Inception Report

# Tich Me Ar Tich Dem

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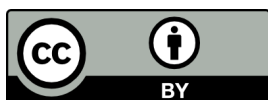
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# About this document

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**Notes**

Tich Me Ar Tich Dem is a research programme running from 2022-01-01 to 2023-12-31. The budget for the research programme is approximately USD 650,000. The initial proposal was developed in 2020 and prepared by Björn Haßler and Tom Blower.

The goal of OpenDevEd is to enable children in low- and middle-income countries to achieve learning outcomes, using technology in education where effective, and supporting and building local capacity wherever possible in our implementation and research.

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# Contents

# 1. Introduction

| Programme summary | |
|---|---|
| **Programme name** | Tich Mi Ar Tich Dem (Teach Me To Teach Them) |
| **Programme location(s)** | Freetown, Bombali District, and Tonkolili District, Sierra Leone |
| **Programme start date** | 1st December 2021 |
| **Programme duration** | 24 months |
| **Key expected outcomes of the programme** | Improved learning outcomes for students.<br><br>A better understanding of teacher professional development in crisis — and crisis vulnerable — contexts, and the specific relation between teacher professional development and student learning outcomes in crisis contexts. |

## 1. Information about OpenDevEd

Started initially in 2009 and incorporated as a limited company in 2014, Open Development and Education Limited (OpenDevEd) is an agile and adaptive consultancy with a multinational staff spread across Europe, the Middle East, Africa, Latin America, and the Caribbean. We specialise in:

- Rigorous education research (systemic mixed-methods research; design-based implementation research; and participatory research);

- Use of technology in education systems (including technology-enhanced education, strategy development, and evaluation);

- Teacher professional development (programme development; implementation; decentralised and value for money approaches; and monitoring and evaluation);

- Efficient education programming (strategy, design, and implementation; participatory and user-centred processes; capacity building; and actionable monitoring, evaluation, and learning systems).

In 2019, OpenDevEd became one of the founding members of the EdTech Hub, a consortium funded by the UK Government, the World Bank, and the Bill and Melinda Gates Foundation (BMGF). With the aim of increasing the use of evidence to inform

decision-making regarding the most appropriate and effective uses of technology to improve learning, the Hub focuses on learners in lower- and middle-income countries. OpenDevEd staff are heavily involved in the Hub's engagement and innovation spheres, and are at present driving the forefront of the Hub's work in Sierra Leone, one of its six target countries.

Elsewhere, OpenDevEd works with private-sector organisations, national and international governmental organisations, third-sector and charitable organisations, and individual educational establishments to drive learning outcomes regardless of gender, disability, or socioeconomic status. We have worked in a broad range of countries across Africa, Asia, and North America.

# 1.2. Safeguarding

OpenDevEd has a number of documents and policies designed for the protection of participants in its research, its staff, and its subcontractors:

- 101 — General Code of Conduct
- 103 — Modern Slavery Guidelines
- 104 — Safeguarding Policy
- 106 — Whistleblowing Policy

These policies contribute to a working research environment in which concerns are raised and dealt with at the soonest possible opportunity. Care was taken to ensure the protection of at-risk individuals and appropriate action in response to any breach of the regulations.

Within the context of Tich Mi Ar Tich Dem, due diligence will be undertaken to ensure that providers of goods and services meet the rigorous requirements of these policies needed to undertake this research. This responsibility is contractually enforced for all staff and subcontractors. Voluntary, informed consent for all participants will be used. Information about participation in the programme will be given in both English and Krio (including on contacts to raise any concerns around safeguarding), and participants will be free to withdraw at any stage for any reason. Any concerns or allegations will be treated confidentially and with the utmost seriousness; where necessary, local authorities or law enforcement will be informed and cooperated with fully.

# 2. Programme context

## 2.1. Development context of Sierra Leone

Sierra Leone is a West African country of just over eight million people, bordered by Guinea and Liberia, with a per capita GDP of $527 in 2019 (↑World Bank, 2021). The country is recovering from multiple crises: a civil war, landslides, the Ebola crisis and the COVID-19 pandemic. With the introduction of Free Quality School Education in 2018, these emergencies have aggravated the learning crisis that Sierra Leone's education system already faces. While the primary school enrolment rate rose to 139% in 2019, children only receive an average of 4.5 learning-adjusted years of schooling by age 18 (↑UIS,2019; ↑World Bank,2018). In such crisis contexts, teachers are pressured to deliver quality education and socio-emotional support to students.

However, levels of unqualified teachers, particularly at a primary level, are high (↑Mackintosh, et al., 2020). In the latest education sector plan, the government highlighted a need to identify the most effective way to deliver in-service TPD (↑MOEST, 2017). The plan critiqued previous efforts as 'one-off and of short duration, disjointed and uncoordinated' (↑MOEST, 2017). Teachers in rural areas struggle to access TPD opportunities due to their distance from teacher training colleges, a limited understanding of English language courses and the absence of school-based communities of practice (↑Crisp et al.,2017; ↑Kamara,2020; ↑Ibn Junaid et al., 2016).

## 2.2. Programme regions

The programme's research will focus on government-run primary schools in Bombali District (Figure 1, in blue) and Tonkolili district (Figure 1, in red). The programme will be headquartered in Sierra Leone's capital, Freetown, in the Western Area Urban District (Figure 1, in orange).

Bombali and Tonkolili Districts cover the northern-central part of the country, with a combined population of just over 1.1 million people in 2015 [REF]. Though diverse, the Temne and Limba peoples are the most prevalent ethnic groups, and the population is predominantly Muslim. Though some heavy industries (such as construction and mining) are present, the majority of the population are engaged in the agricultural sector. In Bombali in particular, a former rebel stronghold during the 11-year civil war, the provision and maintenance of key infrastructure such as roads, electricity, and water is further behind other areas of the country. Both districts contain a large number of primary schools, ranging from inner-city schools to schools in deep rural areas without road access. It is these conditions that form a backdrop for the already aforementioned

education crisis exacerbated by the civil war, Ebola, environmental crises, and now COVID-19.

**Figure 1.** *Map of programme implementation areas in red and blue, with programme headquarters in orange*
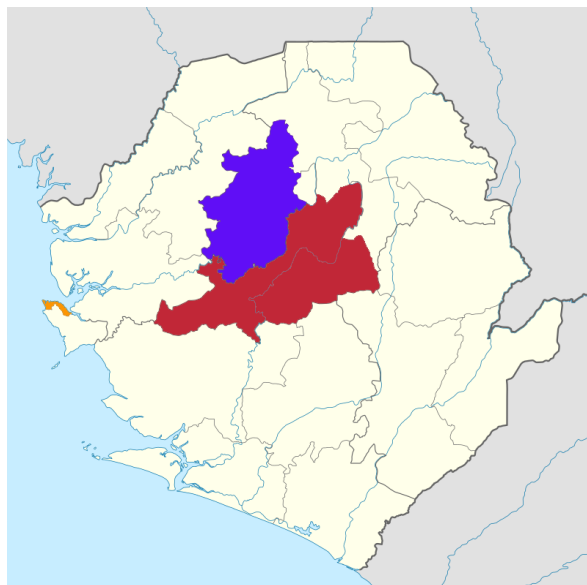


## 2.3. Gender analysis

In Sierra Leone, gender parity indexing shows that at pre-primary and primary level, girls have a slight advantage over boys in terms of access to education, though this trend begins to reverse in post-primary environments (⇡UNICEF, 2020). However, gender disparities are even greater among teaching staff. Evidence indicates that women are significantly underrepresented as a proportion of the teaching workforce in all schools, particularly government-run ones. Outside the comparatively wealthy Western Area surrounding Freetown, the number of female teachers amounts to only 25% of the teaching workforce in government-run schools (⇡Mackintosh, et al., 2020), and as low as 17% in rural areas where schools are located more than 15 km from a major population centre (⇡Mackintosh, et al., 2020). This trend is apparent from pre-service training records: only 28% of Higher Teaching Certificate and 25% of Bachelor of Education students are female, and dropout from teacher training colleges (TTCs) is higher among female trainee teachers than among males (⇡Mackintosh, et al., 2020). In a country where 36% of primary teachers have no formal qualifications, the gender divide is thrown into even sharper relief (⇡Mackintosh, et al., 2020) p.30).

From this data, it is evident that training better suited to female teachers and education staff could address this imbalance, particularly in deep-rural areas where access to TTCs is comparatively limited and the chance of dropout from formal educational qualification higher.

# 3. Programme rationale

## 3.1. Addressing needs and aims

Our research addresses the Sierra Leonean government's need to optimise and validate an effective model for in-service TPD. As noted, a distributed TPD model is favoured (building on the World Bank's Free Education project and the Sierra Leone Education Attendance Monitoring System (SLEAMS), using a 'one-tablet-per-school' (OTPS) model). Evidence indicates that this low-tech approach to TPD can improve learning outcomes in emergencies (↑Haßler, et al., 2019). In contrast, COVID-19 interventions that focus on 'remote learning for children' are catastrophically failing (↑Asadullah, 2020; ↑Asanov, et al., 2020; ↑BRAC, 2020; ↑Le Nestour, et al., 2020; ↑Uwezo Kenya, 2020). Our research provides crucial and timely evidence to shore up current government plans for a scalable, effective TPD intervention.

Our research identifies whether this TPD model addresses the needs of rural / disadvantaged teachers. Our study focuses on a sample of teachers and students from schools in rural / semi-rural areas to understand whether and how school-based TPD initiatives promote student learning (as an alternative to traditional centralised and cascade models). Such traditional models are severely disrupted by COVID-19, highlighting our study's relevance to education continuity in emergencies. As such, our research addresses three key gaps that currently exist in the literature surrounding TPD in emergency contexts in the following ways:

- **Research gap #1: Examining learning outcomes.** Our study explicitly focuses on the relationship between TPD and student learning outcomes, examining student learning in rural and semi-rural schools rather than teacher performance in teacher training colleges. Our research uses an explanatory mixed-methods design that goes beyond the limited approaches of previous studies, and evaluates both foundational and socio-emotional outcomes that are critical to learning in emergencies (including COVID-19: ↑Uwezo Kenya, 2020).

