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MEWAKA National Teacher Development Reform in Tanzania

Design-Based Implementation Research Cycle 1 Findings

Date January 2024

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DOI 10.53832/edtechhub.0167

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About this document

Recommended citation

Koomar, S., Massam, W., Chachage, K., Anthony, G., Mrope, W., Malibiche, M., Mutura, E., Adam, T., Hennessy, S., Mtenzi, F., Komba, A., Mwakabungu, F., Paskali, J.H., & Nkya, H. (2024). *MEWAKA National Teacher Development Reform in Tanzania: Design-Based Implementation Research Cycle 1 Findings* [Technical report]. EdTech Hub. https://doi.org/10.53832/edtechhub.0167.

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Reviewers

Jamie Proctor and Johnpaul Barretto

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Abbreviations and acronyms

AKU	Aga Khan University
AT	Academic teacher
CPD	Continuous professional development
DBIR	Design-based implementation research
DEO	District Education Officer
HT	Headteacher
ICT	Information and communication technology
LGA	Local Government Authority
LMS	Learning management system
MEWAKA	Mafunzo Endelevu kwa Walimu Kazini (TCPD)
MoEST	Ministry of Education, Science and Technology
PF	Peer facilitator
PO-RALG	President's Office – Regional and Local Governance
RQ	Research question
SEND	Special educational needs and disabilities
TCPD	Teacher continuous professional development
TIE	Tanzania Institute of Education
TPD	Teacher professional development
WEO	Ward Education Officer

Abstract

MEWAKA (Mafunzo Endelevu kwa Walimu Kazini, or Teacher Continuous Professional Development [TCPD]) is a landmark, school-based teacher professional development programme being implemented nationally by the Government of Tanzania, with the ultimate aim of raising learning outcomes in schools. EdTech Hub, Aga Khan University, and the Tanzania Institute of Education (TIE) are conducting research to iteratively enhance the MEWAKA implementation at primary school level and to understand the role that technology can play in scaling TCPD. This report presents the findings and recommendations from the first cycle of design-based implementation research (DBIR) conducted in rural schools in the Lindi region. Following a pilot peer facilitator workshop, data was collected through observation and self-reporting methods between September and December 2022. The aims were to capture stakeholders' perspectives at all levels of the education system and to see how schools are implementing the programme on the ground. The emerging findings and recommendations are being used to inform the redesign and further implementation of this TCPD model, and were used to identify key areas to test and investigate in the second cycle of the DBIR in 2023.

1. Introduction

This report shares the first round of findings from design-based implementation research (DBIR) investigating the effectiveness, cost-effectiveness, and sustainability of a tech-supported, decentralised, and school-based teacher continuous professional development (TCPD)[1] model to improve learning outcomes in rural Tanzanian primary schools. The research investigates and aims to iteratively improve the national TCPD model and roll-out (including the semi-structured Communities of Learning), as outlined in the TCPD Supervision Guidelines [Mwongozo wa kusimamia utekelezaji wa mpango wa mafunzo endelevu kwa walimu kazini](↑Ministry of Education, Science and Technology, 2022b) and TCPD Implementation Guidelines at School Level and Teacher Resource Centres (↑Ministry of Education, Science and Technology, 2022a). The research seeks to understand the model's effectiveness and the role that technology can play, providing recommendations to improve the model incrementally.

The research team includes researchers from EdTech Hub, Aga Khan University, and the Tanzania Institute of Education (TIE). This report presents the findings and recommendations from the first data collection cycle, which took place following a peer facilitator workshop, from September to December 2022. The findings are being used to inform the redesign and further implementation of this TCPD model, and were used to identify key areas to test and investigate in the second cycle of the DBIR in 2023. Following the DBIR phase, Phase 2 of the research will conduct a quasi-experimental study in 2024.

Section 2 of this report provides background information on the national TCPD programme. Section 3 reviews the literature in relation to technology and TCPD in LMICs, and in Tanzania specifically and the literature regarding DBIR. Section 4 presents our research questions and methodology. Finally, Section 5 presents findings and recommendations from the research for redesign and reimplementation.

[1] Note: we use TCPD, TPD (teacher professional development), and CPD (continuous professional development) relatively interchangeably throughout this report. TCPD is used primarily given this is the term the government uses to refer to the intervention overall. However, TPD and CPD are also used, particularly when reporting the qualitative findings, as this is how many participants refer to professional development.

2. Background to TCPD in Tanzania

This section positions the research alongside the national-scale TCPD implementation in Tanzania.

2.1. National TCPD implementation in Tanzania

MEWAKA (*Mafunzo Endelevu kwa Walimu Kazini*, or teacher continuous professional development (TCPD) is a landmark teacher professional development programme being implemented by the Government of Tanzania. Designed to operationalise the National Framework for TCPD (↑Ministry of Education, Science and Technology, 2020), the programme is decentralised, with teacher learning based in schools and clusters, focused on semi-structured Communities of Learning (CoLs). CoLs are spaces where teachers can gather weekly to discuss and reflect on issues most relevant to their schools, as well as learn and improve their pedagogical skills. MEWAKA aims to help teachers solve problems collaboratively, learn new approaches to improve their practice, and generally create a culture of collaboration, reflection, and school improvement to enhance student learning outcomes. Where feasible, the programme is tech-enhanced through the use of the Tanzania Institute of Education Learning Management System (LMS).

MEWAKA was first introduced to education officers in all regions and district councils through orientation workshops led by the Ministry of Education, Science and Technology (MOEST) between January and May 2022, when schools were directed to identify peer facilitators and begin implementing CoLs. In August and September 2022, a *Peer Facilitators' Manual* [Matini] (↑Tanzania Institute of Education, 2022) was developed and introduced through a training workshop for peer facilitators, headteachers, academic teachers, and ward, district, and regional education officers in selected pilot districts, including in the schools that are part of this study.

According to the TCPD supervision guide, the TCPD team at each school consists of the headteacher, peer facilitators, academic teacher, and the school's internal school quality assurance (SQA) coordinator. Their role is to schedule CoLs within the school timetable, ensure teachers attend CoLs and supervise their implementation, ensure record-keeping and monthly reports are completed, and support the peer facilitator with any materials or resources needed for CoL activities.

2.2 Implementation in the DBIR schools

Each school in the DBIR sample had a TCPD team in place at the time of the study. For the schools in DBIR Cycle 1, two peer facilitators were

selected at each school and received the three-day pilot training workshop based on the *Peer Facilitators Manual* [Matini] (↑Tanzania Institute of Education, 2022). This workshop was implemented by TIE national facilitators for the eight schools participating in the DBIR as the first pilot for using the manual. The headteachers, academic teachers, ward, district and regional education officers for these schools also attended the workshop. The four schools observed in DBIR Cycle 1 held weekly CoLs as directed in the School Level TCPD Implementation Guidelines [Mwongozo wa kutekeleza mafunza ya MEWAKA katika ngazi ya shule na vituo vya walimu] (↑Ministry of Education, Science and Technology, 2022a).

3. Literature review

This section reviews literature on the use of technology for TPD in LMICs and in Tanzania specifically. It then presents literature regarding the DBIR methodology, outlining the rationale for selecting DBIR within this research.

3.1. Technology and TPD in low- and middle-income countries

Studies show that learning outcomes for children and young people in low- and middle-income countries (LMICs) remain persistently low. However, it is argued that teacher quality is the most important determinant of school learning outcomes (↑Evans & Popova, 2015; ↑Hennessy et al., 2022). Although building teachers' capacity to lead to improved learning outcomes is critical, teacher professional development (TPD) opportunities in LMICs are limited and unsustained, with mixed outcomes for teachers and students ↑Hennessy et al. (2022). Where TPD opportunities exist, research indicates that the input is often too theoretical, acontextual, and lacks sustainability. As a result, vast numbers of learners, especially those in marginalised population groups, endure a poor-quality educational experience, culminating in underachievement and limited life chances.

Recent work suggests that the need for teacher development increases with the proliferation of EdTech use. For instance, ↑Major & Francis' (2020) Rapid Evidence Review on personalised learning indicates that learning gains from personalised, adaptive technology use are greater when an experienced teacher is available to offer contextualised input and feedback. Furthermore, a meta-analysis of 77 randomised experiments focused on student learning in primary schools in LMICs found that the use of EdTech (0.15) and teacher training (0.12) were two elements associated with the largest effect sizes (↑McEwan, 2015). As such, coherently integrating technology within TPD systems is vital.

The most prevalent uses of EdTech tools and resources related to teacher learning in LMICs concern their potential to enhance both formal and informal TPD opportunities (64% of studies: ↑Hennessy et al., 2022). For example, videos are tools teachers commonly use to watch model teachers or reflect on their own teaching practice (e.g., ↑Hennessy et al., 2016; ↑Kaneko-Marques, 2015; ↑Lok et al., 2018). These "microteaching" sessions can help support teachers' reflective and evaluative skills when analysing an example of classroom practice. Additionally, teachers frequently use internet sources, social media, and online or remote communities of practice to develop lesson structure, content, and, crucially, to share

resources related to planning and assessment (e.g., ↑Demir, 2018; ↑Ekanayake & Wishart, 2014; ↑Kabilan & Khan, 2012). As such, communities help teachers develop the skills to navigate, find, and adapt resources to suit their contextual needs (↑Harley & Barasa, 2012; ↑Sáenz Rodríguez et al., 2017). With the advent of digital technology, teacher communities have become increasingly useful forums. ↑Hennessy et al. (2022) note the significance of peer support in the literature on tech-supported TPD, with 22% of studies noting benefits in this area. Therefore, technology can be used to develop teachers' overall practice, their methods of navigating and sharing resources, and their ways of reflecting with colleagues to create and enhance communities built upon learning and professional progression.

3.2. Use of technology for TPD in Tanzania

Teacher professional development (TPD) is widely regarded as a driving force in enhancing skills and motivation. And to address the learning crisis, we need teachers with adequate skills and motivation. For this reason, upskilling the teaching workforce is consistently cited in countries' education sector development plans. However, outcomes are historically mixed, with ineffective models often supported, teachers taught skills they cannot practically apply in the classroom, and continuous support and input not provided longitudinally (↑Hennessy et al., 2022).

In Tanzania, World Bank data show that in 2018, the average pupil–teacher ratio was 51:1 in primary schools, with ratios exceeding 200:1 in some schools. In such a situation, building a competent and effective teaching workforce becomes vital to meeting the current and future demands of the system (↑World Bank, 2017). Of course TPD is crucial to enhancing the competencies and effectiveness of the workforce.

However, the CPD (continuous professional development) Implementation Roadmap for Tanzania (↑Cambridge Education, 2021) and a recent review of the challenges and opportunities for TCPD in Tanzania (↑Komba & Mwakabenga, 2019) show that historically ineffective top-down approaches, such as cascade models, have been implemented. These top-down models, which attempt to transfer large amounts of content or pedagogical knowledge, without continuous support or teacher input, have proved costly and ineffective in enhancing teaching quality in Tanzania. This is demonstrated by ↑Hardman et al.'s (2011) review of pre- and in-service training in three East African countries, outlining challenges and lessons learnt. A baseline study on the quality of classroom interaction and the provision of TPD was conducted to inform the Teacher Development and Management Strategy (↑Ministry of Education and Vocational Training (MoEVT), 2008, cited in ↑Hardman et al., 2011). The study

covered 300 primary English, mathematics, Kiswahili, and science lessons at Standards 3 and 6, spanning eight districts. The analysis found that pupil-centred forms of learning made up just 14% of lesson time, with paired or group work making up only 6% of lesson time; on the other hand, traditional 'chalk and talk' methods took up over half of lesson time (↑Hardman et al., 2011). ↑Chirwa's (2018) work looking at the use of technology in Tanzanian teacher colleges supports ↑Hardman et al.'s (2011) assessment that there remains an overreliance on 'chalk and talk' classroom instruction, with 71% of teachers lacking the requisite knowledge to use the internet for teaching and learning purposes. This data presents the state of teaching practice in Tanzania over the past decade or so. It shows that ineffective pedagogies have historically been common, and, as a result, have proved ineffective in producing positive learning outcomes.

The findings above highlight the need for a shift in approach to TPD in Tanzania. In an EdTech Hub country-level review of Tanzanian research initiatives, ↑Jordan et al. (2021) note that the key recommendations from ↑Hardman et al.'s (2011) study centre on:

- A shift towards school-based professional development opportunities for teachers.
- Employing established pedagogical approaches (such as reflective practice).
- Implementing a blended, flexible model, using "paper-based and online distance learning materials, and face-to-face meetings with tutors and cluster meetings of teachers" (↑Hardman et al., 2011, p. 676).

Assessing teachers' needs continuously is vital to any TPD programming to understand teachers' underlying motivations, knowledge, and skills (↑Onguko, 2014). The most pressing TPD needs identified by Tanzanian teachers include but are not limited to:

- Skills for teaching with technology (including technology integration and uses of digital material).
- Caring for teachers' health and well-being.
- General pedagogy/teaching methods (↑Koomar et al., 2022b).

The recommendations noted by ↑Hardman et al. (2011), and synthesised teacher needs gathered through various means, underpinned the TCPD model that the present study explored through the research questions listed below.

3.3. DBIR and its relevance for the study

DBIR is an approach that entails improvement through collaboration between researchers and practitioners in designing interventions that can address practical problems in teaching and learning (↑Crowley, 2016; ↑Fishman et al., 2019; ↑Penuel et al., 2011). It emphasises a focus on persistent problems of practice as constructed by multiple stakeholders; commitment to iterative, collaborative design with implementers and practitioners; developing theory and knowledge related to both classroom learning and implementation; and, unlike design-based research (DBR), developing capacity for sustaining change in systems. DBIR allows for co-designing, iterative trialling, and refinement of new practices while drawing on existing theory and evidence regarding tech-mediated TCPD, in conjunction with learning from the practical context, including learning about the needs of key stakeholders. This cyclical deductive-inductive process allowed us to test the boundaries of the original ideas. It also allowed us to review outcomes (such as design principles) and repurpose them for subsequent improvement.

