result in meaningful change in any teaching practice because there would not be enough time and resources to improve each skill (Lemov, Woolway, and Yezzi 2018).</p>
School- and cluster-based PD has the added benefit of being collaborative , which is associated with improved teaching and learning.	
<p>Collaborative: The school- and cluster-based PD format lends itself to cultivating collaborative relationships among teachers. Ideally, school- and cluster-based PD activities serve both as a venue to provide teacher training and a</p>	<p>High-quality PD provides opportunities for teachers to share ideas and collaborate in their learning, often in job-embedded contexts. Collaborative PD environments enable teachers to learn continuously from one another, share their visions,</p>

place in which teachers can observe one another and provide ongoing feedback on instructional practices.

plan, and critically examine what in their day-to-day practice enhances student learning. Collaborative school-based PD sessions can lead to changes in culture and instruction at the school level that transcend individual classrooms (Buczynski and Hansen 2010; Louis, Marks, and Kruse 1996). These environments can bring about national improvements in teaching and learning (Buczynski and Hansen 2010; Doppelt and others 2009; Lara-Alecio and others 2012).

In Which Contexts Might School- and Cluster-Based Approaches Be Most Appropriate?

School- and cluster-based PD is most appropriate and provides significant advantages in contexts in which:

- **Logistical issues make mass trainings more difficult.** School- and cluster-based PD can ameliorate logistical challenges posed by cascade training approaches. For example, school- and cluster-based PD can reduce necessary transportation costs (due to bringing together an audience of participants for an extended period) and can provide an alternative to getting a coach into every classroom to provide one-on-one tailored feedback on teaching practices. However, school- and cluster-based PD approaches are not cost free. Particularly, cluster-based PD requires a budget for coordination and logistics and for teachers to travel and meet (box 1).
- **Reforms or changes to education policy or curricula occur frequently.** School- and cluster-based approaches provide an effective forum for the practical exchange of information and practices on new educational reforms (Johnson 2019). Implementation experience has shown that teachers welcome information on how to understand and implement education reforms for which they have little practical preparation or available models. In addition to rolling out new education reforms, school- and cluster-based teacher PD can be leveraged as a venue to transmit appropriate and updated information during emergencies and crises, such as during the COVID-19 pandemic. School- and cluster-based PD may offer an approach to bridge professional development gaps by offering a forum for teacher feedback, innovative approaches to classroom management, and supports to digital learning and technology training at the local level.
- **In contexts in which it is not yet possible to get a coach into every classroom to observe a teacher.** 1-to-1 coaching is generally accepted to be one of the most effective in-service PD methods (Darling-Hammond, Hyler, and Gardner 2017; Kraft and Blazer 2017). Because school- and cluster-based PD is the fullest expression of the afore-mentioned principles of effective teacher PD, it can serve as an intermittent investment. These approaches lend themselves to continuous, collaborative, practical, focused, and tailored PD that enables countries to move gradually toward one-on-one coaching models.
- **It is important to note that school- and cluster-based approaches can exist in parallel with conventional cascade models and complement them.** Cascade trainings are not inherently ineffective in all contexts. Specifically, cascade training's most characteristic deficiencies are the concentration of expertise at the topmost levels combined with a heavily transmissive mode of training at all levels (Hayes 2000).

Positive instances of cascade training exist. Some remedy both deficiencies by borrowing characteristics from school- and cluster-based training. Examples could be decentralizing responsibilities and providing additional opportunities for teachers teaching similar subjects/grades to reflect on the relevance of training to their local contexts (see Rizvi and Nagy 2016 on Pakistan; Herriot and others 2002 on Kenya). Well-designed cascade approaches can be especially helpful (or even kick start) PD programs that need to quickly train numerous teachers with introductory content, which then can be reinforced and deepened through school- and cluster-based continuous PD. In these ways, school- and cluster-based approaches are versatile—even modular—so can provide complementary support to other teacher PD models.

BOX 1. Pros and Cons between Cluster-Based and School-Based Continuous PD

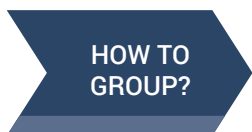
For some education systems, deciding between cluster-based and school-based models can be an important consideration. Cluster-level continuous PD involves relatively high coordination and logistical costs to ensure that teachers have a location and the budget to meet. For example, continuous PD could entail paying teachers for this travel, allocating time for teachers to travel and meet in clusters, or sometimes paying a stipend to the school that regularly hosts cluster meetings. Nevertheless, cluster-level PD can offer an energizing environment for teachers to group in grade- or subject-level clusters outside of their normal school environments to find solutions to common problems.

School-level models of continuous PD are a less expensive approach due to fewer coordination and logistical costs. School-level models can create a positive and collaborative school environment in which to try new pedagogical approaches. However, school-level models can be less effective when there are few teachers of the same grade or subject per school. Moreover, without sufficient support at the school level, meetings can lose focus or reinforce less effective habits and misconceptions.

Source: Adapted from Ralaingita 2021.

What Are the Key Decision Points When Considering How to Structure and Support School- and Cluster-Based PD?

Decisions on how to structure and support school- and cluster-based continuous PD typically involve the five key decision points. This Note will elaborate on key principles for each of these five decisions.



a. Focus first on identifying the best way to group teachers.

Clusters are groups of schools that are geographically close and accessible to one another (Leu 2004; Mendelsohn and Ward 2001; Mphahlele 2012). In forming clusters, geographic location should be the first determinant. Generally, each cluster consists of 3 to 7 schools—including 1 school in each group that serves as the “Cluster Center.”

Geographically, a cluster center is not necessarily equidistant from all its satellite schools, although it should be easily accessible to them. The decision on defining a cluster center prioritizes identifying a school that has more exemplary practices over a school that is geographically at the center. Cluster centers are most effective when they exhibit positive structural and process characteristics, such as being relatively well equipped for inclusive classroom practices, with good leadership, management, and/or teaching (Mendelsohn and Ward 2001).

Some contexts may lack an exemplar school. In such contexts, consider directing resources toward creating an exemplar school that can act as a cluster center. In creating this exemplar school, increased investments can support pedagogical leadership and administrative tasks that benefit other satellite schools in the cluster.

Within clusters and schools, groups of teachers typically are formed by grade level or subject area. Ideally, teachers are grouped with others who share common goals, use similar instructional strategies, and may experience similar challenges.

- **Typically, grade-level groupings are suitable among elementary school teachers** (Gallimore and others 2009).
- **At the secondary level, school- and cluster-based efforts are most successful when teachers are organized in subject-area teams, such as seventh-grade mathematics or eighth-grade biology.** When such teams are not possible, grouping secondary school teachers by subject with a sub-grouping across grade levels is common (for example, mathematics teachers, grades 6-8).

