# Effectiveness of two e-learning modalities for school leader professional development on effective school leadership in Rwanda

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# Content

## Summary

In this report, we present an evaluation of a Continuous Professional Development (CPD) training programme for school leaders, delivered in an e-learning modality. Randomization into one of the two modalities took place at the sector level. In the first modality (the trainer-led group) trainees are guided by a trainer from the University of Rwanda - College of Education. In the other modality (the peer-led group) trainees were guided through different activities by their peers, with only occasional involvement of a trainer. The Diploma Programme on Effective School Leadership consists of four modules: (1) Overview of school leadership and working with parents and the wider community; (2) Creating strategic direction for the school; (3) Managing the school as an organisation; and (4) Leading learning & leading teaching.

We examine whether there is a difference between the peer-led group and the trainer-led group in terms of process (i.e. participation) outcomes, assessment outcomes, satisfaction with the e-learning modality, leadership questionnaire outcomes (filled out by both the participants as well as by teachers from the participants' schools) and school assessment outcomes. In particular, the underlying question of this study is the following: can the peer-led group perform as well as the trainer-led group in terms of school leadership styles, standards, skills and competences, and participation and exam results on the CPD programme? Additional sub-questions that we ask are whether we can determine factors that explain differences in effectiveness, how the two modalities compare in terms of costs and whether the more effective modality in terms of outcomes is also more cost-effective.

When looking at the process outcomes, which we expected to be moderators for the post-test leadership outcomes and the assessment outcomes, we find that the trainer-led group participated significantly more in the online environment, especially in Module 1. However, in the other three modules, the participation rates between the two modalities is comparable.

Interestingly we find that the process data in Module 1 is the only outcome data that shows higher outcomes for the trainer-led group. All other outcome measures that we analyzed were in favour of the peer-led group, or did not show significant differences. Based on the final satisfaction questionnaire, we find that the peer-led group was more satisfied with the CPD programme in terms of the assignments and the lessons, and perceived usefulness of the used videos.

With respect to the leadership outcomes from the post-test questionnaire, this study shows that the peer-led group had a significantly higher perceived usefulness of the CPD programme, and scored themselves significantly higher on distributed leadership. However, these findings are not confirmed by the teachers at the schools of the trained (deputy) head teachers. In the post-test questionnaire filled out by teachers, we only observe higher scores for instructional leadership and intellectual stimulation for school leaders in the peer-led group.

Furthermore, based on the assessment data, we found that the peer-led group achieved significantly better results than the trainer-led group, with respect to the portfolio of evidence, exam scores and passing rates and for participation in online distance work.

When trying to identify whether there are background characteristics of the trainees (i.e. school leaders) that may explain differences in effectiveness, we do not find any differential effects for the leadership outcomes based on the post-test questionnaire when looking at the trainee's gender, school leader position (HT or DHT), trainee's educational level or school type (government-aided, public or private). For some of the assessment outcomes, we find that highly educated trainees (i.e. school leaders with a master's degree or a PGDE degree) in the peer-led group perform significantly better than in the trainer-led group.

We do not find any evidence of a moderating effect of the process outcomes on the post-test questionnaire leadership outcomes and the assessment outcomes.

When comparing the costs of the two different modalities per participant, we find that the costs for the peer-led participants are 1.4 times lower than the costs per participant in the trainer-led group. However, we find positive and significant effects in favour of the peer-led group, and not for the trainer-led group, which implies that not only the costs are lower for the peer-led group, but also that the effects are higher, providing us with a double positive result for this group.

All in all, we conclude that the peer-led group is more beneficial compared to the trainer-led group, both with respect to the effectiveness of the outcomes and with respect to the cost-effectiveness.

# 1. Introduction

In less developed countries, more than one out of every four children entering compulsory education leaves school early without a secondary diploma. Sabates et al. (2010) highlighted some of the most predominant factors influencing the increasing dropout rates in developing countries, particularly focusing on Africa. The most important factors hindering educational completion in the less developed countries include inferior educational quality stemming from overcrowded classrooms, presence of underqualified teachers, insufficient learning materials and inappropriate language of instruction. School distance is also an important factor to influence students' decision to continue school. Apart from school related factors, socioeconomic factors like poverty, malnutrition and family's perception about the importance of secondary education are also important factors influencing the dropout rates of the students. Furthermore, grade repetition or enrolling in a lower grade at a higher age often demotivates the students to continue with school education. Particularly for girls, school safety and teenage pregnancy play crucial role in influencing the decision to drop out from the schools.

Tackling poor learning outcomes, conflicts, and/or negative perceptions on learning organizations as a whole, requires a whole school approach. There is a particularly important role for school leaders in encompassing school-based problems with the ambition to underpin the whole school approach (Robinson et al, 2008; Leithwood et al, 2008). Ideally, school leaders support teaching and learning, i.e. they promote the school as a learning organization and engage teachers in continuous professional development in general and in induction of new teachers in particular. Furthermore, it is argued that school leaders, who support, evaluate and develop teacher quality also have a high impact on learning outcomes.

This report focuses on the training of school leaders (head teachers and deputy head teachers) in Rwanda, that are organized as part of the programme called "Leading, Teaching and Learning Together" in secondary education, which is set up by VVOB in partnership with the Rwanda Basic Education Board (REB) and the University of Rwanda- College of Education (UR-CE) and with funding from the Mastercard Foundation (McF).

In this report, we evaluate the effectiveness of two modalities of the e-learning version of the CPD programme on various outcomes. Furthermore, we analyse the cost-effectiveness of the two modalities in the programme. This is the final report of this study, which is a follow up of the baseline report that was published in April 2021. For more background information on the study, and an overview of the literature, please see our baseline report[1].

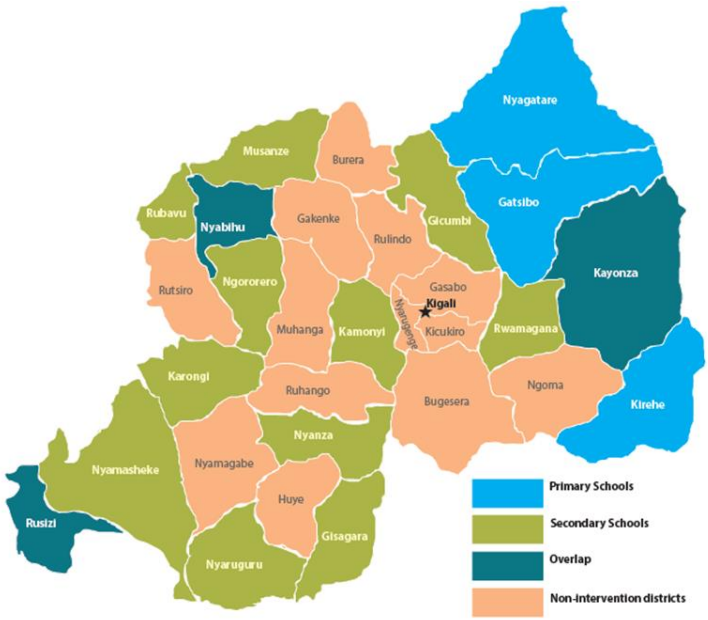
[1] See: "https://rwanda.vvob.org/sites/rwanda/files/school_leadership_baseline_report_cea_april_2021_final.pdf"

# 2. Intervention

## 2.1. Definitions

The intervention is a Continuous Professional Development (CPD) Diploma Programme on Effective School Leadership for Head Teachers (HTs) and Deputy Head Teachers (DHTs) implemented within the context of the Leading, Teaching and Learning Together (LTLT) in Secondary Education programme. The LTLT in secondary education programme runs from 2018 to 2021, targeting secondary schools in 14 districts in Rwanda (Figure 2.1). The short-term objective of the programme is to strengthen the competences of key education actors through improved CPD support systems for these actors. Actors that are directly targeted by the programme are: District Directors of Education (DDEs), District Education Officers (DEOs), Sector Education Inspectors (SEIs), School leaders (head teachers and deputy head teachers), School Based Mentors (SBMs) and school subject leaders (SSLs) in Science, Technology, Engineering and Mathematics (STEM) (VVOB, 2019). As part of the programme, VVOB in collaboration with REB and the University of Rwanda College of Education (UR-CE) offers certified training programmes to the different actors. In addition to the Diploma Programme on Effective School Leadership, Sector Education Inspectors (SEIs), School Based Mentors (SBMs), and STEM SSLs are being trained in Educational Mentorship and Coaching. From 2021, VVOB and its operational partners will prepare to upscale the different CPD programmes to the remaining 16 districts. Such preparations include the provision of laptops for online learning and setting up a data ecosystem to track school progress.

**Figure 2.1 Targeted districts**




Source: Concept Note on Promoting Effective School Leadership, VVOB-Rwanda, REB & UR-CE, June 2019

## 2.2. Diploma Programme on Effective School Leadership

The purpose of the Diploma Programme for Effective School Leadership is for head teachers and deputy head teachers to grow in their role as school leader, to develop their competences, to improve the overall school environment and to lead their teachers in order to improve teaching quality, with the ultimate goal

to improve students learning, well-being and achievements. Effective school leaders motivate teachers to invest in their professional development and encourage exchange and learning from each other. Note that, although it is not part of this evaluation study, the CPD programme is complemented with Professional Learning Communities (PLCs) in the treated schools.

The diploma programme, consisting of 40 credits offered in four modules is a one-year long programme, that originally was set up to have 18 contact days (of which 16 training days in blocks of 2 days, and 2 examination days). In 2019 the programme was offered as a blended programme, with 14 training days face-to-face (f2f) and 2 days through online/distance learning. As of 2020, due to the COVID-19 pandemic, the full programme is offered online, except the examinations which were done face-to-face. The role of the trainers (lecturers from the UR-CE and other universities in Rwanda) is different for the f2f mode of delivery (that was used pre-COVID) and the online mode. In the f2f mode, the trainers provided PowerPoint presentations, and engaged participants in different f2f learning activities such as group discussions. In the online mode, the trainers make instructional videos available in the online environment, and act merely as a coach, by logging in frequently to answer questions, and to stimulate discussions on the forum. Trainers follow-up on the online activities of the trainees, while VVOB follows up on the online activity of the trainers. All trainers have received an e-tutoring programme prior to facilitating the online programme. Next to the activity in the formal online environment, many trainers have WhatsApp group discussions with the trainees they are responsible for, and they frequently offer support by telephone. This support involves both technical and learning support. To prepare trainees for the online CPD programmes, they take part in a preparatory digital literacy training which equips them with the skills to navigate the Moodle environment and complete assignments online. Note that in the experiment at hand we compare this default setting of the online mode with a modality where there is no trainer involved in the online environment, except for grading assignments and assessment. The difference between the two modalities will be further explained in Section 3.1.

The Diploma Programme on Effective School Leadership consists of four modules: (1) Overview of school leadership and working with parents and the wider community; (2) Creating strategic direction for the school; (3) Managing the school as an organisation; and (4) Leading learning & leading teaching. These modules are based on the five professional standards for effective school leadership (that will be discussed in more details in Section 5.6). Note that leading teaching and leading learning are separate standards, and therefore 4 modules refer to 5 standards. Furthermore, there are 5 crosscutting themes (school improvement planning, inclusive education, gender, monitoring and evaluation, ICT integration and school collaboration).

In these modules participating Head Teachers and Deputy Head Teachers (from now on referred to as school leaders or trainees) use an interpretative framework of a school leader, consisting of professional self-understanding and subjective education theory. Trainees are challenged to a constant interaction between thinking and practice. Reflective practices are very important in the programme and are a crucial process to remain critical towards oneself and one's work. Printouts of the programme manuals and other learning materials are distributed to the trainees. This includes four extensive programme manuals, one for each module, with theory and learning activities. As such, both the f2f cohort, as the blended learning and fully online cohorts, received printouts of their learning materials.

As the programme is competence based, it contains both formative and continuous assessment (60%) as well as summative assessment (40%). Furthermore, group learning and sharing experiences is an explicit part of the programme. The formative assessment consists of 8 practice-based written assignments (4 modules with 2 assignments per module), participation during the training activities (e.g. in forums and online quizzes) and a portfolio of evidence. Furthermore, the programme includes a field visit by trainers to the schools of the trainees. The aim of the field visit is to support the trainees. They receive feedback on how they can perform on the five standards of effective leadership. The summative

assessment consists of a two hour long written examination per module. Trainees are only allowed to participate in the written exam for each module, when they have at least an 85% attendance rate for the module and have submitted all assignments for both modules.

## 3. Research questions and setup

Since the CPD programme for school leaders will soon be scaled up to 16 additional districts and the programme in its current form can be considered as resource intensive, we wish to have a balanced decision on the best way that distance learning using digital/online tools (short: e-learning) can be provided to school leaders. As such, we aim to experiment with two different forms of e-learning, primarily trainer-led versus primarily peer-led moderation.

Given the limited availability of resources to organize the CPD programme, we wish to explore whether the peer-led group, with limited access to a trainer from the UR-CE, performs as well as the trainer-led group in terms of cognitive and non-cognitive outcomes. In particular, the main underlying question of this research is formulated as follows: **can the peer-led group perform equally well as the trainer-led group in terms of school leadership styles, standards, skills and competences, exam results and participation from the CPD programme**? Online moderation by trainers from UR-CE may play a role in better trainee's performance (Yen et al., 2018). However, when thinking carefully about the design of an e-learning course, literature also indicates that interaction with a tutor is not per definition always meaningful and, as such, not always adding to trainee's performance, as compared to a well-designed e-learning course with only limited mentoring available (Price et al., 2007).

The proposed research aims at answering four questions in this respect:

1. How effective is e-learning with e-moderation by a trainer from UR-CE (trainer-led group) vs. e-learning-with e-moderation by peers (peer-led group) for various process and outcome measures?
2. Which factors explain the differences in the effectiveness of trainer-led e-learning as compared to peer-led e-learning?
3. How does trainer-led e-learning compare to peer-led e-learning in terms of costs?
4. Is the more effective intervention also most cost-effective for various outcome measures and for various sub-groups of participants?

### 3.1. Experimental setup

To this end, we conduct an experimental study that involves both a trainer-led group and a peer-led group, and measurement of the trainees pre- and post-intervention outcomes, as well as teacher perceptions of leadership by the school leader pre- and post-intervention. Schools are randomised into one of the two study arms according to the administrative sector level, meaning that within a sector all schools are either part of the trainer-led group or of the peer-led group. The reason for randomizing schools at sector level and not at school level, was driven by the fact that school leaders in one sector often know each other and are likely to exchange on ideas and information in for instance Professional Learning Communities which would increase the chance of contamination. Both groups will receive guidance from a UR-CE trainer on how to access the online programme and will be supported by this trainer during a field visit. Both groups will also receive the CPD programme fully online.

However, the trainer-led group will receive guidance from trainers in online activities while the peer-led group will (only) receive guidance from peers in online activities. For example, during individual learning activities the trainees in the trainer-led group will receive feedback from the trainer, while trainees in the peer-led group will get automated feedback. Trainees in the peer-led group frequently use peer feedback and peer learning without involvement of trainer, while the trainees in the trained-led group only occasionally use peer feedback and peer learning. During forum discussions and brainstorm sessions the trainer will active moderate the discussion in the trainer-led group, while in the peer-led group the peers will moderate the discussion and the brainstorm themselves. In the trainer-led group, trainees are required to attend one synchronous session per module (additional sessions are optional). Trainees in the peer-

led group do not have such a session, although recordings of these sessions are also shared with trainees from the peer-led group (see Appendix E for a detailed overview of the course elements in both scenarios and the role of trainers). However the peer-led groups still get assigned a trainer, for marking assignments and the assessments, and for facilitation in the online environment (although they get much less time for that than the trainers in the peer-led group). As a result of the lower involvement of the trainers in the peer-led group, there are 33 trainers for 233 trainees in the trainer-led group, which is about 1 trainer per 7 trainees and 9 trainers for 230 trainees in the peer-led group, which is about 25 trainees per trainer.

### 3.2. Relevant outcomes

The relevant outcomes that we focus on in this study are the following: (1) intermediate process outcomes from the online Moodle environment in which the online course takes place (such as attendance/dropout (i.e. number of sessions completed), participation in e-learning activities, (i.e. scores on online quizzes, activity on the online forum, participation in online workshops); (2) formative and summative assessment outcomes from the diploma programme (performance on exams, assignments and the portfolio of evidence); (3) questionnaire outcomes on the level of satisfaction with the CPD programme and e-learning environment; (4) leadership outcomes measured via questionnaires (on barriers to participate in e-learning, job satisfaction, work task motivation, motivation to learn, self-efficacy and on leadership styles, competences and skills); and (5) a school-level assessment of the standards of effective school leadership (i.e. establishing goals and expectations; strategic resourcing; planning, coordinating and evaluating teaching and the curriculum; promoting and participating in teacher learning and development; and ensuring an orderly and supportive environment). As mentioned above, these five standards of effective school leadership set forth by REB form the backbone of the diploma programme. The standards are assessed via a School Leadership Assessment Tool, which is assessed by trained enumerators based on both background information of the school as well as 66 key indicators that are underlying the five standards of effective leadership. The assessment consists of half a day of document checks, observations and interviews at the school. The school leadership assessment is a valuable addition to the online intermediate and assessment outcomes and the surveys on satisfaction and leadership skills that are used, as it is more holistic and triangulated with other assessments.

## 4. Research method

This study is designed as a randomized trial, in which schools are randomly assigned to the two groups based on the sector in which the school is located. All school leaders of the schools that are allocated to the trainer-led group take part in the trainer-led programme and all school leaders of the schools that are allocated to the comparison group take part in the peer-led programme. Based on a randomised controlled trail (RCT) as we have here, we can compare the average outcomes from the peer-led group with the average outcomes of the trainer-led group after the CPD programme has taken place.

There are a couple of assumptions underlying the group comparison in an RCT. First, it is important that the treatment group and the control group are comparable based on observed and unobserved background characteristics. If this condition is met, the effectiveness of the intervention can be ascribed to the treatment and not to differences in characteristics between the treated and untreated groups.

Second, there should be no overlap (or 'spill-over') between the two groups. Spill-over effects may lead to trainees in the trainer-led group learning from their peers on their own initiative. This may lead to an underestimation of the actual effect.

A good way for ensuring comparability between the peer-led and trainer-led group is random assignment (to the intervention). Random assignment means that differences between treated and untreated trainees are based on a random error in the assignment process. The idea is that these random errors in observed or unobserved characteristics cancel each other out in the comparison of the peer-led and trainer-led group before and after the intervention, so that the estimated effectiveness of induction programmes is a 'true' measure of the effect.

Because we have an RCT with comparable groups and no overlap between the groups, the effectiveness analysis can take place with relative straightforward statistical techniques. These include a comparison of the trainer-led scenario with the peer-led scenario in relation to the outcomes mentioned above using relatively simple bivariate techniques first (T-statistics). Furthermore, multivariate regression analyses is performed for the outcomes which are (near) significant in the bivariate analyses, in which we then control for background information of school leader and/or schools and the pretest value of the analysed outcome, using OLS regression techniques. We would like to correct for the trainer, but unfortunately do not have that information. However, the closest thing to the trainer that is known to the researchers is the online group in which a school leader participated (18 groups in total, 9 peer-led and 9 trainer-led groups). We therefore also check the results for inclusion of standard errors clustered at the level of this group. Furthermore, we check the results for inclusion of standard errors clustered at the district level, as the groups were randomized at the district level. Note that we analyse several outcomes measures per module with T-tests. In some studies authors apply a Bonferroni correction with a large number of t-tests. However, the Bonferroni correction is a rather strict test that is often considered too strict, so we choose not to apply this test. Instead, we are very cautious in interpreting results with a p-value above 0.02 (instead of the usual 0.05), to account for the risk of the problem of multiple comparisons.

To check whether there is a differential effect of certain background characteristics of the school leaders and the school, we perform multivariate regression analyses with interaction terms between the dummy indicating in which modality a school leader participated and the specific characteristic.

Lastly, in additional regression analyses, we use a two-step analysis in the regressions. if we want to look at sub-parts of the two scenario-learning modalities, such as actual participation in the online programme. We then first analyse how participation in different e-learning activities varies among the two e-learning modalities and then, in a second step, whether this has a moderating effect on the outcomes for which we showed significant differences between the two groups (e.g. the assessment outcomes).

Besides the effectiveness, we also wish to estimate the cost-effectiveness of the Diploma Programme on Effective School Leadership. For this purpose, we balance the costs and the returns of the programme. The costs are measured as the spending on the implementation of the programme. The diploma programme involves the training of school leaders (DHT and HTs). The returns will be expressed in terms of, improved outcomes. In the cost effectiveness analysis, we explicitly compare the costs of the two scenarios and assess if the additional costs of the trainer-led scenario are worthwhile in relation to the difference in effect size. This proposed method is comparable to cost-effectiveness analysis in Cabus et al. (2020).

# 5. Outcome measures

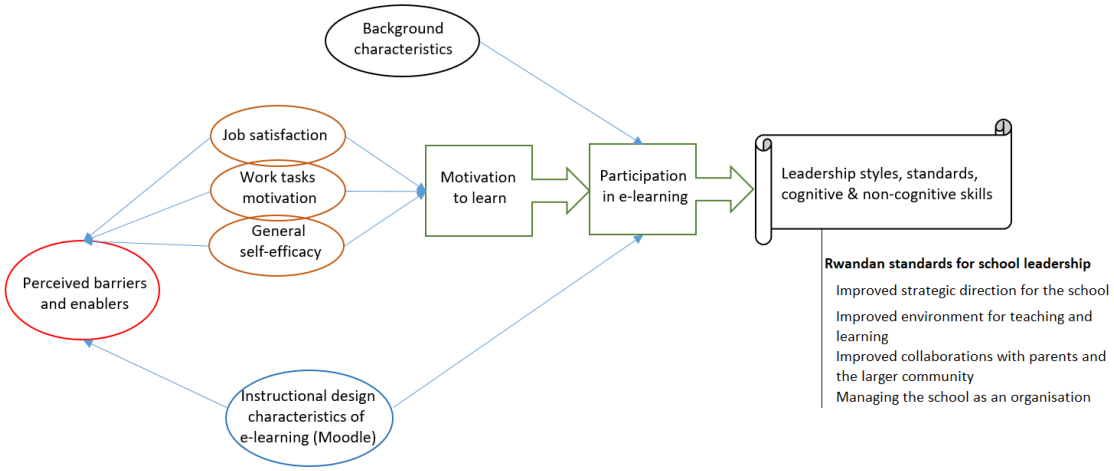
This chapter starts with the conceptual framework on effective school leadership, which discusses how the certain outcome measures are related to each other and to the intervention. This framework is based on the literature and visually presented in Figure 5.1.
Next, the following five sections in this chapter describe the five different types of outcome measures that we look at in this report, that are also part of Figure 5.1. (1) The intermediate outcomes from the online Moodle environment in which the online course takes place, called the process outcomes (and called participation in e-learning in Figure 5.1); (2) formative and summative assessment outcomes (called cognitive skills in Figure 5.1); (3) questionnaire outcomes on the level of satisfaction with the CPD programme and e-learning environment; (4) leadership outcomes measured via the post-test questionnaire (on barriers to participate in e-learning, job satisfaction, work task motivation, motivation to learn, self-efficacy and on leadership styles, competences and skills); and (5) a school-level assessment of the standards of effective school leadership.

Important to mention is that there is large variation in the number of observations between the different outcomes. That are discussed in this chapter. Ideally one would want to use the same number of observations for all outcome measures. However, doing so would lead to a large loss of observations in most outcomes, as the weakest link (in this case the post-test questionnaire for school leaders) would be determining the number of observations also for the other outcomes. In addition to that, merging datasets in order to end up with one set of school leaders that we have all outcomes for was never the intention. This means that identification of school leaders between datasets is not always perfectly possible, and in some cases not possible at all, because some questionnaires were administered anonymously. Lastly, a lower number of observations leads to a higher chance of power problems, so therefore we prefer not to reduce the number of observations unnecessary. For these reasons, we choose to report each outcome for the maximum amount of observations available. Note that the non-response to the questionnaire is discussed separately in Section 6.1.

## 5.1. Conceptual framework

The CPD programme on effective school leadership is offered to trainees through the online learning platform Moodle. E-learning has several advantages: people save time and can prepare themselves at any location for taking part in the lessons. Therefore, it is often argued that e-learning for adults is easier to combine with working hours, or with family obligations, and is then more able to overcome situational barriers (e.g. time or travel constraints). But also the organizer of the e-learning programme should not make reservations on locations, and can save time by not having to travel to these locations. The organizer can also reach more people in one class because he/she is not restricted to the number of people that fit in the room. E-learning is then less costly than physical gatherings (e.g. no travel costs, no reservation costs, no catering, etc.). Even though face-to-face interactions facilitate better communication among trainees and instructors and allow for greater clarity while delivering knowledge and skills, the literature also provides growing evidence that highlight online education or e-learning's the convenience and flexibility, especially in the context of self-regulated learning (Tayebinik and Puteh, 2013; Kemp and Grieve, 2014). In fact, recent studies portray blended learning mechanism (combining both face-to-face interactions and e-learning) as the most approach for distance learning courses (Tayebinik and Puteh, 2013).

**Figure 5.1 Conceptual framework on participation in e-learning (CPD programme) and improved leadership styles, competences and skills**




Note that « More attention for inclusive education and gender, monitoring and evaluation » is left out the Rwandan standards for school leadership, because this is beyond focus of the cost-effectiveness study.

**Source** Adapted from Garavan et al (2010), p.157.

However, literature also indicates a set of disadvantages. For example, trainees dropout more frequently from courses due to lack of motivation to learn or because of a suboptimal instructional design. In this respect, Garavan et al. (2010, p.157-158) have built a tractable model of participation in e-learning (Figure 5.1). We summarize from Garavan et al. (2010, p. 158) the most important components/mediators of the conceptual model on participation in e-learning, and adapt the authors' conceptual framework as to fit with our target group of school leaders. Furthermore, we add the leadership styles, competences and skills, that the e-learning programme wishes to positively influence, to the conceptual framework.

Figure 5.1 presents three orange balloons: the school leaders' job satisfaction, work tasks motivation and general self-efficacy. These orange balloons are the mediators between barriers to participation in e-learning and motivation to learn. Initially, we do not expect over the course of the intervention to alter/improve directly these mediators. However, general self-efficacy may improve because of participation in the CPD programme.

The blue balloon presents the instructional design characteristics e-learning. As described above, this instructional design differs between the trainer-led group and peer-led group. The trainer-led school leaders get assigned a trainer from UR-CE, while the peer-led group get less access to a trainer. Because of this, we expect a direct relationship between these instructional design differences between trainer-led and peer-led group school leaders and the way participants will experience their e-learning trajectory, in favour of the trainer-led group.

In this respect, it is important to acknowledge some of the literature on mentoring in an online programme, and the role of different interactions. Multiple studies found a significant effect of the teacher's presence on learner engagement and retention (Yen et al., 2018). Price et al. (2007) discuss that successful tutoring includes both cognitive and affective components: students are not only concerned with achieving learning goals but also with satisfying their emotional needs. So it is important to train both tutors and students to compensate for the lack of real interaction and non-verbal information via the use of explicit verbal cues. One of the challenges of offering a course completely online is that one needs to think more consciously about these things. A smile in the classroom can mean a great deal to students and it is a challenge to incorporate similar signs of affections in the online learning environment.

However, teacher presence and support are not the only indicators for online learning engagement and success. Jung and Lee (2018) note that the perceived usefulness and quality of an online learning environment has a significant impact on learning engagement. In this respect it is interesting that Joosten et al. (2019) propose a quality framework for online courses with two main determinants: clarity and richness, clarity being determined by a course' design, organization and support mechanisms and richness coming from the interaction within a course. Anderson (2008) distinguishes three main types of interaction: student-content, student-instructor and student-student. According to Anderson (2008) useful and meaningful learning is possible if one of the three forms of interaction is at a high level. High levels of more than one of these three modes will likely provide a more satisfying educational experience, though these experiences may not be as cost or time effective.

## 5.2. CPD process outcomes

In the digital environment of the online Moodle, the participation in the various components of each module was automatically registered. These components consist of, for example, participation in the quizzes, feedback assignments, forum discussions and workshops. As each module usually consist of multiple activities belonging to one component, we have calculated the attendance for each participant as the share of activities that (s)he attended which is expressed as a percentage in the table below. Table 5.1 shows the average participation rate for each component in each of the four modules, for all participants jointly (regardless of whether they were assigned to the trainer-led or peer-led group).

An interesting, and also relevant, observation based on Table 5.1 is that the number of trainees participating in the online activities declines over time. Between Module 1 and Modules 2 and 3, the number of participating school leaders decreased by 13%. Furthermore, Table 5.1 shows that especially in Module 4 the number of observations is very low. However, this seems to be a mistake in the data, and not pure attrition, because if we look at the assessment outcomes in Section 5.3, we see a much larger number of observations in Module 4 (although still slightly lower than in Modules 2 and 3).

**Table 5.1 Average participation rate of all participants**

| Variable | N | Average | Std. Dev. |
|---|---|---|---|
| **Module 1** | | | |
| Quizzes | 462 | 78.22 | 22.63 |
| Feedback | 462 | 77.44 | 27.14 |
| Forum discussion | 462 | 68.37 | 34.88 |
| Assignment | 462 | 79.43 | 40.45 |
| Assignment act | 462 | 73.59 | 44.13 |
| Workshop | 461 | 63.05 | 43.42 |
| **Module 2** | | | |
| Quizzes | 403 | 89.98 | 22.32 |
| Forum discussion | 403 | 70.93 | 30.81 |
| Workshop | 403 | 74.00 | 30.16 |
| Questionnaire | 403 | 81.98 | 27.28 |
| Drag and drop | 403 | 83.37 | 34.26 |
| Assignment | 403 | 73.94 | 40.25 |
| Assignment act | 403 | 95.03 | 21.74 |
| **Module 3** | | | |
| Quizzes | 403 | 79.76 | 29.46 |
| Assignment | 403 | 68.85 | 39.00 |
| Forum discussion | 403 | 54.01 | 36.49 |
| Feedback | 403 | 76.92 | 32.80 |

| | | | |
|---|---|---|---|
| Peer review | 403 | 45.07 | 39.12 |
| Idea boardz | 403 | 70.51 | 34.42 |
| **Module 4** | | | |
| Quizzes | 266 | 75.52 | 35.16 |
| Assignment | 266 | 74.43 | 39.62 |
| Forum discussion | 266 | 61.00 | 37.71 |
| Idea boardz | 266 | 64.17 | 34.80 |

## 5.3. CPD assessment outcomes

The CPD programme includes both formative assessment (60%) and summative assessment (40%), which are graded by the trainers, who are assigned to the groups of participating trainees (i.e. school leaders).

For each module the formative assessment consists of 2 practice-oriented written assignments where the participant can score a maximum of 15 points per assignment. In total there are 8 assignments divided over the 4 modules. In addition, each module the portfolio of evidence is assessed. For the portfolio, the participant can obtain a maximum of 25 points per module. Furthermore, participation in online and distance work is monitored.

The summative assessment consists of a two-hour written exam for each module, taking place onsite. Trainees are only allowed to participate in the written exam for each module, when they have at least 85% attendance rate for the module and have submitted all assignments for the module. For the examination, the participant can obtain a score of up to 40 points.

Table 5.2 shows the average grades for each of the formative and summative assessments in each of the four modules, for all participants jointly (regardless of whether they were assigned to the trainer-led or peer-led group).