- **Research gap #2: Examining the conceptualisation of TPD.** Our study investigates the relative importance of different components of the education system (TPD; teacher monitoring and accountability; books etc.), as well as different aspects of TPD (Teacher Group Meetings; facilitators; TPD materials etc.). Our research builds on the work of ↑Piper et al. (2018), who analysed different elements of a multipronged TPD intervention in Kenya. However, while Piper et al. investigated a major, multi-million dollar, donor-funded TPD initiative, our research examines a significantly lower-cost TPD programme in a multi-emergency context.

- **Research gap #3: Examining the definition of 'emergency'.** Our research focuses on Sierra Leone, where the population has experienced multiple, overlapping forms of emergency (including COVID-19):

  - Schools in Bombali, where communities lack access to secure water facilities, witnessed the destruction of civil war and suffered significant loss of life during the Ebola crisis (↑UNOCHA, 2015; ↑WHO, 2016);

  - Schools in Tonkolili where communities struggle to recover from civil war, exhibit a high level (74%) of food insecurity, lack access to clean water, and saw a high number of Ebola cases (↑UNOCHA, 2015).

Our study fills the gap in the EiE evidence base on how to improve learning outcomes (via TPD, at scale) despite such contextual pressures.

## 3.2. Alignment with Sierra Leonean national policy and other actors' initiatives

The Ministry of Basic and Senior Secondary Education (MBSSE) and the Teaching Service Commission (TSC) are working with multiple partners to address these challenges. Under the World Bank's Free Education project, the MBSSE and TSC have partnered with EdTech Hub to develop a technology-supported, school-based TPD programme. As part of this programme, one teacher-facilitator in all government- and government-assisted schools will receive a tablet with preloaded materials — including structured session plans, videos, audio materials — to facilitate teacher group meetings. Importantly, the programme will focus on improving teacher practices with the aim of increasing primary-level learning outcomes in literacy and numeracy. Now, the government and the broader development community need to understand the effectiveness of such a TPD programme.

## 3.3. Alignment with Sustainable Development Goal 4 targets

As a programme seeking to enhance and contribute to the international research body of evidence on education in crisis-vulnerable and crisis-affected contexts, our research aligns well with several of the SDG4 outcome targets and means of implementation (↑UNESCO, 2017):

- **Universal primary and secondary education.** Our research aims to support the provision of quality education at a primary level, increasing the likelihood of transitioning to secondary education, and helping the MBSSE to continue its

programme of free universal basic education without large bottlenecks of under-skilled students stuck in primary education.

- **Universal youth literacy and numeracy.** Literacy and numeracy are two of the three key measures of learning outcomes of this research, with significant resources dedicated to capturing and analysing quantitative data.

- **Teachers and educators.** Skilled, motivated teachers are key to achieving the SDG 4 targets. Our research focuses on teacher professional development in comparatively disadvantaged, crisis-vulnerable regions of Sierra Leone. Teachers are the primary active participants in the study, and are its primary source of feedback.

## 3.4. Application of the INEE minimum standards

Whatever form a research project of this nature would take, several of the INEE core Foundational Standards (Domain One) are applicable:

- **Community participation.** The community is considered as key stakeholders in children's education. Though they are not the primary focus participants of this research, families, and community members will be informed of the nature of the research, and the process of enrolling and withdrawing from the study. Furthermore, these stakeholders will be targeted as part of national-level results dissemination.

- **Coordination.** We will maintain strong contact networks and communicate regularly with stakeholders and other actors in the area. Issues and challenges will be raised and worked on with relevant individuals and entities as they arise.

- **Analysis.** Monitoring and evaluation will be systematic and impartial, taking into account the cultural and gender-based dimensions to assessment. Analysis and results will be conducted thoroughly and disseminated widely as global public goods through a variety of forums.

Minimum Standards under Domain Three (Teaching and Learning) have also been taken into account, particularly Standards 2, 3, and 4.

- **Standard 2 — Teacher Professional Development and Support.** Effort will be taken to identify appropriate staff to act as facilitators for the TPD that will take place, with participation open to all teachers dependent upon their needs. Content will be aligned with that approved by the Teaching Service Commission, and will be appropriate to the learning context in which it is delivered.

- **Standard 3 — Instruction and Learning Processes.** TPD content is focused on building teacher competence, delivering teaching that is relevant and inclusive.

Research methods are used which take account of the different learning needs of primary students. Parents and the community are informed of the nature of the research and the TPD being implemented.

- **Standard 4 — Assessment of Learning Outcomes.** Measures of assessment focus on core competencies of literacy and numeracy, as well as socio-emotional and mental health (SEMH). Our research methodology is systematic, impartial, and replicable.

# 3.5. Beneficiaries, inclusivity, and equity

The primary beneficiaries of this research programme in Sierra Leone are the government of Sierra Leone and Sierra Leonean education researchers. National-level stakeholders (MBSSE, TSC, and the Directorate of Science, Technology and Innovation; DSTI) therefore are the primary beneficiaries of the programme, as the research outputs will serve to inform the delivery of decentralised teacher training initiatives, and direct priorities for external donor funding. Internationally, the primary beneficiaries of this research programme are policymakers, donors, and education researchers.

As the research programme improves the delivery of a TPD intervention, teachers will benefit from those improvements. Because the TPD should improve the quality of teaching, students are indirect beneficiaries. In the longer term, the research insights indirectly benefit students and their families through improved learning outcomes in literacy, numeracy, and SEMH.

# 4. Programme design

## 4.1. Research questions

Our first objective is to determine which components of the distributed TPD model make the most significant contributions to students' learning outcomes (RQ1). This supports the MBSSE to develop an effective TPD programme, ensuring that teachers in remote / rural areas can build skills to improve student learning in emergencies. This objective also addresses TPD-research gaps, including cost factors, broader systemic issues, and ability for programmes to reach rural / remote areas (Research Gap #2).

**RQ1. What are the most important factors (within TPD) contributing to student outcomes?**

RQ1 is investigated through sub-questions at three different levels: systemic (RQ1-A), school / facilitator (RQ1-B) and teacher (RQ1-C).

**RQ1-A. What are the systemic enablers and barriers to effective school-based TPD in emergency contexts?**

RQ1-A examines the national- and community-level factors, including policy, impacting TPD in emergency contexts. This addresses the need for a more holistic definition of emergency contexts in TPD research (Research Gap #3). We consider how such factors affect school operation, school resourcing (including TLMs), and wider factors such as teacher progression.

**RQ1-B. What are the key enablers and barriers for making school-based facilitators and headteachers effective?**

RQ1-B examines school-based factors, including the crucial role of facilitators, selection of peer facilitators and the role of headteachers.

**RQ1-C. What are the key enablers and barriers for teacher learning?**

RQ1-C considers teacher-level factors related to TPD structure, for instance in Teacher Group Meetings (TGMs), the use of TPD programme materials, activities undertaken on the one-tablet-per-school provided by SLEAMS, shared lesson planning and peer observation. RQ1-C also considers socio-emotional factors for teachers (e.g. motivation).

Overall, RQ1 synthesises these sub-questions into an evidence-based TPD-blueprint. Our research ultimately points to the most effective combination of TPD-factors for rural / resource-constrained schools; and importantly, which factors contribute most meaningfully to teacher resilience in the face of crisis. Key factors likely include TGMs, printed teacher-materials, facilitator support (phone / WhatsApp), strategic tablet-use

(videos of classroom practice; monitoring). We explore initial answers to RQ1 during Phase 1 (DBIR) with 10 schools; in Phase 2, these are confirmed (mixed-methods / RCT).

Our second objective is to determine, at scale, the causal impact of the TPD programme on students' learning (RQ2). This objective addresses the lack of high-quality, quantitative evidence on the impact of TPD on students' learning outcomes, particularly for students in rural / resource-constrained areas (Research Gap #1).

**RQ2. To what extent does a distributed TPD programme impact primary school students' learning outcomes in emergency contexts?**

RQ2 evaluates the impact of the TPD programme on students' learning outcomes in 70 treatment schools, compared to 70 control schools. RQ2 is directly addressed in Phase 2.

Overall, school-based TPD models present an alternative to centralised / cascade models; school-based models have the potential for higher effectiveness in terms of student learning *in addition to* resilience against prolonged crisis conditions. Our evaluation of such TPD models offers crucial evidence informing policy and practice in Sierra Leone; it has the potential to influence TPD practice in a large range of resource-constrained, crisis-vulnerable EiE situations.

## 4.2. Innovation

The nature of the decentralised TPD model being investigated is highly innovative. Turning away from the more traditional cascade-style model, relying on imported expert knowledge, the decentralised, distributed TPD model under examination offers fertile new ground for researchers into its effectiveness and sustainability.

Secondly, the proposed research takes an innovative approach in the use of Design-Based Implementation Research (DBIR). An iterative research approach notable for its agile response to situational factors and change and for informing scale-up of interventions, DBIR is an ideal tool for informing contextually appropriate research at scale and providing actionable insights for decision makers.

Thirdly, the proposed research combines DBIR with traditional mixed-methods research, utilising a framework known as systemic mixed-methods research ⤊Haßler, et al. (2021).

## 4.3. Cross-cutting issues

A number of cross-cutting issues affect the research, which have consequently been factored into the design of the programme as a high-quality piece of research.

