

WORKING PAPER

Evaluating a certificate programme on educational mentorship and coaching leading to induction activities for new teachers in Rwandan primary schools

Final Research Report 2020

*Sofie Cabus, Carla Haelermans, Ilse Flink,
Clémentine Uwamahoro Gafiligi, Jean Francois
Maniraho, Karolina Rutkowska & Jef Peeraer*

EVALUATING A CERTIFICATE PROGRAMME ON EDUCATIONAL MENTORSHIP AND COACHING LEADING TO INDUCTION ACTIVITIES FOR NEW TEACHERS IN RWANDAN PRIMARY SCHOOLS

Final research report 2020

**Sofie Cabus, Carla Haelermans, Ilse Flink, Clémentine Uwamahoro Gafiligi, Jean
Francois Maniraho, Karolina Rutkowska & Jef Peeraer**

RESEARCH COMMISSIONED BY VVOB - education for development

Abstract

We conduct an RCT that estimates the impact of a Certificate Programme on Educational Mentorship and Coaching on the prevalence and quality of induction activities in Rwandan primary schools. To this end, School Based Mentors (SBM) and tutors of the pre-service Teacher Training Centre (TTC) are enrolled in the Certificate programme. Mentors are active in the primary schools of the first intervention group. Tutors from the pre-service TTC additionally monitor the situation at school in the second intervention group. Results indicate a significant increase in teachers' participation in induction activities in both intervention groups compared to the control group. Further, we estimate positive effects on non-cognitive outcomes of teachers, who participated in the induction activities between March and November 2019. Largest effects are found for emotional exhaustion, teacher efficacy, and work-related needs satisfaction.

COMMENTS ARE WELCOME sofie.cabus@kuleuven.be

KU Leuven
HIVA - RESEARCH INSTITUTE FOR WORK AND SOCIETY
Parkstraat 47 box 5300, 3000 LEUVEN, Belgium
hiva@kuleuven.be
<http://hiva.kuleuven.be>

D/2020/4718/011 – ISBN 9789088361074

© 2020 HIVA-KU Leuven

No part of this publication may be reproduced in any form, by mimeograph, film or any other means, without permission in writing from the author.

Acknowledgements

The team would like to acknowledge the ELMA foundation, the Rwanda Education Board and the University of Rwanda - College of Education for their dedication and support to the Certificate Programme on Educational Mentorship and Coaching as well as to this evaluation study.

We thank Line Kuppens and Kristine Smets from the VVOB head office in Brussels for providing constructive feedback. We would also like to acknowledge the hard-working enumerators who conducted the data collection for this study to the highest professional standards.

Lastly, we thank the schools and the respondents for dedicating their time to providing their interesting insights and views.

Extended abstract

This report presents a study of a Randomized Controlled Trial (RCT) evaluating the impact of a Certificate Programme on Educational Mentorship and Coaching on the prevalence and quality of induction activities for new teachers in primary education in Rwanda and on non-cognitive outcome measures of new teachers. To this end, School Based Mentors (SBM) and tutors of the pre-service Teacher Training Centre (TTC) are enrolled in the Certificate programme. SBM and TTC tutors ought to play a major role in guiding and organizing school-based coaching and mentoring and promoting reflective practice among colleagues. Newly qualified teachers (NQT) and newly appointed teachers (NAT), from now on called new teachers (NT), are of special interest to the SBM and TTC tutor, as they often face difficulties in the adaptation to the environment and (new) teaching practices.

Once trained, the SBM conducts mentoring activities (induction activities) at school, such as formal one-to-one mentoring (e.g. on pedagogical and subject content knowledge), and discussions with peers through a community of practice. The task of the TTC tutor was to support the SBM in implementing high-quality induction activities and monitor the NT by observing his/her teaching practice as to provide feedback three times per year (every school term).

In the RCT, NT received either the mentoring activities only (treatment group 1), or both the mentoring and monitoring activities (treatment group 2). Selection of SBM and TTC tutors (and hence NT) in one of the two treatment groups took place randomly. Therefore, in the analysis we have two treatment groups and one control group.

We empirically assess the effectiveness of the Certificate Programme for NT in terms of: (1) participation in induction activities; and (2) in terms of non-cognitive teacher outcomes. To this end, we have conducted a pre-intervention study in March 2019, and a post-intervention study in November 2019. The pre-intervention study consists of 719 new teachers, who were tracked again in the post-intervention study. We collected data of 641 (89.1%) respondents in the post-intervention study.

Based on the results of the pre-intervention study, we show that the two types of treatment groups (mentoring only; mentoring and monitoring) and control group are very similar on pre-treatment characteristics and on the pre-intervention outcome measures, confirming a successful random assignment to the treatment groups and control group. Further, we check reliability and validity of our questionnaire measuring non-cognitive teacher outcomes by using scales of previously validated surveys. Based on the results, we argue to keep ten outcome measures for further evaluation: Job satisfaction; the overall scale of Work Related Needs Satisfaction; Needs for Autonomy; Needs for Relatedness; Teacher efficacy; Personal accomplishments; Emotional exhaustion; Intrinsic motivation; Introjected Regulation; and Amotivation.

Comparing the results of the post-intervention study to the pre-intervention results, we see a sharp significant increase in participation in induction programmes in both the treatment groups and compared to the control group. We estimate standardized effect sizes (ES) of 0.32 for the mentoring only group, and standardized ES of 0.65 for the mentoring and monitoring group. As such, there is a direct significant effect of both treatment groups on participation in induction programmes.

Further, we observe that treated individuals, who participated in induction programmes between March and November 2019, score significantly better on the non-cognitive outcomes after the intervention and in comparison with the control group. Largest effects are found for emotional exhaustion, teacher efficacy, and work-related needs satisfaction.

Mentoring and monitoring, as a combined treatment, is more effective than mentoring only. However, mentoring and monitoring is more than twice as expensive as mentoring only. In order to retrieve the value added of the monitoring activities, we have estimated the cost-effectiveness. For three non-cognitive outcomes, namely, work-related needs satisfaction, needs for autonomy, and emotional exhaustion, the results indicate that the additional investment in monitoring is worth the money. Furthermore, besides limited cost-effectiveness for the other outcome variables, we retain that the combined treatment yields positive effects for 7 out of 10 non-cognitive outcomes, restricted to 4 out of 10 non-cognitive outcomes for the mentoring only group.

Contents

Acknowledgements	3
Extended abstract	5
List of abbreviations	9
List of tables	11
List of figures	13
1 Introduction	15
2 Literature	17
3 Context	19
4 Intervention	21
4.1 Short background	21
4.2 Delivery of the induction programme	21
4.3 CPD Certificate Programme on Educational Mentorship and Coaching	22
4.4 Key activities of the induction programme	22
5 Research method	25
6 Sampling procedure	27
7 Data	29
7.1 Composition of the sample	29
7.2 Background characteristics	29
7.3 Selectivity of non-response in the post-intervention measure	30
7.4 Experience with induction programmes and induction needs	31
8 Description and analysis of outcome variables analysis	35
8.1 Properties and reliability	35
8.1.1 Job satisfaction	36
8.1.2 Work Related Needs Satisfaction	37
8.1.3 Experienced Job Stress and Burnout	38
8.1.4 Self-Assessed Teacher Efficacy	40
8.1.5 Motivation toward Work Tasks	41
8.2 Discussion of quality	43
8.3 Evaluation of the pre-intervention outcomes	44

9 Effectiveness of the Certificate Programme on Educational Mentorship and Coaching	47
9.1 Participation in induction programmes	47
9.2 Effects of the Mentoring Certificate Programme on post-intervention non-cognitive teacher outcomes	48
10 Cost-Effectiveness Analysis	53
11 Conclusion	57
appendix 1 Research method	59
appendix 2 Tables by subgroups	61
appendix 3 Other tables	72
appendix 4 Full model estimates	74
appendix 5 Additional information on costs	76
References	79

List of abbreviations

CBC	Competence Based Curriculum
CPD	Continuous Professional Development
MT	Mentor Trainers
NT	New teachers
NT Mentors	New teachers' mentors
NQT	Newly qualified teachers: per definition recently graduated from TTC
NAT	Newly assigned teachers: not per definition recently graduated from TTC, but recently assigned to a new school
REB	Rwanda Education Board
SBM	School Based Mentor
SSL	School Subject Leaders
TTC	Teacher Training Centre
URCE	University of Rwanda - College of Education

List of tables

Table 7.1	T-test on the differences in pre-intervention background characteristics between the two treatment groups and control group	30
Table 7.2	T-test on the selectivity of non-response in the post-intervention measure	31
Table 7.3	Experience with induction programmes, pre-intervention measure (N=719) and post-intervention measure (N=641)	32
Table 7.4	Participation of respondents in professional mentoring activities at their school	32
Table 7.5	Participation of respondents in induction activities at their school	33
Table 7.6	The degree to which respondents need formally organized support (measured pre-intervention) (N=719)	34
Table 8.1	Scores on the sub-questions of the scale job satisfaction - PRE	36
Table 8.2	Scores on the sub-questions of the scale job satisfaction - POST	36
Table 8.3	Scores on the sub-questions of the scales needs for competence, autonomy and relatedness at work – PRE	37
Table 8.4	Scores on the sub-questions of the scales needs for competence, autonomy and relatedness at work - POST	38
Table 8.5	Scores on the sub-questions of the scales personal accomplishments and emotional exhaustion - PRE	39
Table 8.6	Scores on the sub-questions of the scales personal accomplishments and emotional exhaustion - POST	40
Table 8.7	Scores on the sub-questions of the scale self-assessed teacher efficacy - PRE	41
Table 8.8	Scores on the sub-questions of the scale self-assessed teacher efficacy - POST	41
Table 8.9	Scores on the sub-questions of the scales intrinsic motivation; identified regulation; introjected regulation; external regulation; and amotivation - PRE	42
Table 8.10	Scores on the sub-questions of the scales intrinsic motivation; identified regulation; introjected regulation; external regulation; and amotivation - POST	43
Table 8.11	T-test of outcome variables comparing the two treatments groups each with the control group at pre	44
Table 9.1	Effectiveness of the mentoring certificate programme in increasing participation in (A) an induction programme at the school; (B) informal activities not part of an official induction programme; or (C) an administrative or general introduction at the school (unstandardized coefficients)	48
Table 9.2	Effects of the mentoring certificate programme on teacher outcomes: OLS regressions controlled for background variables and pre-intervention score (unstandardized coefficients)	49
Table 9.3	Effects of the mentoring certificate programme on teacher outcomes (continued)	50
Table 9.4	Standardized Effect Sizes of the effects of the mentoring certificate programme on teacher outcomes: OLS regressions controlled for background variables and pre-intervention score	50
Table 10.1	Standardized Effect Sizes of the effects of the mentoring certificate programmes on teacher outcomes: Ratio between effects	55

Table 11.1	Experience with induction programmes, pre-intervention measure and post-intervention measure- Females	61
Table 11.2	Participation of respondents in professional mentoring activities at their school - Females	61
Table 11.3	Participation of respondents in induction activities at their school – Females	62
Table 11.4	The degree to which respondents currently need formally organized support (pre-intervention) - Females	62
Table 11.5	Experience with induction programmes, pre-intervention measure and post-intervention measure – Males	63
Table 11.6	Participation of respondents in professional mentoring activities at their school - Males	63
Table 11.7	Participation of respondents in induction activities at their school – Males	63
Table 11.8	The degree to which respondents currently need formally organized support (pre-intervention) - Males	64
Table 11.9	Experience with induction programmes, pre-intervention measure and post-intervention measure - NQT	64
Table 11.10	Participation of respondents in professional mentoring activities at their school - NQT	64
Table 11.11	Participation of respondents in induction activities at their school – NQT	65
Table 11.12	The degree to which respondents currently need formally organized support (pre-intervention) - NQT	65
Table 11.13	Experience with induction programmes, pre-intervention measure and post-intervention measure – NAT	66
Table 11.14	Participation of respondents in professional mentoring activities at their school - NAT	66
Table 11.15	Participation of respondents in induction activities at their school – NAT	66
Table 11.16	The degree to which respondents currently need formally organized support (pre-intervention) - NAT	67
Table 11.17	Experience with induction programmes, pre-intervention measure and post-intervention measure – Control	67
Table 11.18	Participation of respondents in induction activities at their school – Control	68
Table 11.19	The degree to which respondents currently need formally organized support (pre-intervention) - Control	68
Table 11.20	Experience with induction programmes, pre-intervention measure and post-intervention measure – Mentoring	69
Table 11.21	Participation of respondents in induction activities at their school – Mentoring	69
Table 11.22	The degree to which respondents currently need formally organized support (pre-intervention) - Mentoring	70
Table 11.23	Experience with induction programmes, pre-intervention measure and post-intervention measure – Mentoring and monitoring	70
Table 11.24	Participation of respondents in induction activities at their school – Mentoring and monitoring	71
Table 11.25	The degree to which respondents currently need formally organized support (pre-intervention) - Mentoring and monitoring	71
Table 11.26	Participation of respondents in induction activities at their school- PRE	72
Table 11.27	Participation of respondents in induction activities at their school- POST	73
Table 11.28	Full model estimates	74
Table 11.29	Full model estimates (Continued)	75

List of figures

Figure 3.1	Structure of the Rwandan education system	19
Figure 3.2	Survival rates in primary education in Rwanda in 2016	20
Figure 4.1	Country map with location of interventions (*)	22
Figure 7.1	Design of the RCT	29
Figure 8.1	Presentation of the components included in the Survey tool	35

1 | Introduction

This report presents a study of a Randomized Controlled Trial (RCT) evaluating the impact of a Certificate Programme on Educational Mentorship and Coaching on the prevalence and quality of induction activities for new teachers in primary education in Rwanda and on non-cognitive outcome measures of new teachers. Rwanda faces particular challenges with regard to teacher subject and pedagogical content knowledge. To improve the quality of education and consequently student learning outcomes, the Rwanda Education Board (REB) introduced a new curriculum in 2015 called the Competence Based Curriculum (CBC) (REB, 2016). The CBC focuses on knowledge creation and application rather than just the acquisition of knowledge and skills (Ngendahayo & Askill-Williams, 2016). The CBC has direct implications for teachers' teaching practices. It requires teachers to teach differently (i.e. student-centred teaching methods instead of knowledge-based methods), to work with new learning materials and to apply new assessment methods.

One of the main ways of the Rwandan Ministry of Education (MINEDUC) to support teachers with implementing the CBC is through the appointment of School Based Mentors (SBM). Ultimately, every school in Rwanda should have a SBM.¹ The SBM ought to play a major role in guiding and organising school-based CPD (e.g. coaching and mentoring) and promoting reflective practice among colleagues.