The present research closely aligns with the Tanzania National TCPD implementation plan (↑Tanzania Institute of Education, 2021). We co-developed and designed the study together with the key stakeholders on the ground, based on the premise that a bottom-up approach, stemming from the direct experiences of those in the field, and incorporating local values, expertise, ownership, and existing capabilities (↑Mubanga, 2012), is most appropriate for assessing and addressing needs and concerns. The approach provided in-depth insights that helped shape and properly contextualise the intervention (↑Boujikian et al., 2022), ultimately gearing it towards sustained, systemic change.

4. Research questions

The DBIR is guided by the following research questions:

RQ1 relates to the decentralised, school-based TCPD model and implementation:

- **RQ1-A** [systems] What are the **system-level enablers** and **barriers** to **sustainable implementation** of a school-based TCPD model in rural primary schools? How do key national-, district-, and ward-level stakeholders perceive that barriers might be **mitigated**? RQ1-A examines the factors at these three levels through the '6Ps' (people, provision, place, policy, pedagogy, product [↑Rahman & Carter, 2022]).
- **RQ1-B** [schools] What are the **key school-level enablers** and **barriers** to making peer facilitators and headteachers effective in implementing the school-based TCPD? How do key stakeholders perceive that barriers might be **mitigated**? RQ1-B examines **school-based factors in TCPD effectiveness**, including the crucial role of peer facilitators (e.g., selection processes, skills and training required, perceptions, motivation, incentives, and teacher perception of peer facilitators) and the role of headteachers (e.g., time and resources required, perceptions, motivation, and incentives).
- **RQ1-C** [teachers] What are the **key teacher-level enablers** and **barriers** to implementing the school-based TCPD? How do key stakeholders perceive that barriers might be mitigated? RQ1-C considers **teacher-level factors related to their learning** (e.g., TCPD structure, teacher needs, the use of TPD programme materials, activities undertaken with technological devices, shared lesson planning, peer observation), **and attitudes** (e.g., teacher motivation, agency, perceptions, and socio-emotional factors).

RQ2 specifically looks at the tech-mediation within the TCPD model and implementation:

- **RQ2-A** [technology] What are the **appropriate uses of technology in rural school contexts** with limited access to technology that can support effective TCPD? RQ2-A considers how technology can be used to support effective TCPD (e.g., effective communication, critical reflection, creating/curating open resources, monitoring and evaluation), in contexts with initially low levels of technology access.

5. Methods

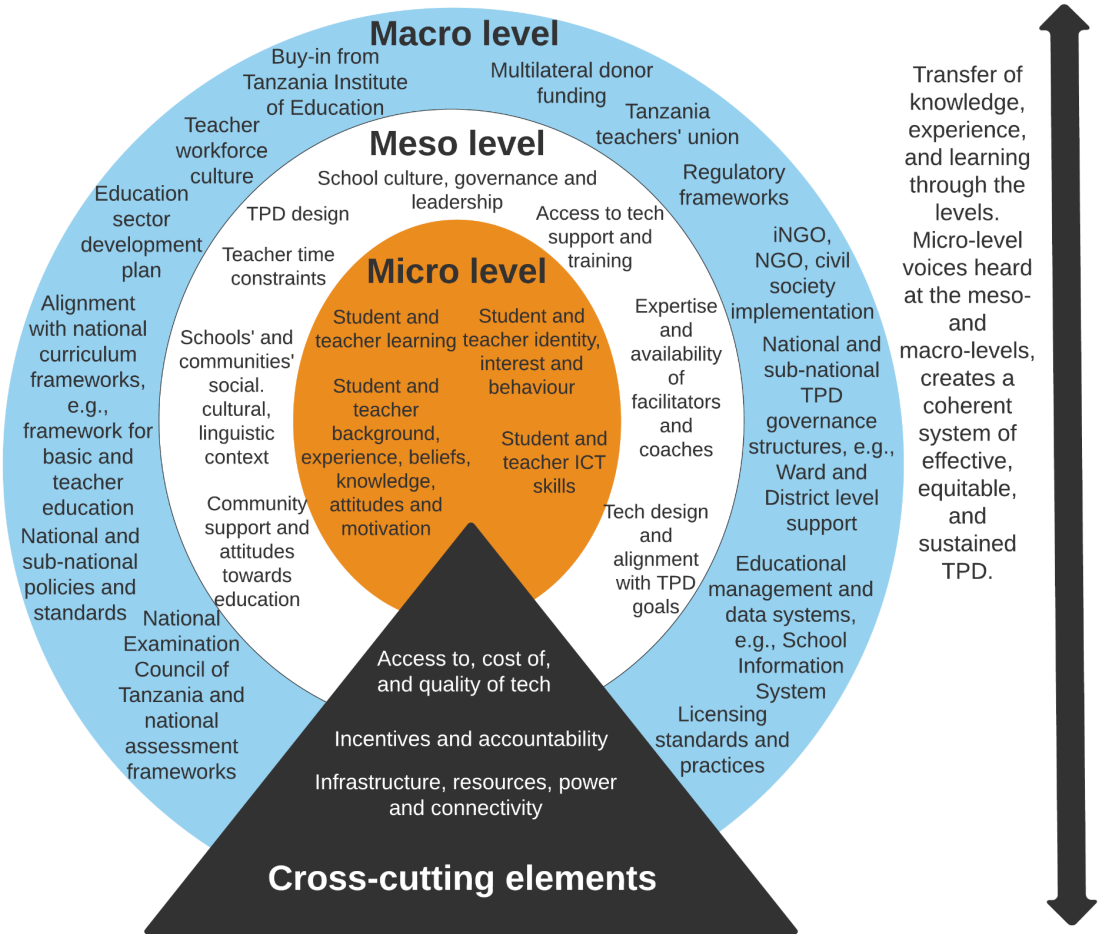
5.1. Research methodology

DBIR was used for the first phase of the study documented in this report. This phase is based on the premise that a bottom-up approach, stemming from the direct experiences of those in the field, and incorporating local values, expertise, ownership, and existing capabilities (↑Mubanga, 2012), is most appropriate for assessing and addressing needs and concerns. It provides in-depth insights to help shape and properly contextualise the intervention, ultimately gearing it towards sustained, systemic change.

5.2. Analytical framework

The macro-, meso-, and micro-level factors in TCPD (Figure 1) are used as an analytical framework to unpack ecosystem factors at each level.

Figure 1. *TCPD ecosystem factors (from ↑Koomar et al., 2022b)*



5.3. Research design

A total of 8 schools with minimal existing school-level technology were selected to be a part of the DBIR. The DBIR had two 4-month cycles. From this group, 4 schools were part of the first cycle, while all 8 schools were part of the second cycle. Each cycle includes the following steps:

- **Fortnightly school observations** — Over two months, the DBIR team visits schools fortnightly to observe CoL sessions and classroom teaching.
- **End of Cycle Evaluation** — The DBIR team conducts school visits to answer the questions we seek to investigate in the cycle. Focus group discussions and interviews are conducted.
- **Analysis** — The DBIR team analyses the results with the aims of producing:
    i. Recommendations to the Government of Tanzania on improving the TCPD implementation
    ii. Evidence that can be fed back into the broader evidence base on TCPD in LMICs.
- **Redesign and reimplementation** — The DBIR team works with implementers to select a subset of recommendations and use them to redesign components of the TCPD plan in order to iteratively improve it.

The schools are split into four groups, with different combinations of technology. The profiles tested in Cycle 1 are shown in Table 1 below (these were revised for Cycle 2).

Table 1. *Tech profiles*

	Cycle 1 tech provision	Uses of tech
Profile 1: No additional tech ***Personal devices***	**School #1** ■ No tech provided ■ No mobile credit provided ■ Online LMS	■ Participants (teachers and facilitators) use their own personal devices to access the LMS and TCPD materials. ■ Facilitators must use their personal devices to lead CoL sessions and coordinate the TCPD.
Profile 2: Limited tech ***Facilitator tablet only***	**School #3** ■ 1 **tablet** (doubling as **offline** server)—with SIM card + Moodle app + WhatsApp ■ 1 Raspberry Pi offline server ■ 1 solar power bank ■ **Credit and SIM cards provided for the 1 tablet** ■ 1 tripod ■ 1 microphone ■ Offline LMS	■ Facilitators are the primary users of the tablet, using it to communicate with other facilitators, access materials, lead and coordinate CoLs, watch videos, monitor attendance of teachers. ■ Teachers are the secondary users, and could, for example, use the device to access TCPD materials. However, their access is severely limited, given the provision of just one device. ■ The tablet's camera will be used for any video recordings (e.g., lesson observations), with the tripod.

	Cycle 1 tech provision	Uses of tech
Profile 3: Shared tech ***1 device per 3 or 4 teachers***	**School #5** ■ 1 high-spec **tablet** (doubling as **online** server)—with SIM card + Moodle app + WhatsApp ■ 3 **medium-spec tablets** ■ 1 tripod ■ 1 portable projector with speaker ■ 1 power bank ■ Credit and SIM cards provided ■ Online LMS	Use follows the same logic as Profile 2, and: ■ With additional technology, teachers now become primary users of the technology, alongside facilitators. ■ Facilitators, however, are the primary users of the main tablet. ■ Power banks can be used by all participants in School #6 for additional charging capacity.
Profile 4: Shared + individual tech ***1 device per 3 or 4 teachers + individual phones***	**School #8** ■ 1 high-spec tablet—with SIM card + Moodle offline app + WhatsApp ■ 1 Raspberry Pi offline server ■ 2 **medium-spec tablets** ■ 5 **individual low-spec KaiOS phones + funds for SIM and credit** ■ 1 tripod ■ 1 portable projector with speaker ■ 2 solar power banks ■ Credit and SIM cards provided ■ **Offline** LMS	As per Profile 3, and: ■ Teachers can now use the individual low-spec phones to communicate with colleagues, access WhatsApp, etc.

5.4. Data-collection processes and tools

In March 2022, baseline data was collected in all eight schools and the findings are outlined in ↕Koomar et al. (2022a). Between September to November 2022, fortnightly data was collected in the four Cycle 1 schools. Fortnightly data included classroom and CoL observations. In November 2022, end-of-cycle data was collected. This included a feedback survey, interviews, and focus group discussions. Table 2 below summarises the data-collection tools used. The tools have been made publicly available on the EdTech Hub website here[2] under Creative Commons licensing.

[2] https://edtechhub.org/evidence/edtech-hub-research-portfolio/impact-of-tech-supported-tpd-model-on-learning-tanzania/research-instruments-pack/ Retrieved 10 January 2024

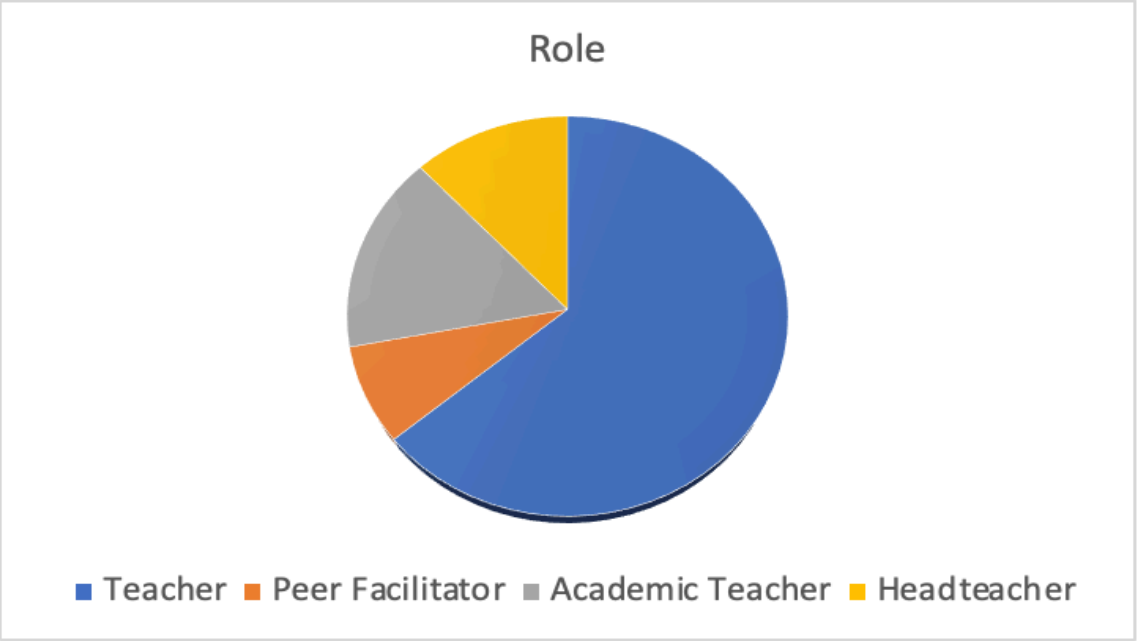
Table 2. *Data collection tools and sample sizes*

Instrument	Sample size	Notes
Classroom observation	School 1–4 observations School 3–3 observations School 5–4 observations School 8–4 observations Total: 15	■ Aimed at observing whether teaching and learning is improving. ■ All observed classes started on time and 13/15 ended on time. ■ All observed classes were in Standard 3 or Standard 6 ■ Breakdown by subject observed – 7 Science lessons – 3 Mathematics lessons – 3 Kiswahili lesson – 2 English lessons
CoL observation	School 1–4 observations School 3–4 observations School 5–3 observations School 8–4 observations **Total: 15**	■ Aimed at observing what is happening in CoLs and whether it correlates with the envisioned structure and functioning outlined in the CPD implementation plans.
Feedback survey	25 respondents from a possible 33 (i.e., 76% sampled of total group) ■ 16 teachers ■ 2 Peer facilitators (PF)(who are also teachers) ■ 4 academic teachers (AT) ■ 3 headteachers (HT)	Aimed at understanding attitudes towards TCPD. ■ Only 5 respondents were female (20%) ■ No females were represented in the PF, AT, or HT groups ■ Teaching experience ranged from 4.5 to 17 years

Instrument	Sample size	Notes
Teacher FGDs	School 1–1 FGD School 3–1 FGD School 5–1 FGD School 8 — See TCPD team FGD	■ Aimed at understanding enablers and barriers to TCPD at a school-level, from teachers' perspectives. ■ FGDs lasted approximately 1.5 hours.
TCPD team FGDs (Headteacher, Academic teacher, SQA Officer, Peer facilitator)	School 1–1 FGD School 3–1 FGD School 5–1 FGD School 8–1 combined Teacher-TCPD team FGD (due to small staff size)	■ Aimed at understanding enablers and barriers to TCPD at a school-level, from the perspective of the TCPD team responsible for coordinating the CoLs. ■ FGDs lasted approximately 1.5 hours.
Implementer interviews	6 x national interviews 2 x Regional-/District-level interviews 4 x Ward Education Officer (WEO) interviews	Individual one-hour interviews with each stakeholder

Observations and surveys were captured through a digital data collection tool called mWater,[3] from which descriptive statistics were analysed. Focus group discussions and interviews were transcribed, translated, and coded on Atlas.ti.[4] The transcripts were thematically analysed. The feedback survey participants can be seen in Figure 2.