**Figure 2.** *Cross-cutting issues*

| Area | Objective | Activities & tracking |
|---|---|---|
| Equity | Ensure parity and prevent discrimination on any grounds (sex, race, religion etc.) | • Recording signatories to the Code of Conduct and safeguarding policies<br>• Recording and swift action on any reported violations |
| Health[1] | Prevent health risks to participants and staff, particularly that of COVID-19 | • Strict isolation protocols for any staff displaying symptoms / in contact with symptomatic people<br>• Standard protocols with regard to COVID-19 (masks, handwashing, sanitising, and social distancing)<br>• Due diligence on all hired drivers |
| Inclusion[2] | Remove barriers to participation in the research programme | • Work collaboratively with participants to understand their needs and community-based problem-solving approaches<br>• Communications in local media regarding the research<br>• Gender-mixed research teams<br>• Instructions and consent in English and Krio |
| Environment | Prevent unnecessary waste, emissions, or other damage to the environment | • Noting & limiting budgets for paper-based stationeries<br>• Ensuring record-keeping is as close to fully electronic as possible<br>• Monitoring office waste production<br>• Logging (and limiting, where possible) kilometres driven |

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[1] See also Risk matrix (Annexe C)

[2] For more gender-specific points, see Section 9

# 4.4. Research design

Our study uses a two-phase, sequential, mixed-methods design (systemic mixed-methods research: ⇑Haßler, et al., 2021; building on mixed-methods approaches: ⇑Creswell & Creswell, 2017; ⇑Tashakkori & Teddlie, 1998; ⇑Bamberger, 2012; ⇑Teddlie & Tashakkori, 2009, ⇑2003; ⇑Teddlie & Yu, 2007). The mixed-methods design takes place over 28 months with participation from 150 schools in Bombali / Tonkolili districts (Sierra Leone) across two phases (Phase 1: 10 schools; Phase 2: 70+70). We investigate the relationship between TPD and student learning outcomes (foundational and socio-emotional and mental health (SEMH). SEMH is key to resilience in crisis-vulnerable contexts.

## 4.4.1. Data collection: Phase 1 (September 2021 – April 2022)

Phase 1 employs design-based implementation research (DBIR; ⇑Penuel, et al., 2011) in 10 schools. DBIR is a systematic method for refining interventions for later effective, contextually appropriate, large-scale roll-out (Phase 2). We research collaboratively with school-based facilitators, headteachers, teachers, and students identifying needs and community-based, problem-solving approaches through a process of iterative, grounded inquiry.

- Peer facilitators in test-group schools use scripted, printed TPD materials, the 'one-tablet-per-school' to engage teachers in school-based TPD (total cost ~$10 per teacher per year. These facilitators receive a short briefing event and light-touch ongoing remote support.

- Data collected explores which programme elements contribute to learning gains, are unnecessary, or whether and how they can be strengthened.

- Phase 1 data is collected by the programme researchers, in several cycles, and analysed immediately. Results are utilised to optimise the TPD programme implementation and refine research instruments.

Qualitative data types which will be collected:

- Video-recorded observations of teacher and students (lessons) and facilitators and teachers (teacher group meetings — TGMs);

- Audio-recorded semi-structured interviews (facilitators, headteachers, and teachers) investigating perceptions of the programme and change induced by the programme;

- Reflective portfolios and structured self-assessment (facilitators, headteachers, and teachers);

- Focus groups (teachers and students).

Additionally, piloting of Phase 2 instruments is undertaken, assessing validity, robustness and reliability (a process relying on good psychometric properties; scalability; accounting for age / achievement variance of same-grade students; and strong situational contextualisation).

### 4.4.2. Data collection: Phase 2 (September 2022 – June 2023)

Implementation partners scale the improved TPD programme to 70 schools, in which Phase 2 data is collected. Our research now evaluates whether the TPD programme works at scale.

- Enabling causal inference, Phase 2 implements a clustered Randomised Control Trial (RCT) in 140 schools (⇡Dong & Maynard, 2013: CRA2; 70 treatment / 70 control schools), with baseline and endline measurements during the course of one school year, together with qualitative data collection.

- We measure impact of TPD on teacher performance and foundational and SEMH outcomes for students (primary schools,  all pupils in Grade 6; est. 5,700 pupils total).

- Standardised validated tests are used (Uwezo, ⇡Plaut & Jamieson-Eberhardt, 2015). Data is collected by 5 researchers plus 24 enumerators.

Our design has an estimated minimum detectable effect size of 0.12 (⇡McEwan, 2015; ⇡MBSSE, 2019) with ICC= 0.2 (estimate: ⇡Hedges & Hedberg, 2007; ⇡Hale et al., 2014).

**Figure 3.** *Parameters for the RCT*

| Parameter | Value |
| --- | --- |
| minimum detectable effect size | 0.12 |
| ICC | 0.2 |
| alpha | 0.05 |
| power | 90% |
| average cluster-size | 40 |
| number of pupils / school | 247 |
| number of pupils tested | 40 |
| number of clusters / arm | 70 |

### 4.4.3. Quantitative data (baseline / endline):

- Uwezo student literacy (print recognition, phonemic awareness, oral fluency; reading / listening comprehension);

- Uwezo student numeracy (number identification, quantity discrimination, addition, subtraction, multiplication, fractions; adapted: ↑Acer, 2015, ↑PAL Network, 2020);

- Student SEMH: assessed using adaptations of tests (KIDSCREEN; ↑Ravens-Sieberer et al., 2005; etc.);

- Pre-/post-training questionnaires charting teacher / facilitator development in attitudes and views, as well as reflective understanding of interactive pedagogy.

### 4.4.4. Methodology and system of analysis

Quantitative data is analysed using robust statistical techniques such as factor analysis, multivariate regression, multilevel modelling, hierarchical linear modelling, econometric analysis (value-for-money) among others, while adjusting for clustering in the data. While measuring the impact of the TPD programme on students' foundational and SEMH outcomes, we control for other school-, teacher-, student-level factors (e.g. gender, location, language, household income level, prior student attainment, existing teacher feedback/school type, etc.; ↑Piper et al., 2014).

Learners may sometimes remain home due to COVID-19 thus children in school time and at home will need to be disaggregated (using SLEAMS). To ensure minimum attrition, we set-up robust process monitoring mechanisms between the baseline and the endline sample and revisit sample-size calculations. We follow a stratified random-sampling approach before undertaking clustered, randomised assignment of the treatment.

Qualitative analysis uses cross-sectional indexing, relationships between themes, discrepancies and counterexamples, groundedness, empirical anchorage, cross-team collaborative reliability checks; constant comparison, sentimental analysis, triangulation (internal / external validity, inference; ↑Adelman, 2011; ↑Groenwold et al.2014; ↑Iacus et al., 2012; ↑Mason, 2002; ↑Silverman, 2015; ↑Glaser & Strauss, 1967; ↑Larsson, 1998). Classroom observation is structured by pedagogical approaches (including 'dialogic moves'; ↑Vrikki et al., 2019). Analysis is sensitive to equity, gender, inclusion / SEND and language (including site differences via non-language-specific tests). Software includes Open Data Kit, Stata, SPSS-AMOS and ATLAS.ti-Cloud.

# 4.5. Theory of Change

The 'intervention-level' Theory of Change (ToC) posits that

> **if** a scalable, distributed, school-based, crisis-enabled open teacher professional development model for TPD is used,

**then** disadvantaged teachers in (semi-)rural or crisis-affected areas will be able to improve the quality of their teaching through ongoing support,

**resulting in** improved learning outcomes for students.

Our research-programme-level Theory of Change is the research inputs and outputs validate/invalidate the 'intervention-level' Theory of Change. If the intervention-level Theory of Change is validated, this represents a step-change in the understanding of TPD in sub-Saharan Africa.

In this way, the research-programme-level Theory of Change and the implementation-level Theory of Change are interwoven, forming an overall Theory of Change. This can be seen in Figure 4 below.

**Figure 4.** *Theory of Change*
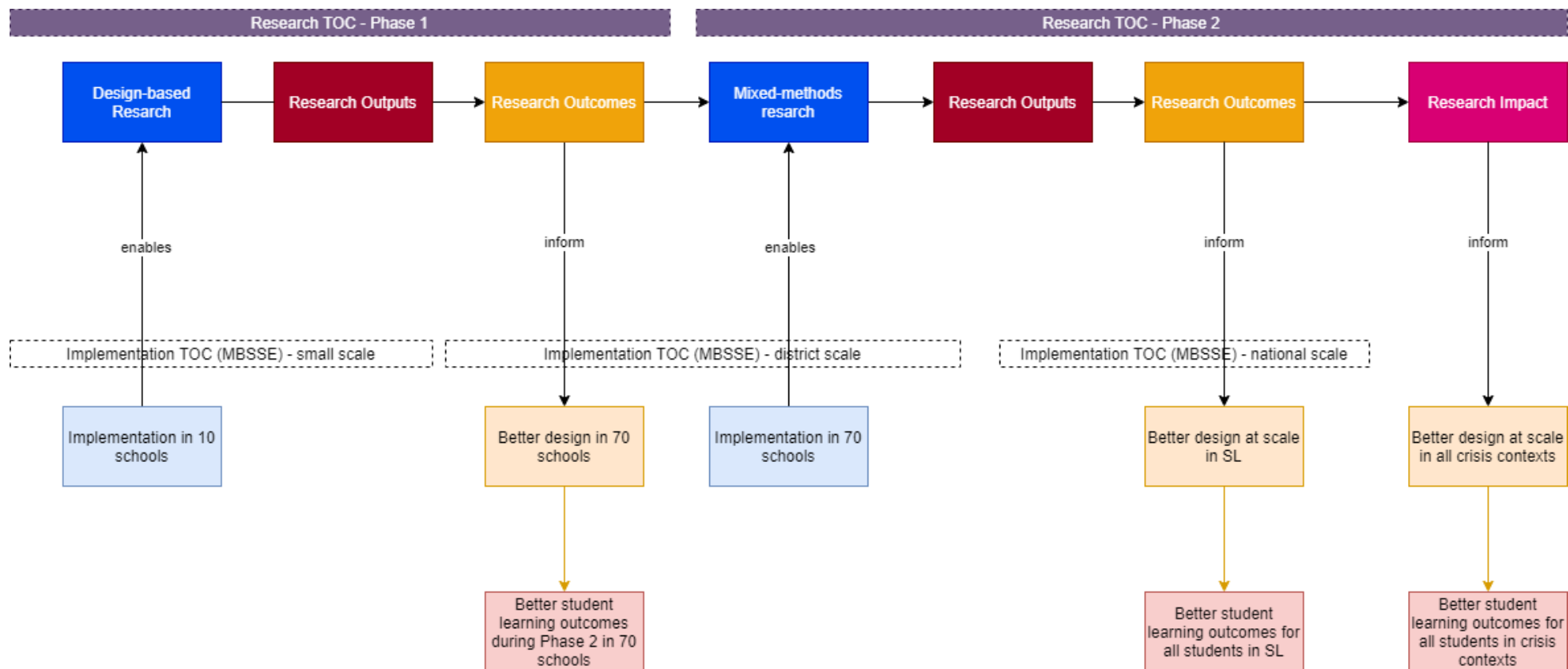
At present, there is a significant gap between how TPD is practised (in LMICs, including SSA) and what the research suggests about effectiveness (↑Low- and middle-income countries: Popova et al., 2018). However, while we have negative examples ('how not to do it') there are no positive examples that have been validated at scale. This is precisely what our research grant sets out to do: The validation of a specific model that has been built while heeding what we know to be effective practices.