Newly qualified teachers (NQT), or newly appointed teachers (NAT)², are of special interest to the SBM, as they go through a transition period from school-to-work or from school-to-school. Throughout this report we will refer to both NQT and NAT as new teachers by using the joint abbreviation NT. Literature indicates that these transition periods are difficult (among others, Smith and Ingersoll, 2004). Without the required support for NT, teacher motivation and retention are likely to be negatively affected. A Certificate Programme on Educational Mentorship and Coaching was introduced in 2018 as a pilot, in which SBMs are taught to and stimulated to develop and implement induction activities for NT in primary schools in Rwanda with the goal to equip NT with the skills necessary to teach the CBC. In addition, Teacher Training Centre (TTC) tutors were trained to provide support to a selection of SBMs. As of 2019, the programme was rolled out to 589 schools. This programme is developed by VVOB – education for development in Rwanda in partnership with Rwanda Education Board (REB), the University of Rwanda College of Education (URCE), and the Ministry of Education (MINEDUC). In this report we distinguish between three groups of schools: (1) the mentoring only group, i.e. schools in which the SBM was trained to organize induction and mentoring activities; (2) the mentoring and monitoring group, consisted of schools where the SBM was trained and received support (or monitoring) by a trained TTC tutor; and (3) control group, i.e. no SBMs trained and no support was provided by a TTC tutor. The objective of this evaluation study was to analyse the effectiveness of the two different treatments in the Certificate Programme on Educational Mentorship and Coaching compared to the control group, (1) on the organization of induction activities for New Teachers, and (2) on non-cognitive teacher outcomes of New Teachers, through the participation in indication activities. In addition, we assessed the cost effectiveness of the two treatment groups.

¹ As early as in 2012, SBM were offered and organised by the Rwanda Education Board (REB), however, owing to recruiting problems, not every school could be offered a SBM.

² Teachers who face a transition to a new school after having had seniority in another school before.

The evaluation discussed in this report refers to two periods: the pre-intervention period (March 2019) and the post-intervention period (November 2019). We refer to the period right before the introduction of the Certificate Programme on Educational Mentorship and Coaching and the subsequent new induction programmes, as the pre-intervention study. Based on this we can indicate the state of participants' participation in induction programmes, mean differences between treatment and control groups in pre-intervention characteristics, and the (validity and reliability of) selected non-cognitive teacher outcomes. These non-cognitive teacher outcomes are job satisfaction, work related needs satisfaction, experienced job stress, self-assessed efficacy and motivation among teachers.

The data on the post-intervention are then used to evaluate: (1) the change in induction activities among the treatment groups (mentoring only and mentoring and monitoring groups) compared to the control group; and (2) the effectiveness of the Certificate Programme on Educational Mentorship and Coaching in terms of the selected non-cognitive teacher outcomes.

In what follows, we discuss previous literature on induction programmes in Section 2. Section 3 discusses the context of the Rwandan education system, followed by an overview of the different components of the induction programme (Section 4). Then, Section 5 presents the research method for the evaluation of the effectiveness of the induction programme and Section 6 presents the sampling procedure. Data and descriptive statistics of background characteristics are found in Section 7. A description of the full set of pre-intervention outcome variables is discussed in Section 8. Section 9 presents estimates on the effectiveness of the Certificate Programme on Educational Mentorship and Coaching and Section 10 discusses the cost-effectiveness of the programme. Section 11 concludes.

2 | Literature

Previous literature indicates that teachers considerably improve performance over the first three to five years mainly owing to teachers' informal learning on-the-job (Rockoff, 2004, 2008; Hanushek & Rivkin, 2010; Hanushek, 2011). However, in these first critical years in-service, New Teachers (NT) are also more likely to leave the profession early. There are several factors that contribute to teacher attrition: (1) teachers can face a difficult integration into the new school; (2) there may be system constraints, or difficulties in finding a permanent job at the new school (i.e. the problem of frequent migration of teachers), or salary and status issues.

These reasons, in turn, may negatively affect teaching practices and teacher efficacy of NT, which in turn may reduce teachers' value added, motivation and overall job satisfaction, and increase stress, emotional exhaustion and burnout (among others; Hackman & Oldham, 1975; Broeck et al., 2010; Strong, 2005; Richter et al., 2013; Cabus et al., 2019). These negative feelings towards the teaching profession can, in the worst case, trigger emotional exhaustion and burnout (Richter et al., 2013).

Smith & Ingersoll (2004) and Ingersoll & Strong (2011) discuss the important role for induction programmes to stimulate teachers' competences and to retain them on-the-job within the first years of employment. Induction programmes consist of activities for beginning teachers, mostly organised by the school and/or in cooperation with the pre-service teacher training. Examples are mentoring and coaching, video-analysis of teachers' teaching, and peer observation and discussions (Maandag et al., 2007; Algozzine et al., 2007; Davis & Higdon, 2008; Roehrig et al., 2008; Wang et al., 2008).

From the literature it is clear that especially mentoring activities are important for teacher retention. A mentor is often a more experienced colleague at the school of the new teacher (Ingersoll and Smith, 2004).³ This mentor offers support to the new teacher in, for example, subject or pedagogical content knowledge and class management, and introduces the new teacher to the school and his/her new colleagues. However, there are some conditions attached to who the mentor is, for example: a mentor should be a person that the new teacher can trust; the chosen mentor should stay appointed for more than one year; and the mentor should have a professional attitude towards the mentoring activities (Evertson & Smithey, 2000; Cohen & Fuller, 2006; Fletcher & Strong, 2009; Smith & Ingersoll, 2004; Strong, 2005; Odell & Huling, 2000; Stanulis & Floden, 2009). The mentor can also be the school leader who shows transformational school leadership (Thomas et al., 2020). Further, there are requirements attached to the assignment of the mentor. Based on a systematic literature study, Cabus et al. (2019) argue that mentoring programmes are more effective in case of higher frequency, longer duration, and better quality. But how frequent and how long a mentoring programme should run in order to be effective remains largely unclear. With regard to mentoring quality, Richter et al. (2013) indicate that mentoring and coaching of NT should aim at knowledge transformation rather than at knowledge transmission. Knowledge transformation is defined as a learning process that attaches new knowledge to prior knowledge of the mentee, in this case the new teacher.

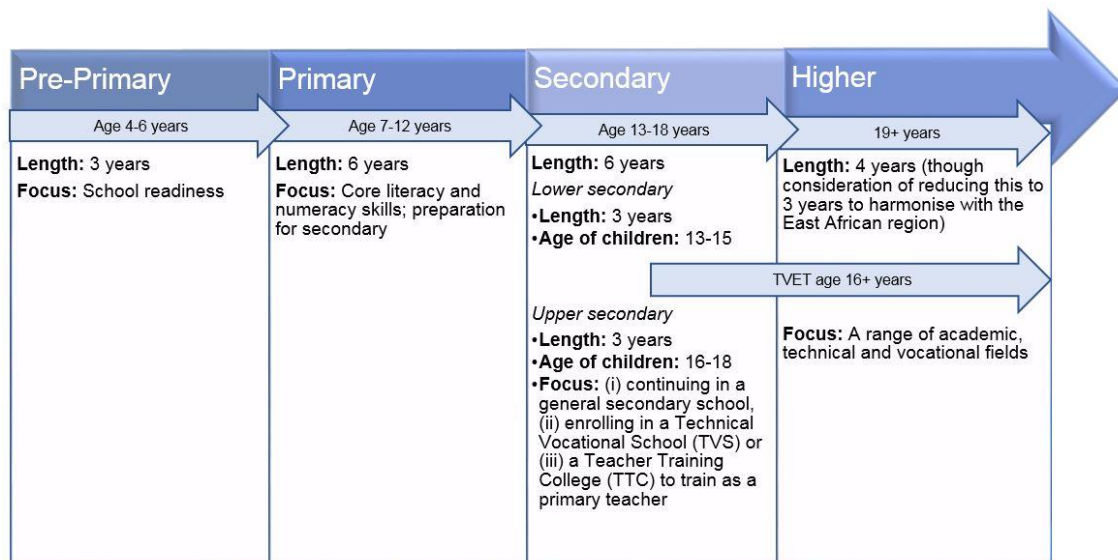
³ According to the definition of Ingersoll and Smith (2004, p.683), mentoring is defined as: "[...] the personal guidance provided, usually by seasoned veterans, to beginning teachers in schools." We elaborate on this definition by also including experienced teachers into the target group for mentoring activities, who recently started in a new school.

3 | Context

Similar to other countries, the formal education system in Rwanda has four main levels or sub-sectors: pre-primary, primary, secondary, and higher education. This report focuses on primary education.

Compulsory education takes 12 years, where children's age normally ranges from 7 to 18. Compulsory education covers primary education, lower and upper secondary education (MINEDUC, 2017). There are national examinations at the end of primary, lower secondary and upper secondary education that determine eligibility for proceeding to the next level of education. The language of instruction in primary grade 1 to 3 (P1-P3) is Kinyarwanda⁴, and changes to English as of primary grade 4 (P4). Figure 3.1 shows the structure of the Rwandan formal education system, including pre-primary education.

Figure 3.1 Structure of the Rwandan education system

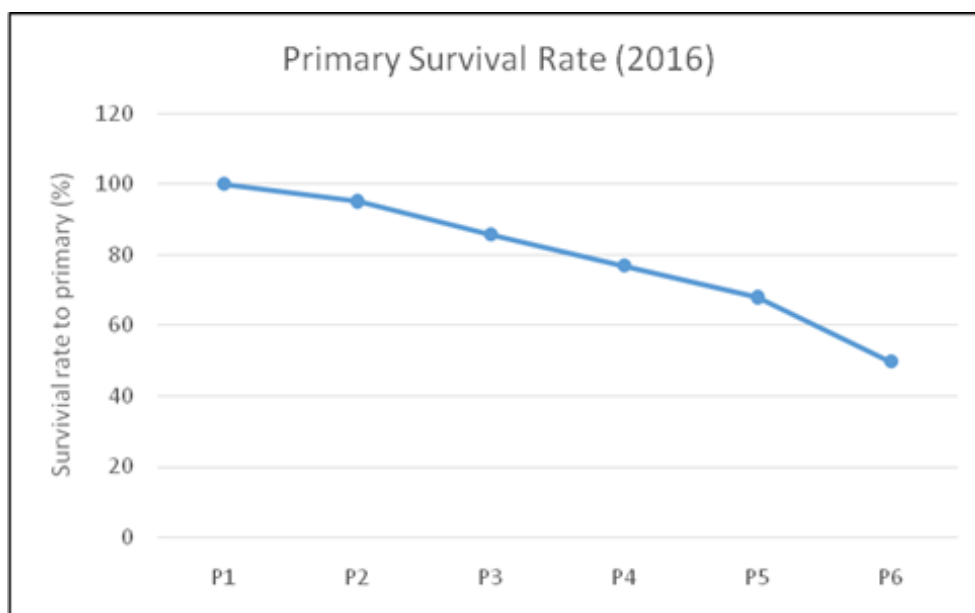


Source Figure 1 – Structure of the Rwandan education system in MINEDUC (2017) Education Sector Strategic Plan 2018/19 to 2022/23 final draft 3rd October 2017, pp 14

Because Rwanda is committed to providing free education for all children aged 7-18, access to education has increased significantly in the early 2000s. Accordingly, enrolment rates in primary education in Rwanda have been quite high since 2012, with 97.7% of children enrolled in P1 in 2016 (MINEDUC, 2017). However, many children in primary education are not within the expected age range owing to grade repetition and dropout. Figure 3.2 plots the survival rates (Y-axis) over the primary school grades (X-axis) and indicates that by primary grade 6 (P6) only about 50 percent of children are still in school. This implies that throughout their primary school career, many primary school pupils drop-out.

⁴ It has been decided that P1-P3 will also be taught in English in the future. However, during the time of this research project that was not implemented yet.

Figure 3.2 Survival rates in primary education in Rwanda in 2016



Source Figure 5 in MINEDUC (2017) Education Sector Strategic Plan 2018/19 to 2022/23 final draft 3rd October 2017, pp 22

Although access rates to primary education are quite high, the quality of education remains a serious challenge. We identify three indicators of the quality of education: learners' basic literacy and numeracy skills, pupil-teacher ratio, and the proportion of adequately trained teachers. First, quality can be expressed in mastering basic literacy and numeracy skills. In fact, to successfully progress through primary, secondary and tertiary education, and to be able to master technical and vocational courses, it is necessary to have a strong basis in literacy and numeracy, which is not the case for many students. In 2011 and 2014 an assessment of the learning achievements was conducted in Rwandan schools in order to provide an overview of the levels of learning in literacy and numeracy of children in primary grade 2 (P2) and primary grade 5 (P5). In 2014, the results showed that respectively 45.3% and 32.9% of P2 students achieved the grade level competency in literacy and numeracy. In P5, these proportions largely remained unchanged (44.1% and 38.3% in P5, for literacy and numeracy, respectively). Pupils from urban schools did perform better than those in rural schools, and learners in private schools performed better than their peers in public schools (government schools) (MINEDUC, 2017).

Second, the pupil-teacher ratio in primary education in Rwanda – an often used indicator of the quality of education (Glewwe et al., 2011) - is as high as 58:1. What is more, the ratio of pupils per qualified teacher is 62:1 (with a target of 48:1 for 2017/18) (MINEDUC, 2017). Note nonetheless, that there is large variation in the average class size and pupil-teacher ratios across and within districts within the country. To lower the pupil-teacher ratio, Rwanda has introduced the double-shift system. The double-shift practice entails that teachers educate a different group of students in the mornings and afternoons, implying that students only get education half a day, but teachers work full day shifts.

Third, the quality of education can be indicated by the number of adequately qualified teachers in service (MINEDUC, 2017). One of the key educational challenges in Rwanda is that teachers lack the required competencies in subject content, pedagogy and language of instruction (English and Kinyarwanda). About 93% of teachers is qualified, however, in practice quality between teachers varies (MINEDUC, 2017). We also present evidence on this in Section 7.

4 | Intervention

4.1 Short background

In close collaboration with REB, the Ministry of Education, and URCE, VVOB introduced a pilot of a Certificate Programme on Educational Mentorship and Coaching in 2018, aiming to encourage induction programmes for NT (NQT and NAT) in primary education in Rwanda. This pilot was simultaneously researched, and in 2019 further rolled out to 589 schools, and again researched. By our definition, NQTs are in the first 3 years of their teaching career after leaving pre-service teacher education, while NATs have a maximum of 3 years teaching experience in their newly assigned school.