Depending on the activity, school- and cluster-based approaches can benefit from starting with, or involving occasional, whole group activities that later break into either grade or subject/content-area groups. Conditions for flexible grouping have great utility in that they can avoid the restrictive nature of grouping teachers by grade or subject area (Johnson 2019). In situations in which teachers are teaching different subjects (such as mother tongue and a second language) but are addressing similar content (such as letter writing, reading comprehension), trainers/mentors can use flexible groupings. Such groupings can help teachers make better connections across curriculum and content areas.

HOW OFTEN TO MEET?

b. Next, focus on identifying the frequency of meeting.

PD efforts yield best results when they are continuous and engage teachers in 30 to 100 hours of learning over 6 to 12 months (Yoon and others 2007). Time is found to be a crucial factor to the success of school- and cluster-based training. Receiving well-designed PD for an average of 49 hours spread over 6 to 12 months can increase student achievement by 21 percentile points (Yoon and others 2007). In comparison, one-shot, “spray-and-pray” workshops lasting 14 hours or less show no statistically significant effect on student learning (Wei and others 2009).

Interactions among teachers can occur through a combination of school- and cluster-based meetings. There is no consensus on the frequency of these meetings across settings. However, school-based meetings tend to range from a few times during a school year to weekly meetings and can be combined with frequent cluster meetings once every few weeks or month (Leu 2004). Technology can be used strategically to facilitate communication in between meetings.

- **School-level meetings organized weekly or bi-weekly** enable purposeful reflection on a teacher’s classroom practices and enable the follow-up to happen soon after, usually within the next session.
- **Cluster-level meetings organized monthly (and/or held at least three times per term)** enable sufficient time for planning, strategizing, and evaluating different aspects of teaching at a cluster level (Jacobs 2015).

Technology such as WhatsApp, text messaging, or Google Groups can be used strategically to facilitate communication and sharing between group meetings. Alongside text exchanges, teachers can use virtual platforms to share video lessons and discuss specific pedagogical strategies. Technology use must be considered thoughtfully and clear guidance be laid out for teachers. For example, Kenya’s School-Based Teacher Support Initiative lays out clear guidance and recommendations for virtual peer learning platforms. The program requires all teacher clusters to form a WhatsApp group forum to share information. Teachers also are required to set group rules and identify ways to manage information sharing on the platform. Facilitators are tasked with overseeing and moderating interactions on virtual platforms. The program’s teacher’s manual includes a specific activity and time allocation to set up a WhatsApp group and to generate group rules to manage the WhatsApp platform. The manual also provides step-by-step instructions on how to share files and audiovisual content on WhatsApp, Google Groups, and YouTube. Yet, technology is not a wholesale replacement for in-person school- and cluster-based continuous PD. When possible, it is integral to begin with in-person elements to build rapport before introducing a virtual communications model.

Ensure that time to attend school- and cluster-based training is formally included in teachers' schedules (Villegas-Reimers and Reimers 1996; Hennessy, Haßler, and Hofmann 2015). As often as possible, school-based trainings should occur during school hours, such as during mutual planning periods. Moreover, implementation experiences have shown that efforts to include school principals and leaders in school- and cluster-based trainings can increase the likelihood that teachers will obtain dedicated time in their schedules to participate in PD activities (section 4).

Limited evidence also points to the possibility--indeed the potential--for school- and cluster-based approaches to deliver effective PD to rural areas and areas experiencing fragility, conflict, and violence (FCV). For rural schools, teachers could receive highly focused school-based facilitation and directed resources but less frequently. For example:

- In Lesotho, District Resource Teachers (DRTs) were established to reach teachers in isolated mountainous areas (Mulkeen 2009). **DRTs visited schools 4 times per year for 2 to 3 days each trip**, helping teachers via individual consultations and group workshops for clusters, giving demonstration lessons, and supporting teachers with difficulties. The program has improved student achievement and has proved sustainable over time (Mulkeen 2009).
- A similar arrangement was made in Yemen, in which trainers travelled to teachers in particularly mountainous or remote areas. **The trainers provided the teachers with 10 consecutive days of training followed by 4 consecutive days of supervision and support** in the classroom (Creative Associates 2015).

School- and cluster-based approaches also can effectively deliver PD opportunities in schools that operate in FCV contexts or that use double-shifting. For example:

- In Yemen, **in which schools used double-shifting, teachers were required to attend trainings at the cluster school either before or after their morning or afternoon shift** (Creative Associates 2015). This structure was strongly preferred by school directors and teachers, who had expressed disapproval of the Ministry of Education's previous approach, which involved taking teachers out of the classroom for multiple full-day sessions.
- **In addition, the school- and cluster-based model provides a more viable alternative for female teachers.** In the past, female teachers were deterred by their and others' hesitations from attending multi-day trainings far away in fragile or active conflict zones. The program markedly increased the participation of female teachers in PD in Yemen (Creative Associates 2015).

WHO FACILITATES?

c. Identify the ideal profile of an individual who leads/facilitates the set groupings.

At the cluster level, the proper selection of trained and qualified facilitators is critical to sustain the PD program.

Depending on the scale of the program, multiple profiles of individuals/groups should be appointed to support the school- and cluster-based PD model. Explicit roles and expectations for each profile of individuals help to formalize a transparent selection and appointment process (box 2). Formalized roles at the outset also facilitate the official and explicit designation of time within an individual's schedule to carry out her/his responsibilities.

- At state- or province-level, a **coordinator** should be appointed to oversee all the zones within the state. The coordinator plays a largely administrative and monitoring role. The coordinator will be responsible for the programmatic tasks such as setting training content, appointing zonal facilitators, and organizing regular trainings and interactions among zonal facilitators.
- Within each state/province, a **zonal facilitator** can be appointed to disseminate the content prepared at state/central level, organize trainings for cluster-level coordinators/facilitators, ensure that each cluster has the required resources, and provide opportunities for regular interactions among the clusters and cluster coordinators for the standardized roll-out of training. Similar to the coordinator, the zonal facilitator plays an administrative and monitoring role.

- A **cluster facilitator** should be appointed to oversee activities at the cluster level. These facilitators can be a head teacher, a supervisor of the school (typically the cluster center), or an exemplary teacher. Facilitators who are education practitioners, as opposed to researchers or government officials, are more effective (Popova, Evans, and Arancibia 2016). Depending on the context, the decision on the individual who supports these sessions can range from entirely ad hoc to highly systematic. In Ethiopia, for example, who selects cluster-level facilitators (known as “key teachers”) depends on the cluster. At times, the key teachers are selected by principals and, at other times, by other teachers. In a different model, teachers may be required to pass through a number of “levels” in their PD. They must meet a set of requirements before they are designated master teachers. In contrast to the coordinator and zonal facilitator, the cluster facilitator plays a largely pedagogical support role.
- **Individual school-based sessions also will require a facilitator.** School-level facilitators can range from being peer teachers to school principals. Ideally, they will have received specific training to facilitate peer trainings at the school level, although this training is not necessary (see section d. on supporting materials). In fact, peer-facilitators can be particularly effective in this context because they are simultaneously executing the same lesson plans as everyone in the group (Gallimore and others 2009). Appointing a peer-facilitator also “... frees up coaches and content experts to play a knowledgeable resource role” (Gallimore and others 2009). The coaches and content experts can support these school-level meetings but are not necessarily responsible for leading these meetings week to week. Similar to the cluster facilitator, the school-level facilitator plays a largely pedagogical support role.