Figure 2. *Feedback survey respondents*



[3] See https://www.mwater.co/ Retrieved 23 January 2024
[4] See https://atlasti.com/ Retrieved 23 January 2024

6. Findings

This section presents findings related to how MEWAKA has been implemented in schools, and at each level of the system. Sections 6.2 and 6.3 focus particularly on enablers and barriers. Sections 6.4, 6.5, and 6.6 report on MEWAKA's impact on teaching and learning and on the use of technology within the programme.

6.1. Overview of the implementation of MEWAKA in the schools observed

From September to December 2022, in all four schools where observations took place, scheduled CoL sessions were held weekly, in the afternoons, usually after regular school hours. Peer facilitators for every CoL session were male,[5] and some schools rotated peer facilitation duties. At two schools, a different teacher facilitated the CoL for each observation, while at the other two schools, two or three facilitators alternated or co-facilitated sessions.

At the time of the Cycle 1 observations, only self-study modules and TCPD guides were available on the LMS; CoL modules still needed to be digitised or made available to schools (versions of these were in place by Cycle 2). Teachers and TCPD teams at all four schools reported using the LMS to find materials for the CoL and for their classroom teaching. Use of the LMS by peer facilitators was observed during two different CoL sessions at School 3, and LMS use by teachers during a CoL session was observed once at School 1 and twice at each of the other schools. In most schools, the topic of CoL sessions was observed to change every week, except in School 1, where the topic of 'teaching aids' extended across two observed sessions.

Average attendance at CoL sessions was 88% per week, but this varied by school and session, ranging from 69% to 100% of teachers attending. When asked on the teacher survey, "*How motivated have you been to engage in the TCPD and CoLs?*" 23 of the 25 respondents said, "*A lot*." Reasons for absence given by the minority of teachers who missed CoL sessions included:

- Conflicting duties
- Supervision of students

[5] At the time of this study, rural schools in most regions commonly had more male than female staff members. In this sample, while females make up around half of the teaching staff at School 3 and School 5 (43% and 55%, respectively), at School 1 there is only 1 female teacher out of 7 teachers at the school, and School 8 has only male teachers (5 in total).

- Timing (e.g., conflicts with when teachers would go home for a meal)
- Lack of motivation to stay on after school

See Section 6.2.2. On system-level barriers for further discussion of these reasons and participants' proposed mitigation strategies.

6.1.1. Stakeholders' understanding of CoLs/MEWAKA

The Local Government Authority (LGA) officers, teachers, and TCPD teams who participated in interviews and FGDs showed awareness of MEWAKA and a shared understanding of the purpose of CoLs. According to an LGA officer,

> *"At TCPD and CoLs, teachers will do and learn a lot in collaboration with others; they will also manage it [CoLs]. They will look for methods and through TCPD be able to improvise teaching and learning resources from their own environment."* (LGA Officer interview, November 2022)

It should be noted that the participants showing a comparable high level of awareness took part in FGDs in the four schools that were observed bi-weekly. The interviews were conducted with LGA officers who participated in the (pilot) *Peer Facilitator Manual* workshop held in Lindi in September 2022. Interviews with officers and schools less involved in the DBIR could potentially reveal different levels of awareness. For example, several LGA officers reported that understanding, implementation, and internal monitoring of CoLs "*differs among schools*". The School 5 TCPD team also reported that when their teachers met teachers from other (non-DBIR) schools, they heard that not all schools were implementing CoLs regularly, which had a negative impact on the motivation to participate by some teachers' in DBIR schools.

LGA officers were aware of the purpose of CoLs for improving teachers' competencies through exchanging experiences to enable them to meet challenges in their classroom contexts. Some of the LGA officers interviewed saw their own role as "*monitoring the quality in the provision of training*" (LGA Officer interview, November 2022), while others focused mainly on compliance with the CoL timetable, rather than the quality and impact of CoL sessions.

6.2. System-level findings

RQ1A: [Systems] What are the **system-level enablers** and **barriers** to **sustainable implementation** of a school-based TCPD model in rural primary schools?

6.2.1. System-level enablers

System-level enabling factors ranged from peer facilitation workshops, to TCPD monitoring mechanisms. Availability and access to technology, and the role of peer facilitators and mentors, were also identified.

Peer facilitation workshops

Participants highlighted the fact that the peer facilitator workshop (implemented as a pilot for the *Peer Facilitator Manual*) clarified for many officers how CoLs were meant to be conducted. This made it easy for the peer facilitators themselves, but also other officers at ward and district level who attended the peer facilitation workshop.

Monitoring

It was also noted that regular monitoring, especially by WEOs, played a key role in ensuring that weekly TCPD activities happened across the schools as required, despite some setbacks, as highlighted in Section 6.2.2.

> "*Now that there is a national level monitoring on how TCPD is implemented, the report that came back showed that we are implementing in accordance with the guidelines and procedures that have been set. In other words, we are implementing according to the established procedure, unlike the beginning where teachers would enter the CoLs with irrelevant topics.*" (LGA officer interview, November 2022)

Availability of technology

LGA officers at ward and district levels believed the distribution of tech tools, especially tablets, coupled with growing teacher awareness of the impact of TCPD on their professional growth, increased teachers' enthusiasm to participate in the CoLs and other TCPD activities.

Other enabling factors

Other enablers mentioned by one LGA officer included the organisation of learning units per CoL session (i.e., covering one specific topic per session), which made it easy for teachers to follow the session and spend less time organising themselves. Another LGA officer highlighted that pupils' success in learning is also a motivating factor:

> "*It makes teachers encouraged to continue following up the TCPD programmes as they can see the outcomes.*" (LGA officer interview, November 2022)

6.2.2. System-level barriers

Several system-level barriers to effective implementation of TCPD activities were identified. These ranged from awareness, financial resources, and CoL structure to issues around specific needs for Special Needs Schools.

Awareness

LGA officers reiterated that key stakeholders were left out of the initial trainings, which created gaps in terms of understanding how exactly the TCPD activities should be run, especially the CoLs. One officer highlighted the fact that some

> "*administrators, at the school and ward level, have not yet understood the importance of training*" (LGA officer interview, November 2022).

Financial resources

Financial resources to support TCPD implementation were viewed as insufficient by schools and LGA officers, and incentives for teacher participation were commonly cited as needed by all study participants. Costs reported by LGA officers and TCPD teams included the materials used in CoL sessions and transport to and from cluster-level workshops. LGA officers and school TCPD Teams specifically noted insufficient capitation grants for schools, and lack of transport or fuel for monitoring visits by ward officers.

> *"Until now, there is no money coming to the ward education coordinator's office to run TCPD and CoL or other educational activities in my ward. Instead, we are working with dedication, loyalty, and patriotism."* (LGA Officer interview, November 2022)

> *"Regarding the financial issue, there is no money from my office to run the activity, but we, the coordinators and headteachers, have to contribute some money from our allowance to support TCPD programmes."* (LGA Officer interview, November 2022)

Timing of the CoLs

Timing was another barrier mentioned several times during interviews and FGDs. Overlapping schedules, which resulted in teachers missing CoLs because they were assigned other duties by ward or district officers and/or within school was not uncommon. Observed average attendance was 88%

per week, but this varied by school and session, ranging from 69% to 100% of teachers attending.

> *"You will find that our leaders in the council are aware of TCPD timetables but, there are other responsibilities they bring to us to perform such that the time they bring the task is the same time that TCPD has to be done."* (School 3 TCPD Team FGD, November 2022)

Having to hold CoLs outside regular school hours to ensure that teachers did not miss lessons affected teachers' motivation, as attending CoLs was perceived as unpaid extra hours of work. (See also Section 6.4 on teacher-level barriers).

Specific needs for Special Needs Schools

The fact that Special Needs Schools have specific needs for particular teaching strategies and accessing TCPD materials was also noted. Some teachers have low or no vision, hearing impairment, or albinism. It was noted that the technology that was in place during the research was not supportive for this group of teachers. Several stakeholders, including WEOs, TCPD teams, and teachers, highlighted the need to consider this to create equitable access to learning during TCPD activities.

> *"Some teachers with hearing [impairments] and low vision [should] be given technological aids that will help them capture knowledge."* (Teacher FGD, November 2022)

> *"Technology helps, but* [...] *for example, our colleagues who are blind, there are systems that could be enabled in these tablets, and they will have access through voice. If you put it on the phone system, it takes a little time to speak and it makes it annoying."* (School 5 TCPD Team FGD, November 2022)

6.2.3. System-level mitigations proposed by participants

LGA officers, teachers, and TCPD teams all had some suggestions for overcoming the system-level challenges:

- **Awareness**: Workshops should be held on a regular basis, and should include all important stakeholders, including headteachers and SQA and LGA officers at various levels.

- **Finances and motivation**: A regular budget or financial support needs to be provided at school level to support CoL activities.

  On this point, two wards reported steps they had already taken at local level, although these were deemed insufficient by the participants and their sustainability may be questionable:

  - Ward officers reported donating their own allowances to cover MEWAKA costs at schools.
  - One ward officer insisted the headteachers within the ward had to find a way to provide at least soda (or other snacks) to motivate teachers to attend CoLs.

  "To stay in the session for one hour, they need at least some refreshments, such as biscuits and soda. It will increase the teacher's level of concentration in the session because during the session the teachers are tired, taking into account that the sessions are conducted post normal working hours. Therefore, it is important that teachers are empowered so that they can fully participate in TCPD programmes." (School 1, TCPD Team FGD, November, 2022)

- **Providing certificates of participation in TCPD programmes**. This recommendation for a system-level intervention came from teachers:

  "*People would be highly motivated if after some time they are awarded with a certificate showing that they have grown professionally.*" (School 1 Teacher FGD, November 2022)

- **Harnessing social media**. LGA officers as well as teachers reported using WhatsApp to gain further support from peers (across schools and wards) in between CoL sessions. TIE and/or LGA officers and TCPD facilitators could leverage social media such as WhatsApp and make it an official learning space. Social media could be adopted at system level and be used to disseminate learning materials across CoLs. Teachers felt this could be used as a learning avenue since many teachers have access to social media, and it has proved useful.

6.3. School-level findings

RQ1-B [schools] What are the **key school-level enablers** and **barriers** to making peer facilitators and headteachers effective in implementing school-based TCPD?

School-based factors in TCPD effectiveness range from the organisation of CoLs at school level, to the selection processes, skills and training,

perceptions, and motivation of peer facilitators and the role of school leadership in supporting and supervising TCPD.

6.3.1. School-level enablers

Flexibility within TCPD structures

The *TCPD Supervision Guide for LGA Officers* (↑Ministry of Education, Science and Technology, 2022b) and the ↑School Level MEWAKA Implementation Guidelines Ministry of Education, Science and Technology (2022a) stipulate that CoLs should be held weekly and provide monitoring forms where CoL topics and attendance are recorded and reported monthly to WEOs.

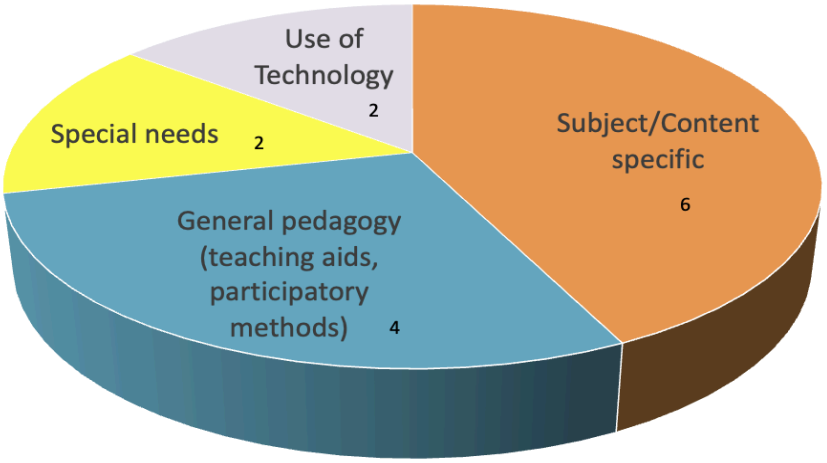
Schools have adapted their own routines for the required schedule and record keeping

The academic teacher designated the day and time of CoLs in each school. At the schools in the study, CoLs were held on Thursday or Friday afternoons. Record keeping varied by school. In one school, a designated peer facilitator always recorded the topic and attendance, regardless of who facilitated the session. In another school, this task rotated among all teachers on a weekly basis. Yet another school nominated one teacher (who is not a peer facilitator) as the 'secretary of the CoL', who filled in the records each week.