**Table 5.2 Average grades of all participants**

| Variable | N | Average | Std. Dev. |
|---|---|---|---|
| **Module 1** | | | |
| Verdict (pass) | 405 | 75.55 | 43.02 |
| Exam score | 405 | 27.01 | 5.71 |
| Assignment 1 | 407 | 9.59 | 3.24 |
| Assignment 2 | 407 | 9.39 | 3.84 |
| Portfolio | 407 | 16.01 | 7.02 |
| Participation online distance work | 407 | 3.92 | 1.03 |
| **Module 2** | | | |
| Verdict (pass) | 406 | 43.10 | 49.58 |
| Exam score | 407 | 26.37 | 5.96 |
| Assignment 3 | 407 | 7.63 | 4.75 |
| Assignment 4 | 407 | 7.97 | 5.30 |
| Portfolio | 407 | 9.12 | 8.01 |
| Participation online distance work | 407 | 3.59 | 1.34 |

| | | | |
|---|---|---|---|
| **Module 3** | | | |
| Verdict (pass) | 405 | 63.20 | 48.28 |
| Exam score | 386 | 24.30 | 7.14 |
| Assignment 5 | 347 | 7.72 | 4.85 |
| Assignment 6 | 374 | 8.59 | 4.57 |
| Portfolio | 404 | 12.84 | 8.89 |
| Participation online distance work | 403 | 3.88 | 1.16 |
| | | | |
| **Module 4** | | | |
| Verdict (pass) | 405 | 72.09 | 44.90 |
| Exam score | 381 | 29.44 | 6.58 |
| Assignment 7 | 388 | 8.71 | 4.86 |
| Assignment 8 | 376 | 9.12 | 4.57 |
| Portfolio | 393 | 11.18 | 9.50 |
| Participation online distance work | 395 | 3.61 | 1.21 |

## 5.4. CPD satisfaction outcomes

At the midterm and at the end of the CPD programme, the participants were asked to indicate their level of satisfaction with the CPD programme. They were asked to indicate how satisfied they were with the quizzes, assignments and forum discussions. Furthermore, they had to indicate how useful they found the videos and handouts. All the statements were rated on a 5-point Likert scale (1= not enjoyable/useful at all, 5= very enjoyable/useful). The questionnaires were anonymous.

Table 5.3 shows the average satisfaction rate of the midline and post-test satisfaction questionnaire, for all participants jointly (regardless of whether they were assigned to the trainer-led or peer-led group). Note that the midline satisfaction survey was only filled out by 225 out of 463 participants, whereas the post-test satisfaction survey was only filled out by 157 participants. Because these questionnaires were anonymous, we unfortunately cannot analyse whether this low response rate to the questionnaire was selective or not.

**Table 5.3 Average satisfaction rate of all participants**

| | Midline satisfaction | | | Post-test satisfaction | | |
|---|---|---|---|---|---|---|
| **Variable** | **N** | **Average** | **Std. Dev.** | **N** | **Average** | **Std. Dev.** |
| **How much did you enjoy the following:** | | | | | | |
| Quiz | 225 | 4.34 | 0.64 | 157 | 4.42 | 0.58 |
| Assignments | 225 | 3.85 | 0.83 | 157 | 4.12 | 0.80 |
| Forum discussions | 225 | 3.58 | 0.96 | 157 | 3.73 | 0.98 |
| Feedback | 225 | 3.56 | 0.91 | 157 | 3.79 | 0.83 |
| Lessons | 225 | 4.18 | 0.77 | 157 | 4.33 | 0.73 |
| H5P | 225 | 3.99 | 0.68 | 157 | 4.05 | 0.84 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **How useful were the following:** | | | | | | |
| Video's | 225 | 4.25 | 0.74 | 157 | 4.33 | 0.67 |
| Handouts | 225 | 4.45 | 0.64 | 157 | 4.49 | 0.64 |
| **How easy/difficult is it to navigate:** | | | | | | |
| Moodle | 225 | 3.63 | 0.91 | 157 | 3.89 | 0.80 |
| **How motivated are you to continue:** | | | | | | |
| Motivation | 225 | 3.97 | 0.90 | - | - | - |

## 5.5. Questionnaire outcomes school leaders and teachers

The school leaders were provided questionnaires, both pre and post-intervention, and their responses were recorded on the following aspects:

1) *Barriers to e-learning* on a 5-point Likert scale (1= strongly disagree, 5= strongly agree)
2) *Job Satisfaction* on a 5-point Likert scale (1= extremely dissatisfied, 5= extremely satisfied)
3) *Work tasks motivation* on 5-point Likert scale (1= completely disagree, 5= completely agree)
4) *General self-efficacy* on a 5-point Likert scale (1= strongly disagree, 5= strongly agree)
5) *Motivation to learn* on a 5-point Likert scale (1= strongly disagree, 5= strongly agree)
6) *Instructional leadership* on a 7-point Likert scale (1= never, 7= every day)
7) *Transformational leadership* on a 5-point Likert scale (1= not at all, 5= always)
8) *Leadership overall* on a 4-point Likert scale (1= high level of support needed, 4= no support needed at present)
9) *Trust in school leaders* on a 5-point Likert scale (1= strongly disagree, 5= strongly agree)
10) *Distributed leadership* on a 5-point Likert scale (1= strongly disagree, 5= strongly agree)

These 10 constructs consist of an average value based on several statements that were included in the questionnaires that jointly comprise these constructs.

Robinson et al. (2007, p.656) summarises five groupings or leadership dimensions based on a systematic review and meta-analysis of the previous literature. The authors argue that five dimensions could be derived from 199 listed survey items or constructs in their study. These five leadership dimensions with definitions are taken from Robinson et al. (2008, p.656) and summarised in. In the final column we align these five dimensions of Robinson et al. (2007) to the Rwandan five national school leadership standards.

**Table 5.4 Leadership dimensions**

| Leadership dimensions | Definition | Rwandan five national school leadership standards |
|---|---|---|
| D1) Establishing goals and expectations | Includes the setting, communicating, and monitoring of expectations learning goals, standards, and expectations, and the involvement of staff and others in the process so that there is clarity and consensus about goals. | Leading learning, also by working with parents and the local community. |
| D2) Strategic resourcing | Involves aligning resource selection and allocation to priority teaching goals. Includes provision of appropriate expertise through staff recruitment. | Strategic direction for the school. |
| D3) Planning, coordinating, and evaluating teaching and the curriculum | Direct involvement in the support and evaluation of teaching through regular classroom visits provision of formative and summative feedback to teachers. Direct oversight of curriculum through school wide coordination across classes and year levels and alignment to school goals. | Managing the school as an organization; leading teaching. |
| D4) Promoting and participating in teacher learning and development | Leadership that not only promotes but directly participates with teachers in formal or informal professional learning. | Leading teaching. |
| D5) Ensuring an orderly and supportive environment | Protecting time for teaching and learning by reducing external pressures and interruptions and establishing an orderly and supportive environment both inside and outside classrooms. | Managing the school as an organization. |

**Source** Robinson et al. (2008), p. 656.

The five dimensions of Robinson et al. (2007) fit quite well with the five national school leadership standards in Rwanda. Correspondingly, we include questions in line with these leadership dimensions in the questionnaire. In particular, we ask the respondents to reflect on several items of the leadership dimensions and the needs that the school leaders have for formally organized support in improving their competencies in these items (for example, by offering the CPD program on effective school leadership).

In addition to questionnaires among school leaders, this study also includes a random pair of teachers from the schools of which the trainees are participating in the diploma programme, teachers assessed the school leadership style and competences of their school leaders. The main reason why we also wished to collect those responses is to control for socially desirable answers from the school leaders on the questionnaires for non-cognitive outcomes on leadership, and to have a more objective measure of school leadership. Therefore, we additionally analysed the answers from the teachers to measure impact of the trainer-led vs. peer-led intervention. Note that the teachers' questionnaire covered the topics (6) to (10) only. A team of 20 trained enumerators collected data from teachers through telephone surveys using KoBo Toolbox. Enumerators were blinded to the intervention group during the teacher surveys.

School leaders filled in the surveys during a f2f preparatory workshop. The same 20 enumerators were there to support them with filling in the survey and followed-up with them through phone calls if they did not submit.

### 5.5.1. Quality of the school leader and teacher questionnaires

We have measured several outcome variables by using validated questionnaires from past published research in the field. The following ten constructs were measured in the questionnaire for the school leaders: barriers to e-learning, job satisfaction, work task motivation, general self-efficacy, motivation to learn, instructional leadership, transformational leadership, leadership overall, trust in school leader and distributed leadership. The questionnaire of the teachers only consists of the last five construct, thus instructional leadership, transformational leadership, leadership overall, trust in school leader and distributed leadership. A complete overview of the constructs can be found in the baseline report.[2]

Figure 5.2 and 5.3 show the reliability through alpha scores of the school leader and teacher questionnaire. The results of the baseline measurement are shown with α1 and the results of the final measurement with α2. For most overall measures, we observe good reliability (alpha score shown in green). However, it is mainly with subscales within the overall scale that we have reliability issues (alpha score is shown in red).[3] Note that the colours in this scheme and the relations between the scales are based on the theoretical framework that was discussed in Section 5.1.

Most of the scales in the questionnaires are measured well, but we still observe poor reliability statistics for some sub-scales within the overall scales, despite the good overall quality of the selected questionnaires, the extensive piloting phase and the professional translation/presentation of the English questions into Kinyarwanda. This is most likely due to the population of study: whereas we conduct the questionnaire among Rwandan school leaders and teachers, in most cases the questionnaires have only been validated in the past in Western societies, and, additionally, not necessarily among school leaders or teachers. Further, it may be the case that the Rwandan population answered some questions in a socially desired way. Cultural norms and values can influence the way we perceive a question, and, as such, how we provide answer to that question. Furnham (1986) argues that social desirability is a relatively stable, multidimensional trait of persons in very different situations, and, therefore, that answer patterns even could be used to study a populations' view on (ab)normality. We consider this beyond the scope of this study, but this drawback should be taken into account when analysing further results.

The leadership dimensions are measured in both the school leader questionnaire and in the teachers' questionnaire. Note that, in general the constructs are much more reliable in the teacher's questionnaire. Except for Establishing goals and expectations (D1), under Distributed Leadership, most scales and subscales are quite ok for the teacher's questionnaire, but not so much for the school leader questionnaire. For the latter, the overall scales appear consistent, while the subscales may not. This was the case for the pretest questionnaire and is still the case in the post-test questionnaire.

We argue that the outcome measures that produced stable results in both the baseline and final measurement should be retained for further evaluation. These are the scales that have a reliability of at least alpha? = 0.6.

[2] See: https://rwanda.vvob.org/sites/rwanda/files/school_leadership_baseline_report_cea_april_2021_final.pdf
[3] Note that we find a similar reliability of the questionnaire when we select only the participants who completed both the pre and post questionnaire.

**Figure 5.2 Evaluation of quality school leader questionnaire**

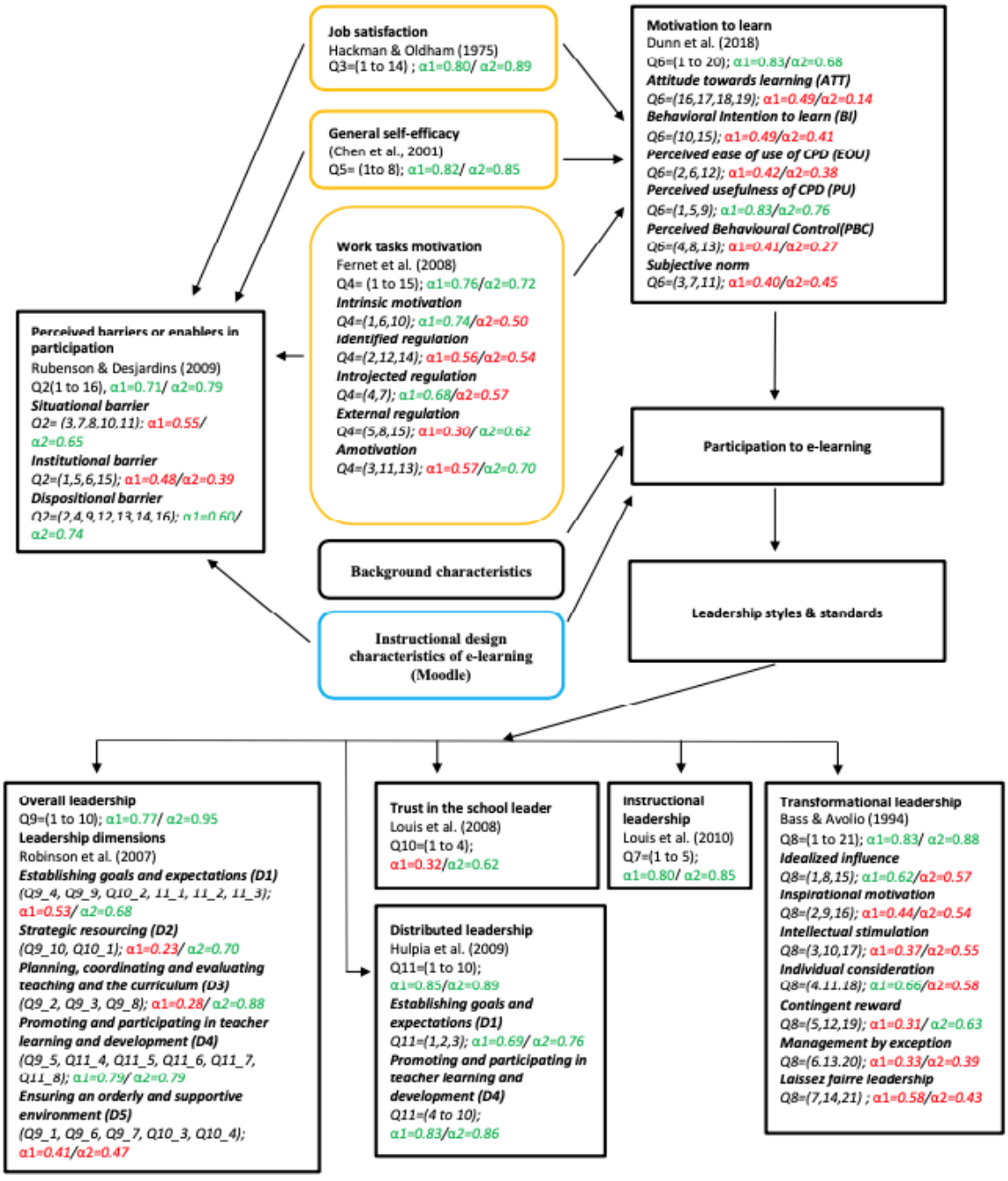
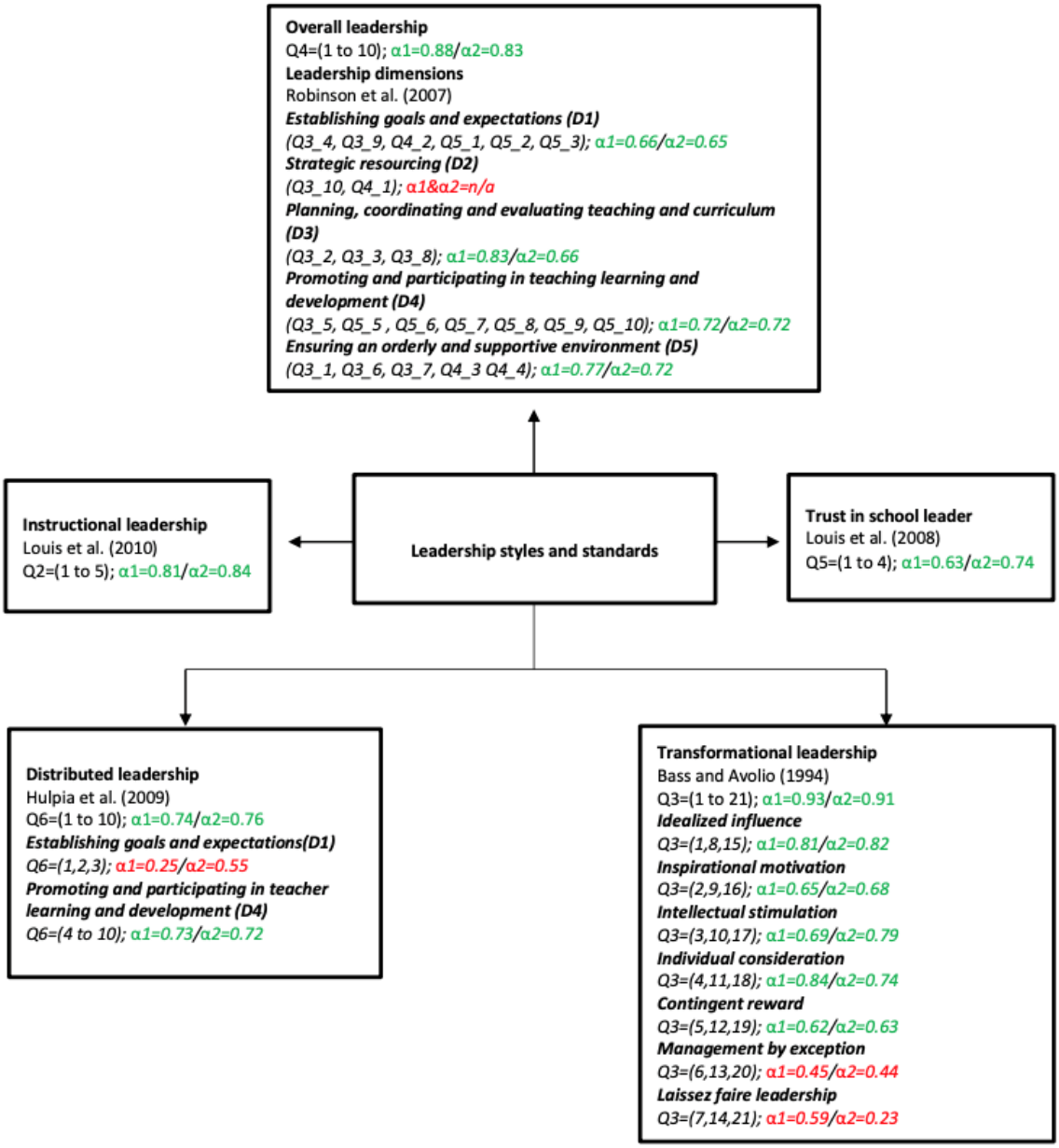


**Figure 5.3 Evaluation of quality Teacher questionnaire**




### 5.5.2. Summary statistics of the school leader and teacher questionnaires

Table 5.5 shows the average score for each of the constructs for all school leader participants jointly (regardless of whether they were assigned to the trainer-led or peer-led group). Note that here we only have 327 school leaders that filled out the questionnaire. We discuss the potential selectivity into participating in the questionnaire in Chapter 6.

Table 5.6 shows the average score for each of the constructs (6) to (10) for all teachers jointly (regardless of whether the school they are from has a trainee that was assigned to the trainer-led or peer-led group).

The summary statistics of *all* underlying statements for the school leader can be found in the first part of Appendix B. Furthermore, for the topics common to both the school leaders and the teachers (excluding for leadership overall), their responses are shown in the same tables, in the second half of Appendix B.

**Table 5.5 Average score constructs of all participants**

| Variable | N | Average | Std. Dev. |
|---|---|---|---|
| E-learning barrier | 327 | 3.70 | 0.54 |
| Dispositional barrier | 327 | 4.06 | 0.63 |
| Job satisfaction | 327 | 3.84 | 0.50 |
| Motivation overall | 327 | 3.56 | 0.33 |
| Self-efficacy | 327 | 4.27 | 0.45 |
| Learning motivation | 327 | 3.92 | 0.34 |
| Perceived usefulness of CPD | 327 | 4.52 | 0.42 |
| Instructional leadership | 327 | 5.40 | 1.03 |
| Transformational leadership | 327 | 4.17 | 0.41 |
| Leadership overall | 327 | 2.64 | 0.87 |
| Distributed leadership | 327 | 4.38 | 0.47 |
| Distributed leadership D1 – Establishing goals and expectations | 327 | 4.39 | 0.54 |
| Distributed leadership D4 – Promoting and participating in teacher learning | 327 | 4.38 | 0.50 |
| Leadership dimension D4 – Promoting and participating in teacher learning | 327 | 4.15 | 0.45 |

Note: see Table 5.4 for more information on leadership dimensions

**Table 5.6 Average score constructs of all teachers**

| Variable | N | Average | Std. Dev. |
|---|---|---|---|
| Instructional leadership | 446 | 3.48 | 1.08 |
| Transformational leadership | 446 | 3.67 | 0.60 |
| Idealized influence | 446 | 4.03 | 0.79 |
| Inspirational motivation | 446 | 4.09 | 0.69 |
| Intellectual stimulation | 446 | 3.66 | 0.85 |
| Individual consideration | 446 | 3.53 | 0.90 |
| Contingent reward | 446 | 3.19 | 0.94 |
| Leadership overall | 446 | 4.17 | 0.54 |
| Leadership overall D1 – Establishing goals and expectations | 446 | 4.19 | 0.68 |
| Leadership overall D3– Planning, coordinating and evaluating teaching and the curriculum | 446 | 4.19 | 0.67 |
| Leadership overall D5– Ensuring an orderly and supportive environment | 446 | 4.10 | 0.60 |
| Trust in school leader | 446 | 4.05 | 0.72 |
| Trust in school leader D5 – Ensuring an orderly and supportive environment | 446 | 4.21 | 0.78 |
| Distributed leadership | 446 | 4.34 | 0.40 |
| Distributed leadership D4 – Promoting and participating in teacher learning | 446 | 4.36 | 0.44 |
| Leadership dimension D1 – Establishing goals and expectations | 446 | 4.18 | 0.51 |
| Leadership dimension D3 – Planning, coordinating and evaluating teaching and the curriculum | 446 | 4.19 | 0.67 |

| | | | |
|---|---|---|---|
| Leadership dimension D4 – Promoting and participating in teacher learning | 446 | 4.35 | 0.42 |
| Leadership dimension D5 – Ensuring an orderly and supportive environment | 446 | 4.14 | 0.58 |

Note: see Table 5.4 for more information on leadership dimensions

## 5.6. School level assessment outcomes

Via a document check, interviews and observations the standards of effective school leadership are being assessed. The information, answers and observations were recorded on the following aspects:

1) *Creating strategic directions for the school* on a 4-point Likert scale (1= School does not meet indicator, 4= school exceeds indicator)
2) *Leading learning* on a 4-point Likert scale (1= School does not meet indicator, 4= school exceeds indicator)
3) *Leading teaching* on a 4-point Likert scale (1= School does not meet indicator, 4= school exceeds indicator)
4) *Managing the school as an organization* on a 4-point Likert scale (1= School does not meet indicator, 4= school exceeds indicator)
5) *Working with parents and the wider community* on a 4-point Likert scale (1= School does not meet indicator, 4= school exceeds indicator)
6) *Crosscutting criteria* on a 4-point Likert scale (1= School does not meet indicator, 4= school exceeds indicator)

These 6 constructs consist of an average value based on several statements that were included in the questionnaires that jointly comprise these constructs.

### 5.6.1. Quality of the post school level assessment

We also analysed the reliability of the outcome variables of the school level assessment questionnaire. Table 5.7 shows the reliability by alpha scores. For all measures, we see strong reliability. Only for the subscale 'Access, equity and inclusion' do we see that the reliability is just below the set threshold of $\alpha$=0.60 (alpha score shown in red).

**Table 5.7 evaluation of quality school level assessment questionnaire**

| Variable | Q(n°) | Alpha |
|---|---|---|
| **Creating strategic directions for the school** | 1.1 and 1.2 | 0.88 |
| School vision, mission and values | 1.1.1 to 1.1.6 | 0.89 |
| Strategic planning | 1.2.1 to 1.2.5 | 0.81 |
| **Leading Learning** | 2.1 and 2.2 | 0.79 |
| Leadership for learning | 2.1.1 to 2.1.4 | 0.77 |
| Care and welfare of students | 2.2.1 to 2.2.6 | 0.68 |
| **Leading teaching** | 3.1, 3.2 and 3.3 | 0.86 |
| Staff supervision and support | 3.1.1 to 3.1.6 | 0.76 |
| Management and deployment of teaching staff | 3.2.1 to 3.2.4 | 0.68 |
| Other supporting structures | 3.3.1 to 3.3.5 | 0.72 |
| **Managing the school as an organization** | 4.1, 4.2 and 4.3 | 0.84 |
| Financial management | 4.1.1 to 4.1.4 | 0.76 |
| Management of learning resources | 4.2.1 to 4.2.4 | 0.79 |
| Supportive element | 4.3.1 | n/a |

| | | |
|---|---|---|
| **Working with parents and the wider community** | 5.1 and 5.2 | 0.84 |
| School governance | 5.1.1 to 5.1.5 | 0.76 |
| Partnership with parents and the community | 5.2.1 to 5.2.6 | 0.82 |
| **Crosscutting criteria** | 6.1 and 6.2 | 0.81 |
| Access, equity and inclusion | 6.1.1 to 6.1.5 | 0.58 |
| School environment | 6.2.1 to 6.2.6 | 0.75 |

### 5.6.2. Summary statistics of the post school level assessment

Table 5.8 shows the average score for each of the constructs for all schools jointly (regardless of whether the school has a trainee that was assigned to the trainer-led or peer-led group). Note that the number of observations here is schools and not trainees. Having said that, we still only have 250 out of the total of more than 400 schools in these data due to the high turnover of trainees.

The summary statistics of all underlying statements can be found in the first part of Appendix C.

**Table 5.8 Average score constructs**

| Variable | N | Average | Std. Dev. |
|---|---|---|---|
| **Creating strategic directions for the school** | 250 | 1.90 | 0.39 |
| School vision, mission and values | 250 | 1.97 | 0.43 |
| Strategic planning | 250 | 1.81 | 0.48 |
| **Leading learning** | 250 | 1.91 | 0.35 |
| Leadership for learning | 250 | 2.13 | 0.33 |
| Care and welfare of students | 250 | 1.76 | 0.45 |
| **Leading teaching** | 250 | 1.78 | 0.37 |
| Staff supervision and support | 250 | 1.75 | 0.41 |
| Management and deployment of teaching staff | 250 | 2.01 | 0.36 |
| Other supporting structures | 250 | 1.63 | 0.53 |
| **Managing the school as an organization** | 250 | 1.93 | 0.37 |
| Financial management | 250 | 1.92 | 0.46 |
| Management of learning resources | 250 | 1.91 | 0.45 |
| **Working with parents and the wider community** | 250 | 1.90 | 0.31 |
| School governance | 250 | 1.83 | 0.39 |
| Partnership with parents and the community | 250 | 1.96 | 0.33 |
| **Crosscutting criteria** | 250 | 1.80 | 0.39 |
| Access, equity and inclusion | 250 | 1.88 | 0.35 |
| School environment | 250 | 1.73 | 0.47 |

# 6. Data preparation and preparatory analyses

## 6.1. Non-response to the questionnaires

There was some non-response and dropout in the pre-test for the school leaders with a total of 53 individuals that were lost. Subsequently, some school leaders did not complete the post-test questionnaire, leaving a further decrease of 122 cases (an attrition rate of 27% for the questionnaire. Note that this is not the same as attrition from the programme). This brings the total sample to 327 participants who completed the post questionnaire of which 158 school leaders belong to the peer-led group and 169 school leaders to the trainer-led group.

Between the pre questionnaire and post questionnaire, the teachers also lost participants for various reasons. Whereas 778 teachers completed the questionnaire before the start of the intervention, 446 of them completed the questionnaire at the end, losing more than 40% of the original total group of teachers.

Figure 6.1 represents the flowchart that shows the sample selection of the school from the population and randomization of the schools to the peer-led and the trainer-led groups of both the pre and post questionnaires. Additional analysis shows that the attrition is not selective by modality or participant characteristics, and that the two groups are still comparable in the post-test sample.

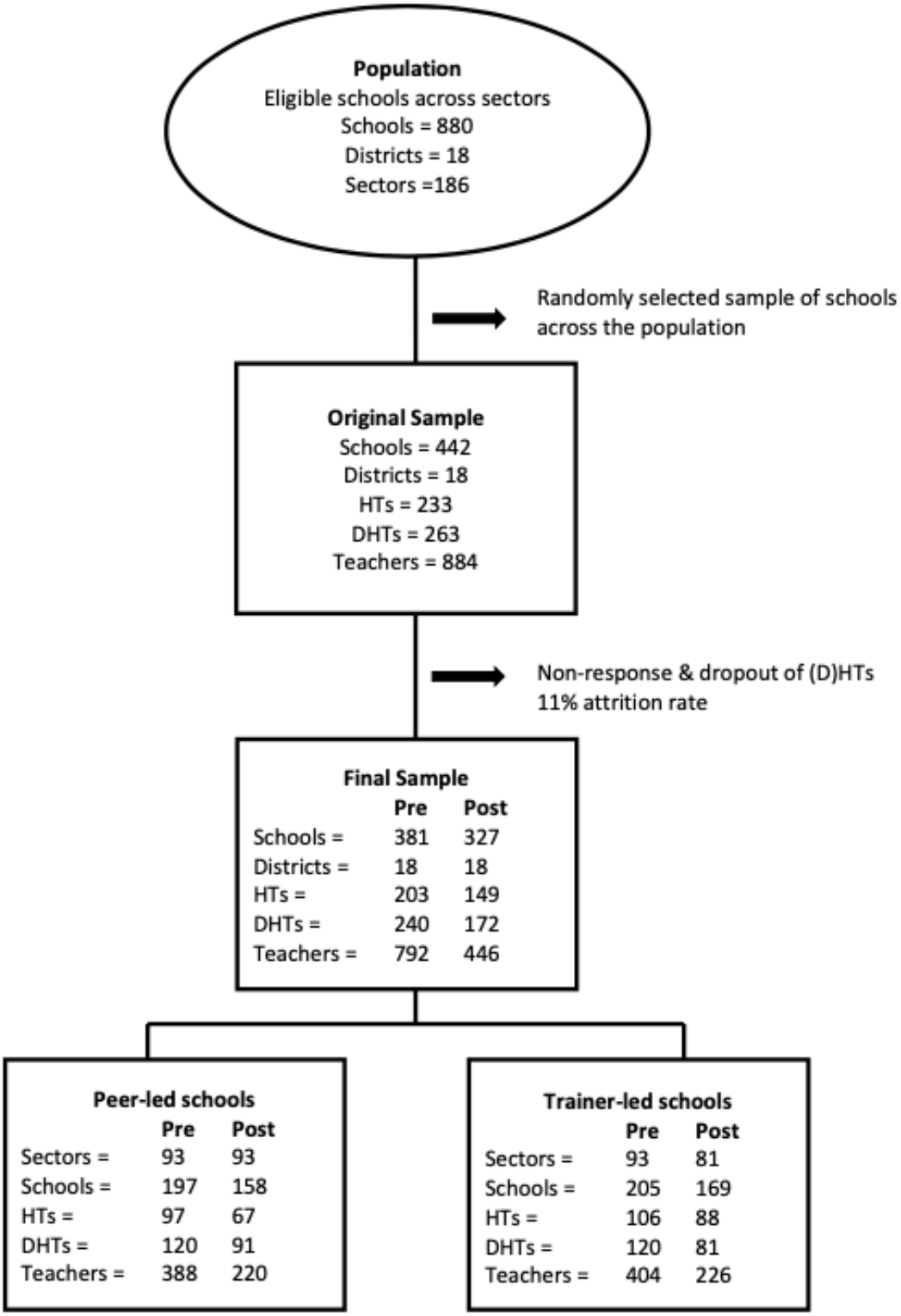
## 6.2. Composition of the sample

The population for analysis involves 327 school leaders. A total of 48% of all school leaders in the sample were peer-led and the rest (52 percent) were trainer-led.