BOX 2. Transparency of Trainer Selection: The Case of Yemen

In Yemen (and other places around the world), it is common for education officials to favor colleagues, friends, or even relatives when appointing trainers, facilitators, or teachers. Typically, monetary benefits are the main motive (for example, per diems for these individuals to attend training or to take on their roles). In the lead-up to its school- and cluster-based teacher PD, the Ministry of Education (MoE) and its development partners instituted multiple key strategies to combat political capture:

1. A selection committee was set up at the central MoE level to oversee the evaluation and selection of Master Trainers and Teacher Trainers.
2. Selection criteria for these positions were outlined and publicized in a MoE decree.
3. All nominees to the position were subject to a rigorous post-training performance evaluation, which included a written test, interview, and demonstration of training skills. Using a score rubric determined by the central selection committee, the top percentile was selected to serve as master trainers; and the median percentile was selected for the teacher trainer role. Points also were given for level of education and expertise and could be added to nominees’ profiles for review. Participants not meeting requirements were not enabled to serve in these posts.

Source: Creative Associates 2015.

HOW TO SUPPORT?

d. Focus on developing quality training and support for facilitators in their roles.

A set of key principles address how to effectively train and support facilitators (at both cluster and school levels) in their roles:

- **Ideally, facilitators (at both cluster and school levels) receive dedicated training on the content of the sessions that they are meant to facilitate and on the facilitation strategies.** For example, in Indonesia, two facilitators in each cluster are formally trained on how to run cluster sessions and on the session content.

- **Facilitators should be given structured materials that help to support high-quality, self-paced school-level meetings** (box 3). High-quality supporting materials are universally useful. However, in the absence of formal training opportunities for peer-facilitators, these materials are particularly important to support them. For example, the materials provide peer-facilitators with a range of high quality and scripted resources created at the central or provincial level. Examples include an overview of topics to be covered in school-based meetings, a structured facilitator’s guide for each session, how to troubleshoot common teacher concerns, and supplementary reading materials for teachers. Structured and/or scripted resources may be appropriate in some, but not all, contexts depending on setting, familiarity with training approaches, and the extent to which local capacity is in place to support individual teacher development.
- **It is essential to start by identifying the necessary behavioral shifts and working backward to build structured materials that can support these shifts.** For example, for teachers who are not accustomed to “practicing” their teaching, systems need to generate the material to guide and reinforce the enactment of that behavior. Box 3 shows how Namibia created support materials to divide reflective thinking into its composite steps through key questions and explicit prompts.
- **Ensuring participation and parallel training of school leaders (including head teachers, administrators, and supervisors) can their increase buy-in of school- and cluster-based PD and improve school-based supports to teachers.** Implementation experience has found that participation of school leaders can increase the likelihood of teachers getting dedicated time in their schedules to participate in PD activities. Evidence from a school- and cluster-based approach in Papua New Guinea showed that, without the support from a head teacher, teachers tended to lack the confidence to reflect on their performance or to be critical of existing practices and seek improvements (AUSAid 2006). The same study found that the success of teachers engaging in school- and cluster-based continuous PD depends heavily on the role of the head teacher. Regular participation by school leaders also will equip them with the same knowledge and skills that the teachers are developing through in-service programs so will enable the leaders to provide guidance and additional support to teachers in their day-to-day classroom teaching.
- **In cases in which school- and cluster-based teacher professional development (TPD) is implemented as part of an externally funded project, dedicated sustainability efforts should be made to ensure that trainers, facilitators, coordinators, and others have the capability to support continuous TPD efforts after program funding ends.** In South Sudan, the school- and cluster-based intervention introduced “sustainability of intervention” workshops for county and payams (an administrative level below the county) education administrators (Winrock International 2016). These workshops included both centralized workshops and field visits accompanied by program staff to upskill and train local stakeholders in administrative capacity.

Box 3. Developing Teachers’ Reflective Skills through Providing Structured Support Materials

The Case of Namibia:

In Namibia, evidence collected from the implementation of a small-scale in-service teacher PD study suggests that teachers who had never used reflective strategies for their own PD could develop reflective skills when they are provided with appropriately structured prompts and supporting materials. The Namibia in-service teacher PD program took place over 3 years and involved training cycles for 5 to 7 teachers. The content comprised trainer-led workshops, support visits in schools, classroom observations, and school-based meetings. Workshops and school visits all employed a reflective approach, which required teachers to freely reflect on their own teaching and participate in groupwork to brainstorm training strategies.

The first few rounds of training employed a free-form, reflective approach, which was found to be largely ineffective in yielding changes in teacher practice. The authors attributed this failure to the fact that teachers had not been “sufficiently empowered to reflect.” The teacher were used to operating in a culture that had “not encouraged them to ask questions publicly, to criticize, or to develop and express their own ideas.” Key changes then were made to the program design to provide a more structured approach to reflective practices among teachers. These changes included:

- **Explicit and heightened use of structured reflection questions** such as “why” and “how.” For example, “Why did you think your technique was useful? How was it useful?”
- **Development and use of structured observation forms** that teachers were required to complete while observing video lessons or **micro-teaching^a** lessons by other teachers. These materials prompted teachers to answer specific questions and look out for certain activities. These focused materials were more effective in prompting reflection from teachers than giving notepads to teachers to record their free-form reflections to an observed lesson.
- **Provision of ample opportunities for teachers to practice reflective methods** familiarized them with the approach and expectations over time.

A comparison of data from lesson observations and learner assessment data collected at the beginning and end of the highly structured training approach indicated significant improvement in teachers’ classroom performance and learners’ English skills. Results from this study suggest important implications for policymakers. They show that reflective approaches to training as conceptualized in literature from developed countries are not always immediately transferable to developing country contexts. However, specific methods, such as structured reflection, reinforcement, and observation, can be effective in developing teachers’ capability to reflect, even those who were unaccustomed to reflective approaches.

Source: O’Sullivan 2002.

Note:

a. “**Micro-teaching** is a teacher training and faculty development technique by which the teacher reviews a recording of a teaching session to get constructive feedback from peers and/or students about what has worked and what improvements can be made to [her/his] teaching technique.”

HOW TO DECIDE CONTENT?

e. Develop effective content for teachers in school- and cluster-based training.