The selection of topics for the CoL was also handled differently by schools

At School 1 and School 3, teachers discussed challenges in their departments, and from these, topics were selected for CoLs to address. At School 5 and School 8, the TCPD teams decided the focus for CoLs based on the team's perception of teacher needs and current school priorities. In these schools, teachers with expertise in the identified areas were then asked to lead the CoL sessions.

Figure 3. *Focus of CoL Sessions*



As shown in Figure 3 above, **the majority of CoL sessions focused on subject content from the curriculum or general pedagogy.** Strategies to address special needs, such as albinism and communicating with learners with special needs, were the focus of two CoL Sessions at School 5, a school which serves students with moderate to severe special needs. The only school to focus explicitly on learning about technology in CoL sessions was School 8, which was the school that had been provided the tech pack with the most devices (Profile 4). One session was on logging in to the internet, and another was on the use of videos.

Headteachers and academic teachers were perceived as playing key supportive roles

At School 1 and School 3, the headteacher collected the topics and challenges raised by teacher departments, decided which was appropriate for the whole-school CoL, and ensured the facilitator for the session had the necessary expertise. At School 8, the headteacher and academic teacher both participated in CoL sessions with the other (three) teaching staff, "*because they also need to learn things like methods of teaching and learning so that they can use it in the classroom*" (School 8 FGD).

Respect for facilitators and peers

In all of the observed CoL sessions, reciprocal respect was noted. Peer facilitators were rated highly for ensuring respectful interactions, and teachers were rated highly for their respect towards the facilitators and their colleagues.

6.3.2. School-level barriers

One category of school-level barriers evident in the findings was the facilitation strategies used in CoL sessions. Several aspects of facilitation and lack of engagement from female teachers were identified as detracting from CoL effectiveness through the CoL and classroom observations. The other categories of school-level barriers, which study participants identified through the interviews and FGDs, were the need for external expertise, designating peer facilitators, and technology-related challenges.

CoL facilitation: Inconsistent use of interactive engagement and focus on content in CoL sessions

According to CoL observation data, while CoL environments appear to be respectful, peer facilitators are inconsistent in the use of interactive activities and in encouraging discussion, reflection, collaboration, and peer feedback (see Box 1). In addition, the focus of discussions in CoLs tends to be almost exclusively on curriculum/subject content, with little explicit discussion of teaching strategies.

Box 1. *Observed facilitation of CoL sessions*

In two-thirds of the observed CoL sessions, facilitators scored 'low' or 'medium' on skills such as:

- using interactive activities
- promoting teacher collaboration
- modelling, enacting, thinking aloud
- using a variety of modalities

A notable exception was School 3, where the peer facilitators who led CoL sessions were consistently rated 'high' or 'medium' on sub-skills under teacher engagement and facilitation. These facilitators also used a wider variety of activities than peer facilitators at other schools in observed CoL sessions.

Lectures and non-interactive methods dominated many observed CoL sessions. These sessions could be characterised as 'chalk and talk', similar to what has often been observed in classrooms. In the few sessions where facilitators were rated 'high' on interactive pedagogy items, the kind of activities noted were group discussion and presentation, question and answer (between individuals and the facilitator), and brainstorming. Games, role play, and giving feedback to peers were not observed in any

CoL sessions. In short, CoL facilitation closely resembles classroom teaching in most of these schools.

There was one CoL session at School 8 where each teacher prepared and shared a teaching aid. Aside from this, the only teaching aids observed in CoLs were flipchart or blackboard drawings and notes, and in the occasional tech-supported sessions, smartphones and tablets were used.

The range of strategies used in observed CoL sessions and level of interaction (rated as 'high', 'medium' or 'low' can be seen in Figures 4, 5 and 6 on the following pages. Some TCPD teams were aware that peer facilitators needed to continue to improve, as the School 8 TCPD team noted:

> *"Support is needed [for] improving ways of facilitating* [...] *There is a need for those who attended [peer facilitator] trainings to be told how to go and use the materials, for example, teaching methods."* (School 8 TCPD Team FGD, November 2022)

Figure 4. *CoL observation data: Teacher engagement*

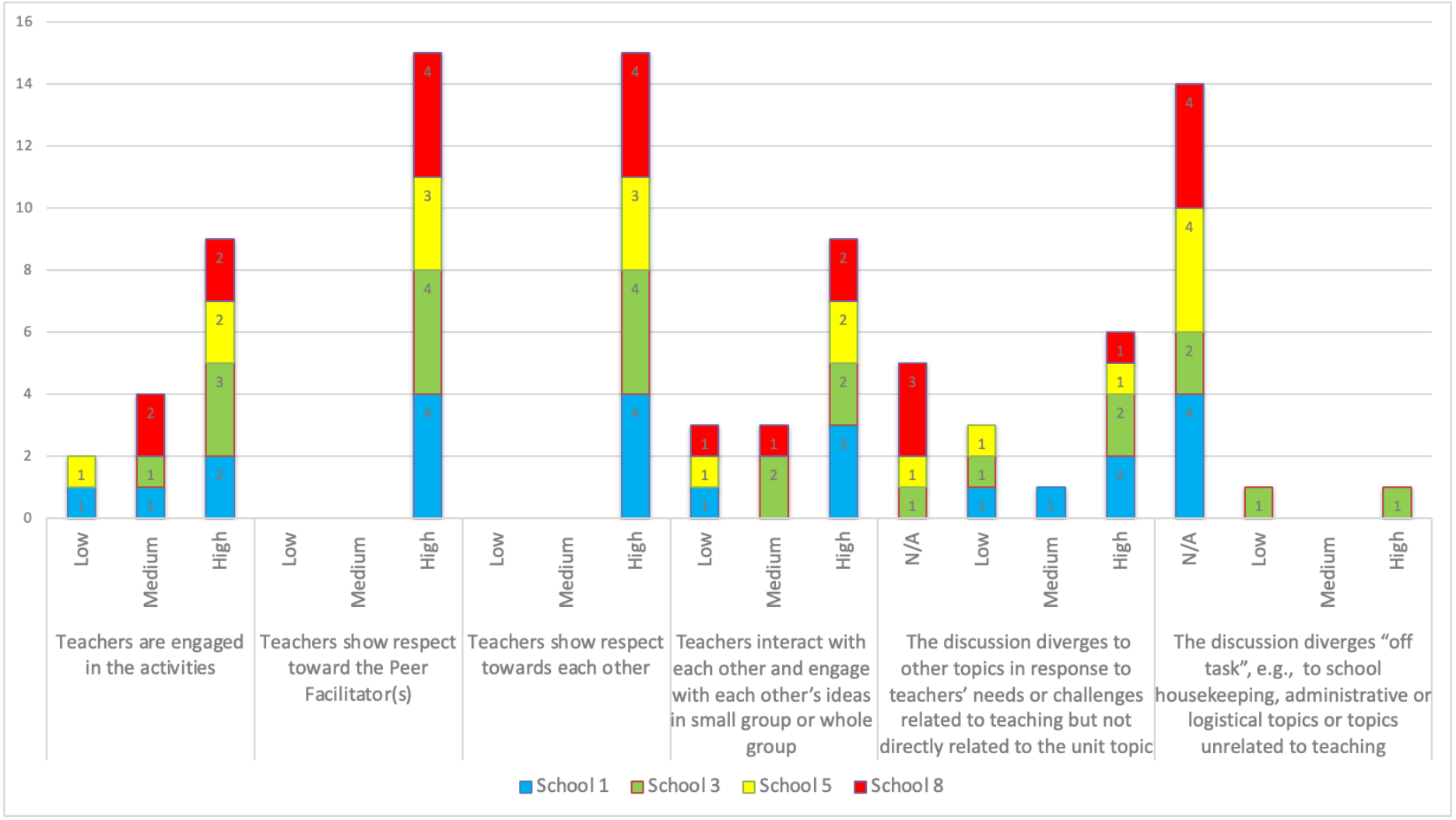


Figure 4 illustrates the collegiate, respectful environments across schools. Engagement in activities and peer interaction was also fairly high. Discussion rarely veered 'off task', bar two instances in School 3.

Figure 5. *CoL observation data: CoL facilitation—Guided learning*

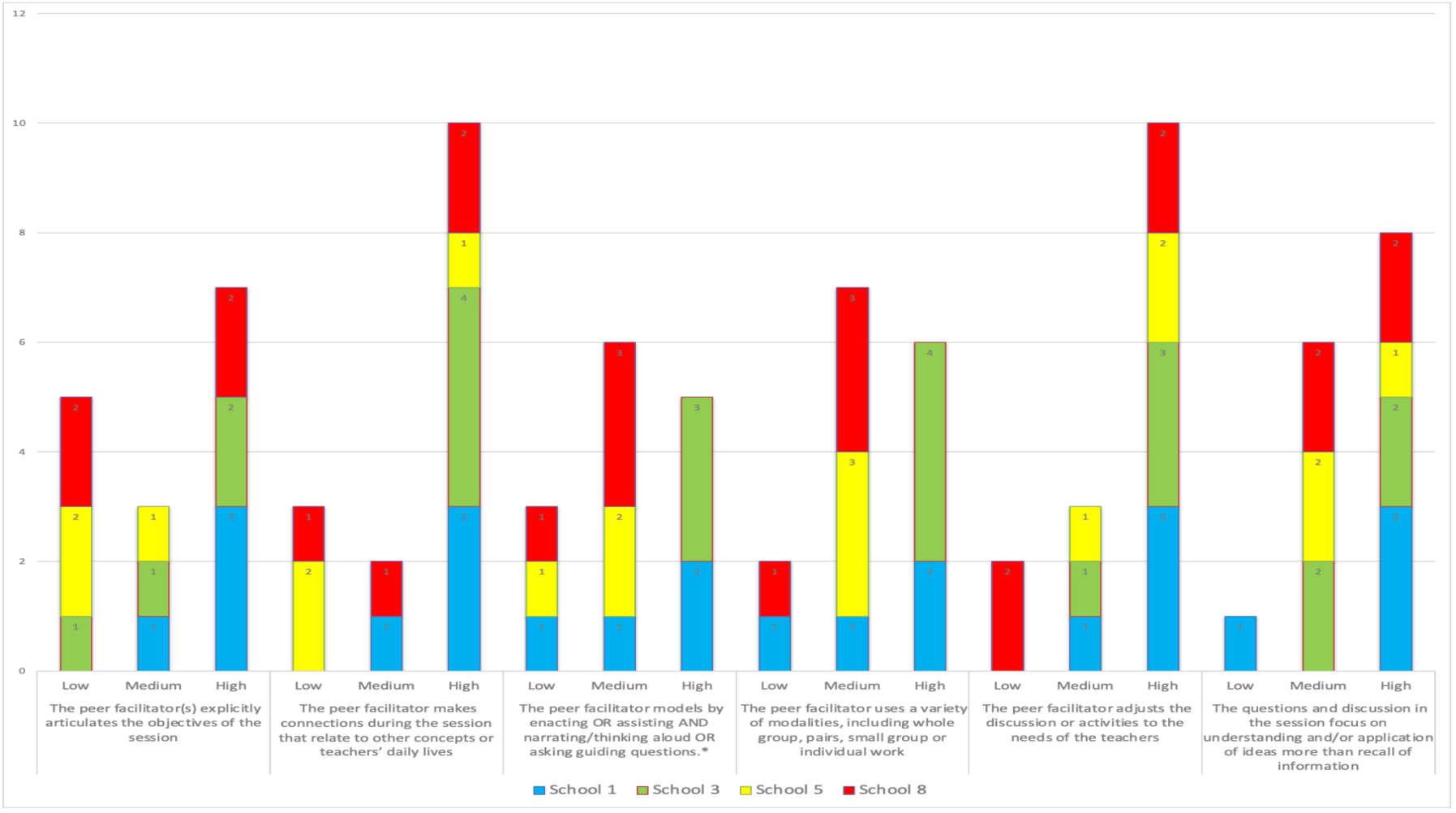


Figure 5 shows CoL sessions were regularly made relevant to teachers' daily lives and wider needs. Furthermore, the sessions generally focused on application of ideas, bar one observed session in School 1. However, explicit articulation of session objectives was more mixed.