In terms of teachers, there were a total of 446 teachers involved in the survey. Of these 446 teachers, 220 teach in schools of which the school leader was part of the peer-led group, and 226 teach in schools that belong to the trainer-led group. For a detailed description of the sample, see the baseline report.[4]

[4] See: https://rwanda.vvob.org/sites/rwanda/files/school_leadership_baseline_report_cea_april_2021_final.pdf

**Figure 6.1 Flowchart demonstrating randomization of the school population to trainer-led and peer-led group and (non-)reponse to the questionnaires in both groups.**



### 6.3. Comparability between the two groups

The background information on the peer-led school leader respondents and the trainer-led school leader respondents involved in the study was compared to see if, on average, they are similar in terms of all background characteristics (See Table 6.1 and 6.2). This background information is collected in the posttest questionnaire, which means that the total number of observations for whom we have this information is 327 over both groups. Note that a large share of respondents did not answer the question which subject they taught before becoming a school leader. Although the reason for this is unknown, it might be that this question was misunderstood, and interpreted as which subjects they teach (present tense). Respondents may not have answered this question, because they are currently not teaching any subjects.

It can be seen in Table 6.1 and 6.2 above that between the peer-led group and the trainer-led group, there is no significant difference between their mean values corresponding to demographic characteristics such as age, gender, work experience, and the characteristics of the schools (in terms of student population and teacher population, etc.) to which they are affiliated.

In other words, the trainer-led group and the peer-led group are, on average, very similar in the sense that none of the p-values corresponding to each of the test statistics are significant at the 5 percent level. Note that we also checked the comparability for the samples for which we have data on the process and assessment, and the conclusion we draw from these checks is similar: there are no significant differences between the two groups for these samples.

This was also compared for the trainer-led group and the peer-led group for the teachers, based on demographic characteristics such as age and work experience. The analysis of the teachers' responses to the questionnaire shows that, on average, the teachers in the trainer-led group and in the peer-led group are similar in most aspects, such as age, gender and work experience. The comparability in teaching subjects is not completely similar for the category of 'other subjects'. We see that more teachers in the trainer-led group teach ' other' subjects compared to the peer-led group. However, this will most likely not lead to large differences in the analyses since the ‘other category’ is a relatively small group.

**Table 6.1 T-statistics, Mann-Whitney statistics and Chi-squared statistics of treatment versus comparison group (school leader) based on assessment, process and questionnaire outcomes**

| | Peer-led Group | | | Trainer-led Group | | | | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **N** | **Average** | **Std. Dev.** | **N** | **Average** | **Std. Dev.** | **T-statistic** | **P-value** |
| Age | 154 | 43.38 | 6.88 | 167 | 42.97 | 6.81 | 0.76 | 0.44 |
| Years of working as school leader in school | 154 | 5.45 | 3.63 | 166 | 5.51 | 4.64 | -0.05 | 0.95 |
| Years of working as school leader in other school | 69 | 5.88 | 3.89 | 90 | 6.85 | 4.64 | 1.40 | 0.16 |
| Students' population in school | 154 | 1248.90 | 833.27 | 167 | 2625.99 | 13588.86 | 1.25 | 0.21 |
| Teachers' population in school | 154 | 34.56 | 13.31 | 167 | 32.07 | 12.78 | -1.71 | 0.08 |
| **Variable** | **N** | | | **N** | | | **Pearson Chi2** | **P-value** |
| **Gender** | | | | | | | | |
| *Male* | 122 | | | 136 | | | 0.24 | 0.61 |
| *Female* | 32 | | | 31 | | | | |
| **Current function:** | | | | | | | | |
| *DHT* | 91 | | | 81 | | | 3.61 | 0.06 |
| *HT* | 63 | | | 86 | | | | |
| **Worked as school leader in other school:** | | | | | | | | |
| *Yes* | 72 | | | 92 | | | 2.22 | 0.14 |
| *No* | 82 | | | 75 | | | | |
| **Subjects taught** | | | | | | | | |
| Science | 18 | | | 18 | | | 0.35 | 0.54 |
| Humanities and Arts | 11 | | | 14 | | | 0.04 | 0.83 |
| Language and Literature | 17 | | | 20 | | | 0.00 | 0.98 |
| Entrepreneurship | 4 | | | 5 | | | 0.00 | 0.93 |
| General Studies and Communication | 4 | | | 2 | | | 1.10 | 0.29 |
| Other | 7 | | | 11 | | | 0.41 | 0.52 |

(*: significance level at between 1 to 5 percent level; ** significant at less than 1 percent level)
Note: In this table there are no significant differences between the two modalities.

**Table 6.2 T-statistics, Mann-Whitney statistics and Chi-squared statistics of treatment versus comparison group (teachers) based on leadership questionnaire**

| | Peer-led Group | | | Trainer-led Group | | | | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **N** | **Average** | **Std. Dev.** | **N** | **Average** | **Std. Dev.** | **T-statistic** | **P-value** |
| Age | 220 | 36.50 | 6.75 | 226 | 36.47 | 6.70 | 0.04 | 0.96 |
| Years of working as teacher in school | 220 | 7.37 | 4.65 | 226 | 7.38 | 4.56 | -0.02 | 0.97 |
| **Variable** | **N** | | | **N** | | | **Pearson Chi2** | **P-value** |
| **Gender** | | | | | | | | |
| Male | 117 | | | 129 | | | 0.68 | 0.41 |
| Female | 103 | | | 97 | | | | |
| **Subjects taught** | | | | | | | | |
| Science | 98 | | | 95 | | | 0.28 | 0.59 |
| Humanities and arts | 42 | | | 44 | | | 0.01 | 0.91 |
| Language and literature | 60 | | | 68 | | | 0.43 | 0.51 |
| Entrepreneurship | 37 | | | 37 | | | 0.01 | 0.89 |
| General Studies and communication | 17 | | | 8 | | | 3.69 | 0.06 |
| Other | 7 | | | 38 | | | 22.83 | 0.00** |

(*: significance level at between 1 to 5 percent level; ** significant at less than 1 percent level)

# 7. Bivariate Results

## 7.1. Effects on process outcomes

Table 7.1 shows the number of observations, averages and standard deviations for the peer-led and the trainer-led group separately, for the process outcomes per module. Furthermore, Table 7.1 shows the process outcomes where we observe significant differences between the two modalities. In Module 1, we observed several significant differences in favour of the trainer-led group. Participants in trainer-led group have participated significantly more in quizzes, feedback activities and workshops in Module 1. On the other hand, in Module 1 we also find that participants in the peer-led group have participated more in assignment activities.

However, in Modules 2 to 4 we find few differences between the two modalities with respect to the participation in activities in the online environment. In Module 2 the peer-led group had a significantly higher participation in assignment activities, whereas in Module 3 the trainer-led group had a significantly higher participation in the Idea Boardz. In Module 4, we do not see any significant differences between the two modalities.

The standardized effect sizes of the significant differences that we *do* find range between 0.2 and 0.24 of a standard deviation, implying a small effect.

**Table 7.1 T-test for comparing the post-test process outcome variables school leaders in Peer-led versus Trainer-led group**

| Variable | Peer-led Group | | | Trainer-led Group | | | T-statistic | P-value |
|---|---|---|---|---|---|---|---|---|
| | N | Participation rate in this activity | Std. Dev. | N | Participation rate in this activity | Std. Dev. | | |
| **Module 1** | | | | | | | | |
| Quizzes | 229 | 75.67 | 26.24 | 233 | 80.72 | 18.12 | 2.41 | 0.02* |
| Feedback | 229 | 74.32 | 29.39 | 233 | 80.51 | 24.41 | 2.46 | 0.01* |
| Forum discussion | 229 | 64.54 | 37.04 | 233 | 72.14 | 32.25 | 2.35 | 0.02* |
| Assignment | 229 | 77.72 | 41.69 | 233 | 81.11 | 39.22 | 0.89 | 0.37 |
| Assignment act | 229 | 80.78 | 39.48 | 233 | 66.52 | 47.29 | -3.51 | 0.00** |
| Workshop | 229 | 58.22 | 44.66 | 232 | 67.81 | 41.71 | 2.38 | 0.02* |
| **Module 2** | | | | | | | | |
| Quizzes | 195 | 88.97 | 25.24 | 208 | 90.93 | 19.20 | 0.88 | 0.37 |
| Forum discussion | 195 | 70.10 | 32.20 | 208 | 71.70 | 29.50 | 0.51 | 0.60 |
| Workshop | 195 | 77.05 | 30.28 | 208 | 71.15 | 29.84 | -1.96 | 0.04* |
| Questionnaire | 195 | 82.05 | 28.35 | 208 | 81.92 | 26.30 | -0.04 | 0.96 |
| Drag and drop | 195 | 84.61 | 34.05 | 208 | 82.21 | 34.50 | -0.70 | 0.48 |
| Assignment | 195 | 75.89 | 39.10 | 208 | 72.11 | 41.31 | -0.94 | 0.34 |
| Assignment act | 195 | 95.38 | 21.03 | 208 | 94.71 | 22.43 | -0.31 | 0.75 |
| **Module 3** | | | | | | | | |
| Quizzes | 195 | 78.58 | 30.13 | 208 | 80.86 | 28.84 | 0.77 | 0.43 |
| Assignment | 195 | 71.28 | 39.59 | 208 | 66.58 | 38.40 | -1.20 | 0.22 |
| Forum discussion | 195 | 54.25 | 37.93 | 208 | 53.78 | 35.19 | -0.12 | 0.89 |
| Feedback | 195 | 76.15 | 33.54 | 208 | 77.64 | 32.16 | 0.45 | 0.64 |
| Peer review | 195 | 46.41 | 40.41 | 208 | 43.83 | 37.93 | -0.66 | 0.50 |
| Idea boardz | 195 | 66.23 | 35.47 | 208 | 74.51 | 33.00 | 2.42 | 0.01* |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Module 4** | | | | | | | | |
| Quizzes | 128 | 76.34 | 34.81 | 138 | 74.76 | 35.59 | -0.36 | 0.71 |
| Assignment | 128 | 76.95 | 38.11 | 138 | 72.10 | 40.98 | -0.99 | 0.31 |
| Forum discussion | 128 | 60.97 | 37.78 | 138 | 61.03 | 37.79 | 0.01 | 0.98 |
| Idea boardz | 128 | 64.21 | 35.24 | 138 | 64.13 | 34.52 | -0.02 | 0.98 |

(*: significance level at between 1 to 5 percent level; ** significant at less than 1 percent level)

## 7.2. Effects on CPD assessment outcomes

Table 7.2 shows the number of observations, averages and standard deviations for the peer-led and the trainer-led group separately, for the CPD assessment outcomes per modules. Furthermore, Table 7.2 shows the formative or summative assessment outcomes where we observe significant differences between the two modalities. Interestingly, and perhaps also surprisingly, we see that all the significant differences in assessment outcomes are found in favour of the peer-led group. In Module 1 we observe two significant differences in favour of the peer-led group. Participants in the peer-led group have significantly higher ratings for the portfolio of evidence (effect of 0.3 of a standard deviation) and for the participation activities for the online distance work (effect of 0.2 SD).

In Module 2 the peer-led group had significantly more pass verdicts and significantly higher ratings for assignment 4. However, the trainer-led group had a significantly higher exam score compared to the peer-led group. This is the only observation where the trainer-led group exceeds the peer-led group. In all cases the standardized effect size was around 0.2 of a standard deviation.

In Module 3 we observe significantly higher ratings for the peer-led group regarding the portfolio of evidence (0.2 SD) and the participation activities for the online distance work (a medium sized effect of 0.6 of a standard deviation). In Module 4 the peer-led group had significantly higher ratings compared to the peer-led group regarding the exam score, assignment 7 and pass verdicts (effects all around 0.2 SD). Furthermore, the peer-led group had significantly higher participation rates in the online distance work (a medium sized effect of 0.4 of a standard deviation).

In terms of standardized effect size, we see a bit more variation in the found effects here than we saw before in the process outcomes.

**Table 7.2 T-test for comparing the post-test assessment outcome variables school leaders in Peer-led versus Trainer-led group**

| | Peer-led Group | | | Trainer-led Group | | | | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **N** | **Average** | **Std. Dev.** | **N** | **Average** | **Std. Dev.** | **T-statistic** | **P-value** |
| **Module 1** | | | | | | | | |
| Verdict (pass) | 195 | 79.50 | 40.48 | 210 | 71.90 | 45.05 | 1.77 | 0.08 |
| Exam score | 195 | 26.99 | 5.53 | 210 | 27.04 | 5.89 | -0.08 | 0.94 |
| Assignment 1 | 195 | 9.75 | 3.21 | 212 | 9.44 | 3.26 | 0.98 | 0.33 |
| Assignment 2 | 195 | 9.59 | 3.79 | 212 | 9.21 | 3.90 | 0.99 | 0.32 |
| Portfolio | 195 | 17.16 | 6.77 | 212 | 14.96 | 7.08 | 3.19 | 0.00** |
| Participation online distance work | 195 | 4.03 | 1.06 | 212 | 3.83 | 0.98 | 2.01 | 0.04* |
| **Module 2** | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Verdict (pass) | 195 | 49.23 | 50.12 | 211 | 37.44 | 48.51 | 2.41 | 0.02* |
| Exam score | 195 | 25.77 | 5.38 | 212 | 26.92 | 6.41 | -1.95 | 0.05* |
| Assignment 3 | 195 | 8.05 | 4.58 | 212 | 7.24 | 4.87 | 1.72 | 0.08 |
| Assignment 4 | 195 | 8.75 | 5.41 | 212 | 7.25 | 5.10 | 2.87 | 0.00** |
| Portfolio | 195 | 9.89 | 8.34 | 212 | 8.40 | 7.65 | 1.87 | 0.06 |
| Participation online distance work | 195 | 3.62 | 1.36 | 212 | 3.57 | 1.34 | 0.40 | 0.68 |
| **Module 3** | | | | | | | | |
| Verdict (pass) | 195 | 66.15 | 47.88 | 210 | 60.47 | 49.00 | 1.18 | 0.23 |
| Exam score | 184 | 24.80 | 6.69 | 202 | 23.83 | 7.52 | 1.33 | 0.18 |
| Assignment 5 | 187 | 8.12 | 4.69 | 160 | 7.38 | 4.96 | 1.43 | 0.15 |
| Assignment 6 | 192 | 8.92 | 4.66 | 182 | 8.27 | 4.66 | 1.36 | 0.17 |
| Portfolio | 195 | 13.86 | 9.13 | 209 | 11.89 | 8.56 | 2.23 | 0.03* |
| Participation online distance work | 194 | 4.21 | 1.04 | 209 | 3.57 | 1.19 | 5.75 | 0.00** |
| **Module 4** | | | | | | | | |
| Verdict (pass) | 195 | 75.89 | 42.88 | 210 | 67.14 | 46.53 | 1.95 | 0.05* |
| Exam score | 189 | 30.15 | 6.82 | 192 | 28.74 | 6.27 | 2.09 | 0.04* |
| Assignment 7 | 185 | 9.31 | 4.45 | 203 | 8.15 | 5.16 | 2.36 | 0.02* |
| Assignment 8 | 182 | 9.16 | 4.51 | 194 | 9.09 | 4.63 | 0.14 | 0.88 |
| Portfolio | 192 | 10.85 | 9.67 | 201 | 11.49 | 9.34 | 0.67 | 0.50 |
| Participation online distance work | 192 | 3.91 | 1.15 | 203 | 3.40 | 1.22 | 4.28 | 0.00** |

(*: significance level at between 1 to 5 percent level; ** significant at less than 1 percent level)

### 7.3. Effects on satisfaction of the CPD programme

Table 7.3 shows the Likert scale averages and standard deviations for the peer-led and the trainer-led group separately, for both the midterm and the post-test satisfaction questionnaire. Furthermore, Table 7.3 shows for which of the activities we observe significant differences between the two modalities in satisfaction. However, we find no significant differences halfway the intervention, but we do see some significant difference at the end of the intervention. Interestingly, again in favour of the peer-led group. The peer-led group enjoyed the assignments and the lessons significantly more than the trainer-led group. In addition, the peer-led group rated the usefulness of the video's significantly higher. All these differences have an effect size of around 0.35 of a standard deviation, which is a medium sized effect.

A possible explanation for the peer-led group being more satisfied with the teaching materials and finding them more useful could be because they did not receive much guidance from the trainer and were therefore for more reliant on the teaching materials.

**Table 7.3 T-test for comparing the mid-satisfaction outcome variables school leader in Peer-led versus Trainer-led group**

| | Peer-led Group (n=118) | | Trainer-led Group (n=107) | | | |
|---|---|---|---|---|---|---|
| **Variable** | **Average** | **Std. Dev.** | **Average** | **Std. Dev.** | **T-statistic** | **P-value** |
| **How much did you enjoy the following:** | | | | | | |
| Quiz | 4.32 | 0.58 | 4.37 | 0.70 | -0.60 | 0.54 |
| Assignments | 3.88 | 0.85 | 3.82 | 0.81 | 0.52 | 0.59 |
| Forum discussions | 3.55 | 0.99 | 3.62 | 0.92 | -0.58 | 0.55 |
| Feedback | 3.58 | 0.89 | 3.55 | 0.93 | 0.27 | 0.78 |
| Lessons | 4.16 | 0.72 | 4.21 | 0.82 | -0.52 | 0.60 |
| H5P | 4.01 | 0.65 | 3.97 | 0.71 | 0.49 | 0.62 |
| **How useful were the following:** | | | | | | |
| Video's | 4.22 | 0.77 | 4.29 | 0.70 | -0.79 | 0.42 |
| Handouts | 4.45 | 0.64 | 4.44 | 0.63 | 0.10 | 0.91 |
| **How easy/difficult is it to navigate:** | | | | | | |
| Moodle | 3.55 | 0.95 | 3.71 | 0.85 | -1.38 | 0.16 |
| **How motivated are you to continue:** | | | | | | |
| Motivation | 3.99 | 0.83 | 3.96 | 0.98 | 0.24 | 0.81 |

(*: significance level at between 1 to 5 percent level; ** significant at less than 1 percent level)

**Table 7.4 T-test for comparing the post-test satisfaction outcome variables school leader in Peer-led versus Trainer-led group**

| | Peer-led Group (n=77) | | Trainer-led Group (n=80) | | | |
|---|---|---|---|---|---|---|
| **Variable** | **Average** | **Std. Dev.** | **Average** | **Std. Dev.** | **T-statistic** | **P-value** |
| **How much did you enjoy the following:** | | | | | | |
| Quiz | 4.50 | 0.52 | 4.33 | 0.63 | 1.80 | 0.07 |
| Assignments | 4.28 | 0.64 | 3.97 | 0.91 | 2.45 | 0.02* |
| Forum discussions | 3.72 | 0.99 | 3.75 | 0.98 | -0.14 | 0.88 |
| Feedback | 3.80 | 0.84 | 3.78 | 0.83 | 0.13 | 0.89 |
| Lessons | 4.45 | 0.59 | 4.21 | 0.83 | 2.07 | 0.04* |
| H5P | 4.16 | 0.80 | 3.95 | 0.88 | 1.62 | 0.11 |
| **How useful were the following:** | | | | | | |
| Video's | 4.45 | 0.61 | 4.22 | 0.71 | 2.15 | 0.03* |
| Handouts | 4.50 | 0.66 | 4.47 | 0.63 | 0.30 | 0.76 |
| **How easy/difficult is it to navigate:** | | | | | | |
| Moodle | 3.96 | 0.69 | 3.83 | 0.89 | 0.96 | 0.33 |

(*: significance level at between 1 to 5 percent level; ** significant at less than 1 percent level)

## 7.4. Effects on post-test questionnaire outcomes

Table 7.5 shows the Likert scale averages and standard deviations for the peer-led and the trainer-led group separately, for the post-test questionnaire outcomes per modules. Furthermore, Table 7.5 shows for which of the outcomes we observe significant differences between the two modalities.

We observe significant differences in favour of the peer-led group regarding perceived usefulness of the CPD programme, distributed leadership and distributed leadership D1 (establishing goals and expectations) (all effects around 0.25 SD). This is not confirmed by the teachers (see Table 7.6), as we do not observe any (significant) differences in distributed leadership between the two modalities. However, we observe significantly higher ratings of instructional leadership as well as higher intellectual stimulation for the peer-led group based on the teachers. Both significant differences at the teacher side have a medium effect in terms of standard deviations, 0.6 SD for instructional leadership and 0.4 SD for intellectual stimulation.

When looking at the correlation between the answers of the trainees on the leadership scales in the questionnaire versus the answers of the teachers at their school (results not shown in the table), we find low correlations that are not significant, in most cases. We find a positive and significant (at the 5% level) correlation for distributed leadership overall, distributed leadership D4 (promoting and participating in teacher learning) and for D4 (promoting and participating in teacher learning) overall. However, even the significant correlations only have a correlation coefficient of around 0.10, which is considered quite low. And these correlations do not seem to be specifically driven by either the trainer-led or the peer-led group either, the lack of correlations also indicates that the trainees do not judge their leadership skills in the same way that the teachers at their school judge these skills, and it is important to take this into account for the remainder of this study.

**Table 7.5 T-test for comparing the post-test questionnaire outcome variables school leaders in Peer-led versus Trainer-led group**

| | Peer-led Group (n = 158) | | Trainer-led Group (n = 169) | | | |
|---|---|---|---|---|---|---|
| **Variable** | **Average** | **Std. Dev.** | **Average** | **Std. Dev.** | **T-statistic** | **P-value** |
| E-learning barrier | 3.75 | 0.56 | 3.66 | 0.52 | 1.53 | 0.12 |
| Dispositional barrier | 4.12 | 0.64 | 4.00 | 0.63 | 1.73 | 0.08 |
| Job satisfaction | 3.85 | 0.49 | 3.84 | 0.52 | 0.16 | 0.87 |
| Motivation overall | 3.57 | 0.33 | 3.55 | 0.34 | 0.50 | 0.61 |
| Self-efficacy | 4.30 | 0.46 | 4.24 | 0.45 | 1.15 | 0.25 |
| Learning motivation | 3.95 | 0.34 | 3.91 | 0.34 | 1.20 | 0.23 |
| Perceived usefulness of CPD | 4.57 | 0.42 | 4.48 | 0.43 | 2.05 | 0.04* |
| Instructional leadership | 5.42 | 1.01 | 5.39 | 1.06 | 0.23 | 0.82 |
| Transformational leadership | 4.16 | 0.42 | 4.18 | 0.42 | -0.37 | 0.71 |
| Leadership overall | 2.56 | 0.86 | 2.71 | 0.87 | -1.49 | 0.13 |
| Distributed leadership | 4.44 | 0.46 | 4.33 | 0.48 | 2.03 | 0.04* |
| Distributed leadership D1 – Establishing goals and expectations | 4.46 | 0.48 | 4.32 | 0.57 | 2.34 | 0.02* |

| | | | | | | |
|---|---|---|---|---|---|---|
| Distributed leadership D4 – Promoting and participating in teacher learning | 4.43 | 0.51 | 4.33 | 0.49 | 1.68 | 0.09 |
| Leadership dimension D4 – Promoting and participating in teacher learning | 4.18 | 0.44 | 4.12 | 0.44 | 1.30 | 0.19 |

(*: significance level at between 1 to 5 percent level; ** significant at less than 1 percent level)

**Table 7.6 T-test for comparing the post-test questionnaire outcome variables of teachers in Peer-led versus Trainer-led group**

| | Peer-led Group (n = 220) | | Trainer-led Group (n = 226) | | | |
|---|---|---|---|---|---|---|
| **Variable** | **Average** | **Std. Dev.** | **Average** | **Std. Dev.** | **T-statistic** | **P-value** |
| Instructional leadership | 3.80 | 1.1 | 3.18 | 1.00 | 6.26 | 0.00** |
| Transformational leadership | 3.72 | 0.56 | 3.63 | 0.65 | 1.61 | 0.11 |
| Idealized influence | 4.10 | 0.73 | 3.97 | 0.86 | 1.72 | 0.08 |
| Inspirational motivation | 4.12 | 0.65 | 4.07 | 0.74 | 0.71 | 0.47 |
| Intellectual stimulation | 3.84 | 0.72 | 3.49 | 0.93 | 4.29 | 0.00** |
| Individual consideration | 3.61 | 0.87 | 3.45 | 0.92 | 1.81 | 0.07 |
| Contingent reward | 3.20 | 0.87 | 3.20 | 1.01 | 0.06 | 0.95 |
| Leadership overall | 4.18 | 0.48 | 4.16 | 0.60 | 0.32 | 0.75 |
| Leadership overall D1 – Establishing goals and expectations | 4.17 | 0.66 | 4.21 | 0.71 | -0.65 | 0.52 |
| Leadership overall D3– Planning, coordinating and evaluating teaching and the curriculum | 4.20 | 0.63 | 4.18 | 0.72 | 0.27 | 0.79 |
| Leadership overall D5– Ensuring an orderly and supportive environment | 4.10 | 0.55 | 4.09 | 0.64 | 0.10 | 0.92 |
| Trust in school leader | 4.05 | 0.72 | 4.06 | 0.73 | -0.12 | 0.90 |
| Trust in school leader D5 – Ensuring an orderly and supportive environment | 4.19 | 0.79 | 4.24 | 0.78 | -0.68 | 0.50 |
| Distributed leadership | 4.33 | 0.41 | 4.36 | 0.41 | -0.73 | 0.47 |
| Distributed leadership D4 – Promoting and participating in teacher learning | 4.36 | 0.42 | 4.37 | 0.46 | -0.18 | 0.86 |
| Leadership dimension D1 – Establishing goals and expectations | 4.16 | 0.52 | 4.20 | 0.51 | -0.85 | 0.39 |
| Leadership dimension D3 – Planning, coordinating and evaluating teaching and the curriculum | 4.20 | 0.63 | 4.18 | 0.72 | 0.27 | 0.79 |
| Leadership dimension D4 – Promoting and participating in teacher learning | 4.37 | 0.40 | 4.35 | 0.45 | 0.35 | 0.73 |
| Leadership dimension D5 – Ensuring an orderly and supportive environment | 4.14 | 0.53 | 4.16 | 0.62 | -0.30 | 0.76 |

(*: significance level at between 1 to 5 percent level; ** significant at less than 1 percent level)

## 7.5. Effects on school level assessment

Table 7.7 shows the Likert scale averages and standard deviations for the peer-led and the trainer-led group separately, for the school level assessment outcomes. Furthermore, Table 7.7 shows that none of the school level assessment outcomes were found to have significant differences between the two modalities.

**Table 7.7 T-test for comparing the post-test school level assessment outcome variables school leader in Peer-led versus Trainer-led group**

| | Peer-led Group (n=141) | | Trainer-led Group (n=109) | | | |
|---|---|---|---|---|---|---|
| **Variable** | **Average** | **Std. Dev.** | **Average** | **Std. Dev.** | **T-statistic** | **P-value** |
| **Creating strategic directions for the school** | 1.88 | 0.40 | 1.92 | 0.39 | -0.75 | 0.44 |
| School vision, mission and values | 1.97 | 0.39 | 1.97 | 0.48 | -0.02 | 0.98 |
| Strategic planning | 1.78 | 0.51 | 1.86 | 0.45 | -1.35 | 0.17 |
| **Leading Learning** | 1.90 | 0.36 | 1.92 | 0.33 | -0.26 | 0.78 |
| Leadership for learning | 2.14 | 0.33 | 2.12 | 0.33 | 0.56 | 0.57 |
| Care and welfare of students | 1.75 | 0.48 | 1.78 | 0.40 | -0.62 | 0.53 |
| **Leading teaching** | 1.79 | 0.37 | 1.77 | 0.36 | 0.51 | 0.61 |
| Staff supervision and support | 1.74 | 0.41 | 1.76 | 0.41 | -0.28 | 0.77 |
| Management and deployment of teaching staff | 2.01 | 0.36 | 2.00 | 0.36 | 0.34 | 0.73 |
| Other supporting structures | 1.67 | 0.54 | 1.59 | 0.52 | 1.14 | 0.25 |
| **Managing the school as an organization** | 1.94 | 0.37 | 1.92 | 0.37 | 0.35 | 0.72 |
| Financial management | 1.93 | 0.45 | 1.90 | 0.49 | 0.61 | 0.54 |
| Management of learning resources | 1.92 | 0.48 | 1.92 | 0.42 | -0.11 | 0.91 |
| **Working with parents and the wider community** | 1.90 | 0.31 | 1.90 | 0.30 | 0.21 | 0.83 |
| School governance | 1.84 | 0.38 | 1.82 | 0.40 | 0.48 | 0.62 |
| Partnership with parents and the community | 1.95 | 0.36 | 1.96 | 0.31 | -0.11 | 0.90 |
| **Crosscutting criteria** | 1.79 | 0.38 | 1.81 | 0.38 | -0.41 | 0.68 |
| Access, equity and inclusion | 1.86 | 0.35 | 1.92 | 0.34 | -1.38 | 0.17 |
| School environment | 1.74 | 0.47 | 1.73 | 0.48 | 0.22 | 0.82 |

(*: significance level at between 1 to 5 percent level; ** significant at less than 1 percent level)

## 7.6. Post-hoc power analysis

The common denominator in all the bivariate analyses that are shown in the previous paragraphs is that there are many insignificant results. One potential reason for finding insignificant results is that the power of our sample(s) is insufficient to detect the relatively small effect sizes that are expected to come out of

such an intervention, where the difference between the two groups is relatively small. Despite having done a power analysis in the inception study and basing the size of the comparison group on that, there was considerable attrition in the sample, especially related to questionnaires of the participating trainees, and to teachers working at their school.

Given the large amount of slightly different samples that we have, and the large amount of outcomes per sample, we have decided to not calculate the power for each insignificant effect, but instead analyse the effect size that could have been found given the sample size that we have, and discuss these for the outcomes that are closest to significance within each type of outcome.

For the process data, we see that given the sample size (which decreases by the module) we are reasonably able to detect an effect varying from 0.26 (Module 1) to 0.34 (Module 4), whereas the effects that we find that are closest to significance are around 0.1. In order to detect those effect sizes we would have need a sample triple or quadruple the size we have now. Furthermore, the differences found are mostly in favour of the peer-led group, which would make the discussion one would normally have next, namely whether the small effect is worth the (additional) money, not applicable in this situation.

If we look at the assessment data, we would be able to detect effect sizes varying between 0.27 and 0.30, whereas the differences we see are between 0.1 and 0.2. For the satisfaction data, the effects that are detectable lie even between 0.37 and 0.45, whereas the effects that we find are around 0.17 for the Moodle part in both the midline and the post-test questionnaire, and 0.30 for the quiz in the post-test questionnaire.

For the post-test questionnaire data, the detectable effects are around 0.31 for the trainee sample and around 0.26 for the teacher sample, whereas effects that are found (and again, closest to significance) are between 0.12 and 0.18 for trainees, and around 0.15 for teachers. Lastly, for the school level assessment data we would be able to detect an effect size of around 0.36, whereas the differences that we find have an effect size of around 0.15.

All in all, we conclude that most of the samples that we use are too small to detect the small effect between the two groups that we see in our analyses. However, one could argue that a very small effect is negligible anyway, and even if a significant effect of around 0.1 would be detected. From that perspective, the samples sizes were sufficient to detect effects of a meaningful effect size. Furthermore, in most cases the difference is in favour of the peer-led group, so from a cost-effectiveness perspective, the question whether the difference in effect can justify the difference in cost is not applicable anyway. We will get back to this in Chapter 9 where we discuss the cost-effectiveness.

## 8. Multivariate Regression Results

To confirm the above presented bivariate findings, we also perform several regression analyses, for all assessment outcomes and post-questionnaire outcomes that were within the range of significance at the 10% level. In the regressions, we step-wise include several control variables. For each outcome of the post-test questionnaire, we estimate five models. In model one we only include the dummy that indicates whether the trainee participated in the trainer-led or in the peer-led group. In the second model, we add the score on the outcome at hand in the baseline questionnaire (note that this model is excluded when analysing the assessment data, as we do not have baseline information there). In the third model we include personal characteristics of the trainee, such as years of experience as a school leader, age, years of experience at this school, highest level of education, gender and school leader position (HT or DHT). In model four we include school characteristics such as school size with respect to students, number of teachers at the school, and school type (government-aided, public or private). In the last model, model five, we also include information about the infrastructure at school, such as whether the school has access to electricity, internet access, whether there are separate toilets for boys and girls, whether there is improved drinking water, whether there is a handwashing station at school, and whether students and/or teachers have access to a computer or a laptop.