Training needs to be tightly aligned to the needs of the teachers. Having a mechanism to diagnose existing skills and behaviors—either at the level of the individual teacher or among teachers throughout the system—can provide valuable information on which type of content can be most effective for teachers. For example, general pedagogical skills training is highly practical for all teachers, at all grade-levels, and for all subjects because it focuses on the everyday practices required in teaching. Training specific to pedagogical content knowledge can be developed if diagnostics show that instruction and assessment specific to certain content areas tend to be the areas of weakness for most teachers. To strike a balance between having an overarching agenda for training and being able to respond to day-to-day issues, countries should consider developing mechanisms that feed information on the needs and requests of teachers to the central educational agency.

When deciding on training content, it is crucial for those responsible to consider the right balance (for the context in which the program is being implemented) between anchoring training in an overarching framework and addressing the needs of teachers at the local level. There is benefit to have content that is more organic and meets local needs, but such content needs to be balanced with a clear vision of the training content and sequence. For example, in settings in which cluster- or school-based approaches are relatively new or local capacity is low, the government or central educational agency should designate specific guidelines for training content, supported by highly structured supplementary materials.

In the initial rollout of school- and cluster-based PD, most low- and middle-income country (LMIC) contexts should use highly structured and centrally developed material. However, as teachers’ skills gradually advance, the aim should be to introduce more reflective and organic activities in PD. For example, given their size and the grouping

of other teachers of similar grades or subjects, school- and cluster-based settings are ripe for activity-based content. Examples of activities that can take place in these meetings include teacher inquiry groups and microteaching (Allen 1967) or lesson study. One caveat is that the evidence base for the efficacy of these methods in LMICs is limited (appendix A). Nevertheless, the evidence base is included here as examples of activities that can be introduced gradually and opportunistically into school- and cluster-based PD:

- **Teacher inquiry groups.** Small inquiry groups of teachers usually are formed based on subject or content area and are led by a peer-facilitator to address a common academic problem. Together, over weeks, teachers set and share an explicit goal for student learning and jointly discuss and plan instruction to address it.
- **Microteaching or lesson study.** At the school level, microteaching or lesson study involves creating a sequence of lesson plans lasting 4 to 5 weeks around a theme that may be content specific or general (this theme can be set at the central level or by teachers). Microteaching provides teachers, usually collaborating in small groups, an opportunity to experiment, observe, and improve. Teachers work with one another to discuss learning goals, plan classroom lessons, observe how their lesson plans and ideas work in a classroom setting, and report the results and observations so that other teachers can benefit from their collaborations (Lewis 2016). Microteaching also can lead to the creation of a community of practice wherein teachers practice implementation of lesson plans in their group before delivering the lessons plans in the classroom. This group “rehearsal” leads to better preparation and implementation because it ensures real-time feedback and scope for teachers to revisit their instruction strategies.
- **Communities of practice (CoP).** School-based sessions and activities sometimes can lead to the creation of additional CoPs. At the school or cluster level, teachers can form a group (based on either grade or subject) to reiterate and implement the key takeaways from cluster meetings, discuss their teaching practices, resolve the issues faced, and reflect together to improve classroom teaching (Ralaingita 2021). Often led by the school head or an expert teacher, these additional CoPs are more informal and focus on more loosely organized content to resolve individual teacher issues and address day-to-day challenges (pedagogical, classroom/school related, and others).

For Further Consideration

School- and cluster-based teacher PD offers many benefits. However, three points should be kept in mind by those who design these PD programs:

- a. **School-based teacher PD alone can be self limiting.** According to the Organisation for Economic Cooperation and Development (OECD), when conducted in isolation, school-based PD is prone to “...becoming introspective and replicating weaknesses that already exist in the school as an organization” (1998). Hence, following a mixed approach of both on- and off-site activities and self-development (at school level) with external assistance (through cluster-level engagement) is more effective and is the common feature of high-performing education globally.
- b. **In many developing countries, incorporating reflective approaches in teaching can be challenging.** The shift toward reflective teaching sometimes makes assumptions about teachers’ professional autonomy, their possession of appropriate tools for reflection, and their own situational views of knowledge (O’Sullivan 2002). Evidence from Namibia indicates that reflective skills can be developed among teachers who never had been exposed to using reflection to develop their teaching skills (O’Sullivan 2002). The Namibia experiences show that reflection or practice can be an appropriate tool, but it needs to be structured and guided in culturally appropriate ways.
- c. **Evidence on how to best design, deliver, and sustain school- and cluster-based PD programs is limited.** Most of the evidence from this Note draws on implementation experience documented from either in-person interviews or project documents. School- and cluster-based PD holds great promise as an approach for continuous, practical, tailored, and focused PD to be delivered directly to teachers. In the face of ever-increasing fragile contexts, the necessity for continuous PD will grow.
- d. **Future research should consider continuous PD as an emergent and pertinent theme for focused, empirical examination.**

Appendix A. Key Questions and Supporting Level of Evidence

Table A1. Key Questions and Supporting Level of Evidence

Key Question	Summary of Evidence	Degree of Confidence Based on Evidence
1. Who should be trained together?	Teachers who share a common grade level or subject.	(3) Conceptual model provided by Huberman 1995. Tied to evidence under Q7 but does not have direct positive relationship with student outcomes. See Popova, Evans, and Arancibia 2016. ^a
2. For how long should teachers receive training?	Thirty to 100 hours of learning over 6 to 12 months.	(5) Well documented in literature from high-income countries (HICs). For examples, see Carpenter and others 1989; McGill-Franzen and others 1999.
3. How frequently should teachers meet in their schools or cluster groups?	School-level meetings: Weekly or bi-weekly.	(3) Research evidence points to the importance of “sustained and intense” continuous PD to impact student learning (Cohen and Hill 2001; Garet and others 2001; Weiss and Pasley 2006). The guidance provided draws from this research evidence and implementation experience.
	Cluster-level meetings: Monthly (and/or held at least three times per term).	
4. Who should give the training?	Effective trainings tend to be conducted by education practitioners (such as primary or secondary teachers).	(5) Well documented in research from varying contexts. For examples from LMICs, see Abeberese, Kumler, and Linden 2014; Bando and Li 2014; Beuermann and others 2013.
5. What should be the content/focus of school- and cluster-based training?	Content and focus of should align with the needs of teachers, schools, and systems. Training on general pedagogical skills and on pedagogical content knowledge lends itself to being practical and focused.	(5) Well documented in research from varying contexts. See Campbell and Malkus 2011; Powell and others 2010; Cilliers and others 2019.
	Deliberate practice with other teachers.	(5) Well documented in research from varying contexts. For LMIC examples, see Piper and Korda 2011; Spratt, King, and Bulat 2013.
	Use semistructured and structured materials and prompts.	(1) For qualitative evidence, see O’Sullivan 2002 study on Namibia.
6. Additional modalities/techniques for training: Lesson Study or Microteaching (Allen 1967).	At school level, microteaching or lesson study involves creating a sequence of lesson plans lasting 4 to 5 weeks around a theme that may be content-specific or general. (This theme can be set at a central level or by teachers themselves.)	(2) Well documented in qualitative literature from HICs. See Fernández, Cannon, and Choksi 2003; Lee 2008; Puchner and Taylor 2006.
7. Additional modalities/techniques for training: Teacher inquiry groups.	Teacher inquiry groups share an explicit goal for student learning and jointly discuss and plan instruction to address the goal over multiple weeks.	(2) Well documented in qualitative literature from HICs. See Clausen, Aquino, and Wideman 2009; Crockett 2002; Rueda and Monzó 2002.