Figure 6. *CoL observation data: CoL facilitation—Supportive environment*

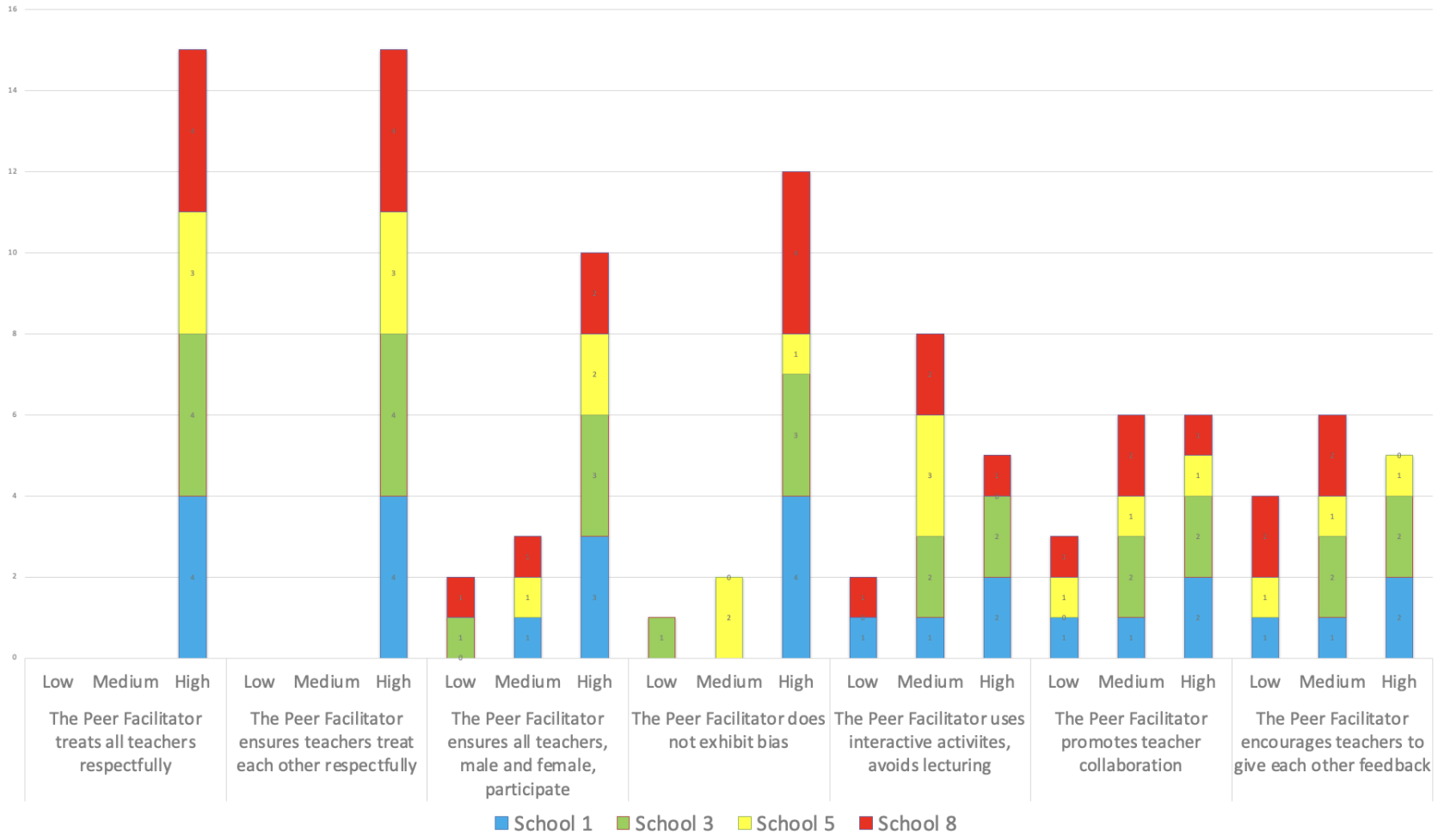


Figure 6 illustrates the peer facilitators were also consistently respectful, like their colleagues, as shown in Figure 4 above. Peer facilitators rarely showed bias across schools. However, promotion of teacher collaboration and peer-to-peer feedback were less frequently observed.

Focus on content rather than teaching strategies

Analysis of the video recordings of a subsample of CoL sessions revealed that the explicit focus is often on clarifying facts in the curriculum (i.e., content knowledge) rather than pedagogical content knowledge or teaching strategies. Even when using mainly a lecture method, the facilitators did model a few different teaching strategies. For example, in explaining a difficult mathematics topic, one facilitator had CoL participants guess the answer to a challenging question first, and then compared their responses to the correct answer (School 1 observation). In a CoL session on a difficult science topic, after an interactive lecture incorporating Q&A, the facilitator assessed the CoL participants' grasp of the content by asking each of them to draw a question card. The participants then had to read the question aloud and answer it, with support from their peers when needed (School 3 observation). However, there was no discussion of how such strategies provided the teacher with formative assessment data or helped to develop student understanding. Teachers did not share other ideas on how the same topic could be made more easily accessible to students, nor was there any evaluation or collective reflection on the effectiveness of the strategies, or ways to make the activities more practical or interactive.

Female teachers were observed to be less engaged than male teachers in some CoL sessions

On equal engagement of all teachers, noting gendered differences, peer facilitators were rated 'low' in 2 out of 15 CoL sessions, and 'medium' in 3 CoL sessions. At School 5, it was noted in one observation that, *"both genders were given equal chance but few females participated."* In the subject-specific science CoL observation at School 3 which utilised a lecture format interspersed with a high degree of Q&A, one of the female teachers initially engaged in responding. However, as the session continued, although the female teachers appeared focused and attentive, only male teachers responded to the facilitator or asked questions.

There could be multiple reasons as to why female teachers were less active in CoL sessions, ranging from, for example, personality to gendered cultural norms or habits in the school. In some cases, female teachers may have been outnumbered by males, and some may also have been less comfortable with the topic of the CoL session in contrast to their levels of comfort with their grade level or subject. However, guidance to peer facilitators included gender responsivity. This issue will merit further investigation in Cycle 2 of the DBIR.

Need for external expertise

Some TCPD teams and WEOs identified the need for external expertise as a barrier. At times, they felt that there was no one with sufficient expertise among the school staff or even the cluster/ward to address the challenges or difficult topics raised by teachers. While this was not true for every challenge, it highlights the need to ensure mechanisms for external input or guidance in the MEWAKA model.

Designating peer facilitators

The premise of the MEWAKA CoL model is that one or two teachers at each school who have sufficient competence and the respect of their colleagues should be nominated as peer facilitators. This streamlines accountability for preparing CoL sessions. It also serves as a recognition of teachers' competence and provides them the opportunity to take on a new leadership role within the school and to gain adult learning and facilitation skills. Nevertheless, two schools rotated facilitation duties among different teachers in each observation, based on who was perceived to have the expertise needed for that day's CoL topic. In the feedback survey, 3 out of 16 teachers suggested that peer facilitators should rotate, and the facilitation training should be provided to all teachers.

Technology-related challenges

The most common challenges reported by teachers and TCPD teams were technology-related. Participants noted inadequate technological infrastructure, such as electricity, connectivity, and insufficient devices, as well as the cost of internet bundles and electricity for charging devices. Teachers' varying levels of digital literacy were also reported as a challenge at each school. See Section 6.6 for further discussion.

6.3.3. School-level mitigations proposed by participants

In discussing the enablers and challenges of CoLs, the participants from TCPD teams, LGA officers and teachers proposed some mitigation measures. At the time of the study, these strategies had not been implemented at any of the schools. Participants' suggestions included:

- **Strengthening CoL Facilitation** — Provide more continuous training, with mentors or coaching, for peer facilitators. "*Mentors must continue to play their roles to support peer facilitators in executing their function.*" (LGA officer interview, Nov. 2022)

- **Reconsidering scheduling of CoL sessions.** LGA officers suggested:
  - Holding school-level CoLs twice a month instead of weekly, so teachers have more opportunity to practise between sessions.
  - Holding cluster CoLs every three months instead of monthly to save on travel costs.

6.4. Teacher-level findings

RQ1-C [teachers] What are the **key teacher-level enablers** and **barriers** to implementing the school-based TCPD?

6.4.1 Teacher attitudes

> *"Nowadays, teachers have become the solvers of their own teaching and learning challenges and are not complainers like in the past. As a result of this programme, teachers have been sharing the challenges they face and finding ways to solve them, instead of waiting to be solved by someone else from outside [... they] find the solution themselves."* (School 1 TCPD Team FGD, November 2022)

Confidence and teacher empowerment

Teachers and TCPD teams reported a change in teachers' attitudes in terms of feeling more "empowered" through the skills they were learning. Teachers mentioned both increased content knowledge and teaching strategies as competencies they were gaining through CoLs. Some teachers characterised this as increasing their confidence:

> *"TCPD has helped us to remove fear due to the competency built in us."* (School 3 Teacher FGD)

LGA officers corroborated these comments, as one Ward Education Officer reported:

> *"We have succeeded in building confidence among teachers; nowadays, teachers are confident enough when facilitating; each one may stand and facilitate teaching."* (Interview, November 2022)

Other teachers related this confidence to the continuous and incremental nature of building competence.

> *"But even the way of presentation, you know; learning* [...] *is broad and when we are in college, in the college where we came from, we*

> *learnt a lot in theory, but it was little in practical. When you come to be employed into the service, you come to meet with the children themselves. You stay with them for a while, and in two or three years something else grows. There comes a time when you get training like this, you become nourished/empowered, then you come back again, and you facilitate each other; there is something you remember."* (School 1 Teacher FGD, November 2022)

Another teacher from the same school felt that this empowerment motivated teachers to keep teaching.

> "*[CoL] facilitates the acquisition of various knowledge between teachers, it also facilitates the teachers to become motivated to continue, for example, when they encounter with a challenge it motivates them to continue with teaching activities."* (School 1 Teacher FGD, November 2022)

On the teacher feedback survey, when asked "*How relevant are the TCPD activities for your needs as a teacher*?" 24 of the 25 respondents replied, "*A lot*."

Increased collaboration

Teachers described many ways in which CoLs had increased the level of collaboration in their day-to-day work. This included sharing expertise at CoL sessions within schools as well as asking questions and sharing resources between schools, through WhatsApp groups they had spontaneously formed. Teachers noted several benefits to the new level of collaboration:

> *"[Now] I'm not ashamed to tell my fellow teacher that I do not know something. Therefore, it has helped teachers to work as a team."* (School 1 Teacher FGD, November 2022)

WEOs were also involved in supporting collaboration. When teachers could not adequately address their challenges with expertise,

> "*The ward supervisor takes a lead over challenges and sees if the challenge can be solved within ward level.*" (LGA officer interview, November 2022)

Challenges with teacher attitudes

While most teacher comments, survey responses, and observed participation in CoLs were engaged and positive, some less positive attitudes were reported. Teacher dissatisfaction mainly centred on

motivation to make the time to engage in CoLs, with a desire for incentives. See Section 6.4.3 on teacher-level barriers for further discussion.

6.4.2. Teacher-level enablers

Enabling factors cited by participants included dedication, collegiality, and motivation, these are discussed below.

Dedication

Although teacher enthusiasm to participate in CoLs varied, most teachers stayed after hours without compensation to participate in CoLs. At School 3, observers noted that teachers were motivated and prepared and started CoL sessions on time even if the headteacher was not present. At School 1, it was observed that when the headteacher was absent, the CoL session was delayed and less organised, but attendance was still high. School 5 teachers were the most likely to vocalise a need for remuneration (incentives), and it was only at this school that some teachers resisted requests to lead CoL sessions because they had not been trained as peer facilitators. Nevertheless, most teachers at School 5 participated in CoLs and could describe strategies, knowledge, and skills they had gained.

Collegiality

Teachers' respectful behaviour in CoLs and their openness to collaborate, admit their challenges, and seek solutions together (see Section 6.4.1 above on teacher attitudes) was also an enabling force for CoL effectiveness.

Gaining motivation through positive results

Teachers at all schools in the study reported that learning how to teach difficult topics and find useful materials online and/or from their peers made them more interested in TCPD.

> *"I am very much motivated because there is a lot of content that was complicated for me, but now, I can teach them easily having been empowered by my colleagues in CoL."* (School 5 Teacher FGD, November 2022)

6.4.3. Teacher-level barriers

While most teachers attended CoL sessions and many reported that they learnt useful skills or content that motivated them, a few challenges with teacher motivation were also reported. School 5 reported more comments about teachers lacking motivation than any of the other schools, in FGDs and surveys, although Schools 1 and 7 and WEOs also raised this issue.

Timing

The main factor reported as a barrier to motivation was the timing of CoLs (see also Section 6.3). At School 5, the TCPD team noted that some teachers heard from their colleagues that other schools don't hold CoLs consistently, leading them to comment that "*[when in] our school we do [CoL sessions] every week, teachers see it as a punishment*" (TCPD Team FGD, November 2022). The School 1 TCPD team also reported that their teachers did not want to stay on after regular work hours for CoLs, particularly not without any incentives. In contrast, all teachers at School 3 and School 8 almost always attended, even if the headteacher was absent. However, a challenge they noted was that the time the facilitators used to prepare for CoLs was the same time they would have used for preparing lessons to teach students.

Limited number of peer facilitators

The other barrier reported by three teachers on the feedback survey and mentioned by one TCPD team was that some teachers were resentful of peer facilitators going to workshops and getting per diems. This was particularly the case if the (non-peer facilitator) teacher was asked to lead a session because of their particular expertise.

6.4.4. Teacher-level mitigations proposed by participants

Teachers, TCPD teams and LGA officers made suggestions for potential system-level and school-level mitigation strategies to overcome the barriers to teacher motivation relating to timing and incentives (see Sections 6.2.3 and 6.3.3).

In addition, three teachers from two different schools suggested that all teachers should receive the peer facilitator training. This could increase the pool of teachers who lead CoL sessions and may reduce envy. Indeed, in the interest of creating equal opportunities, alternating facilitators is now recommended in the official guidance.

6.5. Perceived and observed impacts on teaching and student learning

This section focuses on the potential impacts MEWAKA has had on teaching and learning within the DBIR schools.