The support and guidance (including mentoring) provided to NT in the induction programme is about building the teaching profession, retaining teachers in the profession, and ensuring that they are part of a learning community focused on continuously improving their teaching practice and their learning. The induction programme is part of the School-Based Mentorship Programme Framework (SBMPF). In addition to SBMs, the Mentor Certificate Programme is open to School-Subject Leaders (SSL) and Tutors from the Teacher Training Centre (TTC). TTC tutors co-facilitate the delivery of induction programmes and support SBMs and SSLs (NTs mentors in schools) in their mentoring of NTs. The TTC tutor also establishes a link between the pre-service and in-service teaching training. This is in line with Policy Priority 4 of the draft TDM-policy, which stipulates that CPD of teachers and pre-service teacher education must be more closely linked.

The Certificate Programme on Educational Mentorship and Coaching focuses on developing mentors' skills to equip them to initiate induction activities at school, such as, most notably mentoring and monitoring activities. The mentoring activities consist of an individual learning plan that is put together by the NT and his/her mentor. The learning plan is essentially a bundle of activities that include formal one-to-one mentoring (e.g. on pedagogical and subject content knowledge), and discussions with peers through a community of practice. These activities take place on average two times per week. Then, three times per year, a tutor of the pre-service Teacher Training Centre (TTC) monitors the NT by observing his/her teaching practice and providing feedback. Potential problems with the mentor can also be discussed with the TTC tutor.

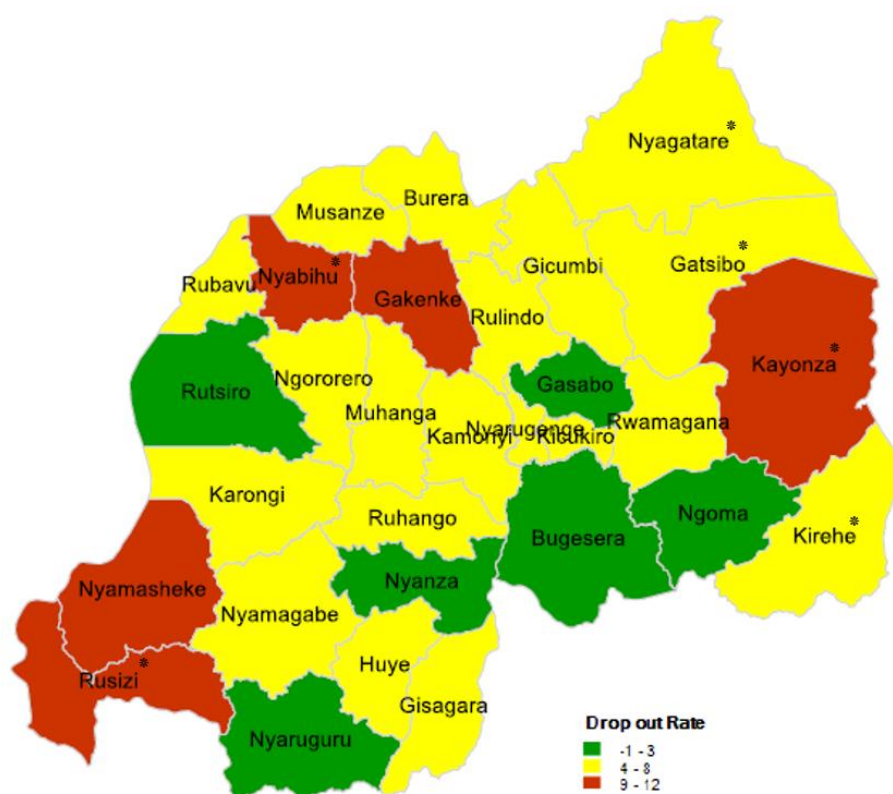
4.2 Delivery of the induction programme

This implementation of the Certificate Programme on Educational Mentorship and Coaching and subsequent induction programme started with a pilot in the year 2018 among 40 schools. To measure the effectiveness of the pilot programme, VVOB, URCE, REB and the Universities of Leuven and Maastricht established a research programme. In 2019, the programme was rolled out in a 589 schools. The induction activities at school are organized by School-Based Mentors (SBM), and Tutors from the Teacher Training Centre (TTC), who are all trained in educational coaching and mentoring through certified CPD Programmes from the University of Rwanda College of Education, co-developed and -implemented with VVOB. More information on the CPD certificate programmes is provided in section 4.3.

The induction programme is implemented in 6 districts in the Western Province (Nyabihu and Rusizi) and Eastern Province (Nyagatare, Gatsibo, Kirehe and Kayanza) of Rwanda (See the districts with an * in Figure 4.1). These districts have higher dropout rates and lower examination results than

on average observed in Rwanda (Ministry of Education, 2016) (as can be seen in Figure 4.1 based on the colours; red districts have high drop-out rates). In total 275 SBMs and 52 TTC tutors from a total of 124 schools are trained in the year 2019, with the aim to have induction programme be introduced to all NTs in these primary (intervention) schools in Rwanda.

Figure 4.1 Country map with location of interventions (*)



Source 2015 Educational Statistical Yearbook, Ministry of Education (2016), p. 31

4.3 CPD Certificate Programme on Educational Mentorship and Coaching

The CPD Certificate Programme on Educational Mentorship and Coaching provides SBMs with coaching and mentoring skills needed to guide and organize CPD at their school (including induction of NT), to promote reflective practice in their respective schools and to advance the implementation of the CBC. It focuses on teacher development as an ongoing process in a teacher's career. Throughout this report, the person who has followed the Educational Mentorship and Coaching programme, will be called the NT's mentor.

TTC tutors also follow the CPD certificate programme on Educational Mentorship and Coaching organised by REB. They receive additional training on monitoring the performance of NT. In addition, TTC tutors are coached by the URCE in their role as co-trainer and coach of mentors (SBM). Given that SBMs and TTC tutors are the main facilitators of induction programmes in schools, the RCT focuses on mentoring by SBMs and monitoring by TTC tutors.

4.4 Key activities of the induction programme

Based on research evidence on means for effective CPD, elements and success factors of induction and in alignment with the priorities and strategies of the Government of Rwanda, the induction programme in Rwandan schools consist of four key activities, which are covered in the CPD certificate

programmes. The first main activity is mentoring, which can be both one-to-one mentoring and group mentoring. Examples of mentoring activities are joint lesson planning, observing mentor's teaching or observing fellow teachers - including a discussion before (preparation lesson observation) and after observation (debriefing and reflection) - analysing students' work and results on assessments, analysing marking and record keeping system, discussing about teaching and learning issues, or suggesting and discussing teaching and classroom management techniques. The second activity is CoP sessions, where NTs and more experienced teachers, teaching the same subject (depending on the size of the school) meet to discuss their work. They think of solutions to challenges they encounter in the classroom and share good practices. Activities that can be undertaken during a CoP-session are, for example, collaborative lesson preparation, lesson study/observation, case discussions, analysing student work on formative and summative assessments, analysing marking and record keeping systems, or developing strategies for teaching learners with special educational needs (SEN). The third activity are seminars or trainings on topics of concern to new teachers, which can be organised at school, sector or district level. The fourth and final activity is TTC support to NTs' induction. This can include classroom observation, analysing students' work and results on assessments or reviewing a NT's CPD-plan (review progress and setting targets) and monitoring the implementation of the induction programmes.

Note that the intervention technically is an intent-to-treat for the NTs, as the SBMs decide which activities actually to implement in their schools, meaning that the content, frequency and intensity of the actual activities within the induction programme vary per school, and even per NT.

5 | Research method

The Mentor Certificate Programme and subsequent induction programme started with a pilot in 2018. During the pilot study in 2018, we have set-up and tested a survey tool for the measurement of the effectiveness of the intervention “induction programmes for New Teachers in Rwanda”. The survey tool measured different non-cognitive teacher outcomes that are expected to change when NT have access to well-designed induction programmes, namely: job satisfaction, motivation, teaching practices, teacher efficacy, and stress and burnout. The measurement instruments underlying these outcomes are discussed in Section 8. To rigorously measure the effectiveness of the Mentor Certificate Programme on the occurrence and quality of the induction programme, VVOB, URCE, REB and the Universities of Leuven and Maastricht established a RCT in 2019, when the programme was rolled out to a larger number of schools.

Based on the RCT, we can compare the average outcomes from the treatment groups with the average outcomes of the control group after the Certificate Programme on Educational Mentorship and Coaching has taken place.

However, two different conditions apply to the treatment group. In a first treatment group the SBM is trained to organize mentoring activities within the scope of the new induction programme. In the second treatment group a TTC tutor is also trained to monitor the NTs’ performance in addition to the mentoring activities. Therefore, in the remainder of this report, we distinguish between two treatment groups, namely: the mentoring group (Treatment 1) and the mentoring and monitoring group (Treatment 2).

There are a couple of assumptions underlying the group comparison in an RCT. First, it is important that the treatment groups and the control group are comparable based on observed and unobserved background characteristics. For example, teachers, who participate in the intervention should have a similar intrinsic motivation for teaching as teachers in the control group. 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 participants and non-participants to the treatment. Spill-over effects may lead to the result that untreated teachers also benefit from the treatment through access to knowledge of or experiences with induction programmes via treated teachers, which may lead to an underestimation of the actual effect.

A good way for ensuring comparability between the treated and untreated teachers is random assignment (to the intervention). Random assignment means that differences between treated and untreated teachers 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 intervention and control group before and after the intervention, so that the estimated effectiveness of induction programmes is a ‘true’ measure of the effect.

In our analyses of the effects of the intervention we use a two-step procedure. In the first step we estimate the effect of the training programmes for the SBM and the TTC, or the SBM only on the extent to which NTs participate in induction programmes. In the second step we estimate the effect of participation in the induction programmes on the non-cognitive teacher outcomes. We use (multivariate) regression analyses to estimate these steps, and present both the results with and without controlling for the pre-intervention measures and background characteristics. To control for the multilevel structure, as the randomization and the treatment took place at the school level, whereas the

unit of observation in the questionnaires is the new teachers, we cluster standard errors at the school level. A more technical description of our estimation strategy and the corresponding equations can be found in Appendix 1.

6 | Sampling procedure

The timeline of estimating the effectiveness of the intervention is as follows. First, we conducted a pilot study in the year 2018 in 38 schools. The pilot study was mainly conducted in order to test the validity of the survey we have constructed. Then, we have collected data on pre-intervention characteristics and on teacher outcomes in the pre-intervention period in March 2019 (pre-intervention measure). SBMs and TTC tutors of schools that were assigned to the treatment started the Certificate Programme on Educational Mentorship and Coaching in April 2019. Between April and September 2019, induction programmes could arise in the schools of the mentors due to the SBMs and TTC tutors being trained in the Certificate Programme on Educational Mentorship and Coaching. In November 2019, we collected data on post-intervention teacher outcomes from both treatment groups and the control group.

Prior to the pilot study in 2018, all 589 schools that were eligible to participate in the CPD certificate programme on educational mentorship and coaching were randomly assigned to three training cohorts. The first training cohort was considered the pilot group which was trained in 2018 and included SBMs of 38 schools. Then, the second training cohort, consisting of the two treatment groups that were trained in April 2019, included 275 schools. The last training cohort of 276 schools, which will be trained in 2020, is considered the control group in this report. As such, a total of 551 schools in training cohorts 2 and 3 were deemed eligible to participate in the RCT. As resources did not allow to select all 551 schools for the RCT, we drew random samples from each of these two training cohorts, in order to end up with two representative treatment groups and one representative control group. To select a sample large enough to detect a small effect of the treatment we used G-power software to calculate the sample size based on the number of NTs. Based on these results, the sample size was set at 1050 NTs, enabling the estimation of a significant small standardized effect of 0.2 (Cohen's d) with a statistical power of 0.80 (convention). Calculating this back to the number of schools, this implied selecting 231 schools (assuming at least 4 NTs per school, the average number of NTs at each pilot school). Because we have two treatment groups, we selected 124 treatment schools and 107 control schools for the RCT. The treatment sample is composed of a random selection of 72 schools that are part of Treatment 1 (Mentoring only) and all 52 schools that are part of Treatment 2 (Mentoring and monitoring), both coming from the second training group. The 107 control schools were randomly selected from the sample of 276 schools in the third training group.

Next, enumerators, who have been trained by VVOB – education for development, went to the selected schools to interview all the NTs. Given that some schools had less NTs than expected, no NT at all and/or some NTs who did not want to participate in the survey, the final sample (after data cleaning of the pre-intervention dataset), included a total of 215 schools and 719 NTs, which is a negligible difference from the 231 schools that we needed according to the power analysis. This includes 275 NTs in treatment group 1, 137 NTs in treatment group 2 and 307 NTs in the control group. Figure 7.1 gives an overview of the design of the RCT, leading from the target population of schools to the sample that is used for the analysis.

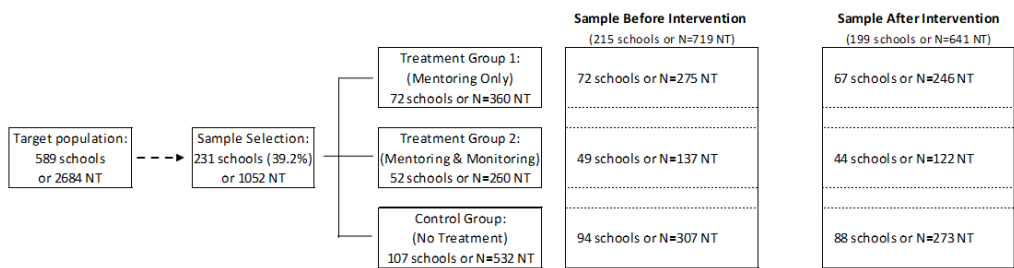
For this research project, ethical approval was obtained from the Rwanda National Ethics committee (case nr. 0094/RENC/2019). The free and informed consent of all participants was attained on article. Participants were made aware of their voluntary participation and the right to withdraw at any moment.

7 | Data

7.1 Composition of the sample

While 760 teachers were surveyed in the pre-intervention period, March 2019, the pre-intervention dataset consists of 719 teachers after cleaning, since we lose 41 observations due to missing information on personal background characteristics of teachers. The total sample for the pre-intervention analysis includes 215 schools: 72 schools (or 275 NT) in Treatment group 1; 49 schools (137 NT) in Treatment Group 2; and 94 schools (307 NT) in the Control Group. The total sample size is then equal to N=719 new teachers.

Figure 7.1 Design of the RCT



Source From the authors

With regard to the post-intervention data, we count 199 schools, or 641 NTs. As such, we lose respondents from 16 schools (78 NT) in the second round of data collection (who were absent e.g. due to illness or pregnancy leave). In Section 7.3, we test for the selectivity of non-response. As the non-response appears to be non-selective, we argue that the non-response does not pose an issue to our further analysis.