Note:

a. Degree of confidence is designated at: 5 – Evidence of direct positive impact obtained from at least one well-designed RCT from an LMIC or at least three well-designed RCTs from any context; 4 – Evidence obtained from at least one well-designed controlled trial (that is, quasi-experimental), evidence from one well-designed case-control or cohort study; 3 – Evidence of indirect positive impact obtained from at least one well-designed RCT from an LMIC or evidence obtained from at least three well-designed RCTs from any context; 2 – Evidence from a number of descriptive or qualitative studies, from any context; 1 – Evidence from a single descriptive or qualitative study or from expert interviews with practitioners only, from any context.

Appendix B. Key Characteristics of Referenced Programs That Provide School- or Cluster-Based Training

Table B1. Key Characteristics of Referenced Programs That Provide School- or Cluster-Based Training

Program	At-Scale?	School, Cluster, or Both?	Frequency of Meetings	Facilitator Selection and Profile	Impact on Teaching Behaviors	Impact on Student Learning Outcomes
Pakistan Cluster-Based Mentoring Programme (CBMP)	No (implemented in 4 of 23 districts)	Both	Forty-eight workshops were organized in 1 year; weekly workshops were followed by classroom observation.	Mentors were selected from among experienced elementary school teachers. Only teachers who demonstrated flexibility, empathy, and willingness to nurture another person reached the final selection.	CBMP was found to have a significant positive impact on teaching practice. Teachers from intervention districts were observed to consistently employ more classroom discussion, cooperative learning, and inquiry-based methods. These teachers also used more effective pedagogical techniques, such as making a clear statement of purpose, presenting topics in a logical sequence, and responding to problems raised during the lesson. Teachers in intervention districts more consistently asked higher order questions and asked students to give examples to demonstrate understanding.	As a result of the intervention, students were observed to more actively help one another in their studies, listen to one another's ideas, ask questions, and respond to questions. Students of intervention teachers were observed to be 29% more consistent in helping one another in their studies and 59% more consistent in responding to questions in the classroom.
Lesotho	No	Both	Four times a year for 2 to 3 days at a time (8 to 12 days in 1 year). Additional workshops were organized several times a year for all the teachers in the schools under the DRT's care. These workshops usually were held on weekends.	DRTs selected were qualified, experienced teachers, had had headteacher or deputy headteacher experience, and were willing to travel frequently. Efforts were made to have gender balance and distribution by district and religion.	Teachers participating in the DRT intervention were found to maintain the use of visual aids on classroom walls and dedicate organized space to group work.	Examination results of students in the case schools improved by 17% in 1 year, compared to 6% in 1 year in other schools throughout the country.

Yemen	Yes	Both	2 visits each month	Master trainer (MTs), teacher trainer (ToTs) and district supervisor selection criteria were outlined and publicized in a decree issued by the Minister of Education. In addition to the basic criteria, ToTs and MTs were selected from targeted governorates to decrease transportation costs and improve sustainability. The selection committee also facilitated gender equity by encouraging women to apply and lowering degree standards for women.	Evaluation at the end of the school year (May 2013) found that 73.0% of teachers performed in the “good” or “better” category of providing independent reading-aloud time for students. This percent compared with only 44.1% of YEGRA teachers having students independently read aloud at the beginning of the year. Moreover, the YEGRA program showed promising results, particularly in teacher motivation.	The YEGRA program demonstrated positive results in student achievement in reading and Arabic. Foundational literacy skills in particular showed substantial improvement. There was a 264% increase in the ability to identify initial sounds in the YEGRA schools compared with only a 39% increase in the control schools. Letter-sound knowledge, an important foundational skill that leads to decoding and fluency, showed an even larger gain among the YEGRA students: 366% improvement over baseline compared with 110% improvement over baseline in the schools using the existing MOE curriculum.
Namibia	No	School-based (trained 99 lower primary teachers and 46 senior primary English teachers)	Four-week-long workshops, 1 each for grades 1, 2, 3, and 4; and 5 to 7 teachers. Workshops were followed by classroom observations.	DRTs	Comparison of data from lesson observations of the same teachers and learner assessment data collected at the beginning and end of the program indicated that the structured reflective approach was successful. It significantly improved teachers’ classroom performance.	Assessment data following the intervention showed significant improvement to learners’ English skills.

<p>Papua New Guinea</p>	<p>Yes</p>	<p>Cluster-based</p>	<p>0-6-weeks of workshops during the year (varied based on provinces).</p>	<p>Trainers and mentors provided the first workshops. Primary school senior teachers or head teachers conducted follow-up workshops.</p>	<p>This qualitative study showed the varying degrees of success and different styles of in-service training operating in the provinces. Provinces that had strong cluster organizations were much more successful in delivering widespread in-service to teachers. Overall, cluster workshops were found to be effective in disseminating information about the new curriculum.</p>	
--------------------------------	------------	----------------------	--	--	---	--

Note:

DRT = District Resource Teacher; YEGRA = Yemen Early Grade Reading Approach.