6.5.1. Participants' perception of CoL outcomes

Despite various challenges and barriers, CoLs were perceived to have positive outcomes for teachers and students. On the feedback survey, when asked, "*How relevant the TCPD activities are for your needs as a teacher*?" 24 of the 25 respondents replied, "*A lot*". In addition to the increase in teacher confidence and collaboration, the perception of teachers and TCPD teams is that teachers' understanding and use of interactive teaching methods has increased. This in turn had a positive impact on student learning. For example:

- At School 1, teachers attributed increased student confidence, critical thinking and even an improvement in early grades reading and mathematics skills and improved exam scores for students of Standard 6 to the strategies from CoLs that teachers applied in their classrooms (e.g., group discussions and brainstorming).
- At School 3, the TCPD team reported that, whereas in the past teachers only used questions and answers, they were now using various methods such as a gallery walk and group discussions. They also reported that teachers had changed the seating arrangement in classrooms from rows to grouped desks so that students could work together more easily.
- At School 5, teachers explained that they were learning skills from their colleagues that they could use with students who have special needs, for example, *"to communicate better with blind or deaf students"* or *"how to teach and live with students with skin disabilities."*
- Teachers at School 8, which focused on using technology and teaching aids in the CoL sessions observed, felt that the skills and content they had learnt in CoLs benefited not only their teaching and student motivation, but also their personal lives:

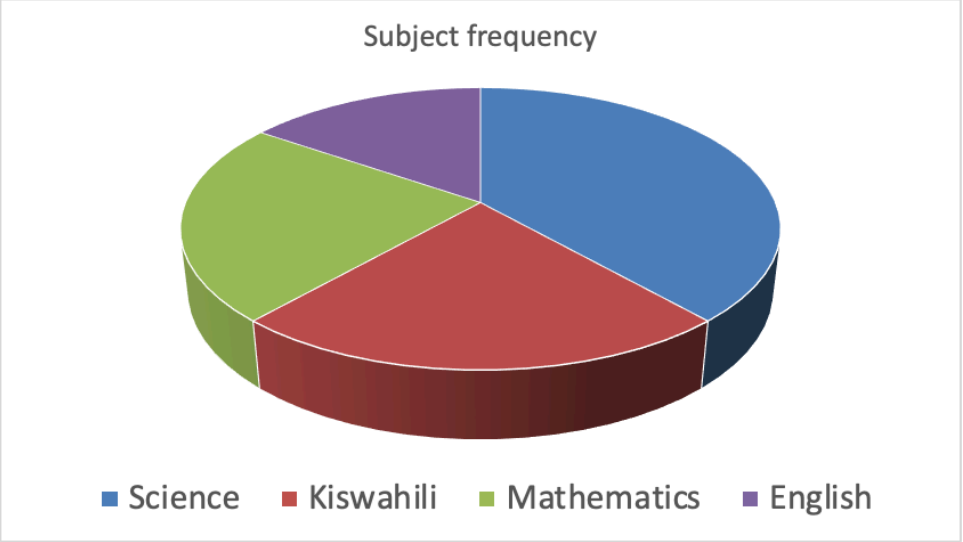
  "[...] *in relation to these technological devices, previously we [teachers] were not conversant using technology devices, but through collaboration it has helped us gain knowledge. The materials we use in TCPD are very important as they help us in facilitating each other but also in the classroom and for personal use."* (School 8 TCPD Team FGD, November 2022)

6.5.2. Classroom observations

While teachers and educational officers noted the positive developments in teacher practices and student outcomes mentioned above, the CoL and Classroom observations did not yet show a high degree of interactive

learning. Analysis of CoL observations is presented under the section on 'CoL facilitation' above. This section presents findings from the 15 classroom observations (covering the subjects depicted in Figure 7 below).

Figure 7. *Subjects taught in lessons observed in Standard 3 and Standard 6*



Strengths observed in classroom observations

- Teachers' and students' interactions were positive across all schools.
- Generally, teachers dealt with mistakes and misconceptions well and used these as opportunities to strengthen learning (see Figure 8 below). Ten out of 15 teachers scored highly in this category, with the researchers noting an atmosphere of trust in two-thirds of the classes observed.
- In 11 out of 15 (73%) of the classes observed, teachers scored highly in relation to not exhibiting any gender biases.

Figure 8. *Classroom observations: Classroom climate and social environment*

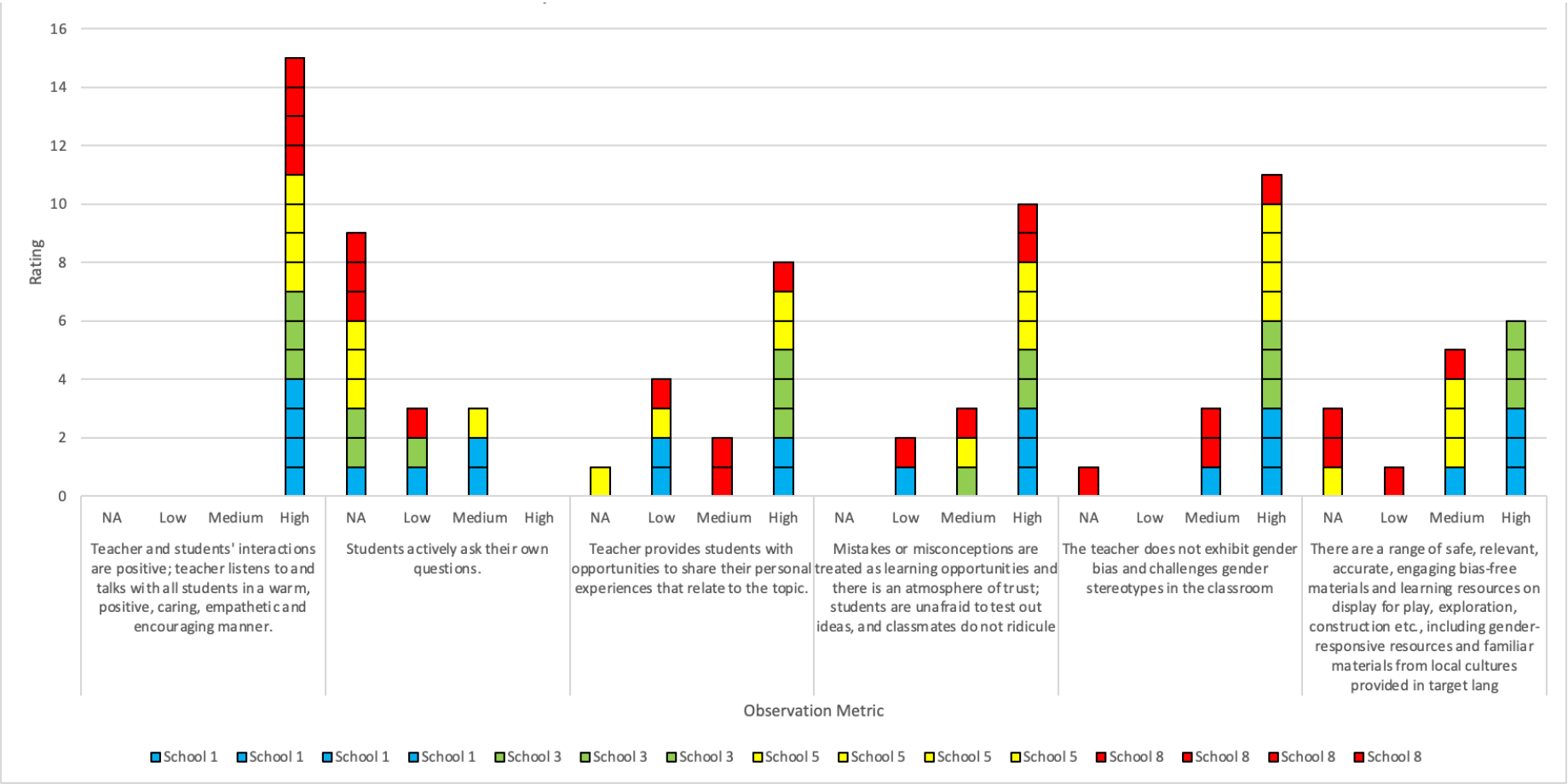


Figure 8 illustrates the theme of respect and caring environments that was evident in CoL sessions and noted during classroom observations. Teachers were generally effective at addressing learners' mistakes or misconceptions, and did not often show any gender bias or stereotypes. However, teachers could have provided more space for students to share their own experiences in relation to the subject content.

Figure 9. *Classroom Observations: Facilitation skills and strategies*

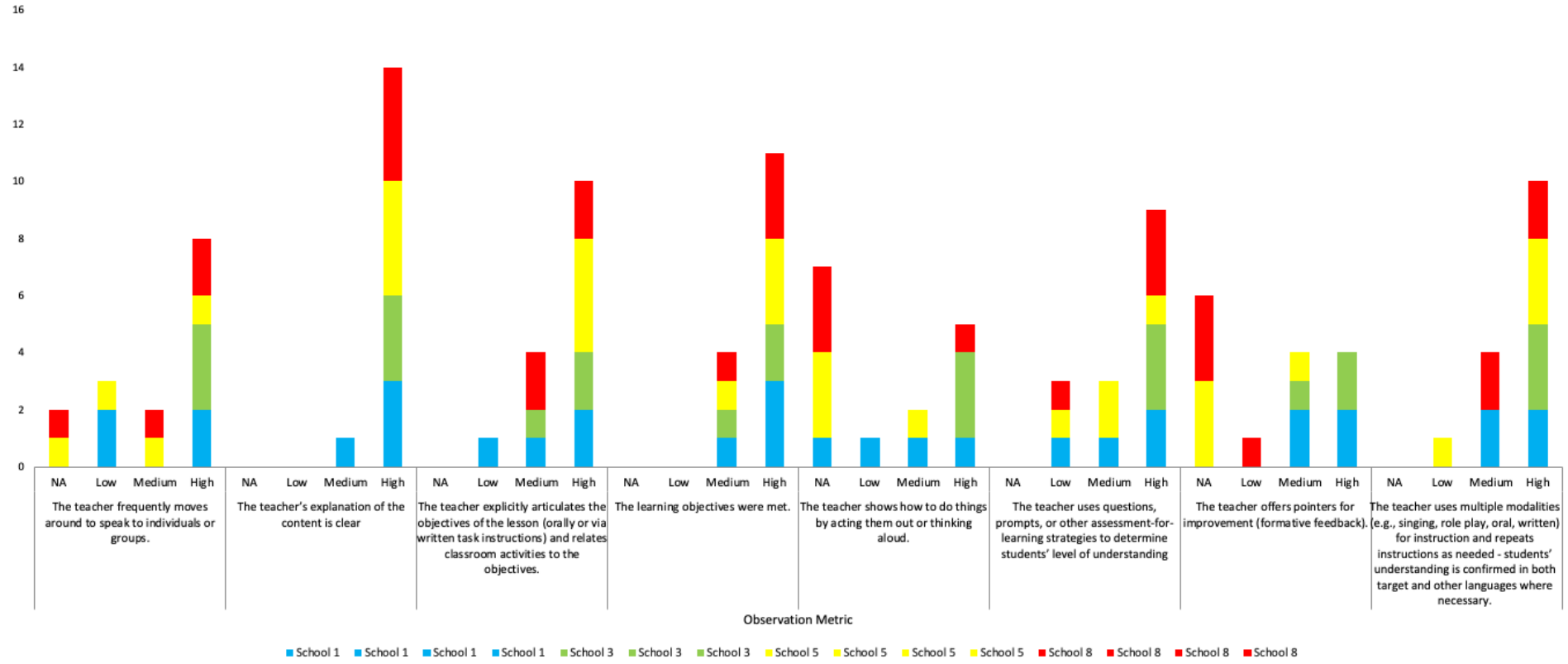


Figure 9 shows teachers were generally clear when explaining content, lesson objectives were often met, and notwithstanding one observation in School 5, teachers used multiple modalities to support teaching and learning. Questioning, as an assessment for learning strategy, was slightly lacking across schools (apart from School 3) and teachers could do more to offer learners feedback.

Figure 10. *Classroom Observations: Supporting positive development*

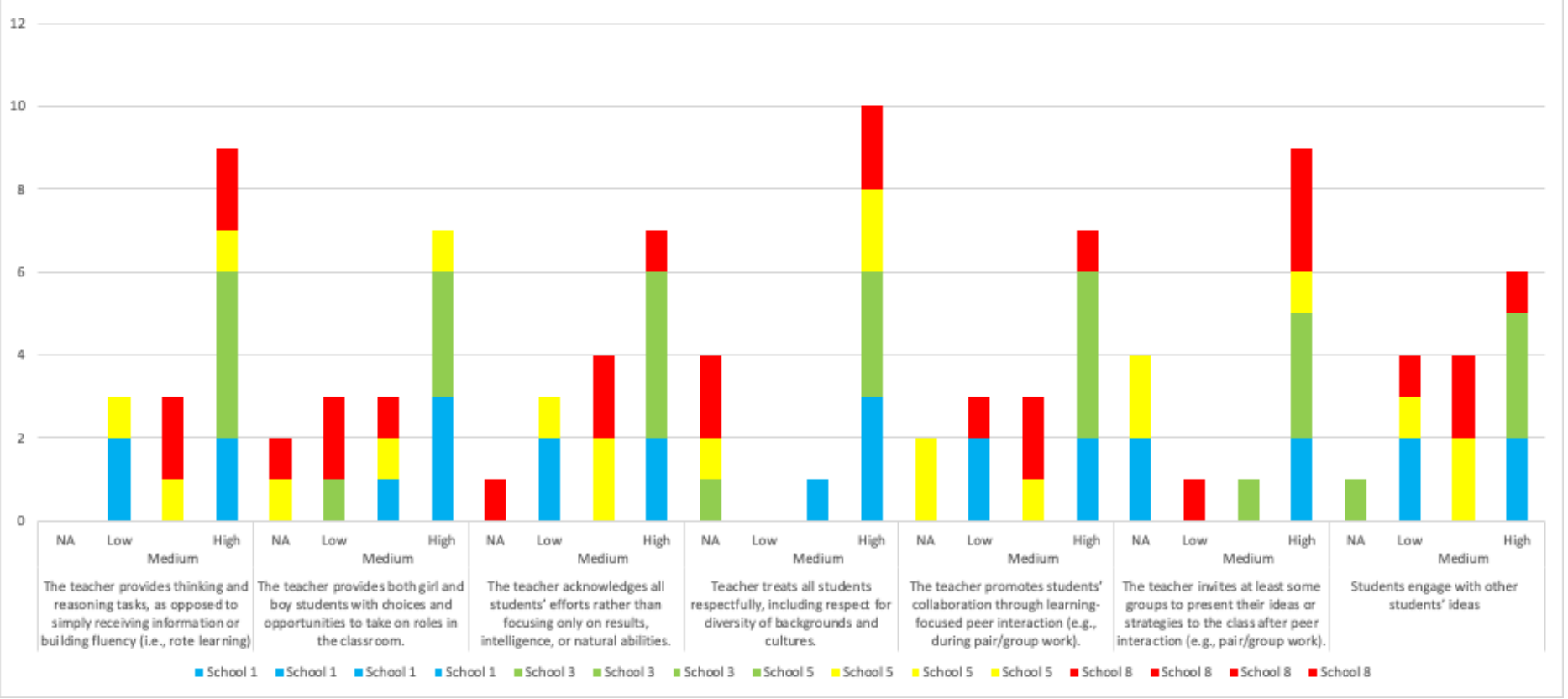


Figure 10 shows that teachers often provided reasoning tasks and invited students to present work following group activities. Observation results were more mixed regarding students engaging with each other's ideas (apart from School 3), while School 5 in particular should focus more on equal gender opportunities in the classroom.