However, this 'specific model' is only one possible model; given the absence of specific evidence, it is hard to argue why one should select this 'specific model' and not another model. In other words, it is difficult to translate the available (mainly) qualitative evidence into an actual specific deployable model.

If our research validates the 'Sierra Leonean model', then this will be the first model to be rigorously validated. More precisely, the first model in which the details of the TPD intervention has been rigorously validated. It would therefore be reasonable to expect that this specific model would become a paradigm for other implementations of TPD. We think this is a reasonable expectation because other research of this kind has similarly established paradigms (e.g., ↑Piper et al., 2018, establishing the need for multipronged interventions).

A specific paradigm — a specific, implementable and well-researched model for TPD — would therefore attract a lot of attention and serve as a benchmark: a step-change in the understanding of TPD in sub-Saharan Africa.

The following sections unpack the research components of the ToC that will be conducted by OpenDevEd and our research partners, as well as implementation components of the ToC that will be conducted by government counterparts such as MBSSE and TSC.

### 4.5.1. Input

The main research inputs to the programme are:

- **resources** provided by the donor, which are our staff time and expenses;

- **research expertise** in both qualitative, quantitative and mixed-methods analysis;

- **edtech expertise** on tech-enabled TPD.

In addition to the research inputs (funded by eCubed) there are also necessary implementation inputs (funded by the Government of Sierra Leone). These are important enabling aspects of the research programme:

- **procurement** of tablets for distribution in schools (one tablet per school);

- **buy-in and stakeholder engagement** with various stakeholders to support the development of a school-based TPD.

### 4.5.2. Activities

Research activities:

- **Design-based implementation research ( Phase 1)** which will systematically improve the intervention parameters to achieve an effective, contextually-appropriate, large-scale TPD model ready for roll-out (See data collection: Phase 1 (Section 4.4.1.) for detailed research activities);

- **Randomised Control Trial (Phase 2)** at a school-level together with qualitative data collection to test the model's effectiveness at scale. (See data collection: Phase 2 (Section 4.4.2.) for detailed research activities).

Implementation activities for Phase 1:

- Selection of 10 schools in rural or crisis affected areas;

- Identification of champion teachers in each school to be peer facilitators;

- Developing or adapting printed and digital TPD resources to support peer facilitators and teachers;

- Distribution of tablets to each school loaded with resources;

- Conduct light-touch technical workshops with peer facilitators to equip them with the facilitation skills needed to run weekly teacher learning groups;

- Creating weekly teacher learning groups led by peer facilitators.

Implementation activities for Phase 2:

- Scale out the roll-out of the improved TPD programme to 70 schools;

- Identification of champion teachers in each school to be peer facilitators;

- Distribution of tablets to each school loaded with resources;

- Conduct light-touch technical workshops with peer facilitators to equip them with the facilitation skills needed to run weekly teacher learning groups;

- Creating weekly teacher learning groups led by peer facilitators.

### 4.5.3. Output

Research outputs:

- An improved scalable, distributed, school-based, crisis-enabled open teacher professional development model;

- Different research products including reports on the research undertaken, preliminary findings, preprints, and publications in journals.

### 4.5.4. Outcomes

The two primary outcomes of the programme can be categorised as follows

- **Implementation outcome** — Improved learning outcomes for students;

- **Research outcome —** A better understanding of teacher professional development in crisis — and crisis vulnerable — contexts, and the specific relation between teacher professional development and student learning outcomes in crisis contexts.

### 4.5.5. Impact

As a study aimed primarily at knowledge production, the impacts of this programme cannot be projected in a similar manner to that of an 'implementation' programme. However, we believe that the innovative nature of the TPD model being explored will nonetheless prove an invaluable addition to the body of knowledge on decentralised TPD delivery in crisis-vulnerable contexts. The key impacts will be felt both nationally and internationally:

- **Impact on donors —** Better tailored and directed funding proposals, more effective use of donor finances;

- **Impact on education in Sierra Leone —** Better TPD programming and therefore better learning outcomes for students.

Since submitting our programme proposals, our positioning among networks of key stakeholders and decision makers in the Sierra Leonean education system (see Section 9) and at a national and global level sets the ground for the findings of this research to impact upon the delivery of — and policy regarding — decentralised TPD models in Sierra Leone, with the potential to benefit the quality of education of the growing number of primary-level learners.

A key mechanism for sustained evidence uptake and policy impact is the establishment of an Research Advisory Committee. The committee represent the programme's implementation lead (TSC), political lead (MBSSE) and financial lead (World Bank). The group will advise on issues such as research design, outputs and dissemination to ensure that the relevant officials receive the most suitable evidence at the right time. Importantly, the group is set to function for the duration of our study.

Separately, an OpenDevEd staff member is working with the Local Education Group's coordinating agency (the European Union) to explore the possibility of setting up and leading a technical working group on EdTech. This position would provide a strategic platform for promoting systematic evidence uptake, as the Local Education Group represents one of the few mechanisms for sectoral coordination in the country. In particular, we would leverage this position to incorporate our evidence in decisions on planning and investment on technology for teacher education in Sierra Leone.

On top of our country-based networks, we are in the process of formalising relationships with the most prominent education stakeholders in Sierra Leone. For example, we have recently agreed in principle to establish a research partnership with the World Bank country office. This partnership would lead to additional Bank-led research components and a series of joint publications. Moreover, the partnership would provide a direct and sustained mechanism to influence the Bank's ongoing technical support and education programming in Sierra Leone, where they are the government's largest donor.

At a government-level, an OpenDevEd staff member is embedded within the MBSSE and advising the TSC on the implementation of the TPD programme (outside of this research project). Our personal relationships with those responsible for teacher education have already offered an important channel to support evidence-based programme design. At present, we are working with the TSC to outline a Memorandum of Understanding to institutionalise our existing relationship and pathways for policy impact for the duration of this study.

Outside of the public school system, OpenDevEd has a strong partnership with Rising Academies which provides low-cost, private schooling to 50,000 students in Sierra Leone, Liberia and Ghana. At present, Rising Academies are in the process of designing a tech-supported, school-based TPD programme. The leadership team at Rising Academies proactively reached out to us to identify ways we can share evidence to support the development of their programme. In the next two weeks, we will meet with this team to set up this collaborative arrangement that would allow us to influence the public and private school system in West Africa.

At an international level, we have mapped out organisations with significant influence on global education. Based on this work, we have met with the Education Commission's Education Workforce Initiative to discuss a potential learning partnership to disseminate findings through their international networks. Notably, this relationship would build on our existing relationship with the Education Commission that started with our collaboration on the #SaveOurFuture paper.

Meanwhile, we have leveraged our position within EdTech Hub to create a platform for this research to influence the policy agenda across sub-Saharan Africa. Through EdTech Hub, we have led the design of a study on a UKAid-funded TPD programme in Tanzania. Importantly, the design of the study (e.g., research questions, methodology) and TPD

programme (e.g., technology-supported, school-based) mirrors that of the work in Sierra Leone. Going forward, an OpenDevEd staff member will act as a bridge between the two projects to share learnings and develop comparative reports. In doing so, we will maximise the reach and impact our research across geographies.

### 4.5.6. Assumptions and potential research limitations

Regarding the Key Assumptions outlined in the MEL Plan, the following sources and activities will be used to track developments and inform programme decisions:

- **Key assumption 1.** Reports from staff in the field will update programme records. For those students unable to communicate in English and Krio, staff will provide translations into Temne / Limba / Loko;

- **Key assumption 2.** Programme records will note the number of schools assessed per team per week;

- **Key assumption 3.** Issues with access to mobile phone signal will be determined by field visits to schools and surveys with teachers during those visits; we will continue to monitor updates from the key mobile providers in Sierra Leone (Orange, Africell, Sierratel, and Smart Mobile) to take account of outages, as well as GSMA's Coverage Map to monitor expansion / contraction of mobile data availability;

- **Key assumption 4.** Programme staff will remain in contact with participating schools and will seek updates regarding local prevalence of COVID-19, confirming the necessary measures prior to undertaking field visits; programme management will also monitor updates from the Ministry of Health on any restrictions, procedures, or other risks within Sierra Leone, ensuring that any staff displaying COVID-19 symptoms quarantine for a period of no less than 14 days before resuming work in-person.

Our research also depends on MBSSE's progress in implementing the TPD programme. While we are confident that the programme will proceed as expected, unforeseen changes cannot be ruled out. The execution of the underlying TPD programme is a risk, but also an opportunity. A novel aspect of this research is that it researches a 'naturalistic TPD' programme, primarily executed by the government (albeit with some support from the WB). This does constitute a risk to the research, but also lends external validity to the research outcomes. We mitigate the risks through close collaboration with stakeholders. Progress of the implementation of the TPD programme itself will be conducted through:

- Surveys completed by school-based facilitators and teachers — weekly;

- Meetings with government stakeholders (district officials) — in coordination with researcher field visits and ad hoc as required.

We do recognise that our programme has limitations:

- Our study uses a single treatment arm for the RCT due to cost limitations; a multi-arm study would allow the comparison of several TPD models;

- If COVID-19 control measures increase, TGMs take place in small socially-distanced groups / pairs. Given infrastructure constraints, virtual TGMs are impossible; virtual coaching is ineffective (↑Cilliers et al., 2020);

- As a piece of pure EiE research, the applicability of this research is more to situations of protracted, compounded multifactor crises than 'hot' crises such as active conflict.

Nonetheless, we are confident that the scale of the programme, its innovative nature, and the strong networks of communication and advocacy make it a forward-thinking study which will contribute actionable evidence to the body of knowledge on decentralised TPD.

# 4.6. Programme logistics

### 4.6.1. Monitoring, Evaluation and Learning (MEL) Plan

For further elaboration of the Monitoring, Evaluation and Learning (MEL) Plan, please consult Annexe B.