7.2 Background characteristics

Table 7.1 summarizes the background characteristics of the sample of teachers, and the differences between the two treatment groups and the control group at the pre-intervention period. We have slightly more men than women in the sample. They are on average 28 years old. Age is not statistically different between the two treatment groups and the untreated teachers. However, gender appears to be significantly different between the second treatment group and the control group. There are 10 percentage points more males in the control group than in Treatment Group 1. Educational attainment is not that high. In the control group, we observe that 91.5 percent of teachers attained level-1. This percentage share is equal to 85.1 percent in Treatment Group 1 (which is significantly different at the 5% -level), and 87.6 percent in Treatment Group 2 (not statistically different). However, since we apply eight consecutive T-tests, we have to be cautious with the interpretation, as by

statistical law we would expect every 1 out of 20 tests to be significant if we use a 5% significance level⁵, and indeed, we see some significant differences at the 10%-level.

All teachers teach in primary school, but 130 teachers (18%) also teach in lower secondary education. The share of teachers also teaching in secondary education varies highly by district (varying from 3 to 37 percent, with an average of 18), but within districts treatment and control groups are comparable. On average, respondents travel thirty to forty minutes to the appointed school. We observe small significant differences between the treatment groups compared to the control group with regard to travel time. However, the difference between the groups is very small (5 to 7 minutes).

Table 7.1 T-test on the differences in pre-intervention background characteristics between the two treatment groups and control group

	Control group		Treatment Group 1		Sig.	Treatment Group 2		Sig.
	Mean	Std.Dev	Mean	Std.Dev		Mean	Std.Dev	
male (%)	0.570	0.496	0.564	0.497		0.474	0.501	*
age (years)	27.7	5.6	28.0	6.0		27.9	6.5	
teacher in primary vs. secondary (%)	0.84	0.37	0.78	0.41	*	0.85	0.36	
educational attainment (%)								
level-1	0.915	0.279	0.851	0.357	**	0.876	0.331	
level-2	0.049	0.216	0.065	0.248		0.058	0.235	
level-3	0.036	0.186	0.076	0.266	**	0.066	0.249	
level-4	0.000	0.000	0.007	0.085		0.000	0.000	
teaching experience (years)								
since graduation	3.4	4.0	3.5	0.3		3.4	3.9	
in this school	1.5	1.0	1.3	0.1	**	1.4	1.0	
travel time (minutes)	39.6	36.7	34.0	30.3	**	32.5	26.8	**

* Stars denote the significant levels of the differences between the treatment group (1/2) and the control group. Significant levels are denoted at 1%-level (***); 5%-level (**); and 10%-level (*). Treatment Group 1 receives mentoring only (N=275); and Treatment Group 2 receives mentoring and monitoring (N=137).

Source From the authors

Furthermore, other statistics (not visible in Table 7.1) show that about 415 teachers (57.7%) have had teaching experience in only one school. Years of teaching experience since graduation from pre-service teacher training varies from 0 to 31 years with an average of three and a half years and a standard deviation of 4. As such, there are a few teachers with a lot of seniority, however, they got appointed to a new school fairly recently, which is why they are included in our sample. There is no significant difference in this respect between the control group and both the treatment groups.

7.3 Selectivity of non-response in the post-intervention measure

We perform independent sample T-tests on the selectivity of non-response in Table 7.2. Therefore, we look at the background characteristics of respondents and compare these with the background characteristics of the non-respondents. There are no significant differences between the two groups. We conclude that, besides a small decrease in statistical power of the regression models, non-response is no issue for further analysis of the post-intervention data.

⁵ 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 undesirable and is unusual to apply to pre-intervention comparisons, as it means to account for false positives in outcomes.

Table 7.2 T-test on the selectivity of non-response in the post-intervention measure

	Non-response (n=78)		Respondents (n=641)		Sig.
	Mean	Std.Dev	Mean	Std.Dev	
male (%)	0.500	0.503	0.555	0.497	
age (years)	27.9	6.4	27.9	5.9	
teacher in primary vs. secondary (%)	0.8	0.375	0.817	0.387	
educational attainment (%)					
level-1	0.872	0.336	0.885	0.320	
level-2	0.077	0.268	0.055	0.227	
level-3	0.038	0.194	0.059	0.236	
level-4	0.013	0.113	0.002	0.039	
teaching experience (years)					
since graduation	3.6	3.6	3.4	4.2	
in this school	1.3	1.0	1.4	1.0	
travel time (minutes)	33.1	32.9	36.5	32.7	

* Stars denote the significant levels of the differences between the post-intervention respondents and the non-respondents. Significant levels are denoted at 1%-level (**); 5%-level (*); and 10%-level (*).

Source From the authors

7.4 Experience with induction programmes and induction needs

One of the objectives of the Certificate Programme on Educational Mentorship and Coaching is that it leads to induction activities for NTs in Rwandan Primary Schools, which subsequently can have an impact on teacher outcomes. This is our primary mechanism under investigation, namely the way through which the Certificate Programme on Educational Mentorship and Coaching could lead to better teacher outcomes through the provision of mentoring and monitoring as part of induction.

In both our pre-intervention questionnaire conducted in March 2019 and in the post-intervention questionnaire in November 2019, we have explored more explicitly whether teachers have experience with induction programmes, or express certain induction needs (Table 7.3, Table 7.4, Table 7.5, Table 7.6)⁶. Of the full sample of teachers, in the pre-intervention questionnaire, 38 percent responds to be familiar with the definition of induction programmes; 54 percent has a new teacher mentor at the school; and 17 percent reports to have a TTC mentor. All these percentages are higher in the post-measure, possibly because they recognize that activities have taken place at their school, or because new teachers have now understood the questions better. In the pre-intervention measure, NTs indicated that the new teacher mentor is mostly a SBM (41%), but can also be the director of studies or deputy head teacher (26%); or the School Subject Leader (SSL) (24%). In the post-intervention measure the majority says it is the SBM. This may again be explained by the fact that the respondents recognize better the role of the SBM after the intervention. Those respondents with a new teacher mentor talk very frequently with him/her. More than 70% indicates to talk to the new teacher mentor at least every month, and almost 50% talk every two weeks, once a week, or even more frequent than that.

⁶ Note that the Tables in 7.4 with descriptive statistics are also split by gender and NQT vs. NAT. These subgroup tables can be found in Appendix 2. Some Tables are also split by the Treatment. The split tables from Chapter 8 are available upon request.

Table 7.3 Experience with induction programmes, pre-intervention measure (N=719) and post-intervention measure (N=641)

Question	Pre	Post
Are you familiar with the definition of induction programmes for new teachers?	38%	75%
There was an organized introduction in my school	27%	40%
I took part in general and/or administrative introduction to my school	83%	89%
Do you have a new teacher mentor at your school?	54%	68%
Who is the new teacher mentor?*		
School subject leader	24%	16%
Director of studies/deputy head teacher	26%	16%
School based mentor	41%	65%
Other	9%	3%
Do you have a 'TTC mentor?	17%	20%

* Answers to this question only provided for those respondents that answered 'yes, I have a new teacher mentor at my school.' Further note that there was no selective dropout between pre and post measures, as we have shown in Section 7.3, which is why we can safely compare the pre- and post group of NTs, even when numbers of observation are not exactly equal.

Source From the authors

Table 7.4 Participation of respondents in professional mentoring activities at their school

Question	Pre	Post
I took part in a professional mentoring programme at my school – Overall	29%	41%
Answers by treatment group:		
Control Group	29%	36%
Mentoring Group	29%	52%
Mentoring & Monitoring Group	28%	67%

Source From the authors

Table 7.4 shows that pre-intervention, barely one in every three respondents took part in a professional mentoring programme at the school, regardless of the treatment group. On average, this increased to 41% after the intervention. The second part of Table 7.4 shows that the increase is highest for the two treatment groups, where participation in professional mentoring programmes increased to 52% and 67% for the mentoring and mentoring & monitoring groups, respectively. However, a small increase in the participation in professional mentoring activities can also be observed among new teachers in the control group. Parallel to the RCT analysed in this study, another RCT took place in Rwanda in which the head teacher of schools was trained. We observe in additional administrative data on the trainings that 37 (out of 88) schools from the control group had the head teacher enrolled in this training. While the goal of training the head teacher was broader than for the SBM Certificate Programme under evaluation in this study, it is likely that the participation of head teachers in the training increased the organization of and participation in professional mentoring activities in the control group as well – which is what we observe in Table 7.4.

Table 7.5 shows the answers on whether teachers participated in specific induction activities at school, both pre- and post-intervention. For reasons of brevity, we only present the share of teachers who reported that they never participated in these activities and the share of teachers that reported that they participated once a week or more frequent than that. In the pre-intervention measures we see that over two-thirds of respondents have never had any activity that resorts to an induction pro-

gramme, like joint lesson planning together with a mentor, classroom observation, individual coaching, developing and reviewing a continuous professional development plan (CPD), peer discussions or workshops on (the didactics of) their subject. The good news is that the share of teachers that report that they never participated in these activities has sharply decreased after the intervention. Interestingly, the share of teachers reporting that they participated once a week or more has also decreased between pre and post measures. Most likely this is due to a better understanding of what these activities entail in the post measures, because they have been exposed to these types of activities all year. New teachers' self-assessment of whether they participated in these activities has most likely improved with this increased understanding. This implies that the pre-intervention measure most likely was an overestimation.

Table 7.5 Participation of respondents in induction activities at their school

	Pre		Post	
	Never	Once a week or more	Never	Once a week or more
Joint lesson planning together with my mentor	59%	17%	47%	13%
Observing mentor teaching	67%	12%	59%	10%
Observing another teacher teaching	39%	23%	35%	19%
Being observed by my mentor	48%	16%	40%	12%
Being observed by another teacher	45%	22%	41%	15%
Individual coaching conversation with my mentor	45%	21%	37%	16%
Developing my individual CPD Plan together with my mentor	58%	17%	42%	15%
Reviewing my individual CPD Plan together with my mentor	56%	18%	46%	15%
Being part of a Community of Practice of teachers teaching the same subject	49%	19%	34%	15%
Being part of a Community of Practice of teachers teaching different subject	46%	14%	42%	11%
Seminars/trainings on topics of concern to new teachers	74%	6%	67%	4%
Analysing student work and results on assessments together with my mentor	60%	14%	55%	9%

* The original table with all 7 answer options, ranging from 'never' to 'every day' can be found in Appendix 3.
Source From the authors

Despite this low participation in professional mentoring activities as indicated in the pre-intervention measure, NTs clearly expressed a need for it (Table 7.6). For example, respondents wish to have formally organised support at the school in order to learn about strategies to manage large classes. Further, teachers indicate that they could benefit from organised workshops, peer discussions or discussions with a mentor at school on didactic material, knowledge and understanding of (teaching) their subject, and administrative documents. Need for formally organised support seems to be lowest for support with student evaluation and assessment and student behaviour.

Table 7.6 The degree to which respondents need formally organized support (measured pre-intervention) (N=719)

	No need at present	Low level of need	Moderate level of need	High level of need
Knowledge and understanding of my subject(s)	13%	22%	37%	28%
Pedagogical competences in teaching my subject(s)	12%	28%	35%	26%
Student evaluation and assessment	42%	22%	21%	15%
Student behavior	36%	24%	21%	20%
Strategies to manage big classes	10%	19%	27%	44%
Classroom management and administration	15%	24%	30%	30%

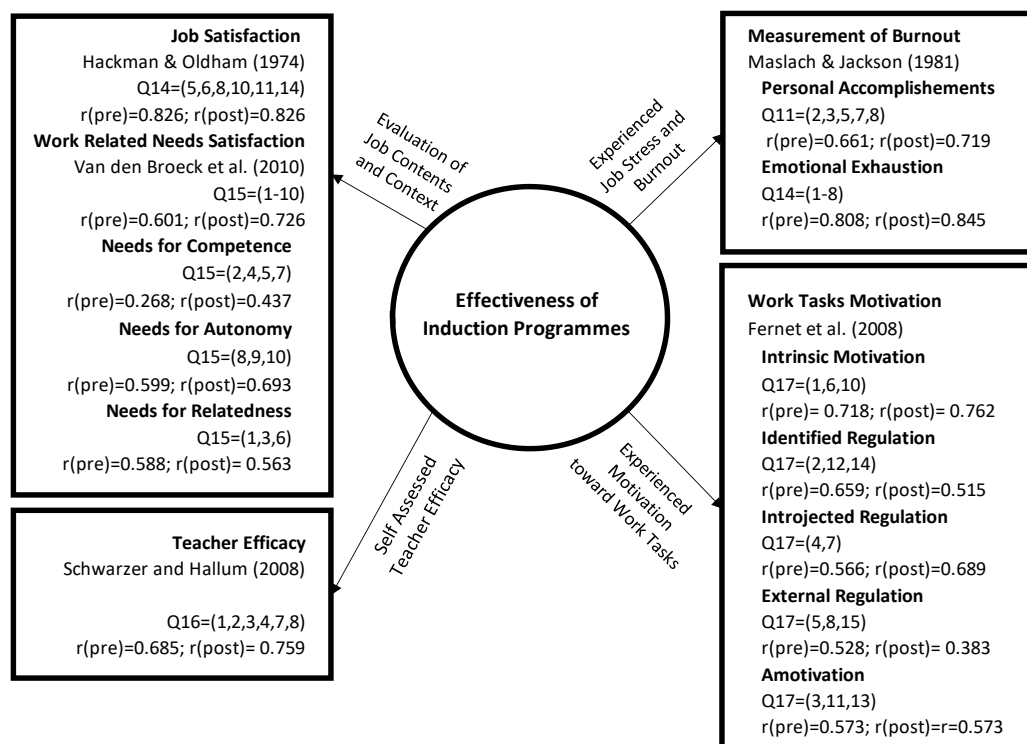
Source From the authors

8 | Description and analysis of outcome variables analysis

8.1 Properties and reliability

We used different sources from the selected literature to (1) measure the effectiveness of the Certificate Programme on Educational Mentorship and Coaching on the organisation of induction programmes, and (2) to measure the effect of participating in induction programmes on a selection of teacher outcomes. These teacher outcomes are (1) teachers' satisfaction with job contents and context (Hackman and Oldham, 1974; TALIS, 2013); (2) work related basic needs satisfaction (Van den Broeck et al., 2010); (3) teacher efficacy (Schwarzer and Hallum, 2008); (4) job stress and burnout (Maslach and Jackson, 1981); and (5) teachers' motivation toward specific work tasks (Fernet et al., 2008). Figure 8.1 summarizes these components, and includes the corresponding questions from the survey and the scale reliability using data from the pre-intervention period (March 2019) and the post-intervention period (November 2019).