Areas where teacher performance in observed classes was inconsistent or could be improved

- Students rarely actively asked their own questions in class. In just 3 of the 15 classes (20%) observed, this item was marked as 'medium'.
  - Teachers did invite students to share their personal experiences related to the topic regularly. In 8 out of 15 classes (53%) this strategy was marked as 'high'. However, in 4 out of 15 (27%) this was marked as 'low'.
  - School 3 teachers performed particularly well in this category, all scoring 'high' (Note: higher performance in School 3 is a trend across all categories.)
- Regarding the provision of a range of safe, relevant, and appropriate learning resources, responses were mixed.
  - All teachers from School 3 scored highly in this category;
  - Three teachers from School 1 scored high, while one scored 'medium';
  - School 8's teachers had mixed results, one scored 'low', one ' medium' and two were logged as 'NA'.

6.6. Appropriate uses of technology in rural school contexts

RQ2A What are the appropriate uses of technology in rural school contexts with limited access to technology that can support effective TCPD?

In the DBIR schools, additional technology was provided as described in Section 5.3. This technology was provided in addition to the national TCPD implementation, not as part of it. Each school was given a different combination of technological devices/access to technology.

6.6.1. Stakeholder perceptions

Teachers across all schools viewed technology positively. They found the following benefits to using technology.

- **Reduced workload.** Some teachers felt that technology can make teaching easier:

  "[...] *technology has also reduced the burden on teachers. For example, Class four science requires the use of devices that the child*

will see, and now we have them at school" (School 8, TCPD team FGD, November 2022).

- **Convenient, quick access to resources.** Some teachers felt motivated as technology made it convenient to access teaching and learning resources:

  "I am motivated by technology issues because I am able to log into the system and read whatever I wish on my own at a convenient time and place without necessarily having to leave my working station in pursuit of the teaching and learning materials." (School 1, TCPD Team FGD, November 2022)

  Increased learner engagement/performance. When using technology in the class, teachers found that learners were more engaged and curious:

  "Children are motivated; they have increased curiosity. Those subjects that were not liked are liked because of technology." (School 5, TCPD Team FGD)

  School 8 (TCPD Team FGD) attributed improved student performance to teachers' use of technology in their teaching. Additionally, they pointed out that students were learning about technology, which was beneficial to them.

- **Improving digital literacy.** Teachers across all schools reported that their digital literacy skills were improving and this supported accessing teaching and learning resources.

  "Another thing that is useful for us from CoLs is the ability of teachers to know how to search material through the internet. This has also brought efficiency to teaching and learning because, by using LMS, the teacher can go online and search for texts, widen their knowledge, and go to teach. In the beginning, we were unable because we did not know how to search for the materials online." (School 1, TCPD team FGD, November 2022)

  A similar sentiment was shared in School 3.

  "But it has also supported teachers to acquire technological skills because; before the introduction of these CoLs, some teachers could not even use smartphones. But after getting these technologies, the teacher can now use them and use them to get materials." (School 3, TCPD team FGD, November 2022)

- **Reduces administrative tasks.** A number of headteachers and WEOs reported that technology can make their administrative work and submission of reports easier.

6.6.2. Barriers and challenges

Several barriers and challenges were identified relating to technology.

- **Desire for more devices.** In response to the question in the feedback survey *"If you could improve anything related to the TCPD and CoLs, what would it be?"* seven (out of 25) noted 'access to technology' (four from School 1, two from School 3, and one from School 8). This point was also frequently made in FGDs. Additionally, Schools 3 and 5 both cited that there were insufficient devices for use in the classroom (although the device provision was intended for TCPD, not classroom teaching).
- **Electricity, connectivity, and cost of internet bundles.** These factors were also commonly cited in FGDs as barriers. School 1 only had connectivity in certain spots. Teams from School 3 and School 8 asked for subsidised internet connectivity costs to make the most effective use of technology. High internet costs were emphasised by School 5 "*because systems like YouTube and LMS use large internet packages.*"
- **Projector limitations.** While schools used projectors, School 8 shared that they would run out of power during class. The fear that a projector could run out of battery charge during a lesson was reported by a WEO as one reason teachers were not always confident about using technology in classes. Additionally, the rough classroom walls make it hard to see the projection (School 8). Data collection reports noted that the light in classrooms also made videos difficult to see. The TCPD team at School 5 thought that if the challenges to using the projector were overcome, "*the use of chalks in the classroom would end*" (TCPD Team FGD, November 2022).
- **Charging devices.** Charging devices was difficult in schools with no power (such as School 8), although a solar charger was provided.
- **Digital literacy.** School 1 and School 5 shared that many teachers still lack digital literacy. This was a particular barrier for teachers with disabilities in School 5.
- **Inclusive design.** School 5 also shared that the tablets and LMS need to be made more accessible for blind and visually impaired users.

- **Technology distractions.** There were some examples of smartphone notifications disturbing lessons. Therefore, there were requests for information on how to turn sound and notifications off on phones (School 5).
- **LMS improvements.** Schools 1 and 5 had difficulties in using the LMS. School 5 shared an experience whereby *"Every time you log in to the system, you need to register again, so it's annoying."* While this isn't the typical user experience, the fact that some users are experiencing this requires further investigation to streamline the login process.
- **Ability to download materials.** Schools 1, 5, and 8 highlighted that downloading materials is important as they can save them as soft copies on their phones, which they can then use offline. Currently, it is not possible to download PDFs from the LMS.

6.6.3. Use of technology for TCPD

Technology was reported to have been used for TCPD in a number of ways. The majority of these uses were self-reported and were observed occasionally. The data illustrates that teachers were aware of the possible uses of technology, while their actual use of it may vary. Uses reported include:

- Finding teaching and learning materials from the LMS and/or internet searches
- Using videos to show rather than to verbally describe a particular pedagogical strategy
- Using WhatsApp to collaborate with other teachers, share resources (particularly videos), ask advice, and solve problems
- Completing administrative work
- Using soft PDF copies of documents (saved on phones), rather than printed versions
- Sending reports to superiors (headteachers/WEOs).

While TCPD teams reported using the LMS and wider internet to find materials for CoL sessions and classroom teaching, actual use of technology during CoL sessions was noted in just under half of the CoL sessions observed. At School 3, the peer facilitators were observed using the LMS during CoL sessions on just three occasions, and teachers also used the LMS or internet twice. At each of the other schools, teachers were observed to access the LMS or internet during one or two CoL sessions, using either school-owned or personal devices, often shared between two

or three teachers. Table 3 below shows the frequency of device use and the kinds of devices used in the observed CoL sessions.

Table 3. Use of devices during observed CoL sessions

				Accessed via...		
During Observed CoL Session:	**LMS/internet use not observed**	**LMS or internet was used by PF**	**LMS or internet was used by teachers**	**Personal device (phone)**	**School device (tablet)**	**Devices were shared by two or more teachers**
School 1						
Observation 1	x					
Observation 2	x					
Observation 3	x					
Observation 4			x	x		
School 3						
Observation 1		x		x		
Observation 2	x					
Observation 3		x	x	x	x	x
Observation 4		x	x	x	x	x
School 5						
Observation 1	x					
Observation 2		x	x		x	x
Observation 3		x	x	X	x	x
School 8						
Observation 1		x	x		x	x
Observation 2		x	x		x	x
Observation 3	**x**					
Observation 4[6]	**x**					

Interestingly, School 8, which was the most rural as well as the school with the highest technology support (Profile 4), conducted CoL sessions about

[6] Observers noted that there was no electricity nor connectivity at the time of this session, which may have prevented planned use of devices.

using technology. In one session, teachers learnt how to log in and off the internet and in another session, how to use videos in class. By contrast, in other schools, teachers learnt to use technologies such as the LMS, internet and WhatsApp in passing, if they did not already know how to use them.

Use of WhatsApp has been vital in TCPD. Teachers formed WhatsApp groups (within and across schools) to share teaching resources and to seek suggestions when they faced a challenge in teaching.

> *"Through WhatsApp groups, we see our colleagues from different schools that are within this programme, we get to understand each other and see how our fellow colleagues have reached in improving TCPD and CoL activities in general."* (School 5, TCPD team, November 2022)

Ward officers and TCPD teams also reported using WhatsApp to report to their superiors.

While neither the MEWAKA programme nor the research highlighted or demonstrated the use of technology in classroom teaching (as the initial focus was using technology in TCPD), this was a use of technology explicitly mentioned in three of the four schools. TCPD team FGDs and teacher FGDs reported that students were more enthusiastic about learning when technology was used.

> *"When we use technological devices to prepare a video-based lesson from the YouTube, pupils are highly motivated to learn and their learning becomes actual and meaningful."* (School 5, teacher FGD)

The projector was used in class and in CoL sessions in School 8.

6.6.4. Differentiated use by tech profiles[7]

School 1 — Profile 1 Personal devices (+ mobile data)

In School 1, a business as usual case was explored, similar to the basic conditions of the national MEWAKA implementation. The lack of devices was mentioned explicitly as a challenge at this school. The LMS was highlighted as useful for accessing teaching and learning resources, although a lack of downloadable PDFs was noted. Nonetheless, the agency of being able to access resources when necessary motivated teachers.

[7] See Table 1 above for details of each profile.

While teachers' digital literacy was noted to have been improving, it was also cited as a challenge that needs to be addressed.

School 3 — Profile 2 Limited tech — (facilitator tablet only)

As School 3 was only given one facilitator tablet while there were seven teachers, teachers noted that all teachers do not get enough opportunity to use it.

Additionally, teachers envisioned using the tablet in classroom teaching and also noted that if they had more tablets, then groups of students would be able to gather around a tablet to learn. School 3 also noted the importance of having PDFs that they can save on their phone. They also shared how they have been engaging with teachers from other schools over WhatsApp to understand how they are conducting TCPD and CoL activities.

School 5 — Profile 3 Shared tech (1 device per 3 or 4 teachers)

School 5 received a number of shared devices, and teachers appreciated having a school-owned device that was not their personal communication tool. As a school with teachers and learners with disabilities, the importance of digital literacy was more pronounced. According to baseline (↑Koomar et al., 2022) and cycle 1 data, currently, one out of four teachers with special needs knows how to use technology. Visually impaired teachers struggled to access the tablets. Similarly to School 3, they wanted to use tablets in the classroom and thus felt that the number of tablets was too few to teach a class of 50 students. Note that School 5 was also given a projector, but use of the projector was not observed, nor did we receive reports on its use.

School 8 Profile 4 (1 device per 3 or 4 teachers + individual phones)

School 8 did not have a power source and did not have strong network coverage. This school was given the most technology, in the form of 3 medium-spec tablets, 5 low-spec phones, a projector, a tripod, a Raspberry Pi preloaded with offline access to LMS materials, and 2 solar chargers. Given the initial lack of technology and the biggest step change in access to technology, the impact of technology access was most visible in this school. As noted above, technology was not only used in CoLs but was also the topic of CoLs. Videos were used in classrooms, and the projector was explicitly mentioned and appreciated for making lessons much clearer and less theoretical for students. The projector was also used for CoL sessions. Despite the provision of a solar-powered charger, charging devices was still difficult, as was access to electricity and connectivity.

7. Conclusion and recommendations

Teacher learning is an incremental process, and changing pedagogical practices takes time. In the first few months of MEWAKA, teachers were more aware of their use of interactive methods. All stakeholders (teachers, headteachers, LGA officers) reported a shift in teacher mindsets towards collaborative problem-solving. Both shifts are promising initial outcomes of MEWAKA.

Barriers and challenges are inevitable in any TCPD programme, and particularly at the early stages of roll-out. The findings from interviews, FGDs and observations suggest several recommendations to be considered in the next phase of implementation.

The recommendations below are presented in three sets. The first set of recommendations are for actions TIE can undertake in the role of curriculum and CoL materials design immediately or in the medium term. The second set of recommendations are adaptations which could be tested in the second cycle of DBIR, from May to December 2023. The third set includes medium and long-term recommendations for consideration by educational leaders at national and LGA levels.

7.1. Recommendations for redesign and reimplementation

7.1.1. Immediate and medium-term actions for TIE

- **Schools should focus more on general pedagogy and problem-solving within CoLs, rather than school curriculum content**. Encouraging student collaboration and active participation in learning was a noticeable gap in classroom observations that should be addressed during TCPD.
    a. TIE to provide model CoL session videos and a digitised *Peer Facilitator Manual*.
- **TIE and educational leaders to provide more ongoing support for peer facilitators**, for example:
    a. TIE to prepare a coaching and mentoring guide
    b. TIE to provide handouts for various roles (e.g. for WEOs, headteachers, SQAs, District Education Officers [DEOs]: handouts with guidance on what to look for when monitoring,

and handouts with coaching questions or tips for supporting peer facilitators)

c. TIE to develop Y2 annual workshop for peer facilitators (those who already had introductory PF Manual workshops in Y1)

d. TIE to prepare module or guidance materials for WEOs' facilitation of TCPD Team CoLs

e. TIE to make materials on the LMS downloadable, so teachers have more autonomy to download and read at their leisure. This will also avoid connectivity issues.

- **TIE to consider CoL module content for special needs schools and special needs units**: Findings have shown that teachers are more motivated about TCPD when it is relevant to their needs. TIE could develop specialised CoL modules to meet the needs and teaching and learning contexts of Special Schools and Special Needs Units.

7.1.2. Actions that could be tested in the 8 schools participating in Cycle 2

The following recommendations are for actions to be jointly planned and implemented by the researchers, schools, and LGA officers participating in the DBIR.

- **Review the frequency of CoLs and cluster group meetings.** With the permission of the ministries and local authorities, different scenarios can be tested in different schools, for example, one set of DBIR schools could continue to hold CoLs weekly, and another set bi-weekly (twice a month). The research team can compare the levels of teacher motivation, engagement, and practical classroom application of what is learnt in CoLs in the two sets of schools.