### 4.6.2. Risks

As a research programme with staff in the field, the most pertinent and immediate risks are those risks to staff and participants which call into question the operational viability of the programme. However, efforts to mitigate these risks are maximised through the programme design, as well as mitigation of other key financial and reputational risks to the programme's progress and success. For further information, please consult Annexe C.

### 4.6.3. Stakeholders

The design of this research study has, from the outset, been in consultation and collaboration with high-level stakeholders to ensure maximum buy-in. The following stakeholders have been involved in the refining of and inputs into this programme:

- The Ministry of Basic and Senior Secondary Education;

- The Teaching Service Commission;

- World Bank's Task Team Leader and Education Specialist for Sierra Leone;

- Other donor representatives.

The feedback process surrounding the programme design is an ongoing, two-way process: feedback will be sought from key stakeholders, with programme updates provided (with the approval of Dubai Cares) to decision makers iteratively impacting the implementation of decentralised, tablet-based TPD policy and programming in Sierra Leone, strengthened by the publication of formal reports and publications.

## 4.6.4. Timeline

The programme is projected to take 28 months to complete. For a full timeline, please consult Annexe D.

# 5. Gender strategy

The necessity to address the notable gender disparity in teacher training as a whole has already been recognised in Section 2.3., and our research intends to contribute to the body of knowledge around increasing female teachers' presence and level of qualification in government-run primary schools. However, the selection of participating primary schools for our research will not be made with prejudice as to the percentage or qualification levels of female teaching staff.

Our research team will be a gender-balanced team, with significant input and leadership from female members. This will be particularly important when during the visitation and enumeration processes conducted at schools. Samples of individual teachers or students for feedback will be selected with an equal gender balance.

Our organisation strives to promote female leadership and excellence in every aspect of our work. We have established whistleblowing and grievance procedures for the addressing of any perceived gender disparity. Any allegations of gender-based — or any other — discrimination are taken with the utmost seriousness, and adherence to policies respecting gender equality and non-harassment are contractually enforced for all staff and subcontractors.

# 6. Programme management and partnership structure

## 6.1. Programme management structure

**Figure 5.** *Programme management structure*
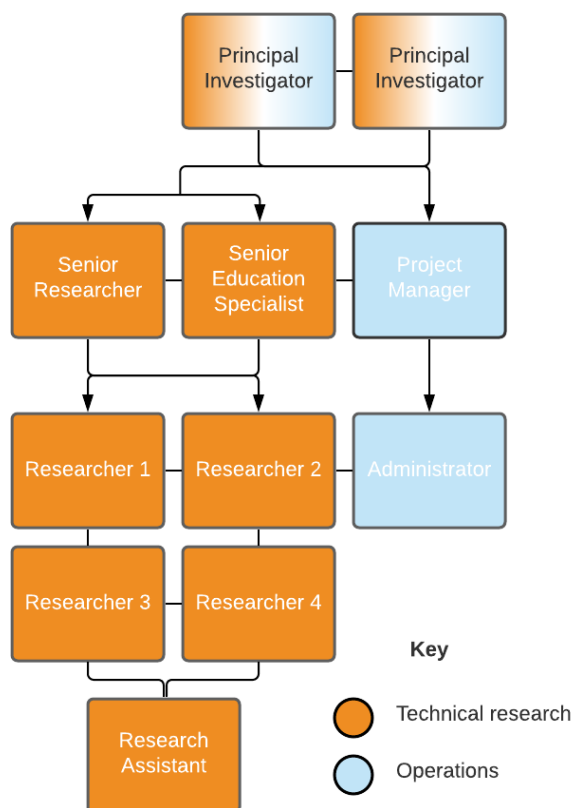


The core project team is structured to prioritise maximum research effectiveness, while ensuring effective communications and efficient use of resources. Figure 5 demonstrates a management structure balancing minimal hierarchy with effective accountability and oversight.

Face-to-face meetings will be held regularly to ensure that project-wide changes and updates are communicated. Use of mobile messaging platforms (e.g. WhatsApp) will allow for the secure transmission of information to and from staff in the field, and the budget includes coverage of satellite telecommunications hardware for areas with poor mobile phone signal coverage (as is likely in parts of Bombali and Tonkolili Districts).

We will maintain an open line of communication with Dubai Cares / INEE, with formal reports on technical and operational progress issued on a quarterly and annual basis. Ad-hoc and urgent updates will be given as necessary. Permission will be sought to release programme outputs as global public goods for furthest dissemination.

## 6.2. Partnerships

Our key partner for this research programme is Science Resources Foundation (trading as Science Resources Africa, http://scienceresourcesafrica.com), an organisation based in Cambridge, UK and Freetown, Sierra Leone, operating in 10 sub-Saharan African countries, including crisis-vulnerable countries, and a long-standing collaborator of OpenDevEd. SRA makes education and scientific resources accessible to young people in

Africa, improving quality education among disadvantaged populations (Sustainable Development Goals, SDG4). SRA's research efforts are grounded in an understanding of the effects of COVID-19 on the education landscape: their recent innovation study in May 2020 reached out to science and education collaborators, students, policymakers, NGOs, and private sector leaders in 10 African countries to provide a wide and inclusive range of insights.

SRA has well-established ties with the Sierra Leonean education research community, positioning the research team well for inter-organisational learning, for effective national dissemination, and for the recruitment and secondary capacity building of four national researchers (see Section 6.1). Aside from being well-versed in rigorous academic research, as a Sierra Leonean organisation SRA have a strong understanding of the research landscape of the country and have much to contribute towards the production and dissemination of programme outputs, as well as specific operational support.

Our proposal builds on two key partnership types.

1. **Endorsement from national-level stakeholders.** This proposal was co-designed with a range of stakeholders, building on our existing effective and collegial partnership with the ministry. This research is fully aligned with the government's TPD implementation strategy and outcomes are used to shape it. Regular meetings are convened to share key insights and determine actions. The Minister of Education, David Sengeh, is exceptionally proactive and student-outcomes focussed; this research is highly welcomed by him and will drive action.

2. **An equitable balance of national and international research experience.** Our study brings together outstanding international research expertise with national researchers. The senior international researcher will be resident (in country) for the duration of the programme, working hand-in-hand with national researchers and education practitioners. An office at the University of Sierra Leone is already available, embedding our research and strengthening relationships with the national research community. Our inter-organisational and equitable partnership (54% of the labour budget is allocated to our local partner), blending international experience and Sierra Leonean talent and local knowledge, draws on and develops the capacities of national researchers, securing their involvement in the programme's design and implementation from inception to closure; and mentoring building their skill sets for effective future contributions to EiE research.

# 7. Sustainability

While our research is a programme of fixed-term study, it is anticipated that the benefits of the programme's research will outlive its timeline and provide value for education stakeholders and decision makers at a strategic, national level, as well as within the Sierra Leonean research community. This will be assured through a number of ways.

- The DBIR approach used in this research will increase school-level ownership of TPD processes and developments. Through direct delivery of sessions within the school setting, school management staff will be able to have direct access to, and feedback on, TPD that is relevant to them.

- The makeup of the programme team ensures that research knowledge and capacity is not simply imported and exported from abroad for the lifetime of the study. The high proportion of national staff and researchers means that capacity will naturally be built for those researchers, and knowledge and outcomes produced will be available to other Sierra Leonean researchers. Research outcomes will also be made available as global public goods for further engagement of students and researchers of education and TPD.

- The project will impact the design of a programme being implemented with funding from the Free Education project. The Free Education project is the largest education-focused multi-donor trust fund in the country's history, with the potential for long-lasting, systemic improvements to student learning outcomes.

- Our research has been co-designed in discussion with the MBSSE and TSC. These bodies are responsible for the professional development of all teachers across Sierra Leone, with regular communication regarding the implementation of the programme. This is a truly collaborative study whose outcomes will be implemented by those with the most power to effect mass systemic improvements in government-run schools.

- Prior to the commencement of the programme, the EdTech Hub has worked towards the establishment of an Research Advisory Committee which would include, e.g.,  the Education Minister, the Chair of the TSC, the Secretary of the TSC, the head of the MBSSE's Delivery Unit, a member of the Directorate of Science, Technology and Innovation, the World Bank's Education Specialist, as well as representatives from other organisations and donors. This integrated, cross-agency committee would be a hitherto unprecedented collaboration in Sierra Leone, aimed at ensuring that the findings of research such as ours feed into policy and decision-making.

# 8. Programme communication and dissemination

As a research programme focused primarily on teaching practice and student learning outcomes, communication with participants and students forms a key part of engagement activities: this is a practice outlined further under the programme's ethical considerations than outward-facing communications activities. However, the programme Communications and Visibility Plan does take account of the need to differentiate programme messaging at different levels (for full details, see Annexe E).

- **International level.** We seek to raise awareness of the new evidence around decentralised TPD models in Sierra Leone as a nation and its relevance within the field of education in emergencies. This will be done primarily through online means (INEE Resource Library, ODE / SRA websites, social media) and through international networks.

- **National level.** We seek to raise awareness among teachers, headteachers, and school management staff of the nature of decentralised TPD and its benefits for teachers outside urban hubs. This will be done in coordination with the Research Advisory Committee (see Section 7), as well as through traditional print, online, and radio media.

- **Sub-national level.** We seek to raise awareness among parents and community members in participating areas of the programme's presence, and to emphasise the programme's ultimate focus on the potential implications for student learning outcomes. This will be done through a combination of traditional radio, online, and print media, as well as through social media.

We will draw on our extensive in-country and international networks (including through the EdTech Hub, as well as the Education Commission's Education Workforce Initiative) to spread messaging. We have experience in facilitating knowledge sharing sessions with other TPD implementers in Sierra Leone, and, pending the approval of Dubai Cares / INEE could run further sessions to disseminate research outcomes as global public goods after the closure of the programme.