In section 8.1 we present standard multivariate regressions, in which we simply add control variables, step-wise, like described above, to the previously presented bivariate analyses. We have also tested these models including clustering of the standard errors at the level of the group in which the trainees participated in the online environment (18 groups in total, 9 for the trainer-led group and 9 for the peer-led group). Furthermore, we check the results for inclusion of standard errors clustered at the district level, as the groups were randomized at the district level. In Section 8.2, we add interaction terms between the dummy that indicate in which group the trainee participated interacted with several trainee and school background characteristics, to see whether there are differential results by these characteristics.

### 8.1. Multivariate regressions questionnaire and assessment data

The multivariate regressions are performed for the following outcome measures. From the post-test questionnaire by trainees we used dispositional barrier, perceived usefulness of the CPD programme, distributed leadership, distributed leadership D1 and distributed leadership D4. From the post-test questionnaire by teachers at the schools where trainees are trained we used instructional leadership and intellectual stimulation. From the assessment outcomes, we ran regressions for the following outcomes: Module 1 (Portfolio and online distance work); Module 2 (Pass rate, exam score, assignments 3 and 4 as well as portfolio); Module 3 (Portfolio and online distance work); Module 4 (Pass rate, exam score, assignment 7 and online distance work).

Table 8.1 presents the regression results for Distributed Leadership, for all five models. Table 8.1 shows that Distributed Leadership is higher for the peer-led group in all five models, and that the coefficient (and significance level) is quite stable between the models. This implies that the control variables that were added in the regression affect the outcome measure similarly for trainees in both the trainer-led group and in the peer-led group. This is once again reassuring for the randomisation in our experiment. Furthermore, the regression results show that the baseline value of the outcome measure is significant and highly predictive for the post-test outcome measure. Also, we see some significant differences in the outcome distributed leadership by educational level of the trainee, and by the availability of computers for the students at school. Apart from that, we do not see significant coefficients among the control variables.

In the other outcomes from the school leaders' post-test questionnaire, as well as the two outcomes for the post-test questionnaire for teachers, we see a similar pattern, the coefficient itself and the significance

level are quite stable between the models. This implies that the outcome Distributed Leadership D1 is still only significant at the 10% level, in all five models. The only exception to this pattern is for the outcome situational barrier. In the bivariate analysis (model 1) we find a coefficient of 0.12 (in favour of the peer-led group) which is significant at the 10% level. This coefficient gradually increases to 0.20 in model five, at a 5% significance level. Adding control variables improves the size and significance of the effect on institutional barriers. Note that the regression results of the outcomes that are not presented here can be found in appendix D1.

We have also tested these models including clustering of the standard errors at the level of the group in which the trainees participated in the online environment (18 groups in total, 9 for the trainer-led group and 9 for the peer-led group). Furthermore, we have tested these model including clustering the standard errors at the district level (the level of randomisation). However, neither of these clustering change the results of the outcomes of the school leader questionnaire, or for the teacher questionnaire.

**Table 8.1 – Multivariate regression analyses – Distributed Leadership from trainee's post-test questionnaire**

| Model | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Peer-led group | 0.107** | 0.105** | 0.107** | 0.123** | 0.109** |
| | (0.0525) | (0.0491) | (0.0498) | (0.0506) | (0.0509) |
| Distributed leadership (pre-test) | | 0.404*** | 0.412*** | 0.405*** | 0.396*** |
| | | (0.0572) | (0.0578) | (0.0578) | (0.0583) |
| Years of experience | | | -0.00428 | -0.00430 | -0.00527 |
| | | | (0.00609) | (0.00609) | (0.00616) |
| Age (in years) | | | 0.00283 | 0.00291 | 0.00338 |
| | | | (0.00381) | (0.00383) | (0.00385) |
| Years of DHT in school | | | -0.00234 | -0.00205 | -0.00429 |
| | | | (0.00651) | (0.00651) | (0.00657) |
| Qualification: finished in education | | | -0.281 | -0.249 | -0.368 |
| | | | (0.466) | (0.466) | (0.471) |
| Qualification: bachelor of education | | | 0.331** | 0.335** | 0.317** |
| | | | (0.144) | (0.145) | (0.146) |
| Qualification: PGDE | | | 0.319* | 0.325* | 0.277 |
| | | | (0.173) | (0.173) | (0.173) |
| Qualification: Masters | | | 0.376* | 0.376* | 0.368* |
| | | | (0.196) | (0.196) | (0.198) |
| Qualification: Others | | | 0.598 | 0.539 | 0.574 |
| | | | (0.464) | (0.466) | (0.466) |
| Female | | | -0.0114 | -0.0103 | -0.000657 |
| | | | (0.0635) | (0.0637) | (0.0638) |
| Function: Deputy head teacher | | | 0.0242 | 0.0276 | 0.0285 |
| | | | (0.0533) | (0.0536) | (0.0538) |
| Student population | | | | 0.000 | 0.000 |
| | | | | (0.000) | (0.000) |
| Number of teachers in school | | | | -0.00120 | -0.00195 |
| | | | | (0.00195) | (0.00200) |
| School type: public school | | | | -0.0355 | 0.0115 |
| | | | | (0.151) | (0.152) |
| School type: government aided school | | | | -0.131 | -0.0806 |
| | | | | (0.148) | (0.149) |
| Infrastructure: electricity | | | | | -0.0326 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | (0.0938) |
| Infrastructure: internet | | | | | -0.00277 |
| | | | | | (0.0680) |
| Infrastructure: separate toilets for boys and girls | | | | | -0.0126 |
| | | | | | (0.127) |
| Infrastructure: improved drinking water | | | | | 0.0172 |
| | | | | | (0.0558) |
| Infrastructure: hand washing station | | | | | 0.0877 |
| | | | | | (0.0832) |
| Infrastructure: student access to computer/laptop | | | | | 0.150** |
| | | | | | (0.0742) |
| Infrastructure: teacher access to computer/laptop | | | | | -0.000482 |
| | | | | | (0.0659) |
| Constant | 4.228*** | 2.553*** | 2.098*** | 2.226*** | 2.130*** |
| | (0.0822) | (0.247) | (0.337) | (0.364) | (0.396) |
| Observations | 327 | 319 | 318 | 318 | 318 |
| R-squared | 0.013 | 0.150 | 0.176 | 0.189 | 0.215 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

For the assessment outcomes, we combine several datasets in order to perform regression analyses with control variables that are background characteristics of the trainees and the schools. The background information comes from the post-test questionnaire, which needs to be merged to the assessment data. Merging the data could not be done perfectly because a large number of trainees did not fill out the post-test questionnaire, leading to the loss of some observations that are present in the separate datasets. This also leads to the fact that some outcomes that were significant at the 10% level in the bivariate analyses are not significant anymore in model 1 from the regressions (which also is a bivariate model, but here augmented with regression analysis).

From the results of these regression analyses, we can distinguish three types of assessment outcomes. The first group is the outcomes that were significant in the bivariate analyses, but are not significant anymore in the regression analyses, most likely due to the loss of observations. This applies to online distance learning in Module 1, pass rate and assignment 3 in Module 2, and assignment 7 and pass rate in Module 4. These outcomes are consistently not significant in all four models of the regression analyses.

A second group of outcomes are the outcomes which show significant differences in the bivariate analyses of the previous chapter and in model 1, but where the significance decreases to the 10%-level in models 2 and 3, and even completely disappears in model 4, the model in which we also include school characteristics. This applies to the assignment 4 score in Module 2, and the portfolio score in Modules 2 and 3.

A last group of outcomes shows significant and stable regression coefficients in all four models, which are in line with what was found in the bivariate analyses. This applies to the portfolio in Module 1, the

exam score in Modules 2 and 4, and online distance learning in Modules 3 and 4. Table 8.2 shows that the portfolio score in Module 1 is higher for the peer-led group in all four models, and that the coefficient (and significance level) is quite stable between the models. The coefficient only slightly decreases between model 1 and model 2, but remains quite stable between models 2 to 4. In table 8.2 we see that female trainees and deputy head teachers score significantly higher on the portfolio in Module 1 than males and head teachers. Furthermore, trainees at larger schools (with high number of students) score higher on their portfolio. These differences in score are seen over all trainees, both in the trainer-led and in the peer-led group.

We have also tested these models of the last group of outcomes including clustering of the standard errors at the level of the group in which the trainees participated in the online environment (18 groups in total, 9 for the trainer-led group and 9 for the peer-led group). Furthermore, we have tested these model including clustering the standard errors at the district level (the level of randomisation). Both clusterings change the results in the same way. Including the clustered standard error makes the analysis of the effect of participation on the exam score in Module 2 insignificant. This means that the outcomes that remain stable, even when clustering standard errors at the online group level or the district level are the portfolio in Module 1, the online distance learning in Modules 3 and 4, and the exam score in Module 4.

Note that the regression results of the assessment outcomes that are not presented here can be found in the separate appendix Excel document for assessment outcomes.

**Table 8.2 – Multivariate regression analyses – Portfolio score Module 1**

| Model | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Peer-led group | 3.107*** | 2.712*** | 2.820*** | 2.697*** |
| | (0.723) | (0.724) | (0.737) | (0.747) |
| Years of experience (pre-test) | | 0.130 | 0.135 | 0.106 |
| | | (0.0884) | (0.0887) | (0.0906) |
| Age (in years) | | -0.0711 | -0.0731 | -0.0669 |
| | | (0.0554) | (0.0559) | (0.0565) |
| Years of DHT in school | | 0.0856 | 0.0943 | 0.101 |
| | | (0.0946) | (0.0949) | (0.0964) |
| Qualification: finished in education | | -6.153 | -6.245 | -6.052 |
| | | (6.732) | (6.757) | (6.870) |
| Qualification: bachelor of education | | -0.707 | -0.761 | -0.695 |
| | | (2.082) | (2.102) | (2.132) |
| Qualification: PGDE | | 0.573 | 0.572 | 0.269 |
| | | (2.495) | (2.504) | (2.528) |
| Qualification: Masters | | 3.133 | 3.076 | 3.145 |
| | | (2.831) | (2.845) | (2.885) |
| Qualification: Others | | -6.544 | -6.188 | -5.020 |
| | | (6.705) | (6.750) | (6.802) |
| Female | | 2.386** | 2.459*** | 2.379** |
| | | (0.927) | (0.933) | (0.941) |
| Function: Deputy head teacher | | 2.279*** | 2.137*** | 2.012** |
| | | (0.775) | (0.783) | (0.790) |
| Student population | | | 0.000* | 0.000* |
| | | | (0.000) | (0.000) |
| Number of teachers in school | | | -0.00600 | -0.0102 |
| | | | (0.0285) | (0.0293) |

| | | | | |
|---|---|---|---|---|
| School type: public school | | | -0.238 | -0.259 |
| | | | (2.193) | (2.225) |
| School type: government aided school | | | 0.0399 | -0.0493 |
| | | | (2.143) | (2.175) |
| Infrastructure: electricity | | | | -2.745* |
| | | | | (1.423) |
| Infrastructure: internet | | | | 0.660 |
| | | | | (0.994) |
| Infrastructure: separate toilets for boys and girls | | | | 1.083 |
| | | | | (1.846) |
| Infrastructure: improved drinking water | | | | -0.565 |
| | | | | (0.816) |
| Infrastructure: hand washing station | | | | -0.665 |
| | | | | (1.228) |
| Infrastructure: student access to computer/laptop | | | | 0.864 |
| | | | | (1.083) |
| Infrastructure: teacher access to computer/laptop | | | | -0.226 |
| | | | | (0.965) |
| Constant | 12.55*** | 13.93*** | 14.01*** | 15.83*** |
| | (1.131) | (3.333) | (3.884) | (4.379) |
| Observations | 322 | 314 | 314 | 314 |
| R-squared | 0.055 | 0.139 | 0.148 | 0.164 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

## 8.2. Multivariate regressions sub-groups

Next, we use multivariate regressions with interaction terms to check if there is a differential effect among subgroups in the difference in effectiveness between trainer-led and peer-led group. We analyse whether trainee's gender, school leader position (HT or DHT), trainee's educational level and school type (government-aided, public or private) may lead to a differential effect. We do so for the same outcome measures as mentioned above and use the most extensive model (model 4), so the one with the largest set of control variables.

For the post-test questionnaire outcomes of the trainees, we find only one differential effect. Table 8.3 shows that deputy head teachers in the peer-led group experience more dispositional barriers than head

teachers, however this is only significant at the 10% level. This is on top of an already higher value for HT trainees in the peer-led group.

**Table 8.3 – Multivariate regression analyses with interaction analyses – Dispositional barriers**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dispositional barrier (pre-test) | 0.270*** | 0.275*** | 0.274*** | 0.277*** |
| | (0.0645) | (0.0641) | (0.0648) | (0.0648) |
| Peer-led group | 0.210*** | 0.0590 | 0.497 | 0.582 |
| | (0.0775) | (0.103) | (0.396) | (0.668) |
| Qualification: finished in education | 0.0637 | 0.0109 | 0.241 | 0.158 |
| | (0.649) | (0.646) | (0.688) | (0.653) |
| Qualification: bachelor of education | 0.138 | 0.144 | 0.315 | 0.198 |
| | (0.199) | (0.198) | (0.308) | (0.209) |
| Qualification: PGDE | 0.143 | 0.141 | 0.381 | 0.202 |
| | (0.237) | (0.235) | (0.351) | (0.246) |
| Qualification: Masters | 0.233 | 0.227 | 0.217 | 0.298 |
| | (0.269) | (0.268) | (0.398) | (0.279) |
| Qualification: Others | 0.857 | 0.935 | 1.016 | 0.839 |
| | (0.636) | (0.633) | (0.672) | (0.639) |
| Trainer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Trainer-led # finished in education | | | 0 | |
| | | | (0) | |
| Trainer-led # bachelor of education | | | 0 | |
| | | | (0) | |
| Trainer-led # PGDE | | | 0 | |
| | | | (0) | |
| Trainer-led # Masters | | | 0 | |
| | | | (0) | |
| Trainer-led # Others | | | 0 | |
| | | | (0) | |
| Peer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Peer-led # finished in education | | | 0 | |
| | | | (0) | |
| Peer-led # bachelor of education | | | -0.306 | |
| | | | (0.404) | |
| Peer-led # PGDE | | | -0.471 | |
| | | | (0.485) | |
| Peer-led # Masters | | | 0.114 | |
| | | | (0.545) | |
| Peer-led # Others | | | 0 | |
| | | | (0) | |
| Years of experience (pre-test) | -0.000753 | -0.000969 | -0.000343 | -0.00161 |
| | (0.00841) | (0.00835) | (0.00845) | (0.00843) |
| Age (in years) | -0.00707 | -0.00727 | -0.00687 | -0.00604 |
| | (0.00532) | (0.00528) | (0.00532) | (0.00537) |
| Years of DHT in school | 0.0165* | 0.0151* | 0.0162* | 0.0164* |
| | (0.00900) | (0.00893) | (0.00903) | (0.00895) |
| Female | -0.139 | -0.152* | -0.148* | -0.158* |
| | (0.126) | (0.0868) | (0.0882) | (0.0873) |
| Function: Deputy head teacher | -0.136* | -0.261*** | -0.136* | -0.123* |

| | | | | |
|---|---|---|---|---|
| | (0.0736) | (0.0988) | (0.0736) | (0.0742) |
| Student population | 0.000 | 0.000* | 0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Number of teachers in school | 0.000199 | 0.000818 | 0.000372 | 0.000298 |
| | (0.00273) | (0.00274) | (0.00274) | (0.00273) |
| School type: public school | -0.259 | -0.268 | -0.264 | -0.165 |
| | (0.208) | (0.207) | (0.212) | (0.224) |
| School type: government aided school | -0.344* | -0.339* | -0.355* | -0.335 |
| | (0.203) | (0.202) | (0.207) | (0.215) |
| Infrastructure: electricity | 0.0818 | 0.0817 | 0.100 | 0.0751 |
| | (0.128) | (0.127) | (0.129) | (0.128) |
| Infrastructure: internet | -0.0632 | -0.0548 | -0.0615 | -0.0562 |
| | (0.0927) | (0.0923) | (0.0928) | (0.0932) |
| Infrastructure: separate toilets for boys and girls | 0.449*** | 0.420** | 0.481*** | 0.438** |
| | (0.172) | (0.172) | (0.174) | (0.172) |
| Infrastructure: improved drinking water | -0.00375 | -0.0157 | -0.00493 | -0.00740 |
| | (0.0761) | (0.0755) | (0.0757) | (0.0757) |
| Infrastructure: hand washing station | 0.139 | 0.161 | 0.128 | 0.155 |
| | (0.115) | (0.113) | (0.114) | (0.114) |
| Infrastructure: student access to computer/laptop | -0.0515 | -0.0421 | -0.0529 | -0.0545 |
| | (0.101) | (0.101) | (0.101) | (0.101) |
| Infrastructure: teacher access to computer/laptop | 0.0238 | 0.0147 | 0.0194 | 0.0201 |
| | (0.0900) | (0.0894) | (0.0902) | (0.0899) |
| Trainer-led # male | 0 | | | |
| | (0) | | | |
| Trainer-led # female | 0 | | | |
| | (0) | | | |
| Peer-led # male | 0 | | | |
| | (0) | | | |
| Peer-led # female | -0.0295 | | | |
| | (0.177) | | | |
| Trainer-led # head teacher | | 0 | | |
| | | (0) | | |
| Trainer-led # deputy head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # deputy head teacher | | 0.263* | | |
| | | (0.139) | | |
| Trainer-led # private school | | | | 0 |
| | | | | (0) |
| Trainer-led # public school | | | | 0 |
| | | | | (0) |
| Trainer-led # government aided school | | | | 0 |
| | | | | (0) |
| Peer-led # private school | | | | 0 |
| | | | | (0) |
| Peer-led # public school | | | | -0.501 |
| | | | | (0.683) |
| Peer-led # government aided school | | | | -0.324 |
| | | | | (0.672) |
| Constant | 2.720*** | 2.762*** | 2.490*** | 2.552*** |

| | | | | |
|---|---|---|---|---|
| | (0.522) | (0.519) | (0.584) | (0.543) |
| Observations | 318 | 318 | 318 | 318 |
| R-squared | 0.168 | 0.178 | 0.175 | 0.173 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

For the post-test questionnaire outcomes by teachers, we do not find any differential effects by sub-groups.

For the assessment outcomes we find differential effects only for two outcome measures: the exam score in Module 4, and the score on assignment 7, also in Module 4. For the score on assignment 7 and the exam score in Module 4, we find that higher educated trainees (i.e. school leaders with a masters degree or a PGDE degree) in the peer-led group perform significantly higher than in the trainer-led group. For all other assessment outcomes, we do not find differential effects.

Note that the regression and interaction results of the post-test questionnaire outcomes that are not presented in a table here can be found in appendix D2. Furthermore, the regression results of the assessment outcomes that are not presented here can be found in the separate appendix Excel document for assessment outcomes.

### 8.3. Assessment effects mediated by process outcomes

In this final section with regressions, we study whether the process outcomes might mediate the difference in effect for the trainer-led versus peer-modality on the assessment outcomes. Although we ran several analyses to check if process outcomes such as participation in quizzes, feedback and assignments in a module are mediating the effect of the modality on the assessment outcomes of that module (such as pass rate and exam score), we do not find any evidence of a mediating effect. Although the process outcomes are positively and significantly related to the assessment outcome of that module, adding these variables to the most extensive multivariate regression does not change the coefficient of the peer-led or trainer-led modality in any way. The coefficient itself does not change at all, and neither does the significance level. This indicates that, despite seeing some significant differences on process outcomes, these differences do not mediate the effect on the assessment outcomes. This means that, although higher participation in the online environment does predict a higher outcome, this does not differ between the trainer-led and peer-led group. For both groups, participation in the online environment influences the outcome in the same way.

## 9. Cost-effectiveness analysis

The fundamental goal of a Cost Effectiveness Analysis is to help decision makers improve the allocation of resources. Understanding the costs of an educational intervention is a way of understanding how the intervention works in relation to its theory of change. Every intervention uses resources that could be used for other alternatives. By looking for the most cost-effective alternative, we are also enhancing the scalability of the intervention at stake, allowing a larger population to be reached with the intervention.
Therefore, besides the effectiveness, we also wish to estimate the cost effectiveness (Levin & Belfield, 2015) of the certificate programme and compare the effects on the various outcomes. For this purpose, we balance the costs and the benefits of the certificate programme. The costs are measured as the spending (in the local currency) on the implementation of the certificate programme for school leaders. The benefits will be expressed in relative terms, of, for example, how much larger the effect is for the trainer-led group, in comparison with the peer-led group. These benefits are then balanced against the costs.

The most common cost measure used is the average cost per participant, which can be combined with the average effect per participant to allow a comparison of cost-effectiveness among program alternatives. Costs are very sensitive to the scale of implementation. The outcomes that we look at are the previously presented effects on assessment and on leadership styles.

The only difference between the costs of the trainer-led and the peer-led group are the (communication and transport) allowances and the expert and/or honorary fees for the trainers. The programme is facilitated by UR-CE trainers and some external trainers, who were randomly assigned to one of the two modalities. Trainers in both groups received the same capacity development and support and received the same training fee per person. They took part in preparation and reflection sessions together. In the trainer-led group, we had 33 trainers for 233 trainees, which is about 1 trainer per 7 trainees. In the peer-led group, we had 9 trainers for 230 trainees, which is about 25 trainees per trainer. This difference in proportion is also reflected in the time that is spent by trainers. In the trainer-led group, there are five days available per modules for facilitation in the online environment, whereas this is only one day for the peer-led group. However, given the large number of students per trainer in the peer-led group, there is more time available for marking assignments and exams and for giving feedback on the portfolio. This implies that the total time spent by the trainers is approximately the same, but of course in the peer-led group more students are serviced by one trainer.

In general, we distinguish two types of costs: implementation costs and honorary costs for the trainers. The implementation costs can be divided into costs related to the participants, costs related to the trainers, costs related to purchasing materials, VVOB and REB-related expenses, and other costs, such as COVID tests. Implementation costs are costs such as renting venues for course delivery, providing training facilities and arranging snacks and lunch. Furthermore, these costs include the provision of laptops to the course participants, and the organisation and preparation of training session, preparation and reflection sessions, assessment sessions and field visits by VVOB staff, included allowances for the VVOB staff (such as transport and per diem), but excluding the salaries of the VVOB staff. For the implementation costs related to the participants, costs related to materials and costs related to VVOB and REB there is no distinction that we can make between the trainer-led and the peer-led group. These are overall costs that are simply divided by the total number of participants (regardless in which group) to get to the cost per participant.

Because of the large difference in number of participants per trainer, we first calculate the total costs separately for the trainer-led and the peer-led group. This includes the trainer honorary costs and the implementation costs related to trainers (for example transportation costs, per diem costs, and communication costs (for the online activities). Next, we calculate the cost per participant for each group separately. We then add the costs per participant based on the implementation costs to the costs per

participant based on the trainer costs, to get the total cost per participant. For the effectiveness analysis, we compare the difference between the two modalities with respect to costs per participant, and relate this to the difference in effectiveness.

The number of participants varies considerably between the different outcome measures that we have presented previously in this report. Therefore, it is important to emphasize which number of participants we use for the cost-effectiveness analysis. We assumed that the most reliable number of participants to use when wanting to account for the costs of the trainers is the number of participants that actually participated in the online environment. Therefore, we use the total number of participants that participated in the online environment in module 1 for the cost-effectiveness analyses. This implies 230 participants in the peer-led group and 233 participants in the trainer-led group.

Table 9.1 shows all the costs, split by implementation and trainer costs, and provides the total costs, the number of participants on whom the costs were spent, and the costs per participant. We then add the costs per participants for each group to arrive at the total costs per participant (including both the implementation costs as well as the trainer costs, of which only the latter differs by group). This is all done in Rwandan Franc. Near the end of the table we recalculate the costs to Euro's, such that the international readers of this report better understand the costs we describe.

Table 9.1 shows that the costs per participant in the trainer-led group are approximately 1.4 times as high as the costs per participant in the peer-led group (a total of €884 per participant versus €619 per participant). This implies that the averages of the outcomes, in favour of the trainer-led group would have to be 1.4 times higher than the averages for the peer-led group, with of course the condition that the averages are significantly different.

However, the results presented above show that for the assessment, satisfaction and leadership outcomes (from the post-test questionnaire) we find positive and significant effects in favour of the peer-led group, and not for the trainer-led group. This implies that not only the costs are lower for the peer-led group, but that the effects are also higher, providing us with a double positive result for this group. The only outcomes where we find effects in favour of the trainer-led group are the process outcomes, and also only in Module 1. However, these are only intermediate outcomes, which we expected might have led to higher assessment scores and leadership outcomes. But the mediation-analyses, which were discussed in section 8.3, show that there is no mediation effect of the process outcomes at all. Therefore, we have to conclude that although the trainer-led group was more active in the online environment in Module 1, this does not influence the outcomes that matter in any way. On the contrary, the peer-led group performs higher (and in many cases significantly higher) on the relevant outcome measures.

**Table 9.1 – Cost-effectiveness overview table of costs**

| **Implementation costs** | Total costs | | Number of participants | Cost per participant | |
|---|---|---|---|---|---|
| Participant costs | RWF | 209,284,019 | 463 | RWF | 452,017 |
| Material costs | RWF | 6,611,560 | 463 | RWF | 14,280 |
| VVOB/REB related costs | RWF | 37,961,044 | 463 | RWF | 81,989 |
| Other costs | RWF | 1,496,010 | 463 | RWF | 3,231 |

| **Trainer costs** | Total costs | | Number of participants | Cost per participant | |
|---|---|---|---|---|---|
| *Total Implementation costs trainers* | RWF | 62,452,156 | | | |
| Implementation costs trainers peer-led group | RWF | 13,382,605 | 230 | RWF | 58,185 |
| Implementation costs trainers trainer-led group | RWF | 49,069,551 | 233 | RWF | 210,599 |

| | Total costs | | Number of trainer days | Number of participants | Cost per participant | |
|---|---|---|---|---|---|---|
| Honorary costs trainers peer-led group | RWF | 25,276,982 | 534 | 230 | RWF | 109,900 |
| Honorary costs trainers trainer-led group | RWF | 61,838,054 | 1349 | 233 | RWF | 265,399 |

| **Total costs per participant** | Cost per participant | |
|---|---|---|
| Total cost per participant implementation costs | RWF | 551,518 |
| Total cost per participant trainer related costs - peer-led group | RWF | 168,085 |
| Total cost per participant trainer related costs - trainer-led group | RWF | 475,998 |
| Total costs per peer-led participant in RWF | RWF | 719,603 |
| Total costs per trainer-led participant in RWF | RWF | 1,027,516 |

| **Recalculation from RWF to Euro** | | |
|---|---|---|
| Total costs per peer-led participant in EUR | € | 619 |
| Total costs per trainer-led participant in EUR | € | 884 |

## 10. Conclusion

In this report, we presented an evaluation of a Continuous Professional Development (CPD) training programme for school leaders, delivered in an e-learning modality. Randomization into one of the two modalities took place at the sector level, in the first modality (the trainer-led group) trainees are guided by a trainer from the University of Rwanda - College of Education. In the other modality (the peer-led group) trainees were guided through different activities by their peers, with only occasional involvement of a trainer.

In this chapter we answer the main research question of this study: Can the peer-led group perform as well as the trainer-led group in terms of school leadership styles, standards, skills and competences, and participation and exam results on the CPD programme? Additionally, the sub-questions that we asked were whether we can determine factors that explain differences in effectiveness, how the two modalities compare in terms of costs and whether the more effective modality in terms of outcomes is also more cost-effective.

The first sub-question was how effective e-learning is with e-moderation by a trainer from UR-CE (trainer-led group) vs. e-learning with e-moderation by peers (peer-led group) for various process and outcome measures? We examined this for a total of around 460 trainees. We start by looking at the process outcomes. We expected that the process outcomes would be moderators for the post-test leadership outcomes and the assessment outcomes. We find that the trainer-led group made significantly more progress, especially in Module 1. For example, the trainer-led group participated in significantly more quizzes, feedback moments, forum discussions and workshops. However, the peer-led group did participate significantly more in assignment activities in Module 1 compared to the trainer-led group. In the other three modules, the participation rates between the two modalities is comparable. A possible explanation that we find higher participation rates for the trainer-led group in Module 1 but not in the other modules, could be that in the first Module both the trainers and the participants were higher motivated than in other modules. Especially the trainers in the trainer-led group may have tried harder to reach participants and to make them participate. It is not uncommon in an intervention to see an increased enthusiasm in the beginning which fades away with the duration of the intervention. Although the enthusiasm of trainees is most likely similar between the participants from the two modalities, the enthusiasm of the trainers, in combination with the lower trainer-trainee ratio may have given the trainer-led group an extra boost.

However, the process data in Module 1 is the only outcome data that shows higher outcomes for the trainer-led group. All other outcome measures that we analysed were in favour of the peer-led group, or did not show significant differences (although in the latter case, the peer-led group often also had a higher average on the analysed outcomes). Based on the final satisfaction questionnaire, we find that the peer-led group was more satisfied with the CPD programme than the trainer-led group in terms of the assignments and the lessons. They also found the videos more useful.

With respect to the leadership outcomes from the post-test questionnaire, the research shows that the peer-led group scored themselves significantly higher on perceived usefulness of the CPD programme, distributed leadership and distributed leadership – establishing goals and expectations. However, note that these findings are not confirmed by the teachers at the schools of the trained (deputy) head teachers. However, we do find significant differences on *other outcomes* in the post-test questionnaire filled out by teachers. We observe that teachers give higher scores for instructional leadership and intellectual stimulation for school leaders in the peer-led group.

Furthermore, based on the assessment data, we found that the peer-led group achieved significantly better results than the trainer-led group. For example, in Modules 1 and 3 the peer-led group had significantly higher results compared to the trainer-led group in terms of the portfolio of evidence. And in

Module 2 and 4 the peer-led group had significantly higher exam scores and passed the module significantly more often, compared to the trainer-led group. We also find that in 3 out of 4 modules the peer-led group scores significantly higher for participation in online distance work.

We do not find any effect on the school assessment outcomes.

Note that although online moderation by trained trainers may play a positive role in better student performance (Yen et al., 2018), this does not necessarily have to be the case, as we also see in our study. On the other hand, the literature also indicates that interaction with a tutor is not per definition always meaningful in an e-learning course, and, as such, not always adding to student performance, as compared to a well-designed e-learning course with only limited mentoring available (Price et al., 2007). The latter also seems to be the case in this study, as we do not find any evidence that the more active and frequent presence of a trainer in the trainer-led group leads to better outcomes. A possible explanation for our findings might therefore be that the role and interaction of the trainer with the trainees in the trainer-led group were not frequent and meaningful enough, or that the online training skills of these trainers were too low, to lead to a significant difference in the online environment. It is also possible that there is an aversion of the school leaders for formal trainers, or that peers understood each other much better, leading to a better learning experience. Another potential reasons is that the peer-led group, who was aware of the fact that they had less access to a trainer, developed much better reflection and self-regulation skills to benefit more from the training. However, all these possible explanations cannot be tested in the current study, and for future research it would be advisable to get a better idea on the actual role and participation of the trainers and the peers in the online environment, for example via qualitative research, as well as on their motivation and self-regulation skills, for example via questionnaires.