Figure 8.1 Presentation of the components included in the Survey tool



* The numbers between brackets refer to those questions with the highest loadings on the components measured in a particular question (e.g. Question 14 measures Job Satisfaction), and 'r' denotes the reliability statistic of the scale. We present reliability statistics using the data from the pre-intervention period ($r(\text{pre})$; March 2019) and the post-intervention period ($r(\text{post})$; November 2019).

Source From the authors

8.1.1 Job satisfaction

Hackman and Oldham (1974) developed a scale for the measurement of overall satisfaction and happiness with the job. Overall happiness and satisfaction is measured based on different questions related to job security, pay and other compensation, peers and co-workers (also referred to as social satisfaction), supervision, and opportunities for personal growth and development on the job (also referred to as growth satisfaction).

Table 8.1 Scores on the sub-questions of the scale job satisfaction - PRE

Q(n°)	Description	Score (max.5)				
		1	2	3	4	5
5	The degree of respect and fair treatment I receive from the head teacher	3%	5%	9%	45%	38%
6	The feeling of worthwhile accomplishment I get from doing my job as a teacher	0%	1%	4%	31%	64%
8	The amount of support and guidance I receive at this school	2%	7%	5%	49%	36%
10	The amount of independent thought and action I can exercise in my job as a teacher	2%	7%	7%	53%	31%
11	How secure things look for me in the future in this school	2%	4%	10%	41%	44%
14	The overall quality of support and guidance I receive at this school	3%	8%	7%	51%	31%

* The scores range from 1 (extremely dissatisfied) to 5 (extremely satisfied). The value of 3 indicates neutral.

Source From the authors

Table 8.2 Scores on the sub-questions of the scale job satisfaction - POST

Q(n°)	Description	Score (max.5)				
		1	2	3	4	5
5	The degree of respect and fair treatment I receive from the head teacher	4%	9%	11%	45%	30%
6	The feeling of worthwhile accomplishment I get from doing my job as a teacher	0%	2%	5%	45%	48%
8	The amount of support and guidance I receive at this school	2%	10%	7%	52%	29%
10	The amount of independent thought and action I can exercise in my job as a teacher	2%	13%	9%	51%	24%
11	How secure things look for me in the future in this school	2%	7%	10%	48%	32%
14	The overall quality of support and guidance I receive at this school	3%	14%	8%	52%	22%

* The scores range from 1 (extremely dissatisfied) to 5 (extremely satisfied). The value of 3 indicates neutral.

Source From the authors

Table 8.1 and Table 8.2 summarize the questions with the highest loadings on the scale for pre and post measure separately. Respondents could answer to these questions on a Likert scale from 1 (extremely dissatisfied) to 5 (extremely satisfied). The reliability statistic using the pre-intervention data and derived from Cronbach's alpha is equal to 0.826 based on the six questions reported in Figure 8.1. Hereby, the scale for job satisfaction meets the generally accepted lower bound criteria of $r \geq 0.7$. This also holds true for the job satisfaction scale measured in the post-intervention period. The comparison between pre and post show that NTs have answered more conservatively in the post measure, most likely for the same reason as described above: NTs' self-assessment has most likely improved with this increased understanding. This implies that the pre-intervention measure most likely was an overestimation.

8.1.2 Work Related Needs Satisfaction

Besides the overall scale on the work-related basic needs satisfaction (W-BNS) scale of Van den Broeck et al. (2010), we capture three sub-scales, namely: the need for competence (1), autonomy (2) and relatedness (3) at work. Table 8.3 summarizes the questions underlying the three W-BNS scales.⁷ We presented the reliability statistic of each of these scales in Figure 8.1. The reliability statistic of the needs for competence scale is poor and equal to $r=0.268$ in the pre-intervention period and $r=0.437$ in the post-intervention period. For the other two scales we estimate moderate reliable coefficients of ($r_{pre}=0.599$ and $r_{post}=0.693$; needs for autonomy) and ($r_{pre}=0.588$ and $r_{post}=0.563$; needs for relatedness at work).

Table 8.3 Scores on the sub-questions of the scales needs for competence, autonomy and relatedness at work – PRE

Q(n°)	Description	Scores (max.4)			
		1	2	3	4
Needs for competence					
2	I feel confident in teaching	1%	3%	12%	84%
4	When I'm at work I have serious doubts about whether I can do things well	17%	18%	20%	45%
5	At work, I feel capable to perform my task	0%	1%	6%	93%
7	I feel comfortable in my task as a teacher	3%	8%	23%	66%
Needs for autonomy					
8	I feel forced to do many things on my job I wouldn't choose to do	74%	10%	8%	8%
9	I feel a sense of choice and freedom in my job	5%	10%	23%	63%
10	I feel pressured to do too many things on my job	64%	13%	11%	13%
Needs for relatedness					
1	I have a good relationship with the other teachers	1%	2%	9%	89%
3	I feel the relationships (with students, teachers, parents, head teacher...) I have at work are just superficial	0%	4%	25%	71%
6	I am open to share my failures with my fellow teachers	0%	2%	5%	93%

* The scores range from 1 (Not at all true) to 4 (Exactly true).

Source From the authors

⁷ With regard to needs for autonomy, we could improve the estimated Cronbach's alpha to ($r=0.647$, instead of $=0.559$) when leaving out the positive formulated question on "I feel a sense of choice and freedom in my job". However, we did not leave out this question, as we need at least three questions in a scale, in order for the scale to reliably represent the overarching concept.

Table 8.4 Scores on the sub-questions of the scales needs for competence, autonomy and relatedness at work - POST

Q(n°)	Description	Scores (max.4)			
		1	2	3	4
Needs for competence					
2	I feel confident in teaching	0%	6%	20%	73%
4	When I'm at work I have serious doubts about whether I can do things well	21%	15%	26%	39%
5	At work, I feel capable to perform my task	0%	2%	13%	85%
7	I feel comfortable in my task as a teacher	3%	14%	29%	53%
Needs for autonomy					
8	I feel forced to do many things on my job I wouldn't choose to do	62%	13%	15%	10%
9	I feel a sense of choice and freedom in my job	5%	15%	26%	54%
10	I feel pressured to do too many things on my job	54%	13%	12%	21%
Needs for relatedness					
1	I have a good relationship with the other teachers	0%	2%	10%	88%
3	I feel the relationships (with students, teachers, parents, head teacher...) I have at work are just superficial	1%	4%	27%	68%
6	I am open to share my failures with my fellow teachers	0%	1%	7%	92%

* The scores range from 1 (Not at all true) to 4 (Exactly true).

Source From the authors

Table 8.3 and Table 8.4 summarize the sub-questions underlying the three W-BNS scales, for both pre and post measures. We see a similar trend as before, that the answers are more conservative in the post measures. However, the overall distribution of the answers is very similar. With regard to the need for competence, teachers respond very differently to question 4 “When I’m at work I have serious doubts about whether I can do things well”. The responses to this question seem to contradict with the overall fair to good responses on the other questions underlying the needs for competence.

We also observe a lot of variance in the responses to the questions on the needs for autonomy. The questions on the needs for relatedness have been answered in favour of relatedness.

8.1.3 Experienced Job Stress and Burnout

In order to measure experienced job stress and burnout we have used two scales provided by Maslach and Jackson (1981). These scales are personal accomplishments and emotional exhaustion. In particular, emotional exhaustion lies at the heart of experienced burnout (Maslach, Schaufeli, & Leiter, 2001). If burnout is present, people tend to evaluate themselves negatively and express feelings of unhappiness with their accomplishments on the job. Furthermore, burnout can lead to depersonalization (e.g. I feel I consider some students as if they were impersonal ‘objects’). Table 8.5 and 8.6 summarize the results on the questions with highest loadings on the two scales for both pre and post measures.

Table 8.5 Scores on the sub-questions of the scales personal accomplishments and emotional exhaustion - PRE

Q(n°)	Description	Scores (max.4)			
		1	2	3	4
	Personal accomplishments				
2	I deal very effectively with the problems of my students	1%	7%	18%	73%
3	I feel I am positively influencing children's lives through my work	1%	3%	9%	87%
5	I can easily create a relaxed atmosphere with my children	0%	2%	11%	87%
7	I can accomplish many worthwhile things in my job as a teacher	1%	1%	9%	89%
8	In my work, I deal with emotional problems very calmly	2%	6%	18%	75%
	Emotional exhaustion				
1	I feel emotionally tired from my work	62%	32%	4%	1%
2	I feel exhausted at the end of the workday	8%	55%	23%	13%
3	I feel tired when I get up in the morning and have to face another day on the job	38%	49%	10%	4%
4	Working with children all day gives me stress	76%	21%	2%	0%
5	At the end of the day I am so tired that I want to cry	59%	32%	5%	3%
6	I feel frustrated by my job	89%	8%	2%	1%
7	I feel I am working too hard on my job	52%	35%	7%	6%
8	I feel that I can't take it any longer to continue teaching	91%	8%	0%	1%

* For the scale of personal accomplishments, the scores range from 1 (Not at all true) to 4 (Exactly true). And for the scale of emotional exhaustion, the scores range from 1 (I never experience this) to 4 (I very always experience this).

Source From the authors

Table 8.6 Scores on the sub-questions of the scales personal accomplishments and emotional exhaustion - POST

Q(n°)	Description	Scores (max.4)			
		1	2	3	4
	Personal accomplishments				
2	I deal very effectively with the problems of my students	0%	11%	25%	64%
3	I feel I am positively influencing children's lives through my work	0%	5%	19%	76%
5	I can easily create a relaxed atmosphere with my children	0%	3%	14%	84%
7	I can accomplish many worthwhile things in my job as a teacher	0%	3%	20%	76%
8	In my work, I deal with emotional problems very calmly	2%	14%	22%	63%
	Emotional exhaustion				
1	I feel emotionally tired from my work	47%	45%	7%	1%
2	I feel exhausted at the end of the workday	6%	56%	26%	12%
3	I feel tired when I get up in the morning and have to face another day on the job	29%	56%	10%	6%
4	Working with children all day gives me stress	64%	31%	4%	1%
5	At the end of the day I am so tired that I want to cry	41%	39%	13%	7%
6	I feel frustrated by my job	80%	15%	3%	2%
7	I feel I am working too hard on my job	42%	36%	11%	10%
8	I feel that I can't take it any longer to continue teaching	85%	12%	2%	1%

* For the scale of personal accomplishments, the scores range from 1 (Not at all true) to 4 (Exactly true). And for the scale of emotional exhaustion, the scores range from 1 (I never experience this) to 4 (I very always experience this).

Source From the authors

We have estimated reliability statistics close to or greater than 0.7 for 'personal accomplishments' ($r=0.661$) and 'emotional exhaustion' ($r=0.808$) in the pre-intervention measure. Cronbach's alphas of these two scales improve slightly in the post-intervention period, so that both scales exceed the lower bound criteria of 0.7 (see Figure 8.1).

8.1.4 Self-Assessed Teacher Efficacy

According to Schwarzer and Hallum (2008), self-assessed teacher efficacy is an important predictor for job stress and burnout. The authors use a scale for the measurement of teacher self-efficacy, which has been constructed in Schwarzer, Schmitz and Daytner (1999). The scale consists of 10 questions in total. The estimated reliability statistic for teacher efficacy is equal to ($r=0.685$) in the pre-intervention period and ($r=0.759$) in the post-intervention period. The questions underlying self-assessed teacher efficacy and the answers to pre and post measures can be found in Table 8.7 and Table 8.8.

Table 8.7 Scores on the sub-questions of the scale self-assessed teacher efficacy - PRE

Q(n°)	Description	Scores (max.4)			
		1	2	3	4
1	I am convinced that I am able to teach successfully all relevant subject content to even the most difficult students	3%	13%	27%	57%
2	I know that I can maintain a positive relationship with parents, even when tensions arise	2%	5%	17%	77%
3	When I try really hard, I am able to reach even the most difficult students	1%	4%	15%	80%
4	I am convinced that as time goes by, I will continue to become more and more capable of addressing my students' needs	0%	2%	7%	91%
7	If I try hard enough, I know that I can exert a positive influence on both the personal and academic development of my students	1%	3%	8%	88%
8	In my work, I am convinced that I can develop creative ways to deal with system constraints and continue to teach well	2%	5%	18%	74%

* The scores range from 1 (Not at all true) to 4 (Exactly true).

Source From the authors

Table 8.8 Scores on the sub-questions of the scale self-assessed teacher efficacy - POST

Q(n°)	Description	Scores (max.4)			
		1	2	3	4
1	I am convinced that I am able to teach successfully all relevant subject content to even the most difficult students	3%	14%	34%	49%
2	I know that I can maintain a positive relationship with parents, even when tensions arise	1%	6%	23%	71%
3	When I try really hard, I am able to reach even the most difficult students	2%	6%	18%	75%
4	I am convinced that as time goes by, I will continue to become more and more capable of addressing my students' needs	0%	2%	12%	86%
7	If I try hard enough, I know that I can exert a positive influence on both the personal and academic development of my students	1%	2%	13%	84%
8	In my work, I am convinced that I can develop creative ways to deal with system constraints and continue to teach well	2%	10%	25%	63%

* The scores range from 1 (Not at all true) to 4 (Exactly true).

Source From the authors

8.1.5 Motivation toward Work Tasks

The Work Tasks Motivation Scale for Teachers (WTMST) assesses five motivational constructs toward work tasks, namely: intrinsic motivation; identified regulation; introjected regulation; external regulation; and amotivation. Each motivational construct consists of 3 questions so that we have 15 questions in total measuring teachers' overall motivation toward work tasks. Table 8.9 and Table 8.10 present the questions and answers to pre and post measures of the different motivation scales. The reliability statistics are moderate for intrinsic motivation ($r=0.718$); for introjected regulation ($r=0.604$); and for external regulation ($r=0.607$). The other reliability statistics are poor for identified regulation ($r=0.493$); and for amotivation ($r=0.558$). Only intrinsic motivation meets the critical bound in the pre-intervention period. However, in the post-intervention period the reliability statistic of introjected regulation ($r=0.689$) also comes very close to 0.7. Conclusion with regard to the other scales in the post-intervention period remain unchanged.