# 9. Programme advocacy strategy

Since the commencement of its involvement in Sierra Leone, OpenDevEd has made significant connections and relationships of trust with and between key education stakeholders in the country, building an action-driven, policy-focused research alliance with the most senior members from MBSSE, TSC, DSTI, and the World Bank. SRA, as a long-standing collaborator with educational institutions in Sierra Leone, also has advocacy connections at regional and national levels. Together, we are in a strong position to advocate for support of the programme and ensure that its outcomes are recognised and integrated into policy and decision-making within the education sector. The key education stakeholders in Sierra Leone, with whom we have forged strong relationships, include:

- Teachers' Service Commission (Chair, Secretary, Director of Professional Development);

- Ministry of Basic and Senior Secondary Education (Minister, Delivery Unit);

- World Bank (Education Specialist);

- EdTech Hub (expert networks and connections with other donors such as FCDO and BMGF).

We have nurtured active knowledge-sharing relationships with other TPD providers in Sierra Leone (pre-service teacher training colleges, UNICEF, EducAid, Save the Children, Humanity & Inclusion, CODE, Plan International, Leh Wi Lan and more). We seek alignment between evidence production and coordinated donor support: we will participate in check-ins with other funded programme leads, where we can share findings and possibly influence decisions; another important group is the GPE Local Education Group. These relationships are alliances between various actors, and this programme offers not only an opportunity to strengthen them, but also to create greater cohesion between a greater number of donors pursuing the same evidence-driven goals.

# Annexes

## 10. Annexe A: Partner safeguarding policies and procedures

(This was attached to the proposal as a folder.)

# 11. Annexe B: Monitoring, evaluation and learning (MEL) plan

## 11.1. MEL Plan narrative

### 11.1.1. MEL rationale

The programme as a research study creates specific demands on MEL. For example, it is necessary to clarify the language as to the 'level':

- monitoring and evaluation of the research programme itself, which can also be construed as reflexive research,

- the research, which can be seen as an in-depth monitoring and evaluation activity of the underlying intervention.

The systemic mixed-methods approach used here acknowledges this relationship (↑Haßler, et al., 2021). Accordingly, MEL indicators have been selected in relation to the key outputs that the research programme aims to achieve, and the utility each output will serve to its audience.

### 11.1.2. Externalities and mitigation

Variables and externalities with the potential to affect data and data collection are, for this study, those which also would affect the overall conduction of the research. For a more detailed breakdown of these risks, please consult Annexe C. The most pertinent risks to data collection are those physical and practical factors affecting whether schools are open or closed for teaching and TPD, and thus either allowing or preventing collection of data in schools (flooding, landslides, COVID-19 resurgence, and road travel). Wherever possible, we have tried to minimise reliance on face-to-face data collection, while acknowledging the importance of face-to-face research activities in collecting accurate and rich qualitative data.

### 11.1.3. Learning questions

To be agile and adaptive, education researchers themselves need to be reflective education practitioners. Accordingly, we ourselves continuously monitor, evaluate, learn and adapt, understanding the role of the researcher (and research programmes) within the wider education ecosystem. Our focus on societal change necessitates a greater understanding of the way in which research can become established among researchers and widely used across the sector.

We ask:

- How can we ensure equity in the undertaking of this research programme? In particular, how can we ensure equitable allocation of resources and tasks between international and Sierra Leonean researchers?

- What is the contribution of the programme to the personal and professional development of all staff involved?

- What contribution does a high-quality research programme make to the research ecosystem in Sierra Leone?

- Are the research methods selected the most appropriate set of research methods to obtain answers to our research questions? What are the possibilities for further evolving and refining the selected research methods?  Are there alternative research methods that might deliver similarly robust answers to the research questions?

- Are there opportunities for cost reduction or more effective use of resources?

Our approach to finding answers to our learning questions is congruous with our overall research approach. We seek to answer our learning questions through qualitative approaches, such as outcome harvesting, as well as through more quantitative approaches, such as log frame monitoring. The quantitative approaches will tell us what we have achieved and whether we have achieved it in a timely and effective manner, while the quantitative approaches will tell us how we got there and about social emotional perspectives of the researchers.

## 11.1.4. Learning capture, dissemination, and use

MEL processes are continually ongoing, feeding the iterative nature of programme rollout and self-examination. Detailed activity logs will be kept, alongside thorough financial records, to ensure that outputs are produced to time and on budget. Lessons learned will be iterated into programme functioning and shared through quarterly / biannual reporting (and in other reports where appropriate)

# 11.2. MEL plan table

The table presented in this section mainly focuses on the quantitative aspects of our monitoring and evaluation activities.

| Results Level Description | Indicator (with definitions as needed) | Data Collection | | | | Data Analysis | | |
|---|---|---|---|---|---|---|---|---|
| | | Method | Frequency | Responsible Entity | | Method | Responsible Entity | Subgroups |
| Impact | - Donors: More effective use of funds and more targeted funding proposals<br>- Sierra Leone: Better TPD programming and improved learning outcomes for students at primary level | | | | | | | |
| Outcome | A better understanding of teacher professional development in crisis — and crisis vulnerable — contexts, and the specific relation between teacher professional development and student learning outcomes. | | | | | | | |
| Output 1 | Phase 1 Report on Term 1 DBIR | Report | Jan 2022 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | | |
| Activity 1.1 | Design-Based Implementation Research conducted | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Researchers, Project Manager, Project Administrator | | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| Activity 1.2 | Data analysis conducted | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |

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|---|---|---|---|---|---|---|---|
| **Output 2** | Phase 1 Report on Term 2 DBIR | Report | Jul 2022 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |
| **Activity 2.1** | Design-Based Implementation Research conducted | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Researchers, Project Manager, Project Administrator | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Activity 2.2** | Data analysis conducted | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Output 3** | Instrument trialling outcomes completed | Report | May 2022 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |
| **Activity 3.1** | Instrument trialling completed | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Researchers, Project Manager, Project Administrator | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Output 4** | Phase 2 quantitative baseline findings report | Report | December 2022 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |
| **Activity 4.1** | Baseline preparation complete | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Researchers, Project Manager, Project Administrator | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Activity 4.2** | Training delivered to 24 enumerators | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Researchers, Project Manager, Project Administrator | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Activity 4.3** | Baseline data collection complete for 140 schools | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Activity 4.4** | Baseline data analysis complete | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Output 5** | Qualitative findings report | Report | Dec 2022 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |
| **Activity 5.1** | Qualitative research undertaken | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Output 6** | Completion report available | Report | July 2023 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |
| **Activity 6.1** | Endline preparation complete | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Researchers, Project Manager, Project Administrator | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Activity 6.2** | Endline complete | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Output 7** | Phase 2 qualitative findings report available | Report | Sep 2023 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |
| **Activity 7.1** | Qualitative research undertaken | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Activity 7.2** | Data analysis conducted | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Output 8** | Phase 2 quantitative findings report available | Report | Sep 2023 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |
| **Activity 8.1** | Data analysis conducted | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Output 9** | Final report with findings from mixed-methods analysis available | Report | Oct 2023 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Activity 9.1** | Integrative analysis conducted | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Output 10** | High-level insights published | Report | Oct 2023 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |
| **Output 11** | Journal outputs published | Publication in journal(s) | Dec 2023 | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | | | |
| **Activity 11.1** | Publication preparation complete | Programme activity logs | Monthly | Principal Investigator, Co-Investigator, Senior Researcher, Senior Education Specialist, Researchers, Research Assistant | Programme log analysis and budget analysis | Principal Investigator, Senior Researcher, Project Manager | N/A |
| **Assumption 1** | Engagements with teachers, teacher facilitators, and students can be conducted, for the majority of cases, in English / Krio. | | | | | | |
| **Assumption 2** | Research teams and enumerators are able to assess three schools per week during the intensive enumeration process. | | | | | | |
| **Assumption 3** | Facilitators in study schools have at least sporadic access to mobile phone signal, either at their school or home. | | | | | | |
| **Assumption 4** | Health and safety precautions taken by enumerators/staff are sufficient measures to reasonably reduce risk from COVID-19 to either programme participants or staff. | | | | | | |

# 12. Annexe C: Risk matrix

| Risk Description | Probability (L/M/H) | Impact (L/M/H) | Mitigation Actions |
|---|---|---|---|
| **Operational/Staff Risks** | | | |
| Resurgence of COVID-19 preventing school visitation/ delivery of DBIR in schools | M | H | • Project management to remove to 'remote working' to minimise person-to-person contact<br>• Dissemination events scaled to virtual event<br>• Use of virtual communities of practice (e.g. via WhatsApp and email) to distribute messages and materials for use by teachers and teacher-facilitators<br>• Programme Phase 1 ('alpha') can be scaled down to reduce contacts |
| Environmental risks to staff during field travel/visits (landslides, floods etc.) | L | H | • Project manager and administrator to monitor conditions and advise if conditions look inclement to travel<br>• Accommodation in the field to be checked to ensure risk-free location |
| Road travel accidents | M | H | • Qualified drivers will be subcontracted through reputable sources with all due diligence conducted before commencement of contract. All vehicles will be properly insured.<br>• Adequate breaks will be taken by drivers<br>• Where possible, all care will be taken to avoid driving in hazardous conditions or at night. |
| **Financial Risks** | | | |
| Theft of petty cash | L | L | • Petty cash spending to be kept to a minimum - larger payments to be completed by purchase order<br>• Available petty cash to be kept in secure location under supervision of project administrator<br>• Project manager to undertake regular reconciliation of petty cash spend and bank account records |

| | | | |
|---|---|---|---|
| Fluctuation in exchange rate | M | M | • Staff rates include allowance for adverse shifts in currency rates between the programme's currencies |
| Change in rate of taxes for either Sierra Leonean nationals or forging foreign nationals | L | M | • Staff rates include allowance for change in tax rates |
| **Development Risks** | | | |
| Introduction/spread of COVID-19 in communities by staff/enumerators | M | H | • Strict hygiene habits to be followed by all programme staff and enumerators (handwashing/mask wearing/use of sanitiser/device cleaning/social distancing)<br>• Where possible, feedback and interviews will be conducted either remotely or at a safe social distance<br>• Any staff/enumerator displaying symptoms of COVID-19 or who has come into contact with any individual known to have COVID-19 will be required to self-isolate for a period of no less than 10 days |
| **Reputation Risks** | | | |
| Programme employees' actions bring INEE/DC/ODE/SRA into disrepute | L | M | • All employees and subcontractors working with or for ODE are contractually obliged to adhere to |
| Research outcomes rejected by key education stakeholders in Sierra Leone | L | M | • External to the actions of the Communication and Visibility Plan (see Annexe E), ODE will maintain a close working relationship with key education stakeholders at TSC, MBSSE, DSTI, and ERAC<br>• ODE to provide key stakeholders and decision makers ad-hoc updates (with the approval of DC/INEE)<br>• ODE to provide relevant information from quarterly and biannual reports (with the approval of DC/INEE) |