As for the question which factors explain the differences in the effectiveness of trainer-led e-learning as compared to peer-led e-learning (sub-question 2), we unfortunately cannot really answer this question with the study at hand. When trying to identify whether there are school background characteristics of the trainees that may explain differences in effectiveness, we do not find any differential effects for the leadership outcomes based on the post-test questionnaire when looking at trainee's gender, school leader position (HT or DHT), trainee's educational level or school type (government-aided, public or private). For the assessment outcomes, we find a few differential effects. For the score on assignment 7 and the exam score in Module 4, we find that higher educated trainees (i.e. school leaders with a master's degree or a PGDE degree) in the peer-led group perform significantly higher than in the trainer-led group. For all other assessment outcomes, we do not find differential effects. Also, we do not find any evidence of a moderating effect of the process outcomes on the post-test questionnaire leadership outcomes and the assessment outcomes. As said above, trainer behavior could be a potential explanation for the findings, but this would need to be studied further in the future.

Next, we turn to the third and fourth sub-question: 'How does trainer-led e-learning compare to peer-led e-learning in terms of costs, and is the more effective intervention also most cost-effective for various outcome measures and for various sub-groups of participants?' When comparing the costs of the two different modalities per participant, we find that the costs for the peer-led participants are 1.4 times lower than the costs per participant in the trainer-led group (a total of €619 per participant versus €884 per participant). However, the results show that for the assessment, satisfaction and leadership outcomes (from the post-test questionnaire) we find positive and significant effects in favour of the peer-led group, and not for the trainer-led group. This implies that not only the costs are lower for the peer-led group, but also that the effects are higher, providing us with a double positive result for this group.

However, it is important to realize that in this study we have only been able to compare the two modalities within the setting of an e-learning training programme. We cannot compare the effectiveness of either modality with earlier cohorts that have participated in fully f2f or blended versions of the training programme. We cannot draw any conclusions on how effective the training programme as an e-leaning

modality. We can only say something about which form of e-learning modality is more effective than the other. Therefore, it is also not possible to link these findings to earlier literature that focuses on the effectiveness of school leadership training programmes, as we did not study that question. We did not ask whether such a programme was effective (although Bruns et al. (2017) did and found positive and significant effects of such an ICT-based programme), but merely which modality of offering this programme was more effective than the other.

Furthermore, while there is quite some knowledge based on effective school leadership (Robinson et al, 2008; Leithwood et al, 2008), there is still little (experimental) evidence on the direct and indirect *impacts* of effective school leadership on the entire school, in general, and quality of teaching and students' achievement, in particular. Unfortunately, this study also cannot contribute to this gap in the literature, as we do not focus on this aspect of spill overs from school leaders to teacher and/or student performance.

Another possible limitation of this study involves the translation of the survey from English to Kinyarwanda. It appears that for some scales we could not retrieve valid and reliable results. Even though we have translated the survey using different experts and native-speakers, it seems we were unable to translate a couple of questions meaningfully as to make the scales understandable. Kinyarwanda is a contextual language for which the translation of a similar English word may be different between close neighborhoods. A third possible limitation is that the data collection was done in several ways including both participants filling the questionnaire out onsite and enumerators collecting the answers by phone. In the phone call data collection, the enumerators read the questions out loud to the respondents, so they were able to explain questions that were unclear to the participants, leading to higher quality data collections. Although the findings from this study show that we do not suffer from selectivity in non-response based on observable participant characteristics, it is possible that unobservable characteristics (such as digital literacy) may have played a role here.

Overall, we conclude that the peer-led group is more beneficial compared to the trainer-led group, both with respect to the effectiveness of the outcomes and with respect to the cost-effectiveness.

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## Appendix A – Tables descriptive statistics characteristics DHT and teacher

This section provides information about the demographic characteristics of the school leaders relating to work experience, educational qualification, some other variables such as job satisfaction, awareness of the CPD programme and also discusses some of the characteristics of the schools (relating to location, infrastructure, number of students, etc.) involved in the study.

Table A.01 and Table A.02 jointly provide information about the demographic characteristics of the school leader in the sample, and information about the schools involved in the study, such as relating to infrastructure availability, location and means of transport to school. We see that 80% of the school leaders in this study are male, and 46% are head teacher vs 54% deputy head teacher. Of the CPD programme about half of the respondents have worked as school leader in another school, with an average of 6.5 years. Most of them did not teach at this school before becoming a school leader. school leaders were also asked about their familiarity with the VVOB CPD programme and 98 percent of the respondents were familiar with the goals. Table A.02 shows that the school leader respondents' average age was 42 years. Most of the respondents have working experience for 5.6 years in the current school, the maximum years of experience reported is 44 years. Note that the number of observations in Table A.02 shows that not all questions were answered by all school leaders, some questions were only asked to school leaders that answered yes on a previous question (e.g. how many years they worked as a school leader at another school), but other questions contain some missing responses.

Only 38 percent of the respondents had teaching experience before becoming a school leader; while working as a teacher, 31 percent of the respondents had taught language and literature or science whereas 21 percent of the respondents had taught humanities and arts (Figure A.02). Over 85 percent of the school leader respondents are reportedly (very) satisfied with their job (Figure A.03). Over 87 percent of the respondents have a Bachelor of education qualification (A0) (Figure A.01).

46 percent of the school leader respondents describe their school location as a village whereas none describes the location as large cities (Figure ). Most of the schools are concentrated within the Rutsiro, Gakenke and Nyamagabe districts (Figure ). The schools are mostly government-aided schools with a nominal fraction of 3 percent being private school (Figure ). 67 percent of the school leaders mention that they have access to a computer or personal laptop (which is an interesting finding as they need a laptop to participate in the CPD programme). 64% of the school leaders work at schools with separate toilets for boys and girls. 64 percent of the school leaders mention that they have access to internet. The majority of school leaders work at a school with access to electricity and access to hand washing stations. Over 78 percent of the school leader respondents describe the travel time to the school (very) long ( Figure ).

**Table A.01 Descriptive statistics on the categorical variables of the school leaders**

| Description | Percentage |
|---|---|
| **Gender** | |
| Male | 80% |
| Female | 20% |
| **Current function** | |
| Headteacher | 46% |
| Deputy headteacher | 54% |
| **Group-CEA** | |
| Peer-led | 48% |
| Trainer-led | 52% |
| **Are you familiar with the purpose/goals of the CPD diploma programme for head teachers and deputy head teachers organized by VVOB and UR-CE?** | |
| Yes | 98% |

| | |
|---|---|
| No | 2% |
| **Did you work as a (deputy) head teacher in another school?** | |
| Yes | 51% |
| No | 49% |
| **Have you taught as a teacher in this school before becoming a (deputy) head teacher?** | |
| Yes | 38% |
| No | 62% |
| **Does your school have the following infrastructure?** | |
| Access to electricity | 91% |
| Access to internet | 64% |
| Access to separate toilets for boys and girls | 64% |
| Access to improved drinking water | 65% |
| Access to hand washing stations | 88% |
| Student access to computer or laptop | 67% |
| Teacher access to computer or laptop | 64% |

**Table A.02 Descriptive statistics on the numerical variables of the school leader respondents**

| Description | Number of respondents | Average | SD | Min | Max |
|---|---|---|---|---|---|
| **How old are you?** | 327 | 42.7 | 6.8 | 27 | 64 |
| **How long have you been a D(H) at this school (in years)** | 326 | 5.6 | 4.2 | 0 | 44 |
| **How many years did you work as a (deputy) head teacher in the other schools?[a]** | 161 | 6.5 | 4.3 | 1 | 29 |
| **How many years are you working in this school?** | 327 | 4.4 | 4.3 | 1 | 38 |

Note: [a]Only relevant if people have actually worked in that role at other schools

**Figure A.01 Highest level of qualification of school leader**

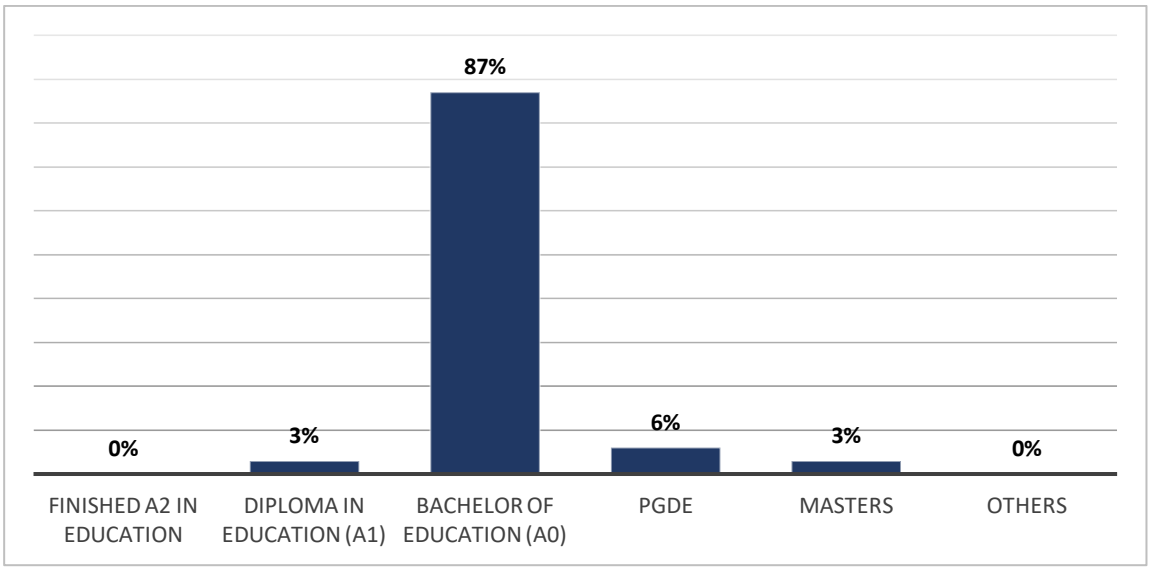


**Figure A.02 Subjects taught before becoming school leader**

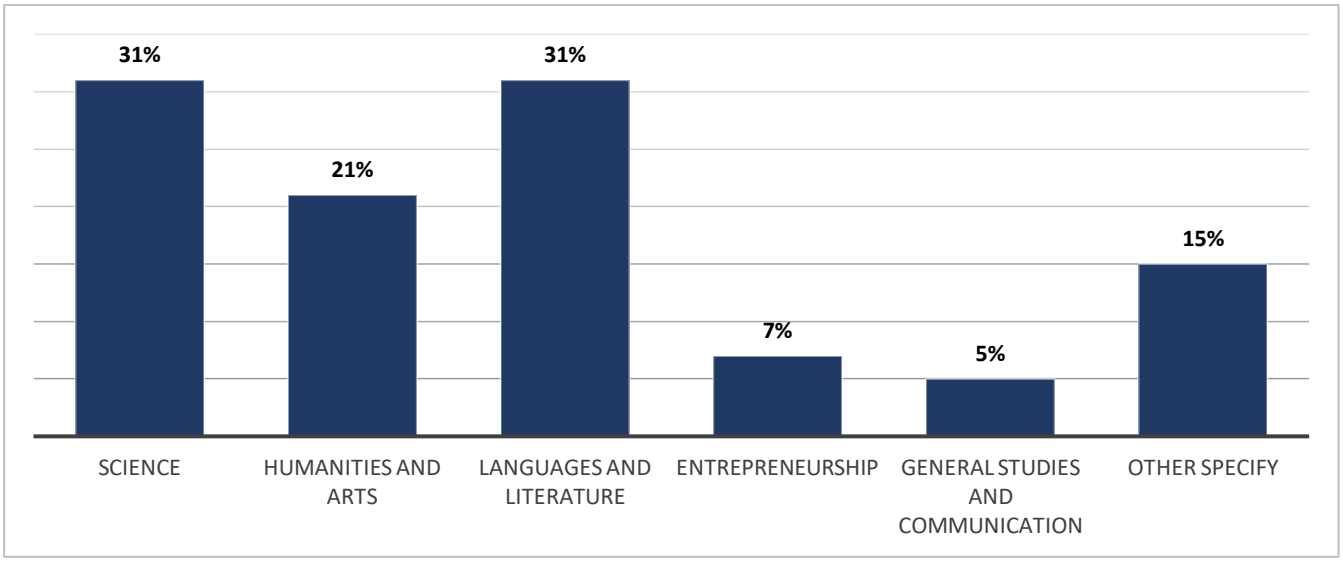



**Figure A.03 How satisfied are you with your job as a (deputy) head teacher?**

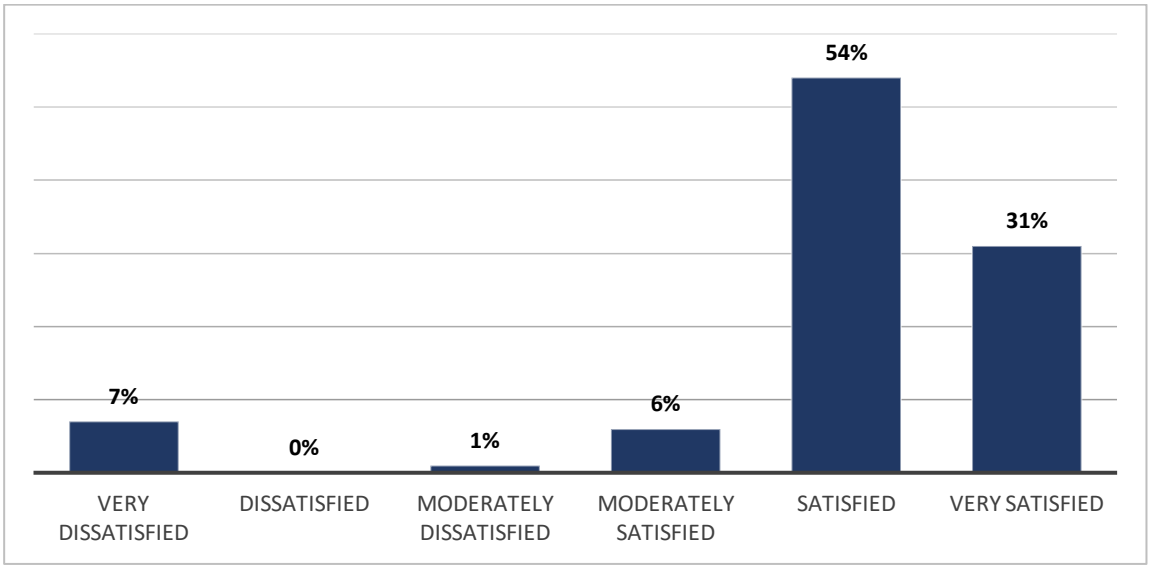


**Figure A.04 School location (school leader response)**

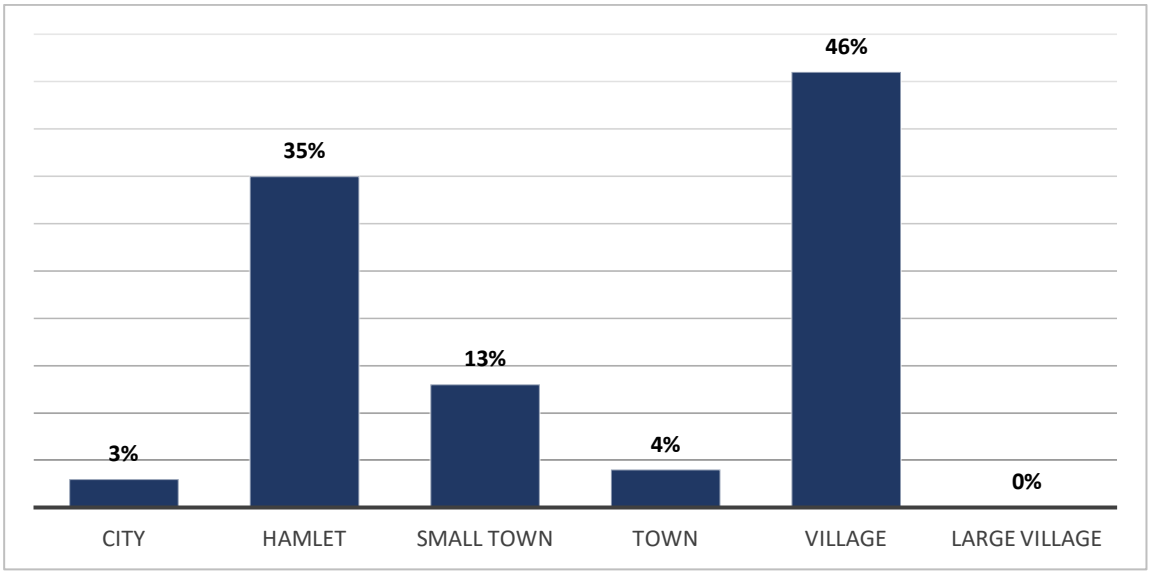



**Figure A.05 Percentage of schools within districts**

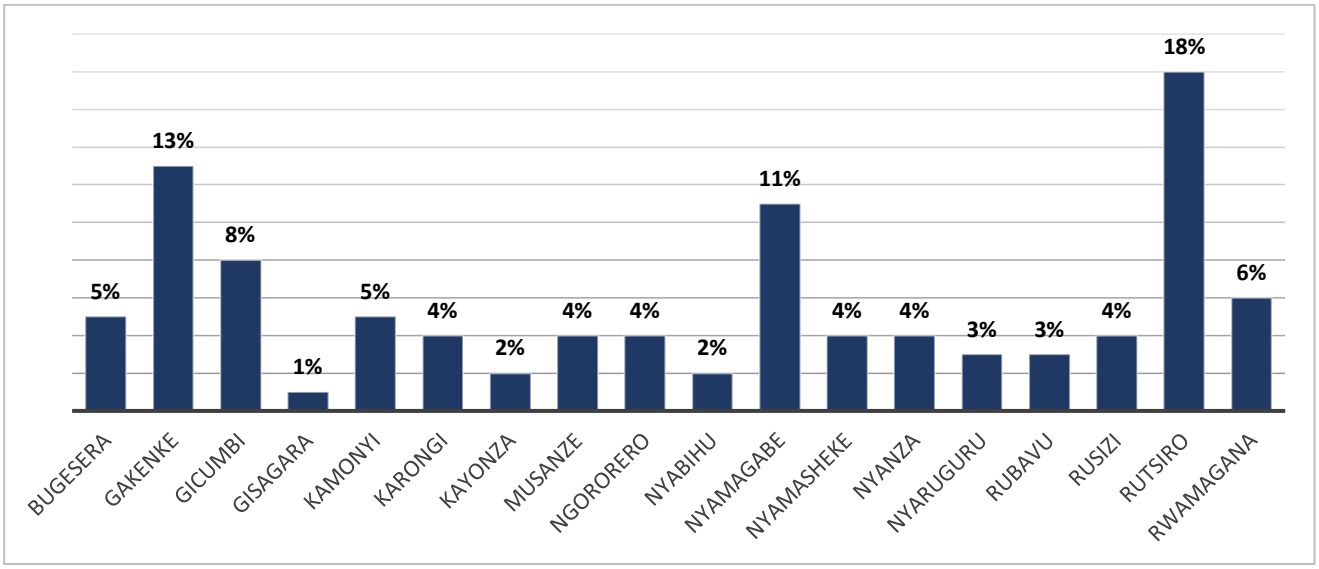


**Figure A.06 School type**

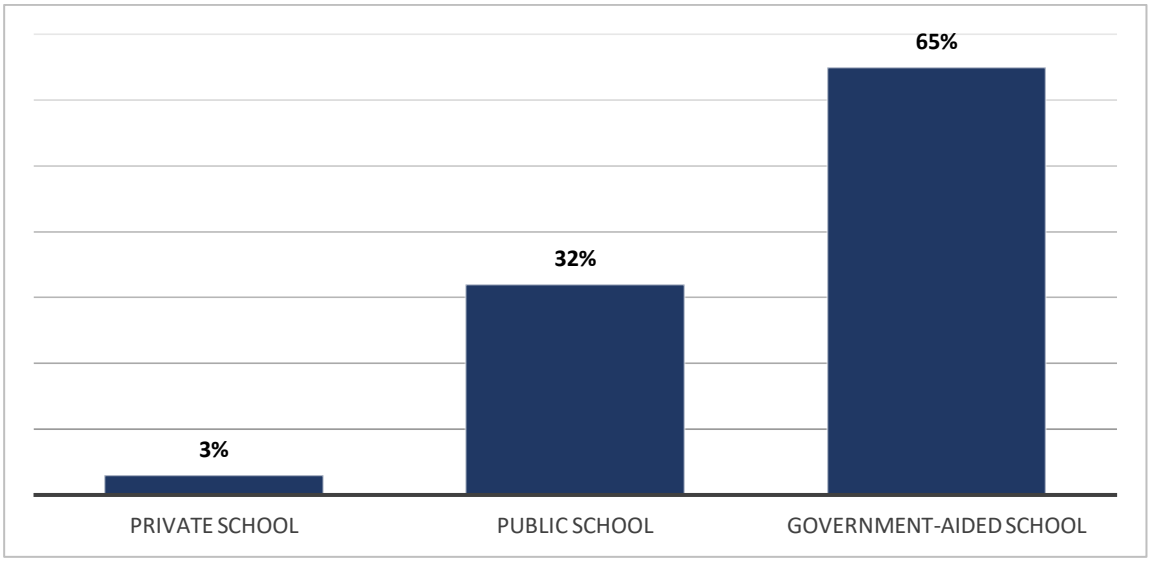



**Figure A.07 Travel time to school (school leaders perspective)**

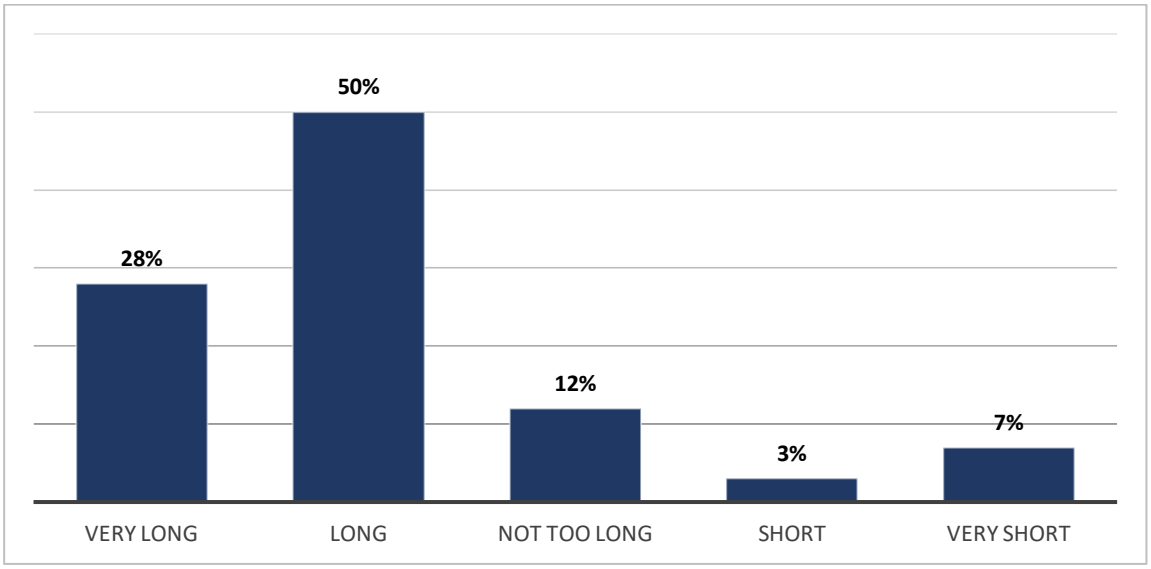



Table A.03 and Table A.04 together provide information about the demographic characteristics of the teachers involved in the study. Out of 451 teachers involved in the study, over half of the respondents had a Bachelor of Education (A0) as the highest-level qualification whereas only one percent of the respondents had a masters as their highest qualification (Figure ). Most of the teachers report that they have approximately 7.4 years of experience in their present school.

About 43 percent of the teachers included in the study taught science as a part of their profession, followed by language and literature, as reported by 29 percent of the respondents (Figure A.03).

Figure A.4 indicates that over 93 percent of the teachers shared (very) positive perceptions towards the school leader. 82 percent of the teachers reportedly travel to the school by foot, and none uses private car to commute to school (Figure A.5).

**Table A.03 Demographic characteristics on the categorical variables of the Teachers**

| Description | Percentages |
|---|---|
| **What is your gender?** | |
| Male | 45% |
| Female | 55% |

**Table A.04 Descriptive statistics on the numerical variables of the teachers**

| Description | Number of respondents | Average | SD | Min | Max |
|---|---|---|---|---|---|
| **How old are you?** | 451 | 36.5 | 6.7 | 21 | 59 |
| **How many years are you a teacher in this school?** | 451 | 7.4 | 4.6 | 1 | 33 |
| **How long does it take you to come to school (in minutes)?** | 451 | 33.4 | 40.0 | 1 | 500 |

**Figure A.08 Highest educational qualification among teachers**

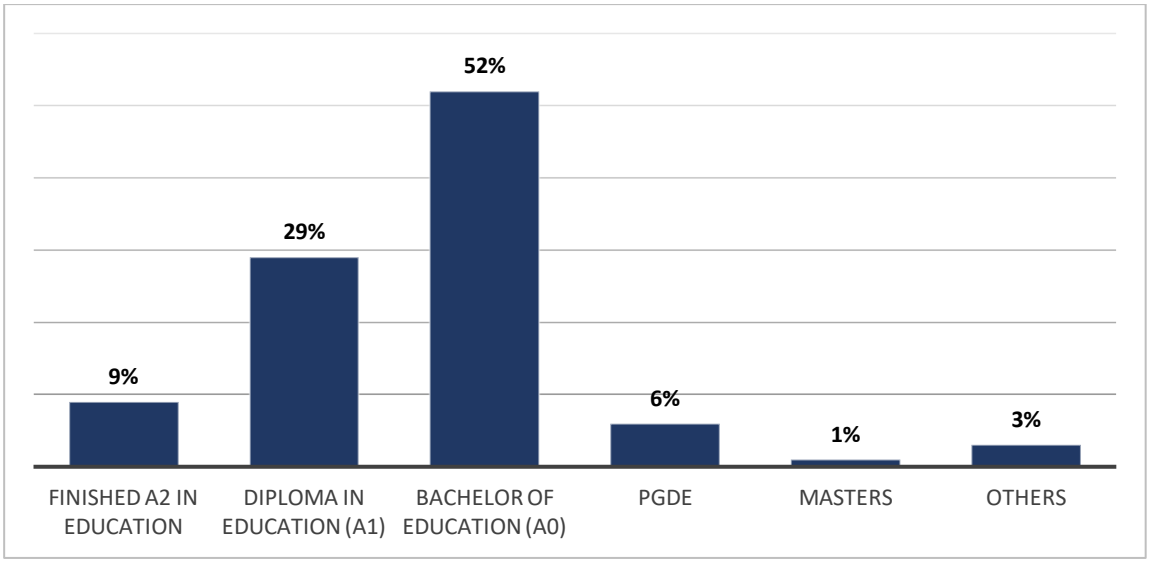


**Figure A.03 Subject taught by the teachers**

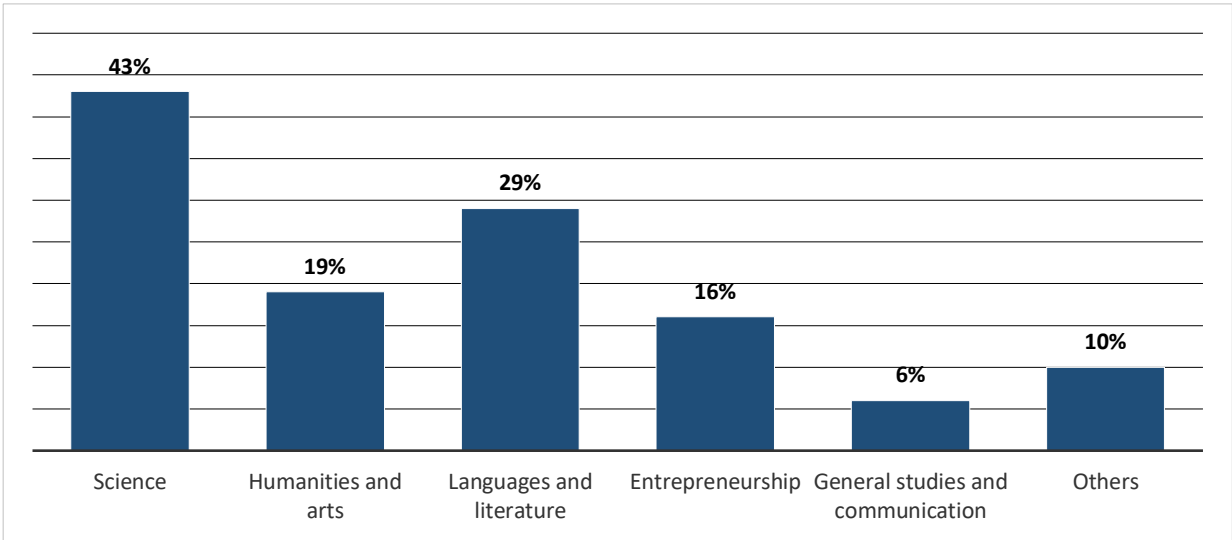



**Figure A.4 Satisfaction with school leader**

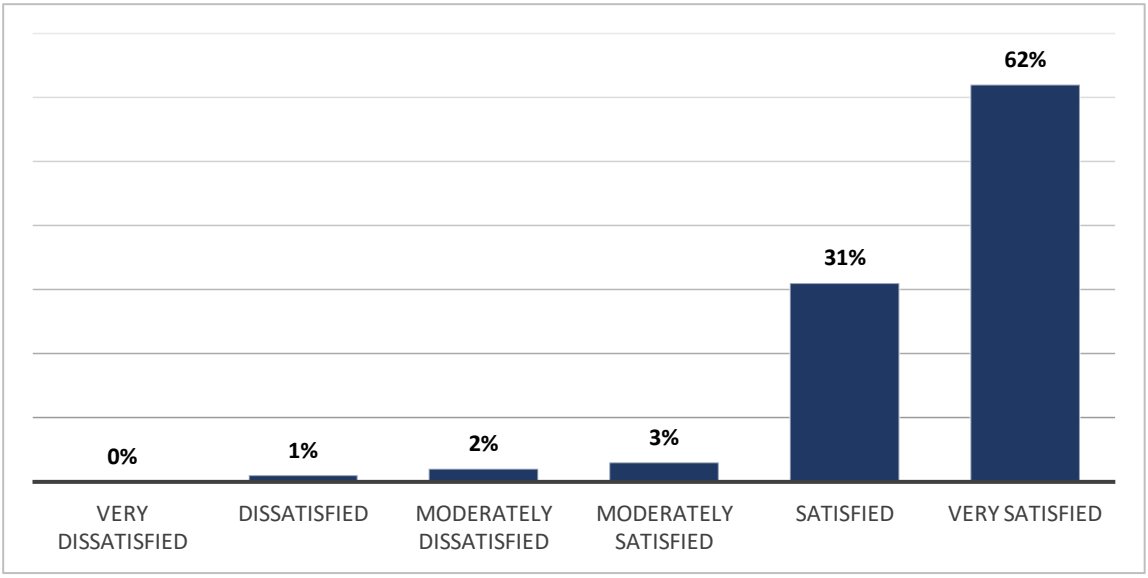
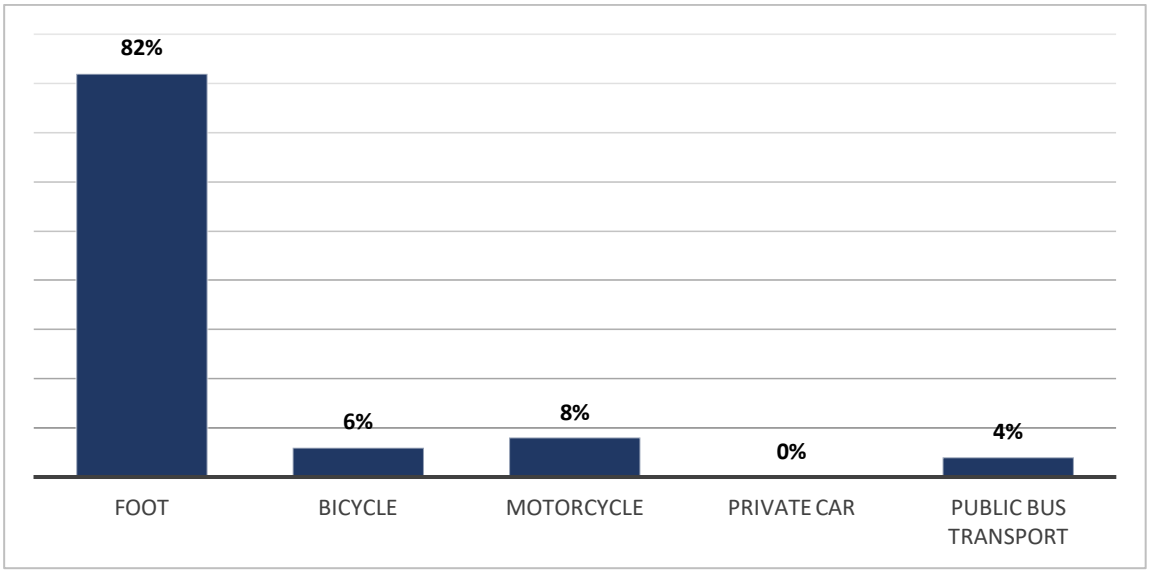