Table 8.9 Scores on the sub-questions of the scales intrinsic motivation; identified regulation; introjected regulation; external regulation; and amotivation - PRE

Q(n°)	Description	Scores (max.5)				
		1	2	3	4	5
	Intrinsic motivation					
1	Because teaching is pleasant to carry out	2%	1%	5%	19%	74%
6	Because I find teaching interesting to do	3%	2%	4%	20%	72%
10	Because I like teaching	3%	1%	3%	16%	77%
	Identified regulation					
2	Because teaching enables me to achieve my own work objectives	1%	3%	5%	25%	66%
12	Because teaching is important for me to do this task	1%	2%	3%	17%	77%
14	Because I find teaching important for the academic success of pupils	1%	0%	1%	10%	87%
	Introjected regulation					
4	Because I would feel guilty if would not teach	14%	4%	8%	20%	54%
7	Because if I don't teach I will feel bad	23%	7%	12%	23%	35%
	External regulation					
5	Because I'm paid to teach	34%	8%	12%	16%	29%
8	Because my work demands teaching	14%	4%	6%	21%	55%
15	Because the school obliges me to teach	56%	9%	6%	12%	17%
	Amotivation					
3	I don't know, I don't always see the relevance of teaching	82%	5%	6%	4%	3%
11	I used to know why I was teaching, but I don't see the reason anymore	78%	5%	8%	5%	5%
13	I don't know, sometimes I don't see the purpose of teaching	89%	3%	4%	2%	2%

* The scores range from 1 (Completely disagree) to 5 (Completely agree). The value of 3 indicates neutral.

Source From the authors

Table 8.10 Scores on the sub-questions of the scales intrinsic motivation; identified regulation; introjected regulation; external regulation; and amotivation - POST

Q(n°)	Description	Scores (max.5)				
		1	2	3	4	5
	Intrinsic motivation					
1	Because teaching is pleasant to carry out	2%	3%	6%	29%	60%
6	Because I find teaching interesting to do	5%	4%	4%	31%	57%
10	Because I like teaching	3%	3%	4%	26%	64%
	Identified regulation					
2	Because teaching enables me to achieve my own work objectives	2%	4%	5%	34%	56%
12	Because teaching is important for me to do this task	2%	2%	3%	27%	66%
14	Because I find teaching important for the academic success of pupils	0%	0%	0%	18%	81%
	Introjected regulation					
4	Because I would feel guilty if would not teach	22%	8%	9%	22%	39%
7	Because if I don't teach I will feel bad	28%	14%	12%	21%	24%
	External regulation					
5	Because I'm paid to teach	30%	14%	11%	22%	23%
8	Because my work demands teaching	13%	7%	7%	28%	45%
15	Because the school obliges me to teach	50%	15%	5%	17%	13%
	Amotivation					
3	I don't know, I don't always see the relevance of teaching	78%	8%	7%	4%	2%
11	I used to know why I was teaching, but I don't see the reason anymore	9%	7%	5%	4%	9%
13	I don't know, sometimes I don't see the purpose of teaching	86%	8%	2%	2%	1%

* The scores range from 1 (Completely disagree) to 5 (Completely agree). The value of 3 indicates neutral.

Source From the authors

8.2 Discussion of quality

We have measured several non-cognitive outcome variables by using validated questionnaires from past published research in the field. Further, we have conducted several pilot initiatives in order to validate and test the questionnaire. Despite the good overall quality of the selected questionnaires, the extensive piloting phase and the professional translation/presentation of the English questions into Kinyarwanda, we still observe poor reliability statistics for some outcome measures. This is most likely due to the population of study: whereas we conduct the questionnaire among Rwandan teachers, in most cases the questionnaires have only been validated in the past in Western societies, and, additionally, not necessarily among teachers. Only the questionnaire with regard to experienced job stress and burnout of Maslach and Jackson (1981), has been explored in African countries (Rajan & Engelbrecht, 2018). 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.

We argue to keep ten outcome measures for further evaluation that have had stable results in both the pilot and pre-intervention study, namely: Job satisfaction; the overall scale of Work Related Needs Satisfaction; Needs for Autonomy; Needs for Relatedness; Teacher efficacy; Personal accomplishments; Emotional exhaustion; Intrinsic motivation; Introjected Regulation; and Amotivation. These ten scales (except for need for relatedness and amotivation) have reliability statistics close to, or above the critical value of 0.7. We still include the scales of need for relatedness and amotivation since they contribute to the overall picture that we wish to study, but we acknowledge that we have to be careful with the interpretation of the results of these scales.

8.3 Evaluation of the pre-intervention outcomes

Overall, the RCT design succeeds well in making the treatment groups and control group comparable. Table 8.11 presents the mean and standard deviation of the outcome variables per scale (unstandardized coefficients) together with the mean difference between the two different treatment groups and the control group, using T-tests.

Table 8.11 T-test of outcome variables comparing the two treatments groups each with the control group at pre

	Control group		Treatment Group 1		Sig.	Treatment Group 2		Sig.
	Mean	Std.Dev	Mean	Std.Dev		Mean	Std.Dev	
Job satisfaction	4.2	0.7	4.2	0.7		4.1	0.7	
Work Related Needs Satisfaction	3.3	0.3	3.2	0.3		3.3	0.3	
Needs for autonomy	3.4	0.8	3.4	0.7		3.4	0.7	
Needs for relatedness	3.0	0.2	3.0	0.2		3.0	0.2	
Teacher efficacy	3.7	0.4	3.7	0.4		3.6	0.4	*
Personal accomplishments	3.8	0.3	3.7	0.4		3.7	0.4	
Emotional exhaustion	1.6	0.5	1.5	0.4	*	1.5	0.4	
Intrinsic motivation	4.6	0.7	4.6	0.7		4.7	0.6	
Introjected regulation	2.4	1.2	2.3	1.2		2.4	1.2	
Amotivation	1.4	0.7	1.5	0.8		1.4	0.7	

* The maximum score on each scale is 5. Significant levels are denoted at 1%-level (**); 5%-level (*); and 10%-level (*).

Source From the authors

All scales except for emotional exhaustion and amotivation present medium to high scores. There are no significant differences between the treatment groups and the control group in this regard. However, the standard deviation for introjected regulation, job satisfaction, need for autonomy and intrinsic motivation are quite high (0.7-1.2). This indicates that non-negligible variance in answers to these outcome variables is present. Smaller variance is found for teacher efficacy and personal accomplishments. However, the average scores (of 3.7) on these two scales are moderately high for teacher efficacy and personal accomplishments, respectively. We do not observe a significant difference between the Treatment Group 1 and the control group on these two scales. There is a significant difference at 10%-level on teacher efficacy between Treatment Group 2 and the control group.

Similarly, we observe a significant difference at 10%-level between Treatment Group 1 and the control group on emotional exhaustion. Overall, we can conclude that the RCT design succeeds well in making the treatment groups and control group comparable.

9 | Effectiveness of the Certificate Programme on Educational Mentorship and Coaching

9.1 Participation in induction programmes

With regard to the post-intervention outcomes, we first examine the effects of the Certificate Programme on Educational Mentorship and Coaching on participation in induction programmes at the school. Table 9.1 presents these results, where we simply compare the participation rate from the two treatment groups with the control group after the intervention (i.e. unstandardized coefficients). In Model 1 we do not control for the list of pre-intervention characteristics of the respondents, as well as the pre-intervention score on this outcome measure. These control variables are added in Model 2, which is the main model of our analyses.

We observe a steep increase in the participation rate in induction programmes with a +15.5 percentage points higher participation rate, significant at 5% level, for the Mentoring only group, and +30.8 percentage points higher participation rate, significant at 1% level, for the Mentoring and Monitoring group. This corresponds to standardized effect sizes of 0.32 and 0.65 standard deviations, respectively.

Table 9.1 also presents the results of the impact of the Certificate Programme on Educational Mentorship and Coaching on informal induction activities at the school (columns 4 and 5) and a general or administrative introduction at the school (the final two columns). For these two outcomes we find no significant effects.

In Table 9.1 we also see that teachers with education level 4 participate significantly less in formal induction programmes and informal activities than teachers with education level 1. However, note that only very few teachers have education level 4, so we have to treat this finding with caution. Furthermore, teachers with more experience, both since graduation and at the current school participate significantly more often in informal activities. However, if teachers have more experience in the current school, they participate significantly less often in an introduction at the current school.

Table 9.1 Effectiveness of the mentoring certificate programme in increasing participation in (A) an induction programme at the school; (B) informal activities not part of an official induction programme; or (C) an administrative or general introduction at the school (unstandardized coefficients)

	Induction programme				Informal activities				Introduction at school			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
Control group (Ref.)												
Mentoring only	0.1614 (0.0652)	**	0.1550 (0.0633)	**	0.0292 (0.0622)		0.0411 (0.0600)		0.0384 (0.0430)		0.0387 (0.0423)	
Mentoring & monitoring	0.3132 (0.0765)	***	0.3086 (0.0786)	***	0.0817 (0.0722)		0.0836 (0.0732)		0.0417 (0.0570)		0.0429 (0.0586)	
Control variables												
Gender (1.Male)			0.0194 (0.0431)				0.0237 (0.0453)				0.0031 (0.0236)	
Age			-0.0022 (0.0050)				-0.0052 (0.0055)				0.0005 (0.0026)	
Teacher in primary vs. also secondary			-0.0527 (0.0545)				-0.0438 (0.0586)				-0.0543 (0.0313)	*
Educational level												
Level-2			0.0281 (0.0900)				-0.0861 (0.0880)				-0.0262 (0.0553)	
Level-3			0.0941 (0.1002)				0.0288 (0.0915)				-0.0035 (0.0472)	
Level-4			-0.6845 (0.0961)	***			-0.6192 (0.0872)	***			-0.0378 (0.0443)	
Teaching experience												
Since graduation			0.0101 (0.0071)				0.0144 (0.0072)	**			0.0073 (0.0031)	
In this school			0.0200 (0.0199)				0.0413 (0.0187)	**			-0.0072 (0.0130)	**
Travel time			0.0000 (0.0006)				-0.0002 (0.0006)				0.0001 (0.0003)	
Constant	0.3590 (0.0423)	***	0.3886 (0.1387)	***	0.3773 (0.0405)	***	0.4420 (0.1459)	***	0.8681 (0.0306)	***	0.8764 (0.0668)	***
Specification	OLS		OLS		OLS		OLS		OLS		OLS	
Clusters	211		210		211		210		211		210	
Obs.	641		630		641		630		641		630	

* Robust standard errors between brackets. Significance level at 10% (*); 5% (**) or 1% (***).

Source From the authors

9.2 Effects of the Mentoring Certificate Programme on post-intervention non-cognitive teacher outcomes

Table 9.2 presents the estimates of the second step of our analyses, namely the effect of participating in induction programmes on non-cognitive teacher outcomes. We control for the set of pre-intervention characteristics as well as the pre-intervention score on the outcome measure. We also estimated model 1 (without control variables), and we see that our results are robust to the inclusion of control variables. This again confirms that randomisation worked well and that non-response is

no issue for our estimations on effectiveness of the Certificate Programme on Educational Mentorship and Coaching. For reasons of brevity we only present the results to model 2 (including control variables) here. Full models are available in Appendix 4.

The treatment dummies compare the average outcomes from the two treatment groups with the average outcomes of the control group in the post-intervention period – for the individuals that did not participate in induction programmes (even though they were part of a treatment group). We account for the fact that some treated individuals are still not participating in induction programmes at the school in the post-intervention period by including the interaction term, which represents the individuals in the treatment group that did participate in induction activities.

The estimates in Table 9.2 and Table 9.3 should be interpreted as an increase in points on the Likert-scale. With regard to the treatment dummies in comparison with the control group (the first 2 rows of Table 9.2 and Table 9.3), most estimates are not significant. This holds true for almost all teacher outcomes we present in Table 9.2 and Table 9.3. Only few estimates are significant at the 5%-level, and the direction of the coefficient (positive or negative) is opposite of the coefficient of the interaction term. This indicates that, on average, and for most outcomes, untreated new teachers in the treatment groups have similar teaching outcomes than the control group.

However, in the interaction terms (the last 2 rows in Table 9.2 and Table 9.3), and corresponding standardized effect sizes in Table 9.4, we observe that treated individuals, who participated in induction programmes between March and November 2019, are scoring significantly better on the teacher outcomes after the intervention in comparison with the control group. With regard to job satisfaction, the estimate of is equal to 0.19 points significant at 1% level (mentoring only) and the estimate is equal to 0.27 points significant at 5% level (mentoring and monitoring). These correspond to standardized effect sizes of 0.27 and 0.39 standard deviations, respectively. With regard to the overall work related needs satisfaction scale, we only find a significant effect for the mentoring and monitoring group equal to 0.22 points (0.73 SD). For the mentoring only group we do not find significant effects. The subscale needs for autonomy is significant at the 5% level for the mentoring and monitoring group (0.41 points, 0.60 SD). The subscale needs for relatedness are not significantly impacted by participation in induction programmes in the treatment groups.

Table 9.2 Effects of the mentoring certificate programme on teacher outcomes: OLS regressions controlled for background variables and pre-intervention score (unstandardized coefficients)

	Job Satisfaction		Work Related Needs		Needs for Autonomy		Needs for Relatedness		Teaching Efficacy	
(Ref. Control group)										
Mentoring only	-0.07		-0.04		-0.08		0.05	**	-0.10	
	(0.11)		(0.70)		(0.15)		(0.02)		(0.07)	
Mentoring&Monitoring	-0.13		-0.17	*	-0.37	**	0.02		-0.17	
	(0.12)		(0.09)		(0.18)		(0.04)		(0.09)	
(Ref. No Induction)										
Mentoring only	0.19	**	0.11		0.16		-0.04		0.25	***
	(0.09)		(0.07)		(0.16)		(0.03)		(0.06)	
Mentoring&Monitoring	0.27	**	0.22	**	0.42	**	0.02		0.31	***
	(0.12)		(0.09)		(0.19)		(0.05)		(0.09)	

* Robust standard errors between brackets. Significance level at 10% (*); 5% (**) or 1% (***).

Source From the authors

Table 9.3 Effects of the mentoring certificate programme on teacher outcomes (continued)

	Personal Accomplishments		Emotional Exhaustion		Intrinsic Motivation		Introjected Regulation		Amotivation	
(Ref. Control group)										
Mentoring only	-0.08 (0.08)		0.09 (0.08)		-0.13 (0.11)		0.33 (0.22)		-0.19 (0.08)	**
Mentoring&Monitoring	-0.17 (0.10)	*	0.29 (0.09)	***	-0.19 (0.17)		-0.49 (0.28)	*	-0.01 (0.09)	
(Ref. No Induction)										
Mentoring only	0.18 (0.08)	**	-0.13 (0.07)	*	0.12 (0.12)		0.55 (0.19)	**	0.12 (0.08)	
Mentoring&Monitoring	0.23 (0.10)	**	-0.33 (0.10)	***	0.19 (0.18)		0.64 (0.31)	**	0.13 (0.12)	

* Robust standard errors between brackets. Significance level at 10% (*); 5% (**) or 1% (***).