References

- Abeberese, Ama Baaфра, Todd J. Kumler, and Leigh L. Linden. 2014. "Improving Reading Skills by Encouraging Children to Read in School: A Randomized Evaluation of the Sa Aklat Sisikat Reading Program in the Philippines." *Journal of Human Resources* 49 (3): 611–33. <https://doi.org/10.1353/jhr.2014.0020>.
- Allen, Dwight W. 1967. "Microteaching." Retrieved from <https://eric.ed.gov/?id=ED019224>.
- Allen, Joseph P., Christopher A. Hafen, Anne C. Gregory, Amori Y. Mikami, and Robert Pianta. 2015. "Enhancing Secondary School Instruction and Student Achievement: Replication and Extension of the My Teaching Partner-Secondary Intervention." *Journal of Research on Educational Effectiveness* 8 (4): (October 2): 475–89. <https://doi.org/10.1080/19345747.2015.1017680>.
- AUSAid (Australian Agency for International Development). 2006. "Papua New Guinea Curriculum Reform Implementation Project Impact Study 6." Final Report. Faculty of Education, Deakin University, Australia and National Research Institute, Papua New Guinea. <https://apo.org.au/sites/default/files/resource-files/2007-04/apo-nid4626.pdf>.
- Bando, Rosangela, and Xia Li. 2014. "The Effect of In-Service Teacher Training on Student Learning of English as a Second Language." IADB Working Paper Series, IDB-WP-529. Inter-American Development Bank, Washington, DC. <https://publications.iadb.org/publications/english/document/The-Effect-of-In-Service-Teacher-Training-on-Student-Learning-of-English-as-a-Second-Language.pdf>.
- Beuermann, Diether W., Emma Naslund-Hadley, Inder J. Ruprah, and Jennelle Thompson. 2013. "The Pedagogy of Science and Environment: Experimental Evidence from Peru." *Journal of Development Studies* 49 (5) (May): 719–36. <https://doi.org/10.1080/00220388.2012.754432>.
- Boyle, Bill, Iasonas Lamprianou, and Trudy Boyle. "A Longitudinal Study of Teacher Change: What Makes Professional Development Effective? Report of the Second Year of the Study." *School Effectiveness and School Improvement* 16 (1) (May): 1–27. <https://doi.org/10.1080/09243450500114819>.
- Buczynski, Sandy, and C. Bobbi Hansen. 2010. "Impact of PD on Teacher Practice: Uncovering Connections." *Teaching and Teacher Education* 26 (3) (April): 599–607. <https://doi.org/10.1016/j.tate.2009.09.006>.
- Campbell, Patricia F., and Nathaniel N. Malkus. 2011. "The Impact of Elementary Mathematics Coaches on Student Achievement." *Elementary School Journal* 111 (3) (March): 430–54. <https://doi.org/10.1086/657654>.
- Carpenter, Thomas P., Elizabeth Fennema, Penelope L. Peterson, Chi-Pang Chiang, and Megan Loef. 1989. "Using Knowledge of Children's Mathematics Thinking in Classroom Teaching: An Experimental Study." *American Educational Research Journal* 26 (4) (January): 499–531. <https://doi.org/10.3102/00028312026004499>.
- Cilliers, Jacobus, Brahm Fleisch, Cas Prinsloo, and Stephen Taylor. 2019. "How to Improve Teaching Practice? An Experimental Comparison of Centralized Training and in-Classroom Coaching." *Journal of Human Resources* 55 (3) (February 7). <https://doi.org/10.3368/jhr.55.3.0618-9538R1>.
- Clausen, Kurt W., Anna-Marie Aquino, and Ron Wideman. 2009. "Bridging the Real and Ideal: A Comparison between Learning Community Characteristics and a School-Based Case Study." *Teaching and Teacher Education* 25 (3) (April): 444–52. <https://doi.org/10.1016/j.tate.2008.09.010>.
- Cohen, David K., and Heather C. Hill. 2001. *Learning Policy: When State Education Reform Works*. New Haven: Yale University Press. <https://yalebooks.yale.edu/book/9780300089479/learning-policy/>.
- Creative Associates International. 2015. "Teacher Motivation and Change in Yemen: Innovations in Teacher PD from the Yemen Early Grade Reading Approach." March. Washington, DC. https://www.creativeassociatesinternational.com/wp-content/uploads/2017/05/YEGRA_Yemen.pdf.
- Crockett, Michele D. 2002. "Inquiry as PD: Creating Dilemmas through Teachers' Work." *Teaching and Teacher Education* 18 (5): 609–24 (July). [https://doi.org/10.1016/S0742-051X\(02\)00019-7](https://doi.org/10.1016/S0742-051X(02)00019-7).
- Darling-Hammond, Linda, Maria. E. Hyler, and Madelyn Gardner. 2017. "Effective Teacher Professional Development." Palo Alto, CA: Learning Policy Institute, Palo Alto, CA.

https://www.yu.edu/sites/default/files/inline-files/Effective_Teacher_Professional_Development_REPORT.pdf.

- Desimone, Laura M. 2009. "Improving Impact Studies of Teachers' PD: Toward Better Conceptualizations and Measures." *Educational Researcher* 38 (3): 181–99 (April). <https://doi.org/10.3102/0013189X08331140>.
- Dichaba, Mpho M., and Matseliso L. Mokhele. 2012. "Does the Cascade Model Work for Teacher Training? Analysis of Teachers' Experiences." *International Journal of Educational Sciences* 4 (3) (December): 249–54. <https://doi.org/10.1080/09751122.2012.11890049>.
- Doppelt, Yaron, Christian D. Schunn, Eli M. Silk, Matthew M. Mehalik, Birdy Reynolds, and Erin Ward. 2009. "Evaluating the Impact of a Facilitated Learning Community Approach to PD on Teacher Practice and Student Achievement." *Research in Science and Technological Education* 27 (3) (November): 339–54. <https://doi.org/10.1080/02635140903166026>.
- Fernández, Clea, Joanna Cannon, and Sonal Choksi. 2003. "A US-Japan Lesson Study Collaboration Reveals Critical Lenses for Examining Practice." *Teaching and Teacher Education* 19 (2): 171–85. [https://doi.org/10.1016/S0742-051X\(02\)00102-6](https://doi.org/10.1016/S0742-051X(02)00102-6).
- Gallagher, H. Alix, Katrina Woodworth, and Nicole Arshan. 2016. "Impact Evaluation of the National Writing Project's College-Ready Writing Project in High Poverty Rural Districts." Society for Research on Educational Effectiveness, Evanston, IL. ERIC no. ED567632. <https://eric.ed.gov/?id=ED567632>.
- Gallimore, Ronald, Bradley Ermeling, William Saunders, and Claude Goldenberg. 2009. "Moving the Learning of Teaching Closer to Practice: Teacher Education Implications of School-Based Inquiry Teams." *The Elementary School Journal* 109 (5) (May): 537–53. <https://doi.org/10.1086/597001>.
- Garet, Michael S., Andrew C Porter, Laura Desimone, Beatrice F Birman, and Kwang Suk Yoon. 2001. "What Makes PD Effective? Results from a National Sample of Teachers." *American Educational Research Journal* 38 (4) (January): 915–45. <https://doi.org/10.3102/00028312038004915>.
- Gilpin, Arlene. 1997. "Cascade Training: Sustainability or Dilution." In *Learning to Train: Perspectives on the Development of Language Teacher Trainers*, edited by Ian McGrath, 185–195. Prentice Hall Europe.
- Hardman, Frank, Jan Abd-Kadir, Catherine Agg, James Migwi, Jacinta Ndambuku, and Fay Smith. 2009. "Changing Pedagogical Practice in Kenyan Primary Schools: The Impact of School-Based Training." *Comparative Education* 45 (1): 65–86. <https://doi.org/10.1080/03050060802661402>.
- Hardman, Frank, Jim Ackers, Niki Abrishamian, and Margo O'Sullivan. 2011. "Developing a Systemic Approach to Teacher Education in Sub-Saharan Africa: Emerging Lessons from Kenya, Tanzania and Uganda." *Compare: A Journal of Comparative and International Education* 41 (5) (September): 669–83. <https://doi.org/10.1080/03057925.2011.581014>.
- Hardman, Jan. 2017. "School-Based Teacher Professional Development in East Africa: Emerging Lessons from Kenya and Tanzania." In Akiba Motoko and Gerald K. LeTendre (eds.), *International Handbook of Teacher Quality and Policy*. Routledge, 517–27. <https://eprints.whiterose.ac.uk/155264/>.
- Hayes, David. 2000. "Cascade Training and Teachers' PD." *ELT Journal* 54 (2) (April 1): 135–45. Oxford University Press. <https://doi.org/10.1093/elt/54.2.135>.
- Hennessy, Sara, Bjoern Haßler, and Riikka Hofmann. 2015. "Challenges and Opportunities for Teacher PD in Interactive Use of Technology in African Schools." *Technology, Pedagogy and Education* 24 (5) (October 20): 1–28. <https://doi.org/10.1080/1475939X.2015.1092466>.
- Herriot, Andrew, Michael Crossley, Magdalena Juma, Judith Waudo, Miriam Mwiroti, and Alexander Kamau. 2002. "The Development and Operation of Headteacher Support Groups in Kenya: A Mechanism to Create Pockets of Excellence, Improve the Provision of Quality Education and Target Positive Changes in the Community." *International Journal of Educational Development* 22 (5) (September): 509–26. [https://doi.org/10.1016/S0738-0593\(00\)00040-7](https://doi.org/10.1016/S0738-0593(00)00040-7).
- Huberman, Michael. 1995. "Networks That Alter Teaching: Conceptualizations, Exchanges and Experiments." *Teachers and Teaching* 1 (2) (October): 193–211. <https://doi.org/10.1080/1354060950010204>.