# 13. Annexe D: Gantt chart

| | | 01/22 | 02/22 | 03/22 | 04/22 | 05/22 | 06/22 | 07/22 | 08/22 | 09/22 | 10/22 | 11/22 | 12/22 | 01/23 | 02/23 | 03/23 | 04/23 | 05/23 | 06/23 | 07/23 | 08/23 | 09/23 | 10/23 | 11/23 | 12/23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Phases** | | | | | | | | | | | | | | | | | | | | | | | | |
| | Phase 1 prepration (since September 2021) | ▓ | | | | | | | | | | | | | | | | | | | | | | | |
| | Phase 1 | ▓ | ▓ | ▓ | ▓ | ▓ | | | | | | | | | | | | | | | | | | | |
| | Phase 2 preparation | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | | | | | | | | | | | | | | | | |
| | Phase 2 main activities and data collection | | | | | | | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | | | | | | |
| | Phase 2 final data analysis and dissemination | | | | | | | | | | | | | | | | | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| | **Activities** | | | | | | | | | | | | | | | | | | | | | | | | |
| A1.1/2.1 | DBIR | 🟦 | 🟦 | 🟦 | 🟦 | | | | | | | | | | | | | | | | | | | | |
| A1.2/2.2 | Data analysis | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | 🟩 | | | | | | | | | | | | | | | | | | |
| **OP1/OP2** | **Report on Term DBIR** | | | | | | | 🟥 | | | | | | | | | | | | | | | | | |
| A3.1 | Instrument trialling | 🟧 | 🟧 | 🟧 | 🟧 | | | | | | | | | | | | | | | | | | | | |
| **OP3** | **Instrument trialling outcomes** | | | | | 🟥 | | | | | | | | | | | | | | | | | | | |
| A4.1 | Preparation for baseline | | | | | | 🟧 | 🟧 | 🟧 | | | | | | | | | | | | | | | | |
| A4.2 | Phase 2 enumerator training | | | | | | | | 🟧 | | | | | | | | | | | | | | | | |
| A4.3 | Baseline data collection | | | | | | | | | 🟦 | | | | | | | | | | | | | | | |
| A4.4 | Baseline data analysis | | | | | | | | | | 🟩 | 🟩 | | | | | | | | | | | | | |
| **OP4** | **Phase 2 quantitative baseline findings report** | | | | | | | | | | | | 🟥 | | | | | | | | | | | | |
| A5.1 | Qualitative research (observation, interviews, focus groups) | | | | | | | | | 🟦 | 🟦 | 🟦 | | | | | | | | | | | | | |
| **OP5** | **Qualitative findings report** | | | | | | | | | | | | 🟥 | | | | | | | | | | | | |
| A6.1 | Preparation for quantitative endline | | | | | | | | | | | | | | | | | 🟧 | | | | | | | |
| A6.2 | Quantitative endline | | | | | | | | | | | | | | | | | | 🟦 | | | | | | |
| **OP6** | **Completion report on endline** | | | | | | | | | | | | | | | | | | | 🟥 | | | | | |

| ID | Task |
|---|---|
| A7.1 | Qualitative research (observation, interviews, focus groups) |
| A7.2 | Data analysis (quals) |
| **OP7** | **Phase 2 qualitative findings report** |
| A8.1 | Data analysis (quants) |
| **OP8** | **Phase 2 quantitative endline findings report** |
| A9.1 | Integrative analysis |
| **OP9** | **Final report with findings from the mixed-methods analysis** |
| **OP10** | **Publication of high-level insights** |
| A11.1 | Preparation of journal paper(s) |
| **OP11** | **Publication of journal paper(s)** |
| | **MEL, reporting, communications, and dissemination** |
| R1 | Quarterly programme calls |
| R2 | Biannual and summative reporting |
| R3 | Monthly social media & blog outputs |
| R4 | Dissemination event |
| R5 | Media communications and stakeholder advocacy key updates |
| R6 | Monthly programme activity logs |

| Key | |
|---|---|
| Activity | |
| Data collection | |
| Data analysis | |
| Output | |

# 14. Annexe E: Communication and visibility plan

| OBJECTIVES / KEY MESSAGES | | | COMMUNICATION ACTIVITIES | | | RESOURCES | |
|---|---|---|---|---|---|---|---|
| **COMMUNICATION OBJECTIVES** | **TARGET GROUPS** | **KEY MESSAGE TO EACH TARGET GROUPS** | **MAIN COMMUNICATION ACTIVITIES** | **COMMUNICATION TOOLS / CHANNELS** | **TIMELINE** | **HUMAN RESOURCES** | **FINANCIAL RESOURCES** |
| Raise awareness of new evidence around TPD in Sierra Leone | Research community (Sierra Leone and international) | Decentralised TPD is an area worthy of further research, both in SL and other crisis-vulnerable contexts | Publication of project outputs and findings (pending DC approval) as global public goods<br><br>Provision of copies to SL universities with education departments<br><br>Project-end dissemination event | INEE resource library<br><br>ODE / SRA websites<br><br>Social media<br><br>Research Advisory Committee<br><br>EdTech Hub<br><br>University research networks | Jan 2022 — Dec 2023 | Principal investigators<br><br>Senior researcher<br><br>Project manager<br><br>Administrator<br><br>Affiliated connections at donor organisations | ~$1,350 |
| Raise awareness among education professionals of the difference of decentralised TPD models | Teachers<br><br>Headteachers and school management staff | There are other ways of delivering TPD that may be better suited to the needs of teachers in peri-urban and rural areas | Create statements for media release at national and local levels<br><br>Progress updates provided to ERAC | Radio<br><br>Newspapers<br><br>Research Advisory Committee | Oct 2023 — Dec 2023 | Principal investigators<br><br>Senior researcher<br><br>Project manager<br><br>Administrator<br><br>News media representatives | ~$1,600 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Raise awareness of the presence of researchers and the potential implications of positive outcomes on student learning outcomes | Parents<br><br>Community members | This research is being conducted with the encouragement of the government<br><br>Long-term vision is of improved student learning outcomes | Create statements for media release at national and local levels | Radio<br><br>Newspapers<br><br>Social media | Sep 2021 — Dec 2023 | Principal investigators<br><br>Researchers<br><br>Project manager<br><br>Administrator<br><br>News media representatives | ~$1,950 |

# 15. Annexe F: Budget

(The budget was attached separately.)

# 16. Bibliography

This bibliography is available digitally in our evidence library at
https://docs.opendeved.net/lib/3RTBA9FR

Concurrent Validity and Inter-rater Reliability. (2015). R4D.
https://www.acer.org/gb/gem/key-areas/reviews-and-analysis/assessment-reviews/
citizen-led-assessments-evaluation-reports. (details)

Adelman, E. (2011). *Accounting for time use in classrooms: alternative methodologies for
measuring the use and cost-effectiveness of time*. 11th UKFIET International
Conference on Education and Development. (details)

Asadullah, N. (2020). *COVID-19, Schooling and Learning*. BRAC.
https://bigd.bracu.ac.bd/wp-content/uploads/2020/06/COVID-19-Schooling-and-Le
arning_June-25-2020.pdf. (details)

Asanov, I., Flores, F., McKenzie, D., Mensmann, M., & Schulte, M. (2020). *Remote-learning,
Time-Use, and Mental Health of Ecuadorian High-School Students during the
COVID-19 Quarantine*. World Bank.
http://documents1.worldbank.org/curated/en/328261589899308503/pdf/Remote-
learning-Time-Use-and-Mental-Health-of-Ecuadorian-High-School-Studentsduring-t
he-COVID-19-Quarantine.pdf. (details)

BRAC. (2020). *Rapid food and income security assessment Round 2: How are BRAC
International volunteers and programme participants coping with COVID-19*.
https://covid19.bracinternational.nl/wp-content/uploads/2020/04/BI-COVID-19-Ra
pid-Assessment-Round2_20200424.pdf. (details)

Bamberger, M. (2012). *Introduction to Mixed Methods in Impact Evaluation* (No. 3).
https://www.betterevaluation.org/en/resources/guides/intro_mixed-methods_imp
act-evaluation. (details)

Cilliers, J., Fleisch, B., Kotze, J., Mohohlwane, N., Taylor, S., & Thulare, T. (2020). *Improving
the teaching of English as a first additional language in South Africa*. [Data set].
American Economic Association. (details)

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and
mixed methods approaches*. Sage publications. (details)

Crisp, M., Safford, K., & Wolfenden, F. (2017). *It takes a village to raise a teacher: the
Learning Assistant programme in Sierra Leone*. The Open University and Plan
International.

http://oro.open.ac.uk/49603/1/Sierra%20Leone%20LA%20Research%20Report%20170517%20FINAL.PDF. (details)

Dong, N., & Maynard, R. (2013). PowerUp! A Tool for Calculating Minimum Detectable Effect Sizes and Minimum Required Sample Sizes for Experimental and Quasi-Experimental Design Studies. *Journal of Research on Educational Effectiveness*, *6*(1), 24–67. https://doi.org/10.1080/19345747.2012.673143. Available from http://www.tandfonline.com/doi/abs/10.1080/19345747.2012.673143. (details)

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine Publishing Company; /z-wcorg/. (details)

Groenwold, R. H., Moons, K. G., & Vandenbroucke, J. P. (2014). Randomized trials with missing outcome data: how to analyze and what to report. *Canadian Medical Association Journal*, *186*(15), 1153–1157. https://doi.org/10.1503/cmaj.131353. (details)

Haßler, B., D'Angelo, S., Walker, H., & Marsden, M. (2019i). *Synthesis of Reviews on Teacher Professional Development in Sub-Saharan Africa*. Open Development & Education. https://doi.org/10.5281/zenodo.3497271. (details)