Source From the authors

Table 9.4 Standardized Effect Sizes of the effects of the mentoring certificate programme on teacher outcomes: OLS regressions controlled for background variables and pre-intervention score

Scale	Mentoring Only	Mentoring & Monitoring
Job Satisfaction	0.27	0.39
Work Related Needs Satisfaction	0.37	0.73
Needs for autonomy	0.23	0.60
Needs for relatedness	-0.20	0.10
Teacher efficacy	0.63	0.78
Personal accomplishments	0.45	0.58
Emotional exhaustion	-0.33	-0.83
Intrinsic motivation	0.20	0.27
Introjected regulation	0.53	0.46
Amotivation	0.17	0.16

* Bold is significant at the 1%-level, italic is significant at the 5% level

Source From the authors

Both treatment groups significantly impact teaching efficacy through induction programmes. We estimate a coefficient of 0.25 points significant at 1% level with respect to the mentoring only group, and a coefficient of 0.31 points also significant at 1% level for the mentoring and monitoring group (standardized effect sizes of 0.63 and 0.78 respectively). Then, we look at personal accomplishments. The results indicate a positive and significant effect of both treatment groups on personal accomplishments of 0.18 and 0.23 points (0.45 and 0.58 SD), respectively. The mentoring and monitoring group also significantly reduces emotional exhaustion among teachers who followed induction programmes. The estimate is equal to -0.33 points significant at 1% level (-0.83 SD). However, we only find this negative impact on emotional exhaustion of induction programmes among the mentoring only group at the 10% level. To conclude, we look at the three motivation scales. From the results, we retain that the scale of introjected regulation is impacted by induction programmes in both groups. The estimate for the mentoring and monitoring group is equal to 0.64 points significant at 5% level (0.53 SD) and the estimate for the mentoring only group is equal to 0.55 points (0.46 SD), significant at the 1% level. With regard to intrinsic motivation and amotivation we do not find significant results.

Table 9.4 shows how the size of the coefficients correspond to one another. We find many more significant coefficients for the mentoring and monitoring group. For the mentoring and monitoring group we find strong improvement in teaching efficacy, emotional exhaustion and work-related needs, and also improvements (but not as strong) for needs for autonomy, job satisfaction and personal accomplishments. For the mentoring only group we find a strong improvement in teacher efficacy, and other improvements (but not as strong) for job satisfaction, work-related needs, need for autonomy, emotional exhaustion and personal accomplishment. Furthermore, all the significant coefficients for the mentoring and monitoring group are (much) larger than for the mentoring only group (except for introjected regulation).

10 | Cost-Effectiveness Analysis

So far, this report has shown that training programmes lead to more induction activities and that participation in induction activities has a positive effect on non-cognitive teacher outcomes. However, training SBMs and TTC tutors is quite costly and the school visits by the TTC tutors are also rather costly.

Therefore, besides the effectiveness, we also wish to estimate the cost effectiveness (Levin & Belfield, 2015) of the training programmes and compare the effects of training only the SBMs (mentoring programme) with also training the TTC tutors (mentoring & monitoring). For this purpose, we balance the costs and the benefits of the training programmes. The costs are measured as the spending (in euros) on the implementation of the training programme for NTs. The benefits will be expressed in relative terms, of, for example, how much larger the effect is of also training the TTC tutor, in comparison with only the SBM. These benefits are then balanced against the costs.

In order to calculate the costs of the training programmes per SBM or per TTC tutor, we use the number of trained SBMs and TTC tutors in 2019. We have a total of 233 SBMs that started the training, and 214 SBMs that finished the training⁸, of whom 52 work at a school where also the TTC tutor was trained (total 19 TTC tutors⁹) and 162 worked at schools where only SBMs were trained. Note that the TTC tutors in the mentoring and monitoring programme attended the same training as the SBMs, resulting in a total number of 242 individuals¹⁰ participating in the mentoring training.

The costs of the training programmes consist of 4 parts (see Appendix 5 for details on the cost calculations): (1) the programme costs of the 39 TTC tutors (the costs of training the TTC tutors (3 training days of 1 full day, including cost for the trainers) and the coaching of the TTC tutors (2 workshops, 2 days), and the costs of 3 field visits per TTC tutor), (2) the costs of training the 247 SBMs and TTC tutors in the mentoring activities (4 sessions of each 2 days, including costs for the trainers, registration fees and exam costs), (3) the costs of the VVOB staff attributed to training the SBMs and TTC tutors¹¹, and (4) the costs of developing the training material for the training of the TTC tutors¹² and for the training of the SBMs¹³.

If we only calculate the programme and development costs (1, 2 and 4), the costs of the mentoring and monitoring programme (training, coaching, field visit by the TTC tutors, and training the SBMs) are €965,00 per school, compared to €465,00/school for the mentoring programme only. If we also include the proportionate VVOB staff costs (part 3), the costs are €1750,00 per school for the mentoring and monitoring programme, and €880,00 per school for the mentoring only programme. See Appendix 5 for the underlying calculations.

8 As the 19 SBMs who did not finish the training programme dropped out in various stages of the programme, and costs were being made until they dropped out, we calculate each drop out as 0.5 participant in order to calculate the costs per SBM. Leading to a total of 223 SBMs.

9 Note that because not all schools in the participating districts are part of the effect study, the costs for the TTC tutors are based on a total of 39 TTC tutors, of which only 19 should be counted for the cost effectiveness analysis.

10 223 SBMs and 19 TTC tutors.

11 Note that the total VVOB costs also include for example the costs of coordinating the SSL programme, so costs attributed to the mentoring and monitoring and the mentoring only programme are calculated proportionally, based on costs shares of the three separate training programmes.

12 These costs include transport and accommodation of participants, partners and VVOB staff, costs for materials, and costs for the venue, including for meals and tea breaks.

13 Note that these materials were developed for workshops with in total 399 participants, so this number is used to calculate the costs per school.

The first finding from these costs is that the VVOB office costs attributed to both training programmes are quite high, nearly doubling the costs per school. For sustainable future implementation of the training programmes it seems worthwhile to investigate the necessity and magnitude of these costs, which are calculated based on the second cohort. As the cost calculation including the VVOB office costs reflect the real costs, we work with those numbers in the remainder of our cost effectiveness analysis.

The question is whether these costs of €880,00 per school to train the SBM are worthwhile, given the effectiveness of 0.33 standard deviation more induction programmes being organized and the effectiveness of significantly increased teacher efficacy (0.63 SD), personal accomplishments (0.45 SD) and work related needs satisfaction (0.37 SD). Unfortunately we cannot calculate the benefits to society of these training programmes since no data is collected on teacher retention and/or student performance.¹⁴ For simplicity, we work with the largest found effect in this analysis, with the understanding that the cost effectiveness analysis is most likely an overestimation (upper bound) of the actual costs per 0.1 standard deviation. With respect to teacher efficacy, where we find the largest effect, we find costs of €140 per 0.1 standard deviation of an effect as a lower bound of the effect for the mentoring only treatment, and €225 per 0.1 standard deviation for the mentoring and monitoring treatment.

The third finding is that, regardless of whether we calculate the costs with or without VVOB staff costs, the ratio is about 2, implying that the mentoring and monitoring programme is twice as expensive as the mentoring only programme. From an economic point of view, it is only defensible to invest the extra money in the TTC training programme (the monitoring part of the intervention) if the results are also twice as large compared with the results of the mentoring only programme. This requires first of all that the same outcomes are significantly higher compared with the control group. Table 10.1 shows that all outcomes that are significant for the mentoring only group are also significant for the mentoring and monitoring group. Furthermore, there are 3 outcomes (Job satisfaction, needs for autonomy and emotional exhaustion) that are not significantly different between the mentoring only and control group, but are significantly different when comparing the mentoring and monitoring group with the control group. The last column shows the ratio between the two effects. If the ratio is below 1, the effect of the mentoring only programme is higher than for the mentoring and monitoring programme. If the ratio is larger than one the effect of the mentoring and monitoring programme is larger. We see in Table 10.1 in red that only for three outcomes the ratio is indeed higher than 2, implying that the effect of the mentoring and monitoring programme is more than twice as large as for the mentoring only programme (last column), implying that the additional investment in the TTC tutor training programme is worth the money. This applies to work related needs satisfaction, needs for autonomy and emotional exhaustion.

¹⁴ If data on teacher retention or student outcomes was available we could have calculated the effect per 0.1 standard deviation of an effect, in order for the decision maker (often policy maker) to make an assessment whether the investment in the training programme generate enough effect.

Table 10.1 Standardized Effect Sizes of the effects of the mentoring certificate programmes on teacher outcomes: Ratio between effects

	Mentoring only	Mentoring & Monitoring	Effect size Ratio
Job Satisfaction	0.27	0.39	1.44
Work Related Needs Satisfaction	0.37	0.73	2.00
Needs for autonomy	0.23	0.60	2.63
Needs for relatedness	-0.20	0.10	0.50
Teacher efficacy	0.63	0.78	1.24
Personal accomplishments	0.45	0.58	1.28
Emotional exhaustion	<i>-0.33</i>	-0.83	2.54
Intrinsic motivation	0.20	0.2ca7	1.36
Introjected regulation	0.53	0.46	1.16
Amotivation	0.17	0.16	0.95

* Bold is significant at the 1%-level, italic is significant at the 5% level.

Source From the authors

11 | Conclusion

This report presented the evaluation of a newly developed Certificate Programme on Educational Mentorship and Coaching in Rwanda. A main component of the Certificate Programme on Educational Mentorship and Coaching is to simulate induction activities within primary schools, which consist of mentoring by a SBM and monitoring by a TTC tutor. We have summarized the results of a pre-intervention study, conducted in March 2019, and the results post-intervention, conducted in November 2019.

The main objective of the pre-intervention study was to assess mean differences in pre-intervention characteristics of the respondents between treatment groups (mentoring only, mentoring and monitoring) and a control group, upon realization of random assignment of teachers to the two treatments of the Certificate Programme on Educational Mentorship and Coaching. Further, we have assessed the pre-intervention status of non-cognitive teacher outcomes for the treatment groups and the control group and test for any differences between the two groups. These non-cognitive teacher outcomes include job satisfaction, work related needs satisfaction, job stress and burnout, teacher efficacy and motivation. In order to conduct the pre-intervention study, questionnaires have been administered among a sample of 719 teachers. The pre-intervention study shows that overall the treatment groups and control group are very similar on pre-intervention characteristics and on the pre-intervention outcome measures. We can confirm a successful random assignment to the treatment groups and control group.

In the post-intervention period, we could follow up on 641 respondents (89.15%) who participated in the pre-intervention study. We showed that selectivity in non-response was not an issue for further analysis of the post-intervention data. Results from multivariate regression techniques show that the Certificate Programme on Educational Mentorship and Coaching has led to increased participation rates in induction programmes among the treatment groups compared to the control group. It is through this participation in induction programmes that we have estimated several favourable impacts on teacher outcomes. For example, both treatments, mentoring only, and mentoring and monitoring, are favourable for work related needs, teacher efficacy, personal accomplishments and introjected regulation, and emotional exhaustion.

In general, it holds true that the combination of mentoring and monitoring is more effective than mentoring only. However, when we analyse the cost-effectiveness of the mentoring and monitoring versus the mentoring only programme, we find that the additional investment in monitoring is only cost-effective from a purely economic perspective for work related needs satisfaction, needs for autonomy and emotional exhaustion. For all other outcomes, the monetary value for the additional investment in monitoring is larger than the benefits yielded from monitoring. Despite this observation it still may be worthwhile to invest in monitoring. Largest standardised effects are found for emotional exhaustion and for work related needs satisfaction using a combined mentoring and monitoring treatment, but no significant effects are found for emotional exhaustion, or much smaller effects for work related needs satisfaction when using the mentoring only. Furthermore, 7 out of 10 non-cognitive outcome measures are significant when using mentoring and monitoring together, compared to only 4 out of 10 when using mentoring only. As such, not only larger effects, but also more significant effects are found when using a combined treatment. Besides limited cost-effectiveness for all outcome variables, as such, monitoring in addition to mentoring should be considered as a valuable way to improve non-cognitive teacher outcomes.

Previous literature on the impact of induction programmes on teacher and student outcomes indicate mixed results. These mixed results can be partly explained by the differences in estimation methods used by the authors. For example, based on (qualitative) classroom observations, Everton and Smithey (2000) argue that mentoring is effective for teachers and their students. However, based on a (quantitative) randomized experiment, Glazerman et al. (2010) argue that induction programmes are not effective in increasing teacher satisfaction or teachers' feelings of preparedness.

The RCT is qua methodological approach more in line with Glazerman et al. (2010). However, contrary to Glazerman et al. (Ibidem), this study indicates a positive impact of professional mentoring activities and monitoring on teachers non-cognitive outcomes. Several explanations can be mentioned for these contradictory findings. First, Ingessoll and Strong (2011) argue that teachers in this RCT evaluated by Glazerman and co-authors were followed up only for a limited period in time. The impact of induction programmes was measured among new teachers only in their first year of teaching. In this study, we look at teachers in the first three years in the new school, as such, also including teachers with a lot of teaching experience since graduation, but with only limited experience in the new school. Furthermore, we look at a wider range of non-cognitive teacher outcomes than satisfaction and feelings of preparedness. The effectiveness of induction programmes differ from outcome to outcome, and it may be the case that teachers in the study of Glazerman and co-authors did improve on other (unmeasured, unobserved) set of variables.

While the RCT under evaluation in this study has been conducted with great care, there are limitations to mention. First of all, compared to the pre-intervention period, we find that new teachers in the control group also report increased professional mentoring activities at their school in the post-intervention questionnaire. Additional work on this observation indicates that another experiment on head teacher training, as well as a School Subject Leader (SSL) training was also running in 37 out of 88 control schools. Even though the selection of these head teachers in the experiment was random, this training may have positively impacted organization of and participation in induction programmes in the control group. Consequences for our results are, however, limited, because one can expect that the treatment(s) would have yielded an even more positive result for non-cognitive teacher outcomes in absence of the head teacher training.

Another possible limitation involves the translation of the survey from English to Kinyarwanda. It appears that for some scales in the pre-intervention period we could not retrieve valid and reliable results. Even though we have translated the survey using different experts and native-speakers, 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 neighbourhoods.