- Jacobs, Sunday. 2015. "Effects of 'Cluster School Based' Teacher PD Model on the Performances of Primary School Social Studies Teachers and Their Pupils in Plateau State, Nigeria." *International Journal of Education and Research* 3 (5) (May). <https://www.ijern.com/journal/2015/May-2015/34.pdf>.
- Johnson, Carla C., and Jamison D. Fargo. 2010. "Urban School Reform Enabled by Transformative PD: Impact on Teacher Change and Student Learning of Science." *Urban Education* 45 (1) (January): 4–29. <https://doi.org/10.1177/0042085909352073>.
- Johnson, Susan Moore. 2019. *Where Teachers Thrive: Organizing Schools for Success*. Cambridge, MA: Harvard Education Press. <https://projectngt.gse.harvard.edu/publications/where-teachers-thrive-organizing-schools-success>.
- Kraft, Matthew A., and David Blazar. 2017. "Individualized Coaching to Improve Teacher Practice across Grades and Subjects: New Experimental Evidence." *Educational Policy* 31 (7) (November): 1033–68. <https://doi.org/10.1177/0895904816631099>.
- Kraft, Matthew A., David Blazar, and Dylan Hogan. 2018. "The Effect of Teacher Coaching on Instruction and Achievement: A Meta-Analysis of the Causal Evidence." *Review of Educational Research* 88 (4) (August): 547–88. <https://doi.org/10.3102/0034654318759268>.
- Lara-Alecio, Rafael, Fuhui Tong, Beverly J. Irby, Cindy Guerrero, Maggie Huerta, and Yinan Fan. 2012. "The Effect of an Instructional Intervention on Middle School English Learners' Science and English Reading Achievement." *Journal of Research in Science Teaching* 49 (8) (October): 987–1011.
- Lee, Jackie F.K. 2008. "A Hong Kong Case of Lesson Study: Benefits and Concerns." *Teaching and Teacher Education* 24 (5) (July): 1115–24. <https://doi.org/10.1016/j.tate.2007.10.007>.
- Lemov, Doug, Erica Woolway, and Katie Yezzi. 2018. *Practice Perfect: 42 Rules for Getting Better at Getting Better*. Hoboken, NJ: John Wiley & Sons. <https://www.wiley.com/en-us/Practice+Perfect%3A+42+Rules+for+Getting+Better+at+Getting+Better-p-9781118216583>.
- Leu, Elizabeth. 2004. "The Patterns and Purposes of School-Based and Cluster Teacher PD Programs." Working Paper 1 under EQUIP1's Study of School-Based Teacher Inservice Programs and Clustering of Schools. USAID (United States Agency of International Development), Washington, DC. https://pdf.usaid.gov/pdf_docs/pnadd973.pdf.
- Lewis, Catherine. 2016. "How Does Lesson Study Improve Mathematics Instruction?" *ZDM* 48 (4) (July 1): 571–80. <https://doi.org/10.1007/s11858-016-0792-x>.
- Louis, Karen Seashore, Helen M. Marks, and Sharon Kruse. 1996. "Teachers' Professional Community in Restructuring Schools." *American Educational Research Journal* 33 (4) (January): 757–98. <https://doi.org/10.3102/00028312033004757>.
- McGill-Franzen, Anne, Richard L. Allington, Linda Yokoi, and Gregory Brooks. 1999. "Putting Books in the Classroom Seems Necessary but Not Sufficient." *The Journal of Educational Research* 93 (2): 67–74.
- McNeil, James. 2004. "School- and Cluster-Based Teacher Professional Development: Bringing Teacher Learning to the Schools." Working Paper 1 under EQUIP1's Study of School-Based Teacher Inservice Programs and Clustering of Schools. <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.469.9818&rep=rep1&type=pdf>.
- Mendelsohn, John, and Viv Ward. 2001. "A Review of Clusters of Schools in Namibia." Report for the Ministry of Basic Education, Sport and Culture. Windhoek Namibia. <https://www.raison.com.na/sites/default/files/A%20review%20of%20school%20clusters%20in%20Namibia.pdf>.
- Mphahlele, Lydia K. 2012. "School Cluster System: A Qualitative Study on Innovative Networks for Teacher Development." *Procedia - Social and Behavioral Sciences* 47: 340–43. <https://doi.org/10.1016/j.sbspro.2012.06.660>.
- Mulkeen, Aidan. 2010. "Teachers in Anglophone Africa: Issues in Teacher Supply, Training, and Management." Development Practice in Education. Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/13545>. License: CC BY 3.0 IGO.