**Figure A.5 Means of transport to school for the teachers**



# Appendix B – Tables school leader and teacher questionnaires post-test

**Table B.01 Barriers to participate in e-learning**

| Q(n°) | Description | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|---|
| **Situational barriers** | | | | | | |
| **3** | I have financial issues that make it difficult for me to follow the CPD programme. | 40% | 32% | 12% | 13% | 3% |
| **7** | The timing of the CPD programme interferes with my job as a (deputy) head teacher. | 11% | 23% | 11% | 38% | 17% |
| **8** | The CPD programme takes too long to finish | 19% | 40% | 14% | 22% | 5% |
| **10** | At home I have no access to a computer or internet facilities. | 25% | 35% | 8% | 22% | 9% |
| **11** | I have limited time because of my family or children that make it difficult for me to follow the CPD programme. | 28% | 35% | 18% | 16% | 2% |
| **Institutional barriers** | | | | | | |
| **1** | I do not have the skills or knowledge necessary to follow the CPD programme. | 54% | 26% | 2% | 14% | 5% |
| **5** | I receive support from superiors to participate in the CPD programme. | 9% | 13% | 9% | 43% | 26% |
| **6** | I receive support from family or friends to participate in the CPD programme. | 13% | 17% | 13% | 41% | 16% |
| **15** | There are good (other) learning opportunities (apart from the CPD programme) in the neighbourhood of my home. | 28% | 25% | 17% | 24% | 6% |
| **Dispositional barriers** | | | | | | |
| **2** | I am afraid that I cannot pass the CPD programme | 47% | 30% | 8% | 11% | 3% |
| **4** | I am insecure about the level of difficulty of the CPD programme | 36% | 37% | 14% | 12% | 1% |
| **9** | I am afraid of participating in e-learning | 54% | 31% | 7% | 6% | 2% |
| **12** | My health makes it difficult for me to follow the CPD programme. | 46% | 39% | 6% | 9% | 1% |
| **13** | My age makes it difficult for me to follow the CPD programme. | 50% | 35% | 6% | 6% | 2% |
| **14** | Personal reasons make it difficult for me to follow the CPD programme. | 40% | 35% | 13% | 10% | 2% |
| **16** | When I was in basic education, I had good learning experience myself | 6% | 12% | 13% | 51% | 19% |

**Table B.02 Job Satisfaction**

| Q(n°) | Description | Extremely dissatisfied | Dissatisfied | Neutral | Satisfied | Extremely Satisfied |
|---|---|---|---|---|---|---|
| 1 | The amount of job security I have. | 0% | 8% | 15% | 63% | 15% |
| 2 | The amount of pay and extra benefits I have. | 3% | 18% | 21% | 50% | 8% |
| 3 | The amount of personal growth and development I get in doing my job as a (deputy) head teacher. | 2% | 8% | 14% | 65% | 11% |
| 4 | The students I talk to and work with on my job as a (deputy) head teacher. | 0% | 2% | 7% | 72% | 20% |
| 5 | The degree of respect and fair treatment I receive from colleagues | 1% | 3% | 12% | 69% | 15% |
| 6 | The feeling of worthwhile accomplishment I get from doing my job as a (deputy) head teacher. | 0% | 3% | 11% | 60% | 26% |
| 7 | The chance of getting to know other people while on the job | 1% | 3% | 7% | 61% | 29% |
| 8 | The amount of support and assistance I receive at this school. | 2% | 7% | 14% | 59% | 18% |
| 9 | The degree to which I am fairly paid for what I contribute to this school. | 3% | 11% | 27% | 49% | 11% |
| 10 | The amount of independent thought and action I can exercise in my job as a (deputy) head teacher. | 1% | 5% | 15% | 64% | 15% |
| 11 | How secure things look for me in the future in this school | 2% | 3% | 14% | 55% | 26% |
| 12 | The chance to help students while at work | 0% | 2% | 4% | 63% | 31% |
| 13 | The amount of challenge in my job as a (deputy) head teacher | 4% | 19% | 30% | 39% | 8% |
| 14 | The overall quality of support and assistance I receive at this school. | 2% | 4% | 12% | 67% | 14% |

**Table B.03 Work tasks motivation**

| Q(n°) | Description | Completely disagree | Mostly disagree | Neutral | Mostly agree | Completely agree |
|---|---|---|---|---|---|---|
| Intrinsic motivation | | | | | | |
| 1 | Because my job as a (deputy) head teacher is pleasant to carry out | 4% | 7% | 13% | 55% | 20% |
| 6 | Because I find my job as a (deputy) head teacher interesting to do | 3% | 6% | 12% | 57% | 22% |
| 10 | Because I like my job as a (deputy) head teacher. | 1% | 3% | 7% | 52% | 38% |
| Identified motivation | | | | | | |
| 2 | Because my job as (deputy) head teacher enables me to achieve my own work goals | 1% | 4% | 8% | 65% | 23% |
| 12 | Because my job as a (deputy) head teacher is important for me. | 2% | 5% | 7% | 57% | 29% |
| 14 | Because I find my job as a (deputy) head teacher important for the academic success of pupils | 2% | 2% | 6% | 47% | 43% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Introjected motivation | | | | | | |
| 4 | Because I would feel guilty if would not do my job as a (deputy) head teacher. | 17% | 21% | 16% | 31% | 15% |
| 7 | Because if I don't do my job as a (deputy) head teacher I will feel bad. | 17% | 20% | 15% | 33% | 15% |
| External motivation | | | | | | |
| 5 | Because I'm paid to be a (deputy) head teacher. | 25% | 23% | 16% | 29% | 7% |
| 8 | Because my work demands it from me. | 7% | 14% | 25% | 42% | 13% |
| 15 | Because the school obliges me to be a (deputy) head teacher | 36% | 29% | 18% | 14% | 3% |
| Amotivation | | | | | | |
| 3 | I don't know, I don't always see the relevance of my job as a (deputy) head teacher | 51% | 30% | 8% | 9% | 2% |
| 11 | I used to know why I was a (deputy) head teacher, but I don't see the reason anymore. | 43% | 32% | 15% | 9% | 2% |
| 13 | I don't know, sometimes I don't see the purpose of my job as a (deputy) head teacher. | 57% | 30% | 6% | 6% | 1% |

**Table B.04 General self-efficacy**

| Q(n°) | Description | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|---|
| 1 | I will be able to achieve most of the goals that I have set for myself as a (deputy) head teacher. | 1% | 1% | 3% | 58% | 37% |
| 2 | When facing difficult tasks in my job as a (deputy) head teacher, I am certain that I will accomplish them | 1% | 1% | 6% | 59% | 32% |
| 3 | In general, I think that I can obtain the school leadership standards that are important to me. | 0% | 1% | 4% | 57% | 38% |
| 4 | I believe I can succeed in the tasks as a (deputy) head teacher to which I set my mind | 0% | 1% | 5% | 50% | 44% |
| 5 | I will be able to successfully overcome many challenges in my job as a (deputy) head teacher. | 0% | 1% | 4% | 61% | 34% |
| 6 | I am confident that I can perform effectively on many different tasks in my job as a (deputy) head teacher. | 0% | 0% | 1% | 58% | 40% |
| 7 | Compared to other (deputy) head teachers, I can do most tasks in my job very well. | 1% | 2% | 10% | 55% | 32% |
| 8 | Even when things are tough in my job as a (deputy) head teacher, I can perform quite well | 1% | 1% | 7% | 62% | 28% |

**Table B.05 Motivation to learn**

| Q(n°) | Description | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|---|
| Attitude towards learning | | | | | | |
| 16 | Participating in a course or learning activity is a good idea. | 0% | 1% | 1% | 41% | 57% |
| 17 | It is not a good idea to participate in a course or learning activity. | 64% | 20% | 3% | 9% | 4% |
| 18 | I participate in a course or learning activity because I love studying. | 3% | 8% | 14% | 48% | 27% |
| 19 | I find it pleasant to participate in a course or learning activity. | 30% | 9% | 6% | 36% | 19% |
| Behavioural intention to learn | | | | | | |
| 10 | My colleagues and friends support my participation in the CPD programme. | 2% | 4% | 11% | 55% | 27% |
| 15 | I expect that I can use the things I have learned in the next months in my job as a (deputy) head teacher. | 1% | 2% | 4% | 50% | 43% |
| Perceived ease of use of CPD (EOU) | | | | | | |
| 2 | The CPD programme will be easy to study. | 2% | 9% | 14% | 55% | 19% |
| 6 | My superiors support my participation in the CPD programme. | 2% | 2% | 9% | 54% | 34% |
| 12 | I have access to facilities, like a computer, internet, in order to participate in the CPD programme. | 2% | 6% | 9% | 49% | 34% |
| Perceived usefulness of the learned material in CPD | | | | | | |
| 1 | Thanks to the CPD programme I will better perform my job as a (deputy) head teacher | 0% | 0% | 0% | 43% | 56% |
| 5 | Thanks to the CPD programme I will be better prepared for my job as a (deputy) head teacher. | 0% | 0% | 2% | 49% | 49% |
| 9 | I intend to use the things I have learned in the CPD programme frequently in my job as a (deputy) head teacher. | 0% | 0% | 1% | 44% | 55% |
| Perceived behavioural control | | | | | | |
| 4 | I have the skills and knowledge necessary to participate in the CPD programme | 1% | 2% | 5% | 55% | 37% |
| 8 | I find my participation in the CPD programme useful for my job as a (deputy) head teacher. | 1% | 1% | 2% | 43% | 54% |
| 13 | I have enough money to participate in the CPD programme. | 20% | 31% | 28% | 17% | 5% |
| Subjective norm | | | | | | |
| 3 | I will participate in the CPD programme because other (deputy) head teachers do it too. | 18% | 26% | 15% | 28% | 14% |
| 7 | I decide how and when I participate in the CPD programme | 3% | 3% | 13% | 57% | 24% |
| 11 | I expect to easily use the things I have learned in the CPD programme in my job as a (deputy) head teacher. | 0% | 0% | 3% | 53% | 44% |

**Table B.06 Instructional leadership**

| Q(n°) | Description | Current function | Never | Less than once a month | Once a month | Every two weeks | Once a week | Several times a week | Every day |
|---|---|---|---|---|---|---|---|---|---|
| **1** | Having discussions on instructional issues with teachers. | School leader | 0% | 2% | 10% | 7% | 25% | 38% | 18% |
| | Having discussions on instructional issues with the (deputy) head teacher | Teacher | 2% | 13% | 32% | 15% | 20% | 16% | 2% |
| **2** | Observing classroom instruction of teachers. | School leader | 0% | 1% | 9% | 10% | 22% | 39% | 19% |
| | The (deputy) head teacher observed my classroom instruction. | Teacher | 4% | 26% | 38% | 12% | 16% | 4% | 0% |
| **3** | Attending teacher-planning meetings. | School leader | 1% | 6% | 20% | 13% | 24% | 25% | 12% |
| | Attending teacher-planning meetings | Teacher | 6% | 31% | 31% | 10% | 16% | 4% | 1% |
| **4** | Giving feedback to teachers on how to improve classroom behaviour or classroom management. | School leader | 0% | 1% | 8% | 10% | 17% | 35% | 30% |
| | Received feedback from the (deputy) head teacher on how to improve classroom behaviour or classroom management. | Teacher | 6% | 20% | 33% | 12% | 17% | 10% | 3% |
| **5** | Giving ideas to teachers for how to improve instruction. | School leader | 0% | 2% | 8% | 4% | 16% | 37% | 34% |
| | Received ideas from the (deputy) head teacher on how to improve instruction. | Teacher | 4% | 20% | 33% | 11% | 19% | 12% | 1% |

**Table B.07 Transformational leadership**

| Q(n°) | Description | Current function | Not at all | Once in a while | Sometimes | Often | Always |
|---|---|---|---|---|---|---|---|
| **Idealized influence** | | | | | | | |
| **1** | I make sure that school members (e.g. teachers, students) feel good to be around me. | School leader | 0% | 1% | 6% | 39% | 54% |
| | The (deputy) head teacher makes me and my colleagues feel good at school. | Teacher | 3% | 7% | 21% | 42% | 27% |
| **8** | School members (e.g. teachers, students) believe in me. | School leader | 0% | 0% | 6% | 46% | 49% |
| | Me and my colleagues believe in the (deputy) head teacher. | Teacher | 1% | 7% | 8% | 46% | 38% |
| **15** | School members (e.g. teachers, students) are proud to be associated with me | School leader | 0% | 1% | 6% | 47% | 46% |
| | Me and my colleagues are proud to be associated with the (deputy) head teacher. | Teacher | 2% | 6% | 9% | 45% | 39% |
| **Inspirational motivation** | | | | | | | |
| **2** | I express with a few simple words what we could and should do. | School leader | 1% | 1% | 10% | 42% | 46% |
| | The (deputy) head teacher expresses with a few simple words what we can and should do. | Teacher | 2% | 4% | 14% | 43% | 37% |
| **9** | I provide positive images about what the school can look like in the future and what we should do to achieve that. | School leader | 0% | 0% | 5% | 36% | 59% |
| | The (deputy) head teacher provides a positive image about what the school should look like in the future and what we can do to achieve that. | Teacher | 4% | 5% | 14% | 47% | 29% |
| **16** | I make sure school members (e.g. teachers, students) find their work meaningful. | School leader | 1% | 1% | 5% | 43% | 50% |
| | The (deputy) head teacher helps me, and my colleagues find meaning in our work. | Teacher | 0% | 4% | 8% | 47% | 41% |
| **Intellectual stimulation** | | | | | | | |
| **3** | I help school members (e.g. teachers, students) to think about problems in a different way. | School leader | 0% | 1% | 9% | 44% | 46% |
| | The (deputy) head teacher enables me and my colleagues to think about problems in new ways. | Teacher | 3% | 8% | 29% | 41% | 20% |
| **10** | I help school members (e.g. teachers, students) to look at challenging things in a new way. | School leader | 0% | 0% | 5% | 45% | 49% |
| | The (deputy) head teacher helps me and my colleagues to look at challenging thing in a new way.. | Teacher | 4% | 6% | 23% | 44% | 23% |
| **17** | I challenge school members (e.g. teachers, students) to rethink their ideas. | School leader | 6% | 4% | 14% | 46% | 30% |
| | The (deputy) head teacher challenges me and my colleagues to rethink our ideas. | Teacher | 4% | 11% | 29% | 36% | 20% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Individual consideration** | | | | | | | |
| **4** | I help school members (e.g. teachers, students) develop themselves. | School leader | 0% | 2% | 11% | 44% | 43% |
| | The (deputy) head teacher helps me and my colleagues to develop ourselves. | Teacher | 12% | 15% | 30% | 31% | 12% |
| **11** | I let school members (e.g. teachers, students) know how I think they are doing. | School leader | 5% | 3% | 12% | 45% | 35% |
| | The (deputy) head teacher lets me and my colleagues know how he/she thinks we are doing. | Teacher | 4% | 12% | 26% | 37% | 22% |
| **18** | I give personal attention to school members (e.g. teachers, students) with special needs (e.g.: disability, emotional support, etc.). | School leader | 1% | 2% | 8% | 39% | 50% |
| | The (deputy) head teacher gives personal attention to me and my colleagues who need special attention. | Teacher | 5% | 7% | 21% | 37% | 31% |
| **Management by exception** | | | | | | | |
| **6** | I am satisfied when school members (e.g. teachers, students) meet agreed-upon standards. | School leader | 0% | 1% | 3% | 33% | 63% |
| | The (deputy) head teacher is satisfied when me and my colleagues meet agreed-upon standards. | Teacher | 1% | 2% | 6% | 47% | 44% |
| **13** | As long as things go well, I do not try to change anything. | School leader | 14% | 10% | 28% | 35% | 13% |
| | As long as things go well, the (deputy) head teacher does not try to change anything. | Teacher | 6% | 15% | 20% | 39% | 20% |
| **20** | I tell school members (e.g. teachers, students) what the minimum standards are for their work. | School leader | 0% | 0% | 9% | 50% | 41% |
| | The (deputy) head teacher tells me and my colleagues what the minimum standards are for our work. | Teacher | 2% | 4% | 12% | 49% | 33% |
| **Laissez faire leadership** | | | | | | | |
| **7** | I am happy when school members (e.g. teachers, students) always work as usual. | School leader | 0% | 2% | 6% | 31% | 60% |
| | The (deputy) head teacher is happy when me and my colleagues do our work as usual. | Teacher | 25% | 22% | 22% | 24% | 8% |
| **14** | I am fine with whatever school members (e.g. teachers, students) want to do. | School leader | 13% | 17% | 29% | 28% | 13% |
| | The (deputy) head teacher is fine with whatever me and my colleagues want to do. | Teacher | 7% | 13% | 33% | 31% | 16% |
| **21** | I only ask of school members (e.g. teachers, students) what is absolutely essential. | School leader | 9% | 12% | 27% | 32% | 19% |
| | | Teacher | N/A | N/A | N/A | N/A | N/A |
| **Contingent reward** | | | | | | | |
| **5** | I tell school members (e.g. teachers, students) what to do if they want to be rewarded for their work. | School leader | 2% | 1% | 10% | 47% | 40% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | The (deputy) head teacher tells me and my colleagues what to do if we want to be rewarded for their work. | Teacher | 1% | 3% | 10% | 47% | 39% |
| **12** | I reward it when school members (e.g. teachers, students) reach their goals. | School leader | 1% | 2% | 19% | 44% | 33% |
| | The (deputy) head teacher rewards it when me and my colleagues reach our goals. | Teacher | 31% | 14% | 27% | 18% | 11% |
| **19** | I make clear that school members (e.g. teachers, students) will be positively rewarded for what they accomplish. | School leader | 0% | 1% | 8% | 49% | 43% |
| | The (deputy) head teacher tells me and my colleagues that we will be positively rewarded when we accomplish tasks. | Teacher | 30% | 14% | 21% | 22% | 13% |

**Table B.08 Leadership dimensions**

| Leadership dimensions | Definition | Rwandan five national school leadership standards |
|---|---|---|
| D1) Establishing goals and expectations | Includes the setting, communicating, and monitoring of expectations learning goals, standards, and expectations, and the involvement of staff and others in the process so that there is clarity and consensus about goals. | Leading learning, also by working with parents and the local community. |
| D2) Strategic resourcing | Involves aligning resource selection and allocation to priority teaching goals. Includes provision of appropriate expertise through staff recruitment. | Strategic direction for the school. |
| D3) Planning, coordinating, and evaluating teaching and the curriculum | Direct involvement in the support and evaluation of teaching through regular classroom visits provision of formative and summative feedback to teachers. Direct oversight of curriculum through school wide coordination across classes and year levels and alignment to school goals. | Managing the school as an organization; leading teaching. |
| D4) Promoting and participating in teacher learning and development | Leadership that not only promotes but directly participates with teachers in formal or informal professional learning. | Leading teaching. |
| D5) Ensuring an orderly and supportive environment | Protecting time for teaching and learning by reducing external pressures and interruptions and establishing an orderly and supportive environment both inside and outside classrooms. | Managing the school as an organization. |

**Source** Robinson et al. (2008), p. 656.

| | | Dimension |
|---|---|---|
| 1. | Enforcing school rules or code of conduct. | D5 |
| 2. | Implementing the competence-based curriculum | D3 |
| 3. | Developing and implementing a school improvement plan | D3 |
| 4. | Defining standards for instructional practices for teachers. | D1 |
| 5. | Providing support and feedback to teachers. | D4 |
| 6. | Understanding pedagogical and administrative documents. | D5 |
| 7. | Financial management of the school (e.g. how money is spent). | D5 |
| 8. | Involving teachers in school-wide decision-making. | D3 |
| 9. | Working with parents and the community. | D1 |
| 10. | Strategic teaching staff recruitment. | D2 |

**Table B.09 Leadership overall (School leader's perspective)**

| Q(n°) | Description | High level of support needed | Moderate level of support needed | Low level of support needed | No support needed at present |
|---|---|---|---|---|---|
| **1** | Enforcing school rules or code of conduct. | 20% | 42% | 17% | 21% |
| **2** | Implementing the competence-based curriculum | 11% | 37% | 25% | 27% |
| **3** | Developing and implementing a school improvement plan | 11% | 40% | 24% | 25% |
| **4** | Defining standards for instructional practices for teachers. | 13% | 39% | 24% | 24% |
| **5** | Providing support and feedback to teachers. | 26% | 28% | 20% | 26% |
| **6** | Understanding pedagogical and administrative documents | 24% | 28% | 23% | 25% |
| **7** | Financial management of the school (e.g. how money is spent). | 14% | 34% | 26% | 26% |
| **8** | Involving teachers in school-wide decision-making. | 27% | 27% | 24% | 23% |
| **9** | Working with parents and the community. | 28% | 28% | 19% | 26% |
| **10** | Strategic teaching staff recruitment. | 17% | 34% | 22% | 27% |

**Table B.10 Leadership overall (Teachers' perspective)**

| Q(n°) | Description | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|---|
| 1 | The (deputy) head teacher enforces school rules or code of conduct. | 1% | 3% | 1% | 45% | 50% |
| 2 | The (deputy) head teacher ensures that teachers implement the competence-based curriculum. | 1% | 2% | 0% | 44% | 53% |
| 3 | The (deputy) head teacher develops and implements a school improvement plan. | 1% | 5% | 5% | 55% | 34% |
| 4 | The (deputy) head teacher defines standards for instructional practices for teachers. | 1% | 9% | 3% | 58% | 29% |
| 5 | The (deputy) head teacher provides support and feedback to teachers. | 1% | 5% | 2% | 47% | 45% |
| 6 | The (deputy) head teacher understands pedagogical and administrative documents. | 1% | 3% | 6% | 46% | 45% |
| 7 | The (deputy) head teacher knows about the financial management of the school (e.g. how money is spent). | 4% | 11% | 25% | 45% | 16% |
| 8 | The (deputy) head teacher involves teachers in school-wide decision-making. | 4% | 10% | 4% | 48% | 34% |
| 9 | The (deputy) head teacher works with parents and the community. | 2% | 3% | 3% | 48% | 45% |

**Table B.11 Trust in school leader**

| Q(n°) | Description | Current Function | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|---|---|
| 1 | I make sure that all students in my school get high quality teachers. | School leader | 3% | 5% | 8% | 42% | 42% |
| | The (deputy) head teacher makes sure that all students in my school get high quality teachers. | Teacher | 2% | 9% | 6% | 53% | 31% |
| 2 | If I promise something to teacher(s), I will keep that promise. | School leader | 0% | 0% | 3% | 35% | 61% |
| | If the (deputy) head teacher promises something to teacher(s), he/she keeps that promise. | Teacher | 6% | 12% | 7% | 46% | 28% |
| 3 | In general, I have good intentions towards the teachers in my school | School leader | 0% | 0% | 1% | 26% | 73% |
| | In general, the (deputy) head teacher has good | Teacher | 1% | 5% | 4% | 50% | 40% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | intentions and motives towards the teachers in this school. | | | | | | |
| **4** | Teachers in my school can freely discuss work related problems with me | School leader | 0% | 1% | 2% | 29% | 68% |
| | Teachers in this school can freely discuss work related problems with the (deputy) head teacher. | Teacher | 2% | 7% | 3% | 45% | 43% |

**Table B.12 Distributed leadership**

| Q(n°) | | Current function | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|---|---|
| **1** | In my school, most teachers share a similar set of values, beliefs, and attitudes related to teaching and learning | School leader | 0% | 3% | 5% | 51% | 41% |
| | In this school, most teachers share a similar set of values, beliefs, and attitudes related to teaching and learning. | Teacher | 1% | 5% | 3% | 51% | 41% |
| **2** | In my school, we have well-defined learning expectations for all students | School leader | 0% | 1% | 4% | 47% | 48% |
| | In this school, we have well-defined learning expectations for all students. | Teacher | 1% | 7% | 2% | 56% | 35% |
| **3** | In my school, student assessment reflects the competence-based curriculum standards. | School leader | 0% | 1% | 4% | 42% | 53% |
| | In this school, student assessment practices reflect the competence-based curriculum standards. | Teacher | 0% | 2% | 1% | 44% | 53% |
| **4** | Teachers in my school support the head teacher in enforcing the code of conduct | School leader | 1% | 1% | 5% | 47% | 46% |
| | Teachers in this school support the (deputy) head teacher in enforcing the code of conduct. | Teacher | 0% | 1% | 1% | 45% | 54% |
| **5** | Teachers in my school take responsibility for improving the school | School leader | 0% | 1% | 6% | 46% | 47% |
| | Teachers in this school take responsibility for improving the school. | Teacher | 0% | 2% | 2% | 52% | 43% |
| **6** | Teachers in my school help maintain discipline in the entire school, not just in their own classroom | School leader | 1% | 1% | 7% | 45% | 46% |
| | Teachers in this school help maintain discipline in the entire school, not just in their own classroom. | Teacher | 0% | 2% | 1% | 39% | 58% |
| **7** | Teachers in my school ask each other for assistance with their classroom instruction | School leader | 0% | 1% | 6% | 48% | 45% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Teachers in this school ask each other for assistance with their classroom instruction. | Teacher | 0% | 6% | 1% | 46% | 47% |
| **8** | Teachers in my school observe each other's teaching | School leader | 1% | 3% | 11% | 47% | 39% |
| | Teachers in this school observe each other's teaching. | Teacher | 1% | 6% | 2% | 53% | 38% |
| **9** | Teachers in my school are given meaningful feedback to their teaching | School leader | 1% | 0% | 3% | 40% | 56% |
| | Teachers in this school are given meaningful feedback to their teaching. | Teacher | 0% | 2% | 1% | 51% | 45% |
| **10** | Teachers in my school exchange curriculum materials with their colleagues | School leader | 0% | 2% | 5% | 38% | 55% |
| | Teachers in this school exchange curriculum materials with their colleagues. | Teacher | 1% | 9% | 3% | 38% | 48% |

# Appendix C – Tables school level assessment post-test

**Table C.01 Creating strategic directions for the school**

| Q(n°) | | School does not meet indicator | School only partially meet indicator | School meets indicator | School exceeds indicator |
|---|---|---|---|---|---|
| **1.1.** | **School vision, mission and values** | | | | |
| 1.1.1 | The school has a clearly stated and realistic educational mission, vision and values | 2% | 7% | 79% | 12% |
| 1.1.2 | The mission, vision, and values reflect the national purpose of education in Rwanda and are aligned with national planning goals. | 1% | 4% | 84% | 10% |
| 1.1.3 | The mission, vision and values are appropriate to the context of the school and the needs of its students. | 1% | 4% | 84% | 11% |
| 1.1.4 | The school has considered the views of the school community in developing the school vision, mission and values. | 4% | 10% | 76% | 9% |
| 1.1.5 | The school has communicated its vision, mission and values to the community | 6% | 21% | 62% | 11% |
| 1.1.6 | School leaders can explain what the school is doing to achieve its mission, vision and values. | 2% | 6% | 81% | 12% |
| **1.2.** | **Strategic planning** | | | | |
| 1.2.1 | The school analyses data to identify areas for improvement and includes these in the SIP. | 2% | 12% | 76% | 9% |
| 1.2.2 | The SGAC members actively participate in developing the school improvement plan. | 4% | 12% | 74% | 10% |
| 1.2.3 | Stakeholders are aware of the School Improvement Plan and intend to implement it. | 3% | 18% | 70% | 8% |
| 1.2.4 | The school monitors and evaluates the implementation of its improvement plan. | 4% | 33% | 56% | 7% |
| 1.2.5 | The SIP includes a strategy for school-wide integration of digital technologies and their effective use in teaching and learning | 11% | 14% | 66% | 8% |

**Table C.02 Leading learning**

| Q(n°) | | School does not meet indicator | School only partially meet indicator | School meets indicator | School exceeds indicator |
|---|---|---|---|---|---|
| **2.1.** | **Leadership for learning** | | | | |
| 2.1.1 | The head teacher is active in the school on most working days. | 0% | 4% | 69% | 27% |
| 2.1.2 | School leader demonstrates good relationships with students, teachers, parents and community. | 0% | 1% | 82% | 17% |
| 2.1.3 | Head teacher keeps record of students' learning progress and uses them to improve the quality of education provided. | 0% | 4% | 84% | 12% |
| 2.1.4 | School leader monitors staff attendance and punctuality and acts as necessary. | 0% | 4% | 82% | 13% |
| **1.2.** | **Care and welfare of students** | | | | |
| 2.2.1 | Students' safety is monitored, with particular attention to those who are most at risk. | 1% | 26% | 63% | 10% |

| | | | | | |
|---|---|---|---|---|---|
| 2.2.2 | Students and staff know what to do in the event of fire, flood or other emergencies at their school/in their classroom. | 7% | 39% | 50% | 4% |
| 2.2.3 | A staff member has been appointed that students can approach if they are concerned about safety or abuse. | 8% | 17% | 69% | 6% |
| 2.2.4 | Teachers who abuse children physically, emotionally or sexually are reported to appropriate authorities. | 2% | 13% | 66% | 6% |
| 2.2.5 | The school has a protocol for dealing with issues of child safety and abuse in the school, community, staff, students and parents know how to apply them. | 17% | 29% | 49% | 5% |
| 2.2.6 | Lunch is provided for all students at school as per the school feeding programme. | 2% | 23% | 57% | 18% |