- **Pilot cost-effective incentives to continue teacher motivation for CoLs.** Through mutual agreement with the wards and schools participating in the DBIR Cycle 2, different forms of teacher incentives could be tested. These could include various forms of recognition (e.g., official letters, school notice boards, public announcements, certificates) or private-public partnerships whereby schools or WEOs solicit refreshments for CoL meetings from local businesses, organisations, or community members. (See Annex 1 for a rapid review of existing research on incentives for teacher motivation in LMICs.)

- **Test the most useful way to publish the *Peer Facilitator Manual***
- **Test the use of Braille**
- **Investigate why female teachers are less engaged than male teachers.** The research team can add additional questions to post-observation and FGD tools to learn more about why female teachers appear to be less engaged in CoL sessions.
- **Understand the adaptations schools have made**—departing from the original plans—**and assess the relative effectiveness of these local adaptations.** The main adaptations noted in Cycle 1 were some schools rotating the role of peer facilitator, and TCPD teams using different mechanisms to identify the topic of CoL sessions. With additional data from Cycle 2, it will be possible to begin investigating the effectiveness of these adaptations.

7.1.3. Recommendations for the system level

The following recommendations include actions that could be taken by LGA and SQA officers, as well as larger considerations for ministry actions that could further strengthen TCPD.

Recommendations for LGA level

- **LGA officers could provide more peer facilitator support and mentoring.** WEOs, District Officers, as well as SQA Officers can monitor CoLs and provide formal and informal support to peer facilitators, focusing on issues such as CoL management, facilitation strategies, and the use of relevant pedagogies, including experiential learning and gender equity and responsiveness within CoLs.
- **LGAs and school leadership could ringfence CoL time for teachers.** The reason given for teachers missing CoL sessions was that they were often assigned various other duties by the LGA education officers. Steps should be taken to ensure that other duties can be completed without interfering with CoL attendance.
- **Ringfence WEOs' time for monitoring CoLs and TCPD activities.** Aside from fuel/transportation costs, WEOs reported time constraints as a barrier to effective monitoring. TCPD activities such as monitoring CoL implementation at school level, organising cluster-level CoLs, supporting TCPD teams, and monitoring teachers' application of what they learn in TCPD could be made an explicit part of WEOs' job description and/or timetables.

- **LGAs could motivate teachers to engage in TCPD by providing recognition** for teachers' participation and improved teaching, for example, through awards, letters of recognition, certificates, public announcements or social media.

Recommendations for MOEST and PORALG

- **Ensure all schools have access to the *Peer Facilitator Manual* workshop**. LGA officers and peer facilitators unanimously reported that the workshop introducing the *Peer Facilitator Manual* (piloted in August–September 2022) significantly clarified the CoL modality and motivated them to implement CoLs at school level. The *Peer Facilitator Manual* workshop should be provided for any schools/LGAs which have not participated in one.
  - **For schools that did have access to the *Peer Facilitator Manual* workshop, implement the next phase of the National TCPD Plan,** whereby an annual workshop is held to refresh and deepen the skills of peer facilitators and School-level TCPD teams.
- **Align SQA support with TCPD (MEWAKA).** Ensure that SQA officers are included in MEWAKA workshops and that they provide relevant and up-to-date advice to teachers and schools.
  - Update SQA monitoring tools and criteria to explicitly include monitoring of CoLs and TCPD
- **Consider adjusting the official school timetable to accommodate CoLs within regular working hours.** Findings from the DBIR schools showed that scheduling CoLs is a challenge for schools. When schools held CoLs after regular hours, there was less teacher motivation to stay and engage in CoL activities, but when CoLs were held at times when students were still at school, some teachers had to miss the CoL in order to supervise students. Examples of how the school timetable could be adjusted to accommodate TCPD include:
  - Following models from other countries where 15 minutes are added to the school day four days a week, so that on the fifth day, students go home 1 hour early, and teachers use that 1 hour for CoL.
  - Creative use of the existing timetable and community support: e.g., make use of community volunteers to teach and supervise students during religious education classes and/or Elimu ya

Kujitegemea (independent learning) and hold CoL sessions for teachers during that time.

- **Support teachers with hearing and visual impairment to engage in TCPD.** Special Needs Units and TIE could collaborate to ensure teachers are given technological aids and appropriately formatted materials that will help them engage with CoLs and TCPD.
- **Consider linking TCPD participation to certificates or promotion.** Research (including studies in LMICs and East Africa specifically) has shown that merit-based promotion and certification for TCPD increases teacher motivation (See Annex 1 for a summary of this research). Incentives for participating in CoLs can be considered in the development of a *Teacher Incentivisation Guide*, especially if CoLs continue to be held outside teachers' regular workday schedule.
- **Provide a sustainable budget line for TCPD.** The findings have shown that school capitation grants have generally been insufficient to sustain the running of CoLs at school level, and that workshops at district or regional level rely on donor aid. A dedicated budget line for TCPD at school, ward, district, and national level would help to ringfence funds to ensure implementation and monitoring that sustains the quality of TCPD provided through school and cluster-level CoLs and peer facilitator workshops.

7.2 Redesign and reimplementation for DBIR Cycle 2

The findings and recommendations from DBIR Cycle 1 were presented and discussed with ministry-level officials in May 2023 (see Annex 2) to prioritise feasible key recommendations from the findings to take forward in the redesign and reimplementation. The following priorities were agreed.

Priority recommendations to be tested directly in the DBIR Cycle 2 research (June–December 2023)

- Test the impact of holding CoLs less often, e.g., twice a month, in a subsample of schools.
- Pilot cost-effective incentives to continue/raise teacher motivation for CoLs
- Investigate why female teachers are less engaged in CoL sessions than male teachers, and whether the imbalance can be adjusted through raising awareness of the imbalance.

- Understand the adaptations schools have made—departing from the original plans—and assess the relative effectiveness of these local adaptations.

Priority recommendations for long-term actions by the relevant government authorities

- Provide a sustainable budget line for TCPD at school, LGA and national level.
    a. *Responsible*: LGAs
- Align SQA Support with TCPD/MEWAKA
    a. *Responsible:* Department of SQA (Assistant Director of SQA Primary Education Section)
- Ensure all schools and relevant stakeholders receive the *Peer Facilitator Manual* workshop
    a. *Responsible:* MoEST and Tamisemi will have to take the lead; specifically, it will be TIE who will be the implementers.

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Annex 1: Rapid Review of studies on incentives for teacher motivation in LMICs

Teacher motivation: Financial and non-financial factors

A short literature review was conducted by the research team to identify motivation strategies for teachers in the African context. The literature was extracted using the academic databases ERIC, SCOPUS, Dimensions, and Google Scholar; searches included master's dissertations as well as broad searches on Google. Boolean searches combined the terms "teacher motivation", "strategy", and "East Africa". More narrow searches were limited to Tanzania specifically but also included neighbouring countries such as Kenya, Zambia, Rwanda, and Uganda as well as others in Africa, including Nigeria, South Africa, and Ethiopia. Additionally, key phrases were searched, including "strategy for teacher motivation in East Africa", "teacher motivation in East Africa", "teacher development and motivation strategies", "motivating teachers in Africa", and variations of "financial and non-financial motivating/reward strategies for teachers in Africa". The findings reveal several motivation strategies for teachers that are both financial and non-financial at a school level as well as at a system level.

A study from Nigeria by ↑Bawalla & Omolawal (2022) assesses non-financial rewards for teachers in relation to job commitment. Here, providing outstanding awards to teachers has the highest mean score. These outstanding awards encompass any form of "rewards" based on their performance (p. 66). Other incentives—in order of mean score—are timely promotion, job security, career development, recognition, decision-making involvement, training, and study leave. More broadly, they observe that a link exists between an increase in teacher commitment and the increase in non-financial rewards.

In another study from Kenya, ↑Kathombe (2018) notes that financial rewards are a "strong predictor for employee performance" (p. 54). In particular, he recommends that university lecturers should be provided with competitive retirement benefits. Among the choices provided in the survey used for the study, retirement benefits were deemed most important among all financial strategies that included medical allowance, insurance benefits, cash bonuses, extra pay for exceeding allocated teaching hours, and financial rewards for strong performance. ↑Kathombe

(2018) also notes that there are non-financial motivators, most notably gaining academic promotions (p. 40) along with employees applying a sense of reflexivity to assess their own skills and then identify useful training that helps them grow in their profession (p. 42). As such, this study shares similarities with the study by ↑Bawalla & Omolawal (2022), but differs in that awards for outstanding work are deemed the greatest motivating factors, although promotions are also recognised as an important incentive.

A study by ↑Mochengo et al. (2016) on non-financial rewards in Kenya draws similar findings, noting the most influential motivators for teachers are recognition strategies such as letters of appreciation and certification, followed by communication strategies encompassing verbal communication, official letters, internal memos, SMS, school bulletins, and job redesigning. Other motivators include job enrichment strategies such as "redesigning jobs" in order to make the teacher's work more interesting and less repetitive, as well as promotion strategies whereby teachers would gain greater autonomy in decision-making (p. 47). Effectively, the study by ↑Mochengo et al. (2016) correlates with ↑Bawalla & Omolawal (2022) emphasising recognition strategy as the primary non-financial factor impacting teacher motivation. It is also interesting to identify a difference between the two studies from Kenya (↑Mochengo et al. (2016) and ↑Kathombe (2018)). The former focuses on secondary school teachers, while the latter on university lecturers. Arguably, secondary school teachers prefer recognition as it is more rewarding for them as the community takes greater notice, whereas university lecturers care less about community perception and more about academic progression and hence, promotion to higher academic titles.

Finally, a study from Zambia by ↑Natalia (2016) on non-financial motivators, finds more common ground with ↑Kathombe (2018), suggesting that promotion has a positive effect on job satisfaction. She also identifies material rewards as playing a role as well, while autonomy also emerges as a significant factor. Natalia highlights the importance of conflict resolution and communication and recommends that educational managers should not blame employees, even if the quality of their work is compromised. Instead, she notes that the system needs to be fixed, along with policy changes at the ministry of education with regard to promotion programmes (and including teachers in this process). Similarly, Natalia suggests that teachers should be given more freedom to increase innovation by altering regulations such as Zambia's eight-hour policy (number of working hours per day).

While debates exist on the most effective factors for influencing teacher motivation, it is important to note, as ↑Kathombe (2018) does, that

non-financial incentives are particularly motivating once a certain level of pay has been established; this is also noted by Rainey (2000). A degree of financial satisfaction must be reached before non-financial incentives become especially motivating for teachers. This notion is complemented by a study from Uganda by Niwamanya (2016) where findings illustrate that financial motivation impacts the performance of teachers by 69.2%, compared to 61.6% for non-financial incentives.

Lastly, there are two facets to financial incentives. First, prompt payment matters. Both Bawalla & Omolawal (2022) and Niwamanya (2016) emphasise the importance of making any payments related to allowances on time, as promised. Second, according to Niwamanya (2016) the employment scheme for teachers needs to be made on a contract basis that includes performance assessments during the renewal.

Applications of the suggested non-financial and financial incentives for the Tanzanian education system context are presented in Table 4 below. In the first two categories, the first incentives reflect those identified by the literature to be the most influential incentives for teachers.

Table 4. *Summary of financial and non-financial incentives and system-level suggestions*

Systems level (Central Gov't & LGAs)	**School level**
Non-financial incentives ■ Outstanding teacher awards ■ Timeliness of earned promotions ■ Job security ■ Career development/Job enrichment ■ Recognition through: ■ Formal letters of appreciation ■ Certificates ■ Internal memos ■ SMS or social media ■ School notice boards ■ Public meetings (i.e., at village, ward, district level) ■ Professional development opportunities ■ Study leave	**Non-financial incentives** ■ Outstanding teacher awards ■ Recognition through: ■ Formal letters ■ Internal memos ■ SMS or social media ■ School notice boards ■ School or public meetings ■ Professional development opportunities ■ Study leave ■ Providing teachers professional autonomy to increase innovation

■ Involving teachers in policy changes, particularly related to promotion ■ Providing teachers professional autonomy to increase innovation ■ Altering/revisiting teacher/school hours	
Financial incentives ■ Competitive retirement benefits ■ Medical allowance ■ Insurance benefit ■ Cash bonuses ■ Extra pay for extra teaching hours ■ Financial rewards for strong performance ■ Employment scheme with performance assessment during contract renewal ■ Prompt payment ■ Structured promotion (linked with TCPD)	**Financial incentives** ■ Cash bonuses ■ Extra pay/allowance for extra working hours ■ Financial rewards for strong performance

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Annex 2: Recommendations workshop participants

On 19 May 2023, a workshop was held in Dodoma to present the findings and recommendations from Cycle 1 to national-level officials. The aim of the workshop was to discuss and agree key recommendations for reimplementation in the forthcoming Cycle 2 DBIR in eight schools where innovative, scalable ideas can be piloted and, where there are easy, cost-effective strategies, in national implementation. The workshop included representatives from the research team, MoEST, PO-RALG and TIE, as shown in Table 5.

Table 5. *Participants in the DBIR Cycle 1 TCPD Redesign Recommendations Workshop*

S/N	Name	Organisation	Role
1.	Dr Franklin Rwezimula	MoEST	Deputy Permanent Secretary—Education
2.	Rabson Chambua	MoEST	TCPD Coordinator
3.	Ephraim Simbeye	MoEST	Director Quality Assurance MOEST
4.	Huruma Mageni	MoEST	Assistant Director Teacher Training
5.	Susana Nussu	PO-RALG	Assistant Director, Primary Education
6.	Dr Noel Fidelis Mafumiko	PO-RALG	Education Officer
7.	Dr Fika Mwakabungu	TIE	Director—Curriculum and Training
8.	Jonathan Paskali Masonda	TIE	TCPD Coordinator
9.	Dr Fredrick Mtenzi	AKU	Head of Research
10.	Johnpaul Barretto	EdTech Hub	Country Co-Lead