- OECD (Organisation for Economic Co-operation and Development). 1998. "Staying Ahead: In-Service Training and Teacher PD." OECD, Paris. <https://doi.org/10.1787/9789264163041-en>.
- OECD (Organisation for Economic Co-operation and Development). 2005. "Teachers Matter: Attracting, Developing and Retaining Effective Teachers, Education and Training Policy." OECD, Paris. <https://doi.org/10.1787/9789264018044-en>.
- O'Sullivan, Margo C. 2002. "Action Research and the Transfer of Reflective Approaches to In-Service Education and Training (INSET) for Unqualified and Underqualified Primary Teachers in Namibia." *Teaching and Teacher Education* 18 (5) (July): 523–39. [https://doi.org/10.1016/S0742-051X\(02\)00014-8](https://doi.org/10.1016/S0742-051X(02)00014-8).
- Orr, David, Jo Westbrook, John Pryor, Naureen Durrani, Judy Sebba, and Christine Adu-Yeboah. 2013. "What Are the Impacts and Cost-Effectiveness of Strategies to Improve Performance of Untrained and Under-Trained Teachers in the Classroom in Developing Countries? Systematic Review." EPPI-Centre, Social Science Research Unit, Institute of Education, University of London. https://www.globalreadingnetwork.net/sites/default/files/media/file/Undertrained_teachers_2013_Orr.pdf.
- Penuel, William R., Barry J. Fishman, Ryoko Yamaguchi, and Lawrence P. Gallagher. 2007. "What Makes PD Effective? Strategies That Foster Curriculum Implementation." *American Educational Research Journal* 44 (4) (December): 921–58. <https://doi.org/10.3102/0002831207308221>.
- Piper, Benjamin, and Medina Korda. 2011. "EGRA Plus: Liberia. Program Evaluation Report." RTI International, Research Triangle Park, NC. <https://eric.ed.gov/?id=ED516080>.
- Piper, Benjamin, and Stephanie Simmons Zuilkowski. 2015. "Teacher Coaching in Kenya: Examining Instructional Support in Public and Nonformal Schools." *Teaching and Teacher Education* 47: 173–83. <https://doi.org/10.1016/j.tate.2015.01.001>.
- Popova, Anna, David K. Evans, and Violeta Arancibia. 2016. "Training Teachers on the Job: What Works and How to Measure It." World Bank, Washington, DC. <https://doi.org/10.1596/1813-9450-7834>.
- Powell, Douglas R., Karen E. Diamond, Margaret R. Burchinal, and Matthew J. Koehler. 2010. "Effects of an Early Literacy PD Intervention on Head Start Teachers and Children." *Journal of Educational Psychology* 102 (2) (May): 299–312. <https://doi.org/10.1037/a0017763>.
- Puchner, Laurel D., and Ann R. Taylor. 2006. "Lesson Study, Collaboration and Teacher Efficacy: Stories from Two School-Based Math Lesson Study Groups." *Teaching and Teacher Education: An International Journal of Research and Studies* 22 (7) (October): 922–34. <https://doi.org/10.1016/j.tate.2006.04.011>.
- Ralaingita, Wendi. 2021. "Teacher PD: Ongoing Teacher Support." "Structured Pedagogy: A How-to Guide. Guide 6." RTI, Research Triangle Park, NC. https://articulateusercontent.com/rise/courses/k7dLuD_MAVKCFofLTr1myltFVUI-9zGm/FSWV7qorPCGkMXaQ-6.%2520Teacher%2520Professional%2520Development-%2520Ongoing%2520Teacher%2520Support.pdf.
- Rizvi, Meher, and Philip Nagy. 2016. "The Effects of Cluster-Based Mentoring Programme on Classroom Teaching Practices: Lessons from Pakistan." *Research Papers in Education* 31 (2) (March 14): 159–82. <https://doi.org/10.1080/02671522.2015.1029962>.
- Rueda, Robert, and Lilia D. Monzó. 2002. "Apprenticeship for Teaching: PD Issues Surrounding the Collaborative Relationship between Teachers and Paraeducators." *Teaching and Teacher Education* 18 (5): 503–21.
- Saxe, Geoffrey B., Maryl Gearhart, and Na'ilah Suad Nasir. 2001. "Enhancing Students' Understanding of Mathematics: A Study of Three Contrasting Approaches to Professional Support." *Journal of Mathematics Teacher Education* 4 (1) (January 1): 55–79. <https://doi.org/10.1023/A:1009935100676>.
- Schweisfurth, Michele. 2013. *Learner-Centred Education in International Perspective: Whose Pedagogy for Whose Development?* Oxford: Routledge. <https://www.routledge.com/Learner-centred-Education-in-International-Perspective-Whose-pedagogy-for/Schweisfurth/p/book/9781138929319>.
- Spratt, Jennifer, Simon King, and Jennae Bulat. 2013. "Evaluation of Mali's mother-tongue early grade "Read Learn Lead" program: Endline Report." The William and Flora Hewlett Foundation, Menlo Park, CA. <https://www.rti.org/publication/evaluation-malis-mother-tongue-early-grade-read-learn-lead-program-0>.

- Suzuki, T. 2008. "The Effectiveness of the Cascade Model for In-Service Teacher Training in Nepal." Paper presented at the Sixth International Conference on Education and Information Systems, Technologies and Applications: EISTA 2008, Orlando, FL, 28 June – 2 July.
- Trotter, Yvonne D. 2006. "Adult Learning Theories: Impacting PD Programs." *Delta Kappa Gamma Bulletin* 72 (2): 8.
- Villegas-Reimers, Eleonora, and Fernando Reimers. 1996. "Where Are 60 Million Teachers? The Missing Voice in Educational Reforms around the World." *Prospects* 26 (3) (September): 469–92.
<https://doi.org/10.1007/BF02195052>.
- Villegas-Reimers, Eleonora. 2003. "Teacher PD: An International Review of the Literature. Quality Education for All." International Institute for Educational Planning (IIEP), UNESCO (United Nations Education, Scientific and Culture Organization), Paris. https://unesdoc.unesco.org/ark:/48223/pf0000133010_eng.
- Wei, Ruth Chung, Linda Darling-Hammond, Alethea Andree, Nikole Richardson, and Stelios Orphanos. 2009. "Professional Learning in the Learning Profession: A Status Report on Teacher Development in the United States and Abroad. A Technical Report" National Staff Development Council, Dallas, TX and School Redesign Network at Stanford University. <https://edpolicy.stanford.edu/sites/default/files/publications/professional-learning-learning-profession-status-report-teacher-development-us-and-abroad.pdf>.
- Weiss, Iris, and Joan Pasley. 2006. "Scaling up Instructional Improvement through Teacher Professional Development: Insights from the Local Systemic Change Initiative." Consortium for Policy Research in Education. March.
<https://doi.org/10.12698/cpre.2006.rb44>.
- Winrock International. 2016. "Lessons Learned in Addressing Access to Education in South Sudan through Community Engagement, School Governance, Conflict Sensitivity, and Teacher Development." Winrock International, Little Rock, AK. http://pdf.usaid.gov/pdf_docs/PA00MM2H.pdf.
- Yoon, Kwang Suk, Teresa Duncan, Silvia Wen-Yu Lee, Beth Scarloss, and Kathy L. Shapley. 2007. "Reviewing the Evidence on How Teacher PD Affects Student Achievement." *Issues and Answers*, REL 33.
https://ies.ed.gov/ncee/edlabs/regions/southwest/pdf/rel_2007033_sum.pdf.

Access Coach Tools
and Resources 