Haßler, B., El-Serafy, Y., Khalayleh, A., & McBurnie, C. (2021n). *Systemic Mixed-Methods Research — a conceptual framework for scalable EdTech research* (Working Paper No. 8). EdTech Hub. https://doi.org/10.5281/zenodo.4557484. Available from https://docs.edtechhub.org/lib/TD2ASC4G. Available under Creative Commons Attribution 4.0 International. (details)

Hale, D. R., Fitzgerald-Yau, N., & Viner, R. M. (2014). A Systematic Review of Effective Interventions for Reducing Multiple Health Risk Behaviors in Adolescence. *American Journal of Public Health*, *104*(5). https://doi.org/10.2105/ajph.2014.301874. Available from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3987586/. (details)

Hedges, L. V., & Hedberg, E. C. (2007). Intraclass Correlation Values for Planning Group-Randomized Trials in Education. *Educational Evaluation and Policy Analysis*, *29*(1), 60–87. https://doi.org/10.3102/0162373707299706. (details)

Iacus, S. M., King, G., & Porro, G. (2012). Causal Inference Without Balance Checking: Coarsened Exact Matching. *Political Analysis*, *20*(1), 1--24. https://doi.org/10.1093/pan/mpr013. (details)

Ibn Junaid, M., Ogange, B., & Allela, M. (2016). *Technology and Teacher Professional Development (TPD): the process and content of microlearning in a school-based integrated in-service teacher education (INSET) project*.

http://oasis.col.org/bitstream/handle/11599/3313/PCF9_Papers_paper_287.pdf?sequence=1&isAllowed=y. Available from http://oasis.col.org/bitstream/handle/11599/3313/PCF9_Papers_paper_287.pdf?sequence=1&isAllowed=y. (details)

Kamara, A. B. (2020). View of Challenges of Teachers on Teaching Practice: A Case Study of Students of Freetown Teachers' College in Sierra Leone | Asian Journal of Interdisciplinary Research. *Asian Journal of Interdisciplinary Research.* https://doi.org/10.34256/ajir2012. Available from https://iorpress.org/journals/index.php/ajir/article/view/109/75. (details)

Larsson, S. (1998). *On quality in qualitative studies.* http://www.leeds.ac.uk/educol/documents/000000821.htm. (details)

Le Nestour, A., Moscoviz, L., & Mbaye, S. (2020). *Phone survey on the Covid crisis in Senegal.* Centre for Global Development. https://dataverse.harvard.edu/file.xhtml?persistentId=doi:10.7910/DVN/9XE95F/95RW9C&version=3.0. Available from https://dataverse.harvard.edu/file.xhtml?persistentId=doi:10.7910/DVN/9XE95F/95RW9C&version=3.0. (details)

MBSSE. (2019). *2019 Annual Schools Census Report.* Ministry of Basic and Senior Secondary Education. https://mbsse.gov.sl/wp-content/uploads/2020/03/2019-Annual-School-Census-Report.pdf. (details)

MOEST. (2017). *Education Sector Plan (2018-2020).* https://www.globalpartnership.org/sites/default/files/2018-10-sierra-leone-esp.pdf. (details)

Mackintosh, A., Ramirez, A., Atherton, P., Collis, V., Mason-Sesay, M., & Bart-Williams, C. (2020). *Education Workforce Spatial Analysis in Sierra Leone* (Research and Policy Paper No. 2; p. 31). Education Commission. https://educationcommission.org/wp-content/uploads/2020/12/2-EW-Spatial-Analysis-Paper.pdf. (details)

Mackintosh, A., Ramirez, A., Atherton, P., Collis, V., Mason-Sesay, M., & Bart-Williams, C. (2020). *Education Workforce Supply and Needs in Sierra Leone* (Research and Policy Paper No. 3; p. 41). Education Commission. https://educationcommission.org/wp-content/uploads/2020/12/3-EW-Supply-and-Needs-Paper.pdf. (details)

Mason, J. (2002). *Qualitative researching 2nd edition Sage.* London. (details)

McEwan, P. J. (2015). Improving Learning in Primary Schools of Developing Countries: A Meta-Analysis of Randomized Experiments. *Review of Educational Research*, *85*(3), 353–394. https://doi.org/10.3102/0034654314553127. (details)

PAL Network. (2020). *International Common Assessment of Numeracy. Background, Features and Large-scale Implementation*. https://palnetwork.org/ican/. (details)

Penuel, W. R., Fishman, B. J., Haugan Cheng, B., & Sabelli, N. (2011). Organizing Research and Development at the Intersection of Learning, Implementation, and Design. *Educational Researcher*, *40*(7), 331–337. https://doi.org/10.3102/0013189x11421826. Available from http://edr.sagepub.com/cgi/doi/10.3102/0013189X11421826. (details)

Piper, B., Simmons Zuilkowski, S., Dubeck, M., Jepkemei, E., & King, S. J. (2018). Identifying the essential ingredients to literacy and numeracy improvement: Teacher professional development and coaching, student textbooks, and structured teachers' guides. *World Development*, *106*, 324–336. https://doi.org/10.1016/j.worlddev.2018.01.018. Available from https://linkinghub.elsevier.com/retrieve/pii/S0305750X18300287. (details)

Piper, B., Zuilkowski, S. S., & Mugenda, A. (2014). Improving reading outcomes in Kenya: First-year effects of the PRIMR Initiative. *International Journal of Educational Development*, *37*, 11–21. https://doi.org/10.1016/j.ijedudev.2014.02.006. Available from http://www.sciencedirect.com/science/article/pii/S0738059314000145. (details)

Plaut, D., & Jamieson Eberhardt, M. (2015). *Bringing Learning to Light: The Role of Citizen-Led Assessments in Shifting the Education Agenda*. Results for Development. https://r4d.org/resources/bringing-learning-light-role-citizen-led-assessments-shifting-education-agenda/. (details)

Popova, A., Evans, D. K., Breeding, M. E., & Arancibia, V. (2018). Global Landscape of Teacher Professional Development Programs: The Gap between Evidence and Practice. Population and Development Review, 1(117), 42. (details)

Ravens-Sieberer, U., Gosch, A., Erhart, M., Bruil, J., Duer, W., Auquier, P., Power, M., Abel, T., Czemy, L., Mazur, J., Czimbalmos, A., Tountas, Y., Hagquist, C., & Kilroe, J. (2005). Kidscreen quality-of-life measure for children and adolescents. *Expert Review of Pharmacoeconomics & Outcomes Research*, *5*(3). https://doi.org/10.1586/14737167.5.3.353. (details)

Silverman, D. (2015). *Interpreting qualitative data* (5th ed.). Sage. https://books.google.com/books?hl=en&lr=&id=Tp94BgAAQBAJ&oi=fnd&pg=PT18&dq=Interpreting+qualitative+data.&ots=-8nM3xS_x7&sig=4SJyBWeutT2qkOQc1Uoy-7a9Bc4. Available from

https://books.google.com/books?hl=en&lr=&id=Tp94BgAAQBAJ&oi=fnd&pg=PT18&dq=Interpreting+qualitative+data.&ots=-8nM3xS_x7&sig=4SJyBWeutT2qkOQc1Uoy-7a9Bc4. (details)

Tashakkori, A., & Teddlie, C. (1998). *Mixed Methodology: Combining Qualitative and Quantitative Approaches.* Sage Publications. (details)

Teddlie, C., & Tashakkori, A. (2003). Major issues and controveries in the use of mixed methods in the social and behvioral sciences. *Handbook of Mixed Methods in Social & Behavioral Research*, 3–50. (details)

Teddlie, C., & Tashakkori, A. (2009). *Foundations of Mixed Methods Research: Integrating Quantitative and Qualitative Approaches in the Social and Behavioral Sciences.* Sage. (details)

Teddlie, C., & Yu, F. (2007). Mixed Methods Sampling: A Typology With Examples. *Journal of Mixed Methods Research*, *1*(1), 77–100. https://doi.org/10.1177/2345678906292430. Available from http://journals.sagepub.com/doi/10.1177/2345678906292430. (details)

UIS. (2019). *Sierra Leone | Education and Literacy.* http://uis.unesco.org/en/country/sl. (details)

UNESCO. (2017). *Unpacking Sustainable Development Goal 4: Education 2030.* UNESCO. https://www.campaignforeducation.org/wp-content/uploads/2018/07/SDG4.pdf. (details)

UNICEF. (2020). *Education Sector Analysis of the Republic of Sierra Leone, Assessing the enabling environment for gender equality.* UNICEF. https://unesdoc.unesco.org/ark:/48223/pf0000375434/PDF/375434eng.pdf.multi. (details)

UNOCHA. (2015). *District Profile: Bombali (Sierra Leone).* https://reliefweb.int/sites/reliefweb.int/files/resources/district_profile_bombali_10_dec_2015am%20%281%29.pdf. (details)

UNOCHA. (2015). *District Profile: Tonkolili (Sierra Leone).* https://reliefweb.int/report/sierra-leone/sierra-leone-tonkolili-district-profile-3-december-2015. (details)

Uwezo Kenya. (2020). *Are Our Children Learning? The Status of Remote-learning among School-going Children in Kenya during the Covid-19 Crisis.* Uwezo. https://palnetwork.org/wp-content/uploads/2020/05/Usawa-Agenda-2020-Report.pdf. (details)

Vrikki, M., Kershner, R., Calcagni, E., Hennessy, S., Lee, L., Hernández, F., Estrada, N., & Ahmed, F. (2018). The Teacher Scheme for Educational Dialogue Analysis (T-SEDA): Developing a research-based observation tool for supporting teacher inquiry into pupils' participation in classroom dialogue. *International Journal of Research and Methods in Education*, *42*(2), 185–203. Education Database. https://doi.org/10.1080/1743727X.2018.1467890. Available from https://www.tandfonline.com/doi/abs/10.1080/1743727X.2018.1467890. (details)

WHO. (2016). *Sierra Leone | Ebola maps.* http://www.who.int/csr/disease/ebola/maps/en/. (details)

World Bank. (2018). *Sierra Leone: Human Capital Index.* https://databank.worldbank.org/data/download/hci/HCI_2pager_SLE.pdf. (details)

World Bank. (2021). *GDP per capita cCurent US$) - Sierra Leone.* World Bank Data. https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SL. Available from https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SL. (details)