**Table C.03 Leading teaching**

| Q(n°) | | School does not meet indicator | School only partially meet indicator | School meets indicator | School exceeds indicator |
|---|---|---|---|---|---|
| **3.1.** | **Staff supervision and support** | | | | |
| 3.1.1 | School leaders regularly observe lessons, record their findings and provide oral and written feedback to teachers. | 0% | 6% | 79% | 15% |
| 3.1.2 | All teaching staff undergo regular documented appraisals of their work which focus on strengths, areas for improvement and actions to improve their skills. | 0% | 8% | 80% | 12% |
| 3.1.3 | Teaching staff have engaged in continuous professional development relevant to the needs of their students and school improvement priorities. | 2% | 19% | 71% | 8% |
| 3.1.4 | Teaching and/or school leadership staff prepare model lessons. | 23% | 28% | 42% | 8% |
| 3.1.5 | New staff undergo a year-long induction program into their roles and responsibilities. | 15% | 56% | 25% | 4% |
| 3.1.6 | The head teacher and DoS have received training relevant to their management responsibilities. | 0% | 10% | 76% | 14% |
| **3.2.** | **Management and deployment of teaching staff** | | | | |
| 3.2.1 | The school has sufficient qualified staff to teach classes and carry out management tasks. | 0% | 31% | 59% | 10% |
| 3.2.2 | Teachers are allocated to classes and departments based on their competences, experience, and the needs of learners. | 0% | 13% | 80% | 7% |
| 3.2.3 | Teachers are on time for school and classes, and are rarely absent. | 0% | 4% | 82% | 15% |
| 3.2.4 | The teachers' workload meets national standards (max. 35 hours per week). | 0% | 9% | 63% | 28% |
| **3.3.** | **Other supporting structures** | | | | |
| 3.3.1. | Structures (departments, communities of practice) are accessed by all teachers in the school | 0% | 11% | 80% | 9% |
| 3.3.2. | Initiatives to enhance English language proficiency are accessible to different school stakeholders (school leaders, teachers, students, administrative staff) | 19% | 44% | 33% | 4% |

| | | | | | |
|---|---|---|---|---|---|
| 3.3.3. | ICT facilities are used by teachers and students for teaching and learning activities | 12% | 24% | 52% | 10% |
| 3.3.4. | The school facilitates the participation of teachers in online/digital/remote CPD | 16% | 26% | 49% | 6% |
| 3.3.5. | Teachers participate in CPD that helps them improve their digital literacy skills | 4% | 23% | 62% | 10% |

**Table C.04 Managing the school as an organization**

| Q(n°) | | School does not meet indicator | School only partially meet indicator | School meets indicator | School exceeds indicator |
|---|---|---|---|---|---|
| **4.1.** | **Financial management** | | | | |
| 4.1.1 | A school budget is available and up to date. | 4% | 9% | 76% | 11% |
| 4.1.2 | The executive committee plays an active role in management of school finances. | 2% | 12% | 75% | 10% |
| 4.1.3 | Expenditure records and cashbooks are well kept and up to date. | 2% | 8% | 78% | 12% |
| 4.1.4 | The school has secured income from sources other than the capitation grant from the Government. | 5% | 28% | 52% | 14% |
| **4.2.** | **Management and deployment of teaching staff** | | | | |
| 4.2.1 | Learning materials (e.g. books, maps, posters, charts) are well organised and properly displayed. | 2% | 20% | 69% | 10% |
| 4.2.2 | Learning resources (e.g. library, laboratory, laptops) are kept securely and are easily accessible during lessons. | 4% | 26% | 59% | 10% |
| 4.2.3 | Writing boards are in good condition and can be clearly seen by all students. | 0% | 7% | 79% | 14% |
| 4.2.4 | Textbooks are well cared for and the books record is up to date. | 0% | 15% | 71% | 14% |
| 4.3. | **Supportive element** | | | | |
| 4.3.1 | Changes within the school are properly introduced and resistance is effectively dealt with | 0% | 4% | 88% | 8% |

**Table C.05 Working with parents and the wider community**

| Q(n°) | | School does not meet indicator | School only partially meet indicator | School meets indicator | School exceeds indicator |
|---|---|---|---|---|---|
| **5.1.** | **School governance** | | | | |
| 5.1.1 | The SGAC have received training and members have a good understanding of their roles and responsibilities | 8% | 18% | 69% | 6% |
| 5.1.2 | SGAC members monitor the implementation of planned activities in the SIP and hold school leaders accountable. | 4% | 21% | 68% | 6% |
| 5.1.3 | The structure of the SGAC conforms to statutory requirements. | 0% | 5% | 90% | 4% |
| 5.1.4 | SGAC meetings are conducted and their minutes are available. | 0% | 3% | 90% | 7% |

| | | | | | |
|---|---|---|---|---|---|
| 5.1.5. | Data on SGAC membership and attendance at SGAC meetings is disaggregated by gender and disability. | 7% | 29% | 60% | 4% |
| **5.2.** | **Partnership with parents and the community** | | | | |
| 5.2.1 | Parents and community members visit the school and are welcome. | 1% | 6% | 82% | 11% |
| 5.2.2 | Parents are given feedback on their children's progress in a language they can understand and practical advice on how they can support their learning and keep them in school. | 0% | 6% | 85% | 9% |
| 5.2.3 | The school communicates its expectations of students' achievement, attendance, completion and behaviour to parents in a language they can understand. | 1% | 6% | 86% | 7% |
| 5.2.4 | Parents are involved in activities organized by the school. | 1% | 19% | 73% | 7% |
| 5.2.5. | The school communicates to parents the roles and responsibilities of staff, students and governing body in a language they can understand. | 1% | 9% | 81% | 10% |
| 5.2.6. | The schools is involved in some activities to support the community. | 3% | 21% | 67% | 8% |

**Table C.06 Crosscutting criteria**

| Q(n°) | | School does not meet indicator | School only partially meet indicator | School meets indicator | School exceeds indicator |
|---|---|---|---|---|---|
| **6.1.** | **Access, equity and inclusion** | | | | |
| 6.1.1 | The school has comprehensive record of trends in students' admissions (including birth dates), attendance and punctuality, and uses these to safeguard children. | 1% | 7% | 81% | 11% |
| 6.1.2 | The school sets a high priority on regular attendance and follows up on unauthorised absences and drop out. | 0% | 1% | 81% | 17% |
| 6.1.3 | The school treats all students fairly with regard to gender, disability, and learning needs. | 0% | 2% | 84% | 14% |
| 6.1.4 | The school has taken steps to make its buildings and facilities accessible to all students. | 14% | 26% | 52% | 8% |
| 6.1.5 | The school involves all students in educational and co-curricular activities | 8% | 32% | 56% | 5% |
| **6.2.** | **School environment** | | | | |
| 6.2.1 | Sports facilities are available and appropriate to the needs of all learners. | 22% | 42% | 30% | 6% |
| 6.2.2 | Classrooms are of an adequate size for the number of students and are clean, safe, well ventilated (windows can be opened) and well lit. | 1% | 20% | 68% | 11% |
| 6.2.3 | Students and staff have access to an adequate and clean supply of water at all times. | 5% | 19% | 66% | 10% |
| 6.2.4 | The school has a girls' room with sufficient equipment to meet their needs. | 2% | 12% | 70% | 15% |
| 6.2.5 | Latrines are sufficient in number, ensure privacy with consideration of gender and disability, are clean and hygienic, and have hand-washing facilities. | 1% | 19% | 70% | 10% |

| | | | | | |
|---|---|---|---|---|---|
| 6.2.6 | The school has adequate and reliable ICT infrastructure which enables and facilitates innovative teaching, learning and assessment practices | 16% | 22% | 50% | 12% |

# Appendix D – Full regression tables

## D1 Regression tables post-test questionnaire School leader and teachers

**Table D1.01 Dispositional barrier School leader**

| Model | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Peer-led group | 0.121* | 0.150** | 0.171** | 0.201*** | 0.204*** |
| | (0.0699) | (0.0676) | (0.0683) | (0.0691) | (0.0693) |
| Dispositional barrier (pre-test) | | 0.301*** | 0.280*** | 0.274*** | 0.270*** |
| | | (0.0628) | (0.0648) | (0.0647) | (0.0644) |
| Years of experience | | | -0.00250 | -0.00206 | -0.000686 |
| | | | (0.00835) | (0.00832) | (0.00838) |
| Age (in years) | | | -0.00586 | -0.00610 | -0.00707 |
| | | | (0.00528) | (0.00530) | (0.00531) |
| Years of DHT in school | | | 0.0154* | 0.0165* | 0.0163* |
| | | | (0.00893) | (0.00889) | (0.00894) |
| Qualification: finished in education | | | 0.0567 | 0.116 | 0.0607 |
| | | | (0.646) | (0.644) | (0.648) |
| Qualification: bachelor of education | | | 0.143 | 0.156 | 0.139 |
| | | | (0.198) | (0.198) | (0.199) |
| Qualification: PGDE | | | 0.168 | 0.170 | 0.141 |
| | | | (0.237) | (0.236) | (0.236) |
| Qualification: Masters | | | 0.241 | 0.211 | 0.234 |
| | | | (0.269) | (0.268) | (0.269) |
| Qualification: Others | | | 0.964 | 0.972 | 0.854 |
| | | | (0.637) | (0.636) | (0.634) |
| Female | | | -0.150* | -0.141 | -0.154* |
| | | | (0.0875) | (0.0875) | (0.0872) |
| Function: Deputy head teacher | | | -0.129* | -0.138* | -0.136* |
| | | | (0.0732) | (0.0734) | (0.0734) |
| Student population | | | | 0.000* | 0.000 |
| | | | | (0.000) | (0.000) |
| Number of teachers in school | | | | -0.000350 | 0.000196 |
| | | | | (0.00268) | (0.00273) |
| School type: public school | | | | -0.298 | -0.258 |
| | | | | (0.207) | (0.207) |
| School type: government aided school | | | | -0.372* | -0.344* |
| | | | | (0.202) | (0.203) |
| Infrastructure: electricity | | | | | 0.0826 |
| | | | | | (0.128) |
| Infrastructure: internet | | | | | -0.0634 |
| | | | | | (0.0925) |
| Infrastructure: separate toilets for boys and girls | | | | | 0.449*** |
| | | | | | (0.172) |
| Infrastructure: improved drinking water | | | | | -0.00502 |
| | | | | | (0.0756) |
| Infrastructure: hand washing station | | | | | 0.142 |
| | | | | | (0.113) |

| | | | | | |
|---|---|---|---|---|---|
| Infrastructure: student access to computer/laptop | | | | | -0.0501 |
| | | | | | (0.101) |
| Infrastructure: teacher access to computer/laptop | | | | | 0.0229 |
| | | | | | (0.0897) |
| Constant | 3.882*** | 2.562*** | 2.747*** | 3.060*** | 2.515*** |
| | (0.109) | (0.292) | (0.458) | (0.501) | (0.528) |
| Observations | 327 | 319 | 318 | 318 | 318 |
| R-squared | 0.009 | 0.079 | 0.113 | 0.134 | 0.168 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D1.02 Distributed leadership D1 School leader**

| Model | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Peer-led group | 0.139** | 0.137** | 0.131** | 0.152*** | 0.137** |
| | (0.0593) | (0.0569) | (0.0562) | (0.0570) | (0.0575) |
| Distributed leadership D1 (pre-test) | | 0.337*** | 0.341*** | 0.332*** | 0.332*** |
| | | (0.0535) | (0.0530) | (0.0532) | (0.0541) |
| Years of experience | | | -0.00388 | -0.00457 | -0.00430 |
| | | | (0.00689) | (0.00689) | (0.00697) |
| Age (in years) | | | 0.00400 | 0.00337 | 0.00353 |
| | | | (0.00430) | (0.00433) | (0.00436) |
| Years of DHT in school | | | -0.00913 | -0.00871 | -0.0100 |
| | | | (0.00736) | (0.00735) | (0.00742) |
| Qualification: finished in education | | | -1.734*** | -1.713*** | -1.935*** |
| | | | (0.526) | (0.526) | (0.531) |
| Qualification: bachelor of education | | | 0.313* | 0.350** | 0.340** |
| | | | (0.163) | (0.164) | (0.165) |
| Qualification: PGDE | | | 0.144 | 0.166 | 0.135 |
| | | | (0.195) | (0.195) | (0.195) |
| Qualification: Masters | | | 0.449** | 0.445** | 0.447** |
| | | | (0.222) | (0.222) | (0.223) |
| Qualification: Others | | | 0.583 | 0.569 | 0.549 |
| | | | (0.524) | (0.525) | (0.526) |
| Female | | | 0.0254 | 0.0188 | 0.0295 |
| | | | (0.0717) | (0.0719) | (0.0720) |
| Function: Deputy head teacher | | | 0.00963 | 0.0119 | 0.0177 |
| | | | (0.0603) | (0.0606) | (0.0609) |
| Student population | | | | 0.000 | 0.000 |
| | | | | (0.000) | (0.000) |
| Number of teachers in school | | | | -0.00301 | -0.00304 |
| | | | | (0.00221) | (0.00226) |
| School type: public school | | | | -0.204 | -0.148 |
| | | | | (0.171) | (0.172) |
| School type: government aided school | | | | -0.254 | -0.192 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | (0.167) | (0.168) |
| Infrastructure: electricity | | | | | 0.0208 |
| | | | | | (0.106) |
| Infrastructure: internet | | | | | -0.0285 |
| | | | | | (0.0768) |
| Infrastructure: separate toilets for boys and girls | | | | | -0.0165 |
| | | | | | (0.144) |
| Infrastructure: improved drinking water | | | | | 0.0243 |
| | | | | | (0.0630) |
| Infrastructure: hand washing station | | | | | 0.110 |
| | | | | | (0.0939) |
| Infrastructure: student access to computer/laptop | | | | | 0.204** |
| | | | | | (0.0837) |
| Infrastructure: teacher access to computer/laptop | | | | | -0.147* |
| | | | | | (0.0747) |
| Constant | 4.189*** | 2.815*** | 2.402*** | 2.731*** | 2.560*** |
| | (0.0928) | (0.234) | (0.337) | (0.374) | (0.414) |
| Observations | 327 | 319 | 318 | 318 | 318 |
| R-squared | 0.017 | 0.127 | 0.194 | 0.208 | 0.234 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D1.03 Distributed leadership D4 School leader**

| Model | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Peer-led group | 0.0932* | 0.0956* | 0.101* | 0.114** | 0.0997* |
| | (0.0554) | (0.0527) | (0.0537) | (0.0544) | (0.0547) |
| Distributed leadership D4 (pre-test) | | 0.328*** | 0.339*** | 0.336*** | 0.331*** |
| | | (0.0575) | (0.0585) | (0.0583) | (0.0586) |
| Years of experience | | | -0.00488 | -0.00462 | -0.00616 |
| | | | (0.00656) | (0.00656) | (0.00662) |
| Age (in years) | | | 0.00228 | 0.00269 | 0.00326 |
| | | | (0.00411) | (0.00413) | (0.00414) |
| Years of DHT in school | | | 0.00115 | 0.00136 | -0.00136 |
| | | | (0.00701) | (0.00701) | (0.00706) |
| Qualification: finished in education | | | 0.312 | 0.351 | 0.276 |
| | | | (0.502) | (0.502) | (0.506) |
| Qualification: bachelor of education | | | 0.324** | 0.316** | 0.297* |
| | | | (0.155) | (0.156) | (0.157) |
| Qualification: PGDE | | | 0.376** | 0.377** | 0.323* |
| | | | (0.186) | (0.186) | (0.186) |
| Qualification: Masters | | | 0.334 | 0.335 | 0.327 |
| | | | (0.211) | (0.211) | (0.212) |

| | | | | | |
|---|---|---|---|---|---|
| Qualification: Others | | | 0.578 | 0.496 | 0.560 |
| | | | (0.500) | (0.501) | (0.501) |
| Female | | | -0.0268 | -0.0226 | -0.0125 |
| | | | (0.0685) | (0.0686) | (0.0685) |
| Function: Deputy head teacher | | | 0.0292 | 0.0336 | 0.0324 |
| | | | (0.0574) | (0.0577) | (0.0578) |
| Student population | | | | 0.000 | 0.000 |
| | | | | (0.000) | (0.000) |
| Number of teachers in school | | | | -0.000492 | -0.00159 |
| | | | | (0.00210) | (0.00215) |
| School type: public school | | | | 0.0391 | 0.0845 |
| | | | | (0.163) | (0.164) |
| School type: government aided school | | | | -0.0817 | -0.0325 |
| | | | | (0.159) | (0.160) |
| Infrastructure: electricity | | | | | -0.0584 |
| | | | | | (0.101) |
| Infrastructure: internet | | | | | 0.0103 |
| | | | | | (0.0731) |
| Infrastructure: separate toilets for boys and girls | | | | | -0.0352 |
| | | | | | (0.136) |
| Infrastructure: improved drinking water | | | | | 0.0229 |
| | | | | | (0.0599) |
| Infrastructure: hand washing station | | | | | 0.0800 |
| | | | | | (0.0894) |
| Infrastructure: student access to computer/laptop | | | | | 0.132* |
| | | | | | (0.0798) |
| Infrastructure: teacher access to computer/laptop | | | | | 0.0601 |
| | | | | | (0.0710) |
| Constant | 4.245*** | 2.870*** | 2.406*** | 2.435*** | 2.354*** |
| | (0.0867) | (0.251) | (0.354) | (0.383) | (0.414) |
| Observations | 327 | 319 | 318 | 318 | 318 |
| R-squared | 0.009 | 0.104 | 0.124 | 0.140 | 0.171 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D1.04 Perceived usefulness of CPD programme School leader**

| Model | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Peer-led group | 0.0965** | 0.0919** | 0.0945** | 0.111** | 0.111** |
| | (0.0472) | (0.0458) | (0.0468) | (0.0472) | (0.0479) |
| Perceived usefulness CPD (pre-test) | | 0.271*** | 0.273*** | 0.278*** | 0.276*** |
| | | (0.0526) | (0.0539) | (0.0539) | (0.0542) |
| Years of experience | | | -0.00140 | -0.000963 | -0.000790 |

| | | | | | |
|---|---|---|---|---|---|
| | | | (0.00573) | (0.00571) | (0.00581) |
| Age (in years) | | | 0.00307 | 0.00288 | 0.00336 |
| | | | (0.00359) | (0.00359) | (0.00363) |
| Years of DHT in school | | | -0.00467 | -0.00378 | -0.00574 |
| | | | (0.00612) | (0.00609) | (0.00619) |
| Qualification: finished in education | | | -0.410 | -0.365 | -0.386 |
| | | | (0.438) | (0.436) | (0.443) |
| Qualification: bachelor of education | | | -0.222 | -0.213 | -0.225 |
| | | | (0.135) | (0.136) | (0.137) |
| Qualification: PGDE | | | -0.185 | -0.191 | -0.202 |
| | | | (0.162) | (0.161) | (0.163) |
| Qualification: Masters | | | -0.161 | -0.199 | -0.207 |
| | | | (0.185) | (0.185) | (0.187) |
| Qualification: Others | | | 0.177 | 0.245 | 0.254 |
| | | | (0.437) | (0.436) | (0.439) |
| Female | | | -0.00364 | 0.00722 | 0.0138 |
| | | | (0.0598) | (0.0597) | (0.0601) |
| Function: Deputy head teacher | | | -0.0112 | -0.0239 | -0.0225 |
| | | | (0.0501) | (0.0501) | (0.0507) |
| Student population | | | | 0.000* | 0.000 |
| | | | | (0.000) | (0.000) |
| Number of teachers in school | | | | 0.00138 | 0.00108 |
| | | | | (0.00183) | (0.00188) |
| School type: public school | | | | -0.314** | -0.302** |
| | | | | (0.142) | (0.144) |
| School type: government aided school | | | | -0.294** | -0.282** |
| | | | | (0.138) | (0.140) |
| Infrastructure: electricity | | | | | 0.0608 |
| | | | | | (0.0883) |
| Infrastructure: internet | | | | | -0.0614 |
| | | | | | (0.0640) |
| Infrastructure: separate toilets for boys and girls | | | | | -0.0359 |
| | | | | | (0.119) |
| Infrastructure: improved drinking water | | | | | 0.0321 |
| | | | | | (0.0523) |
| Infrastructure: hand washing station | | | | | -0.0640 |
| | | | | | (0.0784) |
| Infrastructure: student access to computer/laptop | | | | | 0.0319 |
| | | | | | (0.0700) |
| Infrastructure: teacher access to computer/laptop | | | | | 0.0940 |
| | | | | | (0.0621) |
| Constant | 4.381*** | 3.133*** | 3.242*** | 3.428*** | 3.409*** |
| | (0.0738) | (0.252) | (0.332) | (0.348) | (0.373) |
| Observations | 327 | 319 | 318 | 318 | 318 |
| R-squared | 0.013 | 0.090 | 0.105 | 0.129 | 0.146 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent

Note: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D1.05 Instructional leadership Teachers**

| Model | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Peer-led group | 0.593*** | 0.561*** | 0.566*** | 0.598*** | 0.614*** |
| | (0.122) | (0.119) | (0.121) | (0.121) | (0.123) |
| Instructional leadership (pre-test) | | 0.228*** | 0.229*** | 0.225*** | 0.240*** |
| | | (0.0567) | (0.0582) | (0.0588) | (0.0600) |
| Years of experience | | | -0.00550 | -0.00506 | -0.00772 |
| | | | (0.0173) | (0.0172) | (0.0174) |
| Age (in years) | | | 0.00718 | 0.00689 | 0.00870 |
| | | | (0.00911) | (0.00906) | (0.00918) |
| Years of DHT in school | | | -0.0130 | -0.00868 | -0.00993 |
| | | | (0.0157) | (0.0156) | (0.0157) |
| Qualification: finished in education | | | 0.0633 | 0.289 | 0.421 |
| | | | (1.021) | (1.013) | (1.032) |
| Qualification: bachelor of education | | | 0.282 | 0.401 | 0.249 |
| | | | (0.367) | (0.370) | (0.378) |
| Qualification: PGDE | | | -0.100 | -0.0361 | -0.167 |
| | | | (0.440) | (0.437) | (0.444) |
| Qualification: Masters | | | 0.319 | 0.336 | 0.159 |
| | | | (0.496) | (0.490) | (0.500) |
| Female | | | -0.203 | -0.182 | -0.171 |
| | | | (0.159) | (0.158) | (0.160) |
| Function: Deputy head teacher | | | 0.0581 | 0.0337 | 0.0675 |
| | | | (0.129) | (0.128) | (0.130) |
| Student population | | | | 0.000 | 0.000 |
| | | | | (0.000) | (0.000) |
| Number of teachers in school | | | | 0.00592 | 0.00385 |
| | | | | (0.00473) | (0.00491) |
| School type: public school | | | | -1.044** | -1.067** |
| | | | | (0.453) | (0.459) |
| School type: government aided school | | | | -0.947** | -0.951** |
| | | | | (0.445) | (0.453) |
| Infrastructure: electricity | | | | | 0.106 |
| | | | | | (0.249) |
| Infrastructure: internet | | | | | 0.146 |
| | | | | | (0.165) |
| Infrastructure: separate toilets for boys and girls | | | | | -0.164 |
| | | | | | (0.372) |
| Infrastructure: improved drinking water | | | | | -0.264* |
| | | | | | (0.136) |
| Infrastructure: hand washing station | | | | | 0.265 |
| | | | | | (0.199) |
| Infrastructure: student access to computer/laptop | | | | | -0.0990 |
| | | | | | (0.183) |

| | | | | | |
|---|---|---|---|---|---|
| Infrastructure: teacher access to computer/laptop | | | | | 0.162 |
| | | | | | (0.159) |
| Constant | 2.593*** | 1.792*** | 1.332** | 1.923*** | 1.854** |
| | (0.192) | (0.272) | (0.606) | (0.738) | (0.836) |
| Observations | 245 | 245 | 245 | 245 | 245 |
| R-squared | 0.088 | 0.145 | 0.166 | 0.199 | 0.223 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D1.06 Intellectual stimulation Teachers**

| Model | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Peer-led group | 0.323*** | 0.349*** | 0.331*** | 0.327*** | 0.322*** |
| | (0.0970) | (0.0898) | (0.0915) | (0.0931) | (0.0953) |
| Intellectual stimulation (pre-test) | | 0.401*** | 0.408*** | 0.399*** | 0.391*** |
| | | (0.0623) | (0.0632) | (0.0641) | (0.0652) |
| Years of experience | | | 0.00971 | 0.00975 | 0.0102 |
| | | | (0.0131) | (0.0132) | (0.0134) |
| Age (in years) | | | 0.00768 | 0.00809 | 0.00789 |
| | | | (0.00687) | (0.00696) | (0.00710) |
| Years of DHT in school | | | -0.0115 | -0.0108 | -0.0115 |
| | | | (0.0118) | (0.0120) | (0.0121) |
| Qualification: finished in education | | | -0.567 | -0.500 | -0.376 |
| | | | (0.773) | (0.782) | (0.803) |
| Qualification: bachelor of education | | | -0.241 | -0.224 | -0.269 |
| | | | (0.277) | (0.284) | (0.293) |
| Qualification: PGDE | | | -0.0693 | -0.0678 | -0.106 |
| | | | (0.332) | (0.336) | (0.344) |
| Qualification: Masters | | | -0.154 | -0.146 | -0.236 |
| | | | (0.374) | (0.376) | (0.387) |
| Female | | | -0.0829 | -0.0748 | -0.0529 |
| | | | (0.119) | (0.121) | (0.124) |
| Function: Deputy head teacher | | | 0.136 | 0.132 | 0.140 |
| | | | (0.0968) | (0.0979) | (0.0999) |
| Student population | | | | 0.000 | 0.000 |
| | | | | (0.000) | (0.000) |
| Number of teachers in school | | | | 0.00358 | 0.00271 |
| | | | | (0.00365) | (0.00382) |
| School type: public school | | | | -0.183 | -0.222 |
| | | | | (0.346) | (0.353) |
| School type: government aided school | | | | -0.132 | -0.157 |
| | | | | (0.338) | (0.346) |
| Infrastructure: electricity | | | | | 0.159 |
| | | | | | (0.192) |
| Infrastructure: internet | | | | | 0.179 |
| | | | | | (0.128) |

| | | | | | |
|---|---|---|---|---|---|
| Infrastructure: separate toilets for boys and girls | | | | | -0.00274 |
| | | | | | (0.285) |
| Infrastructure: improved drinking water | | | | | -0.0358 |
| | | | | | (0.105) |
| Infrastructure: hand washing station | | | | | 0.0345 |
| | | | | | (0.153) |
| Infrastructure: student access to computer/laptop | | | | | -0.130 |
| | | | | | (0.142) |
| Infrastructure: teacher access to computer/laptop | | | | | 0.0276 |
| | | | | | (0.123) |
| Constant | 3.268*** | 1.738*** | 1.591*** | 1.622*** | 1.565** |
| | (0.152) | (0.276) | (0.487) | (0.576) | (0.655) |
| Observations | 245 | 245 | 245 | 245 | 245 |
| R-squared | 0.044 | 0.184 | 0.205 | 0.210 | 0.223 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

## D2 Regression tables interaction-effects School leader

**Table D2.01 Distributed leadership School leader**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Distributed leadership (pre-test) | 0.400*** | 0.394*** | 0.385*** | 0.390*** |
| | (0.0587) | (0.0585) | (0.0576) | (0.0581) |
| Peer-led group | 0.0913 | 0.0786 | 0.405 | -0.0407 |
| | (0.0570) | (0.0763) | (0.287) | (0.488) |
| Qualification: finished in education | -0.377 | -0.380 | -0.204 | -0.317 |
| | (0.471) | (0.472) | (0.491) | (0.472) |
| Qualification: bachelor of education | 0.320** | 0.317** | 0.527** | 0.332** |
| | (0.146) | (0.146) | (0.222) | (0.153) |
| Qualification: PGDE | 0.271 | 0.276 | 0.179 | 0.290 |
| | (0.174) | (0.174) | (0.252) | (0.180) |
| Qualification: Masters | 0.371* | 0.367* | 0.586** | 0.381* |
| | (0.198) | (0.198) | (0.287) | (0.204) |
| Qualification: Others | 0.566 | 0.591 | 0.716 | 0.499 |
| | (0.467) | (0.468) | (0.483) | (0.467) |
| Trainer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Trainer-led # finished in education | | | 0 | |
| | | | (0) | |
| Trainer-led # bachelor of education | | | 0 | |
| | | | (0) | |
| Trainer-led # PGDE | | | 0 | |
| | | | (0) | |

| | | | | |
|---|---|---|---|---|
| Trainer-led # Masters | | | 0 | |
| | | | (0) | |
| Trainer-led # Others | | | 0 | |
| | | | (0) | |
| Peer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Peer-led # finished in education | | | 0 | |
| | | | (0) | |
| Peer-led # bachelor of education | | | -0.354 | |
| | | | (0.292) | |
| Peer-led # PGDE | | | 0.403 | |
| | | | (0.350) | |
| Peer-led # Masters | | | -0.384 | |
| | | | (0.392) | |
| Peer-led # Others | | | 0 | |
| | | | (0) | |
| Years of experience (pre-test) | -0.00504 | -0.00533 | -0.00766 | -0.00660 |
| | (0.00618) | (0.00617) | (0.00609) | (0.00617) |
| Age (in years) | 0.00337 | 0.00333 | 0.00271 | 0.00427 |
| | (0.00386) | (0.00386) | (0.00378) | (0.00387) |
| Years of DHT in school | -0.00477 | -0.00453 | -0.00700 | -0.00433 |
| | (0.00661) | (0.00660) | (0.00649) | (0.00654) |
| Female | -0.0469 | -0.000328 | -0.0337 | -0.00880 |
| | (0.0927) | (0.0639) | (0.0631) | (0.0636) |
| Function: Deputy head teacher | 0.0300 | 0.00221 | 0.0290 | 0.0429 |
| | (0.0539) | (0.0730) | (0.0528) | (0.0540) |
| Student population | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Number of teachers in school | -0.00196 | -0.00183 | -0.00181 | -0.00193 |
| | (0.00200) | (0.00201) | (0.00196) | (0.00199) |
| School type: public school | 0.0136 | 0.00951 | -0.00467 | 0.0686 |
| | (0.153) | (0.153) | (0.153) | (0.163) |
| School type: government aided school | -0.0795 | -0.0798 | -0.102 | -0.136 |
| | (0.149) | (0.149) | (0.149) | (0.157) |
| Infrastructure: electricity | -0.0301 | -0.0328 | -0.0391 | -0.0342 |
| | (0.0939) | (0.0939) | (0.0930) | (0.0936) |
| Infrastructure: internet | -0.00351 | -0.000910 | 0.00285 | -0.00346 |
| | (0.0681) | (0.0682) | (0.0668) | (0.0681) |
| Infrastructure: separate toilets for boys and girls | -0.0125 | -0.0187 | -0.00148 | -0.0246 |
| | (0.127) | (0.128) | (0.126) | (0.127) |
| Infrastructure: improved drinking water | 0.0129 | 0.0151 | 0.0254 | 0.0131 |
| | (0.0562) | (0.0560) | (0.0548) | (0.0556) |
| Infrastructure: hand washing station | 0.0983 | 0.0915 | 0.0894 | 0.102 |
| | (0.0847) | (0.0836) | (0.0821) | (0.0831) |
| Infrastructure: student access to computer/laptop | 0.154** | 0.152** | 0.142* | 0.149** |
| | (0.0745) | (0.0744) | (0.0729) | (0.0740) |
| Infrastructure: teacher access to computer/laptop | -0.00321 | -0.00224 | 0.00319 | 0.00101 |
| | (0.0661) | (0.0661) | (0.0649) | (0.0657) |
| Trainer-led # male | 0 | | | |
| | (0) | | | |
| Trainer-led # female | 0 | | | |
| | (0) | | | |

| | | | | |
|---|---|---|---|---|
| Peer-led # male | 0 | | | |
| | (0) | | | |
| Peer-led # female | 0.0900 | | | |
| | (0.131) | | | |
| Trainer-led # head teacher | | 0 | | |
| | | (0) | | |
| Trainer-led # deputy head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # deputy head teacher | | 0.0549 | | |
| | | (0.103) | | |
| Trainer-led # private school | | | | 0 |
| | | | | (0) |
| Trainer-led # public school | | | | 0 |
| | | | | (0) |
| Trainer-led # government aided school | | | | 0 |
| | | | | (0) |
| Peer-led # private school | | | | 0 |
| | | | | (0) |
| Peer-led # public school | | | | -0.00617 |
| | | | | (0.499) |
| Peer-led # government aided school | | | | 0.227 |
| | | | | (0.491) |
| Constant | 2.219*** | 2.260*** | 2.169*** | 2.229*** |
| | (0.395) | (0.396) | (0.423) | (0.407) |
| Observations | 318 | 318 | 318 | 318 |
| R-squared | 0.216 | 0.216 | 0.253 | 0.227 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D2.02 Distributed leadership D1 School leader**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Distributed leadership D1 (pre-test) | 0.327*** | 0.333*** | 0.322*** | 0.332*** |
| | (0.0544) | (0.0542) | (0.0533) | (0.0541) |
| Peer-led group | 0.162** | 0.0905 | 0.505 | 0.109 |
| | (0.0643) | (0.0861) | (0.323) | (0.553) |
| Qualification: finished in education | -1.922*** | -1.953*** | -1.728*** | -1.877*** |
| | (0.531) | (0.532) | (0.554) | (0.534) |
| Qualification: bachelor of education | 0.336** | 0.341** | 0.594** | 0.364** |
| | (0.165) | (0.165) | (0.250) | (0.173) |
| Qualification: PGDE | 0.144 | 0.135 | 0.0540 | 0.159 |
| | (0.196) | (0.196) | (0.285) | (0.203) |
| Qualification: Masters | 0.441** | 0.445** | 0.769** | 0.471** |
| | (0.223) | (0.223) | (0.323) | (0.231) |
| Qualification: Others | 0.561 | 0.576 | 0.731 | 0.492 |
| | (0.526) | (0.527) | (0.545) | (0.528) |

| | | | | |
|---|---|---|---|---|
| Trainer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Trainer-led # finished in education | | | 0 | |
| | | | (0) | |
| Trainer-led # bachelor of education | | | 0 | |
| | | | (0) | |
| Trainer-led # PGDE | | | 0 | |
| | | | (0) | |
| Trainer-led # Masters | | | 0 | |
| | | | (0) | |
| Trainer-led # Others | | | 0 | |
| | | | (0) | |
| Peer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Peer-led # finished in education | | | 0 | |
| | | | (0) | |
| Peer-led # bachelor of education | | | -0.428 | |
| | | | (0.329) | |
| Peer-led # PGDE | | | 0.403 | |
| | | | (0.394) | |
| Peer-led # Masters | | | -0.590 | |
| | | | (0.442) | |
| Peer-led # Others | | | 0 | |
| | | | (0) | |
| Years of experience (pre-test) | -0.00464 | -0.00438 | -0.00686 | -0.00548 |
| | (0.00699) | (0.00698) | (0.00689) | (0.00699) |
| Age (in years) | 0.00357 | 0.00344 | 0.00284 | 0.00441 |
| | (0.00436) | (0.00436) | (0.00428) | (0.00439) |
| Years of DHT in school | -0.00935 | -0.0104 | -0.0130* | -0.0101 |
| | (0.00747) | (0.00745) | (0.00733) | (0.00741) |
| Female | 0.0951 | 0.0300 | -0.00735 | 0.0222 |
| | (0.105) | (0.0720) | (0.0713) | (0.0720) |
| Function: Deputy head teacher | 0.0152 | -0.0230 | 0.0186 | 0.0311 |
| | (0.0610) | (0.0824) | (0.0597) | (0.0613) |
| Student population | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Number of teachers in school | -0.00303 | -0.00284 | -0.00290 | -0.00300 |
| | (0.00226) | (0.00227) | (0.00221) | (0.00225) |
| School type: public school | -0.152 | -0.152 | -0.153 | -0.0854 |
| | (0.172) | (0.172) | (0.172) | (0.185) |
| School type: government aided school | -0.194 | -0.191 | -0.203 | -0.232 |
| | (0.168) | (0.168) | (0.168) | (0.178) |
| Infrastructure: electricity | 0.0169 | 0.0207 | 0.0151 | 0.0181 |
| | (0.106) | (0.106) | (0.105) | (0.106) |
| Infrastructure: internet | -0.0279 | -0.0256 | -0.0249 | -0.0275 |
| | (0.0768) | (0.0770) | (0.0754) | (0.0772) |
| Infrastructure: separate toilets for boys and girls | -0.0169 | -0.0250 | -0.00965 | -0.0265 |
| | (0.144) | (0.145) | (0.143) | (0.144) |
| Infrastructure: improved drinking water | 0.0304 | 0.0208 | 0.0335 | 0.0203 |
| | (0.0634) | (0.0633) | (0.0619) | (0.0630) |
| Infrastructure: hand washing station | 0.0948 | 0.116 | 0.111 | 0.123 |
| | (0.0956) | (0.0943) | (0.0927) | (0.0941) |
| Infrastructure: student access to computer/laptop | 0.198** | 0.206** | 0.194** | 0.202** |

| | | | | |
|---|---|---|---|---|
| | (0.0841) | (0.0839) | (0.0822) | (0.0837) |
| Infrastructure: teacher access to computer/laptop | -0.142* | -0.150** | -0.138* | -0.146* |
| | (0.0750) | (0.0749) | (0.0736) | (0.0748) |
| Trainer-led # male | 0 | | | |
| | (0) | | | |
| Trainer-led # female | 0 | | | |
| | (0) | | | |
| Peer-led # male | 0 | | | |
| | (0) | | | |
| Peer-led # female | -0.128 | | | |
| | (0.147) | | | |
| Trainer-led # head teacher | | 0 | | |
| | | (0) | | |
| Trainer-led # deputy head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # deputy head teacher | | 0.0850 | | |
| | | (0.116) | | |
| Trainer-led # private school | | | | 0 |
| | | | | (0) |
| Trainer-led # public school | | | | 0 |
| | | | | (0) |
| Trainer-led # government aided school | | | | 0 |
| | | | | (0) |
| Peer-led # private school | | | | 0 |
| | | | | (0) |
| Peer-led # public school | | | | -0.115 |
| | | | | (0.565) |
| Peer-led # government aided school | | | | 0.0988 |
| | | | | (0.556) |
| Constant | 2.721*** | 2.716*** | 2.576*** | 2.644*** |
| | (0.412) | (0.412) | (0.452) | (0.430) |
| Observations | 318 | 318 | 318 | 318 |
| R-squared | 0.235 | 0.235 | 0.271 | 0.241 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D2.03 Distributed leadership D4 School leader**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Distributed leadership D4 (pre-test) | 0.337*** | 0.329*** | 0.322*** | 0.323*** |
| | (0.0588) | (0.0588) | (0.0581) | (0.0584) |
| Peer-led group | 0.0681 | 0.0724 | 0.415 | -0.122 |
| | (0.0611) | (0.0820) | (0.309) | (0.525) |
| Qualification: finished in education | 0.260 | 0.265 | 0.451 | 0.324 |
| | (0.506) | (0.507) | (0.530) | (0.507) |

| | | | | |
|---|---|---|---|---|
| Qualification: bachelor of education | 0.302* | 0.297* | 0.518** | 0.307* |
| | (0.157) | (0.157) | (0.239) | (0.164) |
| Qualification: PGDE | 0.313* | 0.322* | 0.245 | 0.330* |
| | (0.187) | (0.187) | (0.272) | (0.193) |
| Qualification: Masters | 0.332 | 0.325 | 0.527* | 0.335 |
| | (0.212) | (0.212) | (0.310) | (0.219) |
| Qualification: Others | 0.545 | 0.575 | 0.712 | 0.474 |
| | (0.501) | (0.503) | (0.521) | (0.501) |
| Trainer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Trainer-led # finished in education | | | 0 | |
| | | | (0) | |
| Trainer-led # bachelor of education | | | 0 | |
| | | | (0) | |
| Trainer-led # PGDE | | | 0 | |
| | | | (0) | |
| Trainer-led # Masters | | | 0 | |
| | | | (0) | |
| Trainer-led # Others | | | 0 | |
| | | | (0) | |
| Peer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Peer-led # finished in education | | | 0 | |
| | | | (0) | |
| Peer-led # bachelor of education | | | -0.374 | |
| | | | (0.315) | |
| Peer-led # PGDE | | | 0.358 | |
| | | | (0.378) | |
| Peer-led # Masters | | | -0.340 | |
| | | | (0.423) | |
| Peer-led # Others | | | 0 | |
| | | | (0) | |
| Years of experience (pre-test) | -0.00577 | -0.00621 | -0.00847 | -0.00758 |
| | (0.00662) | (0.00663) | (0.00656) | (0.00662) |
| Age (in years) | 0.00325 | 0.00320 | 0.00259 | 0.00415 |
| | (0.00414) | (0.00415) | (0.00409) | (0.00416) |
| Years of DHT in school | -0.00221 | -0.00158 | -0.00407 | -0.00142 |
| | (0.00709) | (0.00708) | (0.00700) | (0.00703) |
| Female | -0.0958 | -0.0122 | -0.0446 | -0.0213 |
| | (0.0994) | (0.0686) | (0.0682) | (0.0683) |
| Function: Deputy head teacher | 0.0349 | 0.00873 | 0.0329 | 0.0478 |
| | (0.0578) | (0.0785) | (0.0570) | (0.0581) |
| Student population | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Number of teachers in school | -0.00160 | -0.00148 | -0.00143 | -0.00157 |
| | (0.00215) | (0.00216) | (0.00212) | (0.00214) |
| School type: public school | 0.0883 | 0.0827 | 0.0657 | 0.139 |
| | (0.164) | (0.164) | (0.165) | (0.176) |
| School type: government aided school | -0.0307 | -0.0317 | -0.0565 | -0.0982 |
| | (0.160) | (0.160) | (0.161) | (0.169) |
| Infrastructure: electricity | -0.0541 | -0.0585 | -0.0630 | -0.0592 |
| | (0.101) | (0.101) | (0.100) | (0.100) |
| Infrastructure: internet | 0.00879 | 0.0121 | 0.0167 | 0.00889 |
| | (0.0731) | (0.0733) | (0.0721) | (0.0733) |

| | | | | |
|---|---|---|---|---|
| Infrastructure: separate toilets for boys and girls | -0.0357 | -0.0408 | -0.0193 | -0.0478 |
| | (0.136) | (0.137) | (0.136) | (0.136) |
| Infrastructure: improved drinking water | 0.0154 | 0.0211 | 0.0308 | 0.0184 |
| | (0.0602) | (0.0601) | (0.0590) | (0.0596) |
| Infrastructure: hand washing station | 0.0990 | 0.0835 | 0.0805 | 0.0956 |
| | (0.0909) | (0.0899) | (0.0886) | (0.0893) |
| Infrastructure: student access to computer/laptop | 0.139* | 0.133* | 0.123 | 0.131* |
| | (0.0800) | (0.0799) | (0.0786) | (0.0795) |
| Infrastructure: teacher access to computer/laptop | 0.0555 | 0.0583 | 0.0623 | 0.0617 |
| | (0.0711) | (0.0712) | (0.0702) | (0.0708) |
| Trainer-led # male | 0 | | | |
| | (0) | | | |
| Trainer-led # female | 0 | | | |
| | (0) | | | |
| Peer-led # male | 0 | | | |
| | (0) | | | |
| Peer-led # female | 0.162 | | | |
| | (0.140) | | | |
| Trainer-led # head teacher | | 0 | | |
| | | (0) | | |
| Trainer-led # deputy head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # deputy head teacher | | 0.0494 | | |
| | | (0.111) | | |
| Trainer-led # private school | | | | 0 |
| | | | | (0) |
| Trainer-led # public school | | | | 0 |
| | | | | (0) |
| Trainer-led # government aided school | | | | 0 |
| | | | | (0) |
| Peer-led # private school | | | | 0 |
| | | | | (0) |
| Peer-led # public school | | | | 0.0566 |
| | | | | (0.536) |
| Peer-led # government aided school | | | | 0.306 |
| | | | | (0.528) |
| Constant | 2.424*** | 2.476*** | 2.364*** | 2.462*** |
| | (0.411) | (0.414) | (0.447) | (0.424) |
| Observations | 318 | 318 | 318 | 318 |
| R-squared | 0.175 | 0.172 | 0.204 | 0.185 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D2.04 Perceived usefulness CPD-programme School leader**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Perceived usefulness CPD (pre-test) | 0.279*** | 0.277*** | 0.275*** | 0.278*** |
| | (0.0543) | (0.0543) | (0.0547) | (0.0546) |
| Peer-led group | 0.0890* | 0.145** | 0.230 | -0.152 |
| | (0.0535) | (0.0718) | (0.276) | (0.465) |
| Qualification: finished in education | -0.399 | -0.372 | -0.319 | -0.408 |
| | (0.443) | (0.444) | (0.473) | (0.447) |
| Qualification: bachelor of education | -0.222 | -0.226 | -0.142 | -0.248* |
| | (0.137) | (0.138) | (0.214) | (0.145) |
| Qualification: PGDE | -0.210 | -0.201 | -0.191 | -0.226 |
| | (0.163) | (0.163) | (0.243) | (0.170) |
| Qualification: Masters | -0.204 | -0.205 | -0.224 | -0.234 |
| | (0.187) | (0.187) | (0.279) | (0.195) |
| Qualification: Others | 0.241 | 0.234 | 0.314 | 0.227 |
| | (0.440) | (0.441) | (0.467) | (0.443) |
| Trainer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Trainer-led # finished in education | | | 0 | |
| | | | (0) | |
| Trainer-led # bachelor of education | | | 0 | |
| | | | (0) | |
| Trainer-led # PGDE | | | 0 | |
| | | | (0) | |
| Trainer-led # Masters | | | 0 | |
| | | | (0) | |
| Trainer-led # Others | | | 0 | |
| | | | (0) | |
| Peer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Peer-led # finished in education | | | 0 | |
| | | | (0) | |
| Peer-led # bachelor of education | | | -0.141 | |
| | | | (0.282) | |
| Peer-led # PGDE | | | 0.0283 | |
| | | | (0.337) | |
| Peer-led # Masters | | | 0.0711 | |
| | | | (0.379) | |
| Peer-led # Others | | | 0 | |
| | | | (0) | |
| Years of experience (pre-test) | -0.000549 | -0.000738 | -0.00144 | -0.000911 |
| | (0.00582) | (0.00582) | (0.00587) | (0.00585) |
| Age (in years) | 0.00335 | 0.00343 | 0.00321 | 0.00327 |
| | (0.00363) | (0.00364) | (0.00365) | (0.00368) |
| Years of DHT in school | -0.00630 | -0.00545 | -0.00653 | -0.00578 |
| | (0.00622) | (0.00621) | (0.00626) | (0.00621) |
| Female | -0.0451 | 0.0134 | 0.00639 | 0.0127 |
| | (0.0872) | (0.0602) | (0.0608) | (0.0604) |

| | | | | |
|---|---|---|---|---|
| Function: Deputy head teacher | -0.0206 | 0.00696 | -0.0234 | -0.0223 |
| | (0.0507) | (0.0688) | (0.0509) | (0.0512) |
| Student population | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Number of teachers in school | 0.00106 | 0.000938 | 0.00118 | 0.00105 |
| | (0.00188) | (0.00190) | (0.00189) | (0.00189) |
| School type: public school | -0.299** | -0.300** | -0.319** | -0.326** |
| | (0.144) | (0.144) | (0.148) | (0.156) |
| School type: government aided school | -0.281** | -0.283** | -0.303** | -0.311** |
| | (0.140) | (0.141) | (0.144) | (0.150) |
| Infrastructure: electricity | 0.0638 | 0.0610 | 0.0619 | 0.0639 |
| | (0.0884) | (0.0884) | (0.0896) | (0.0887) |
| Infrastructure: internet | -0.0622 | -0.0635 | -0.0581 | -0.0656 |
| | (0.0640) | (0.0642) | (0.0643) | (0.0646) |
| Infrastructure: separate toilets for boys and girls | -0.0370 | -0.0294 | -0.0195 | -0.0355 |
| | (0.119) | (0.119) | (0.121) | (0.119) |
| Infrastructure: improved drinking water | 0.0272 | 0.0346 | 0.0341 | 0.0313 |
| | (0.0526) | (0.0525) | (0.0525) | (0.0525) |
| Infrastructure: hand washing station | -0.0504 | -0.0682 | -0.0671 | -0.0637 |
| | (0.0798) | (0.0788) | (0.0791) | (0.0789) |
| Infrastructure: student access to computer/laptop | 0.0371 | 0.0299 | 0.0289 | 0.0335 |
| | (0.0702) | (0.0701) | (0.0702) | (0.0703) |
| Infrastructure: teacher access to computer/laptop | 0.0905 | 0.0960 | 0.0917 | 0.0963 |
| | (0.0622) | (0.0622) | (0.0625) | (0.0624) |
| Trainer-led # male | 0 | | | |
| | (0) | | | |
| Trainer-led # female | 0 | | | |
| | (0) | | | |
| Peer-led # male | 0 | | | |
| | (0) | | | |
| Peer-led # female | 0.114 | | | |
| | (0.123) | | | |
| Trainer-led # head teacher | | 0 | | |
| | | (0) | | |
| Trainer-led # deputy head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # deputy head teacher | | -0.0615 | | |
| | | (0.0967) | | |
| Trainer-led # private school | | | | 0 |
| | | | | (0) |
| Trainer-led # public school | | | | 0 |
| | | | | (0) |
| Trainer-led # government aided school | | | | 0 |
| | | | | (0) |
| Peer-led # private school | | | | 0 |
| | | | | (0) |
| Peer-led # public school | | | | 0.259 |
| | | | | (0.476) |
| Peer-led # government aided school | | | | 0.270 |
| | | | | (0.467) |

| | | | | |
|---|---|---|---|---|
| Constant | 3.504*** | 3.498*** | 3.473*** | 3.560*** |
| | (0.371) | (0.372) | (0.406) | (0.379) |
| Observations | 318 | 318 | 318 | 318 |
| R-squared | 0.148 | 0.147 | 0.150 | 0.147 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters/others, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D2.05 Instructional leadership Teachers**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Instructional leadership (pre-test) | 0.240*** | 0.238*** | 0.232*** | 0.240*** |
| | (0.0602) | (0.0599) | (0.0609) | (0.0605) |
| Peer-led group | 0.653*** | 0.782*** | 0.385 | 0.998 |
| | (0.136) | (0.189) | (0.813) | (1.135) |
| Qualification: finished in education | 0.454 | 0.487 | 0.265 | 0.500 |
| | (1.033) | (1.031) | (1.182) | (1.045) |
| Qualification: bachelor of education | 0.241 | 0.226 | 0.113 | 0.289 |
| | (0.378) | (0.378) | (0.694) | (0.403) |
| Qualification: PGDE | -0.158 | -0.186 | -0.464 | -0.113 |
| | (0.445) | (0.444) | (0.761) | (0.470) |
| Qualification: Masters | 0.136 | 0.126 | -0.576 | 0.204 |
| | (0.501) | (0.500) | (0.883) | (0.528) |
| Trainer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Trainer-led # finished in education | | | 0 | |
| | | | (0) | |
| Trainer-led # bachelor of education | | | 0 | |
| | | | (0) | |
| Trainer-led # PGDE | | | 0 | |
| | | | (0) | |
| Trainer-led # Masters | | | 0 | |
| | | | (0) | |
| Peer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Peer-led # finished in education | | | 0 | |
| | | | (0) | |
| Peer-led # bachelor of education | | | 0.201 | |
| | | | (0.827) | |
| Peer-led # PGDE | | | 0.520 | |
| | | | (0.945) | |
| Peer-led # Masters | | | 1.111 | |
| | | | (1.078) | |
| Years of experience (pre-test) | -0.00494 | -0.00447 | -0.00756 | -0.00520 |
| | (0.0172) | (0.0172) | (0.0174) | (0.0174) |
| Age (in years) | 0.00753 | 0.00767 | 0.00699 | 0.00841 |
| | (0.00915) | (0.00913) | (0.00917) | (0.00928) |
| Years of DHT in school | -0.0103 | -0.00872 | -0.0115 | -0.0109 |
| | (0.0157) | (0.0157) | (0.0158) | (0.0157) |

| | | | | |
|---|---|---|---|---|
| Female | -0.0948 | -0.162 | -0.176 | -0.168 |
| | (0.225) | (0.160) | (0.161) | (0.161) |
| Function: Deputy head teacher | 0.0605 | 0.191 | 0.0560 | 0.0715 |
| | (0.130) | (0.175) | (0.130) | (0.131) |
| Student population | 0.000* | 0.000 | 0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Number of teachers in school | 0.00361 | 0.00294 | 0.00345 | 0.00383 |
| | (0.00489) | (0.00492) | (0.00491) | (0.00491) |
| School type: public school | -1.064** | -1.084** | -1.238*** | -0.965* |
| | (0.460) | (0.459) | (0.476) | (0.514) |
| School type: government aided school | -0.944** | -0.986** | -1.115** | -0.898* |
| | (0.454) | (0.454) | (0.469) | (0.501) |
| Infrastructure: electricity | 0.146 | 0.174 | 0.145 | 0.154 |
| | (0.245) | (0.244) | (0.247) | (0.245) |
| Infrastructure: internet | 0.142 | 0.140 | 0.166 | 0.149 |
| | (0.165) | (0.165) | (0.166) | (0.167) |
| Infrastructure: separate toilets for boys and girls | -0.164 | -0.129 | -0.105 | -0.156 |
| | (0.372) | (0.372) | (0.376) | (0.373) |
| Infrastructure: improved drinking water | -0.266* | -0.259* | -0.266* | -0.272** |
| | (0.137) | (0.136) | (0.137) | (0.137) |
| Infrastructure: hand washing station | 0.223 | 0.216 | 0.229 | 0.240 |
| | (0.200) | (0.198) | (0.200) | (0.197) |
| Infrastructure: student access to computer/laptop | -0.0996 | -0.102 | -0.106 | -0.0959 |
| | (0.183) | (0.183) | (0.186) | (0.184) |
| Infrastructure: teacher access to computer/laptop | 0.177 | 0.174 | 0.164 | 0.168 |
| | (0.160) | (0.159) | (0.159) | (0.160) |
| Trainer-led # male | 0 | | | |
| | (0) | | | |
| Trainer-led # female | 0 | | | |
| | (0) | | | |
| Peer-led # male | 0 | | | |
| | (0) | | | |
| Peer-led # female | -0.144 | | | |
| | (0.324) | | | |
| Trainer-led # head teacher | | 0 | | |
| | | (0) | | |
| Trainer-led # deputy head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # deputy head teacher | | -0.272 | | |
| | | (0.253) | | |
| Trainer-led # private school | | | | 0 |
| | | | | (0) |
| Trainer-led # public school | | | | 0 |
| | | | | (0) |
| Trainer-led # government aided school | | | | 0 |
| | | | | (0) |
| Peer-led # private school | | | | 0 |
| | | | | (0) |
| Peer-led # public school | | | | -0.451 |
| | | | | (1.159) |

| | | | | |
|---|---|---|---|---|
| Peer-led # government aided school | | | | -0.345 |
| | | | | (1.144) |
| Constant | 2.494*** | 2.450*** | 2.847*** | 2.327** |
| | (0.828) | (0.827) | (1.047) | (0.914) |
| Observations | 247 | 247 | 247 | 247 |
| R-squared | 0.227 | 0.231 | 0.233 | 0.227 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

**Table D2.06 Intellectual stimulation Teachers**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Intellectual stimulation (pre-test) | 0.406*** | 0.408*** | 0.408*** | 0.410*** |
| | (0.0655) | (0.0657) | (0.0657) | (0.0658) |
| Peer-led group | 0.288*** | 0.343** | 1.114* | 0.287 |
| | (0.106) | (0.149) | (0.631) | (0.888) |
| Qualification: finished in education | -0.424 | -0.395 | 0.159 | -0.370 |
| | (0.812) | (0.815) | (0.931) | (0.822) |
| Qualification: bachelor of education | -0.306 | -0.306 | 0.256 | -0.303 |
| | (0.296) | (0.297) | (0.539) | (0.315) |
| Qualification: PGDE | -0.151 | -0.128 | 0.315 | -0.118 |
| | (0.348) | (0.349) | (0.595) | (0.368) |
| Qualification: Masters | -0.263 | -0.273 | 0.452 | -0.261 |
| | (0.391) | (0.392) | (0.691) | (0.413) |
| Trainer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Trainer-led # finished in education | | | 0 | |
| | | | (0) | |
| Trainer-led # bachelor of education | | | 0 | |
| | | | (0) | |
| Trainer-led # PGDE | | | 0 | |
| | | | (0) | |
| Trainer-led # Masters | | | 0 | |
| | | | (0) | |
| Peer-led # diploma in education | | | 0 | |
| | | | (0) | |
| Peer-led # finished in education | | | 0 | |
| | | | (0) | |
| Peer-led # bachelor of education | | | -0.807 | |
| | | | (0.643) | |
| Peer-led # PGDE | | | -0.549 | |
| | | | (0.739) | |
| Peer-led # Masters | | | -1.053 | |
| | | | (0.843) | |
| Years of experience (pre-test) | 0.0145 | 0.0144 | 0.0143 | 0.0132 |
| | (0.0135) | (0.0135) | (0.0136) | (0.0136) |
| Age (in years) | 0.00656 | 0.00624 | 0.00649 | 0.00710 |
| | (0.00715) | (0.00717) | (0.00718) | (0.00725) |

| | | | | |
|---|---|---|---|---|
| Years of DHT in school | -0.0143 | -0.0136 | -0.0156 | -0.0139 |
| | (0.0123) | (0.0124) | (0.0124) | (0.0123) |
| Female | -0.171 | -0.0331 | -0.0447 | -0.0435 |
| | (0.176) | (0.125) | (0.126) | (0.126) |
| Function: Deputy head teacher | 0.128 | 0.127 | 0.130 | 0.141 |
| | (0.101) | (0.138) | (0.101) | (0.103) |
| Student population | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Number of teachers in school | 0.00304 | 0.00287 | 0.00333 | 0.00307 |
| | (0.00385) | (0.00390) | (0.00387) | (0.00387) |
| School type: public school | -0.215 | -0.207 | -0.145 | -0.146 |
| | (0.357) | (0.358) | (0.369) | (0.399) |
| School type: government aided school | -0.169 | -0.153 | -0.0879 | -0.192 |
| | (0.350) | (0.352) | (0.362) | (0.389) |
| Infrastructure: electricity | 0.279 | 0.260 | 0.300 | 0.265 |
| | (0.192) | (0.192) | (0.193) | (0.192) |
| Infrastructure: internet | 0.175 | 0.171 | 0.172 | 0.165 |
| | (0.129) | (0.130) | (0.130) | (0.131) |
| Infrastructure: separate toilets for boys and girls | -0.0226 | -0.0239 | -0.0220 | -0.0161 |
| | (0.288) | (0.290) | (0.291) | (0.289) |
| Infrastructure: improved drinking water | -0.0641 | -0.0473 | -0.0393 | -0.0483 |
| | (0.107) | (0.107) | (0.107) | (0.107) |
| Infrastructure: hand washing station | 0.0622 | 0.0271 | 0.0110 | 0.0299 |
| | (0.156) | (0.155) | (0.156) | (0.154) |
| Infrastructure: student access to computer/laptop | -0.112 | -0.122 | -0.146 | -0.118 |
| | (0.143) | (0.144) | (0.145) | (0.144) |
| Infrastructure: teacher access to computer/laptop | 0.0268 | 0.0374 | 0.0494 | 0.0378 |
| | (0.124) | (0.124) | (0.124) | (0.125) |
| Trainer-led # male | 0 | | | |
| | (0) | | | |
| Trainer-led # female | 0 | | | |
| | (0) | | | |
| Peer-led # male | 0 | | | |
| | (0) | | | |
| Peer-led # female | 0.280 | | | |
| | (0.252) | | | |
| Trainer-led # head teacher | | 0 | | |
| | | (0) | | |
| Trainer-led # deputy head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # head teacher | | 0 | | |
| | | (0) | | |
| Peer-led # deputy head teacher | | -0.00874 | | |
| | | (0.198) | | |
| Trainer-led # private school | | | | 0 |
| | | | | (0) |
| Trainer-led # public school | | | | 0 |
| | | | | (0) |
| Trainer-led # government aided school | | | | 0 |
| | | | | (0) |
| Peer-led # private school | | | | 0 |
| | | | | (0) |

| | | | | |
|---|---|---|---|---|
| Peer-led # public school | | | | -0.0976 |
| | | | | (0.908) |
| Peer-led # government aided school | | | | 0.112 |
| | | | | (0.895) |
| Constant | 1.821*** | 1.830*** | 1.185 | 1.773** |
| | (0.652) | (0.655) | (0.834) | (0.716) |
| Observations | 247 | 247 | 247 | 247 |
| R-squared | 0.241 | 0.237 | 0.244 | 0.240 |

Standard errors in parentheses
*** significance level less than 1 percent, ** between 1 to 5 percent, * between 5 to 10 percent
Note: Reference categories in the regression for each of the variables are the following: trainer led versus peer-led, qualification diploma in education versus finished in education/bachelor of education/PGDE/masters, male versus female, head teacher versus deputy head teacher, private school versus public school/government aided school

## Appendix E – Detailed overview course elements in both scenarios and the role of trainers

| **Course Elements** | **Group 1: blended delivery with primarily trainer-led online support** | Group B: **blended delivery with focus on peer-led online support** |
|---|---|---|
| Digital literacy training for online learning (1 month) | Yes, online with trainer facilitation and end assessment. | Yes, online with trainer facilitation and end assessment. |
| Trainers | 1 trainer per 10-11 trainees<br><br>As much as possible one group per district (2 trainers per group) | 1 trainer per 17 trainees<br><br>Multiple groups per district (2 trainers per group) |
| Technical support (passwords, server issues, logging in etc.) | Yes, provided VVOB staff throughout course. FAQ list and e-mail address for support. | Yes, provided VVOB staff throughout course. FAQ list and e-mail address for support. |
| Individual learning activity (assignment activity in Moodle) | Yes. Feedback from trainers | Yes. Automated feedback (model answers, reference to manual section…) |
| Peer learning (workshop activity in Moodle) | Occasionally used to facilitate peer feedback and learning. Trainers review some of the work. | Frequently used to facilitate peer feedback and learning. No involvement of trainers. |
| Forum moderation | Active moderation by trainers (welcoming message, concluding message, probing, motivational message…) | Peer moderation only. |
| Brainstorming and feedback activity (Moodle) | Active moderation by trainers (summarize results in forum, ask follow-up questions…) | Peer moderation only. |
| 8 assignments marking + individual fb from trainers | Yes | Yes |
| Portfolio feedback | Yes, 1x/ module | Yes, 1x/ module |
| Exams | Yes, 1x/ module<br>F2f exams (1/ module) | Yes, 1x /module<br>F2f exams (1/ module) |
| Synchronous sessions | Regular (1-2 times per month) Q&A session per group based on pre-posted questions from participants. Recordings and text summary made available. | No. |
| Trainer:trainee ratio | 1:10-11 | 1:15-17 |
| Orientation session | Half-day f2f orientation session | Half-day f2f orientation session |

| | | |
|---|---|---|
| Follow up on non-participation by trainers | Throughout the course. Trainers follow up on login data and activity completion rates and contact those at risk of dropping out. | Just making sure that trainees can access the course at the start of the cohort. |
| Field visit (one) | Yes, if regulations GOR allow.<br>Approx. 3 hours/school. | Yes, if regulations GOR allow.<br>Approx. 3 hours/ school |
| WhatsApp group | No participation from trainer. | No participation from trainer. |
| Manuals | Printed and distributed | Printed and distributed |
| Laptops | Yes, received in 2018 | To be received Q1 2021 |
| Reporting by trainers | Progress report (bi-weekly)<br>Reflection report per session | Progress report (bi-weekly)<br>Reflection report per session |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