Thirdly, for three of the districts we have changed the data collection method from paper in the pre-intervention period to digital in the post-intervention study (the other three districts were digital in both pre and post data collection). This implies that the quality of data collection was different. There are more missing values with the paper-based questionnaires. Furthermore, in the digital data collection digital literate 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 teacher characteristics, it is possible that unobservable characteristics (such as digital literacy) may have played a role here.

appendix 1 Research method

The Mentor Certificate Programme and subsequent induction programme started with a pilot in 2018. During the pilot study in 2018, we have set-up and tested a survey tool for the measurement of the effectiveness of the intervention “induction programmes for New Teachers in Rwanda”. The survey tool measured different non-cognitive teacher outcomes that are expected to change when NT have access to well-designed induction programmes, namely: job satisfaction, motivation, teaching practices, teacher efficacy, and stress and burnout. The measurement instruments underlying these outcomes are discussed in Section **Error! Reference source not found.** To rigorously measure the effectiveness of the Mentor Certificate Programme on the occurrence and quality of the induction programme, VVOB, URCE, REB and the Universities of Leuven and Maastricht established a RCT in 2019, when the programme was rolled out to a larger number of schools.

Based on the RCT, we can compare the average outcomes from the treatment groups with the average outcomes of the control group after the Mentor Certificate Programme has taken place. We then may write:

$$Y_i = \alpha_0 + \beta_1 T_i + \theta_i (T_i \times I_i) + \sigma_i + \varepsilon_i , \quad (1)$$

where Y_i denotes the different teacher outcomes (e.g. motivation, ...) for teacher $i \in \{1, 2, \dots, n\}$; T_i the treatment status of teacher i (Mentoring only, Mentoring & monitoring, or control group); $(T_i \times I_i)$ the interaction effect between the treatment status and the participation dummy in induction programmes; σ_i unobserved variation at the school-level; and ε_i unobserved variation at the level of the teacher. Equation (1) incorporates an interaction effect between the treatment status and the participation dummy in induction programmes, since the intervention (mentoring certificate programmes) may lead to increased participation of the teachers with mentoring (and monitoring) in other induction programmes at the school. In fact, this is the assumed mechanism through which the intervention has a spillover effect on the new teachers in the school. Further, by introducing an interaction term into Equation (1) we account for different estimated regression slopes for the treated teachers (see below regression A), who participate in induction programmes, compared to treated teachers who do not (see below regression B).

$$\begin{aligned} Y_i &= \alpha_0 + (\beta_1 + \theta_i) T_i && \text{when participation in induction is equal to 1} && (A) \\ Y_i &= \alpha_0 + \beta_1 T_i && \text{when participation in induction is equal to 0} && (B) \end{aligned}$$

Two different conditions apply to the treatment group. A first treatment group receives mentoring activities within the scope of the new induction programme. In the second treatment group, a TTC tutor monitors the NTs' performance in addition to the mentoring activities. Therefore, in the remainder of this paper, we distinguish between two treatment groups, namely: the mentoring group only (Treatment 1) and the mentoring and monitoring group (Treatment 2). Therefore, we rewrite Equation (1) as follows:

$$Y_i = \alpha_0 + \beta_1 T_{i1} + \beta_2 T_{i2} + \theta_{i1} (T_{i1} \times I_i) + \theta_{i2} (T_{i2} \times I_i) + \sigma_i + \varepsilon_i , \quad (2)$$

There are a couple of assumptions underlying Equation (2). First, it is important that the intervention groups and the control group are comparable based on observed and unobserved background characteristics. For example, teachers, who participate in the intervention, should have a similar intrinsic motivation for teaching as teachers in the control group. If this condition holds, the effectiveness of the intervention can be ascribed to the intervention, and not to differences in characteristics between treated and untreated individuals. In other words, treated teachers should have similar pre-treatment characteristics than untreated teachers.

A good way for ensuring comparability between the treated and untreated teachers, is random assignment (to the intervention). We describe the sampling procedure in the next Section **Error! Reference source not found.** Random assignment implies that differences between treated and untreated teachers are based on a random error in the assignment process. We test this first assumption by testing for differences in means of the pre-treatment characteristics between the treatment groups and control group by using an independent sample T-test (Section **Error! Reference source not found.**). And finally, we can include the vector with j pre-treatment characteristics X_{ij} into Equation (2):

$$Y_i = \alpha_0 + \beta_1 T_{i1} + \beta_2 T_{i2} + \theta_{i1}(T_{i1} \times I_i) + \theta_{i2}(T_{i2} \times I_i) + \sum \rho_j X_{ij} + \sigma_i + \varepsilon_i . \quad (3)$$

A second assumption underlying Equation (2) deals with the ‘spillover’ of the intervention from participants to non-participants. Spillover effects violate the stable unit treatment value assumption (SUTVA); which implies that untreated teachers benefit from the intervention through access to knowledge of or experiences with induction programmes via treated teachers. In order to meet the SUTVA assumption, treated teachers should not be teaching in control schools, and vice versa. Spillover from treated teachers to untreated teachers is then unlikely.

appendix 2 Tables by subgroups

a2.1 Females

Table 11.1 Experience with induction programmes, pre-intervention measure and post-intervention measure- Females

Question	Pre	Post
Are you familiar with the definition of induction programmes for new teachers?	23%	39%
There was an organized introduction in my school	23%	39%
I took part in general and/or administrative introduction to my school	87%	88%
Do you have a new teacher mentor at your school?	53%	67%
Who is the new teacher mentor? ^{2*}		
School subject leader	21%	14%
Director of studies/deputy head teacher	29%	17%
School based mentor	43%	67%
Other	7%	3%
Do you have a TTC mentor?	20%	21%

Table 11.2 Participation of respondents in professional mentoring activities at their school - Females

Question	Pre	Post
I took part in a professional mentoring programme at my school – Overall	29%	47%
Answers by treatment group: Control Group	27%	30%
Mentoring Group	32%	56%
Mentoring & Monitoring Group	28%	63%

Table 11.3 Participation of respondents in induction activities at their school – Females

	Pre		Post	
	Never	Once a week or more	Never	Once a week or more
Joint lesson planning together with my mentor	62%	17%	48%	12%
Observing mentor teaching	166%	31%	63%	7%
Observing another teacher teaching	105%	61%	38%	19%
Being observed by my mentor	218%	68%	42%	11%
Being observed by another teacher	86%	45%	47%	14%
Individual coaching conversation with my mentor	45%	22%	36%	15%
Developing my individual CPD Plan together with my mentor	65%	22%	42%	14%
Reviewing my individual CPD Plan together with my mentor	62%	23%	46%	15%
Being part of a Community of Practice of teachers teaching the same subject	52%	26%	30%	16%
Being part of a Community of Practice of teachers teaching different subject	51%	18%	42%	15%
Seminars/trainings on topics of concern to new teachers	84%	8%	72%	5%
Analysing student work and results on assessments together with my mentor	70%	13%	61%	8%

Table 11.4 The degree to which respondents currently need formally organized support (pre-intervention) - Females

	No need at present	Low level of need	Moderate level of need	High level of need
Knowledge and understanding of my subject(s)	12%	18%	41%	29%
Pedagogical competences in teaching my subject(s)	11%	26%	37%	27%
Student evaluation and assessment	45%	19%	21%	14%
Student behavior	37%	22%	20%	21%
Strategies to manage big classes	10%	18%	25%	47%
Classroom management and administration	15%	21%	32%	32%

a2.2 Males

Table 11.5 Experience with induction programmes, pre-intervention measure and post-intervention measure – Males

Question	Pre	Post
Are you familiar with the definition of induction programmes for new teachers?	30%	42%
There was an organized introduction in my school	29%	42%
I took part in general and/or administrative introduction to my school	80%	90%
Do you have a new teacher mentor at your school?	54%	69%
Who is the new teacher mentor? ^{2*}		
School subject leader	25%	17%
Director of studies/deputy head teacher	24%	16%
School based mentor	39%	63%
Other	12%	4%
Do you have a 'TTC mentor?	14%	18%

Table 11.6 Participation of respondents in professional mentoring activities at their school - Males

Question	Pre	Post
I took part in a professional mentoring programme at my school – Overall	29%	49%
Answers by treatment group: Control Group	31%	40%
Mentoring Group	28%	49%
Mentoring & Monitoring Group	28%	72%

Table 11.7 Participation of respondents in induction activities at their school – Males

	Pre		Post	
	Never	Once a week or more	Never	Once a week or more
Joint lesson planning together with my mentor	57%	18%	46%	14%
Observing mentor teaching	152%	27%	56%	12%
Observing another teacher teaching	101%	62%	32%	19%
Being observed by my mentor	292%	106%	38%	13%
Being observed by another teacher	86%	40%	37%	15%
Individual coaching conversation with my mentor	47%	21%	38%	18%
Developing my individual CPD Plan together with my mentor	64%	17%	43%	15%
Reviewing my individual CPD Plan together with my mentor	63%	18%	47%	14%
Being part of a Community of Practice of teachers teaching the same subject	56%	18%	38%	14%
Being part of a Community of Practice of teachers teaching different subject	51%	14%	42%	8%
Seminars/trainings on topics of concern to new teachers	81%	7%	63%	5%
Analysing student work and results on assessments together with my mentor	63%	17%	51%	11%

Table 11.8 The degree to which respondents currently need formally organized support (pre-intervention) - Males

	No need at present	Low level of need	Moderate level of need	High level of need
Knowledge and understanding of my subject(s)	14%	26%	34%	26%
Pedagogical competences in teaching my subject(s)	12%	29%	33%	25%
Student evaluation and assessment	40%	24%	21%	16%
Student behavior	34%	26%	21%	20%
Strategies to manage big classes	10%	19%	29%	41%
Classroom management and administration	15%	27%	29%	29%

a2.3 NQT

Table 11.9 Experience with induction programmes, pre-intervention measure and post-intervention measure - NQT

Question	Pre	Post
Are you familiar with the definition of induction programmes for new teachers?	25%	37%
There was an organized introduction in my school	25%	37%
I took part in general and/or administrative introduction to my school	84%	87%
Do you have a new teacher mentor at your school?	55%	70%
Who is the new teacher mentor?*		
School subject leader	24%	16%
Director of studies/deputy head teacher	26%	16%
School based mentor	41%	64%
Other	9%	4%
Do you have a 'TTC mentor?	17%	18%

Table 11.10 Participation of respondents in professional mentoring activities at their school - NQT

Question	Pre	Post
I took part in a professional mentoring programme at my school – Overall	29%	45%
Answers by treatment group: Control Group	31%	35%
Mentoring Group	26%	48%
Mentoring & Monitoring Group	27%	63%

Table 11.11 Participation of respondents in induction activities at their school – NQT

	Pre		Post	
	Never	Once a week or more	Never	Once a week or more
Joint lesson planning together with my mentor	60%	17%	49%	14%
Observing mentor teaching	152%	29%	60%	10%
Observing another teacher teaching	100%	62%	35%	20%
Being observed by my mentor	248%	94%	40%	13%
Being observed by another teacher	82%	40%	41%	14%
Individual coaching conversation with my mentor	44%	24%	37%	16%
Developing my individual CPD Plan together with my mentor	61%	20%	44%	15%
Reviewing my individual CPD Plan together with my mentor	60%	20%	48%	15%
Being part of a Community of Practice of teachers teaching the same subject	52%	22%	34%	17%
Being part of a Community of Practice of teachers teaching different subject	48%	16%	43%	13%
Seminars/trainings on topics of concern to new teachers	80%	8%	66%	5%
Analysing student work and results on assessments together with my mentor	64%	15%	56%	8%

Table 11.12 The degree to which respondents currently need formally organized support (pre-intervention) - NQT

	No need at present	Low level of need	Moderate level of need	High level of need
Knowledge and understanding of my subject(s)	12%	23%	37%	27%
Pedagogical competences in teaching my subject(s)	11%	29%	34%	26%
Student evaluation and assessment	43%	23%	20%	14%
Student behavior	36%	24%	21%	19%
Strategies to manage big classes	10%	20%	27%	44%
Classroom management and administration	15%	26%	30%	29%

a2.4 NAT

Table 11.13 Experience with induction programmes, pre-intervention measure and post-intervention measure – NAT

Question	Pre	Post
Are you familiar with the definition of induction programmes for new teachers?	32%	50%
There was an organized introduction in my school	31%	50%
I took part in general and/or administrative introduction to my school	79%	96%
Do you have a new teacher mentor at your school?	49%	61%
Who is the new teacher mentor?*		
School subject leader	23%	13%
Director of studies/deputy head teacher	27%	16%
School based mentor	38%	68%
Other	12%	3%
Do you have a 'TTC mentor?	16%	25%

Table 11.14 Participation of respondents in professional mentoring activities at their school - NAT

Question	Pre	Post
I took part in a professional mentoring programme at my school – Overall	31%	57%
Answers by treatment group: Control Group	24%	38%
Mentoring Group	39%	66%
Mentoring & Monitoring Group	31%	78%

Table 11.15 Participation of respondents in induction activities at their school – NAT

	Pre		Post	
	Never	Once a week or more	Never	Once a week or more
Joint lesson planning together with my mentor	57%	18%	43%	10%
Observing mentor teaching	176%	27%	56%	8%
Observing another teacher teaching	110%	59%	35%	18%
Being observed by my mentor	267%	64%	41%	8%
Being observed by another teacher	101%	51%	44%	16%
Individual coaching conversation with my mentor	52%	14%	35%	18%
Developing my individual CPD Plan together with my mentor	75%	17%	38%	14%
Reviewing my individual CPD Plan together with my mentor	72%	19%	43%	12%
Being part of a Community of Practice of teachers teaching the same subject	62%	20%	35%	10%
Being part of a Community of Practice of teachers teaching different subject	59%	15%	40%	6%
Seminars/trainings on topics of concern to new teachers	92%	5%	69%	5%
Analysing student work and results on assessments together with my mentor	72%	16%	54%	14%

Table 11.16 The degree to which respondents currently need formally organized support (pre-intervention) - NAT

	No need at present	Low level of need	Moderate level of need	High level of need
Knowledge and understanding of my subject(s)	15%	20%	37%	28%
Pedagogical competences in teaching my subject(s)	12%	23%	39%	26%
Student evaluation and assessment	39%	20%	23%	18%
Student behavior	35%	22%	19%	23%
Strategies to manage big classes	13%	15%	27%	45%
Classroom management and administration	16%	20%	31%	34%

a2.5 Control group

Table 11.17 Experience with induction programmes, pre-intervention measure and post-intervention measure – Control

Question	Pre	Post
Are you familiar with the definition of induction programmes for new teachers?	30%	38%
There was an organized introduction in my school	29%	38%
I took part in general and/or administrative introduction to my school	82%	87%
Do you have a new teacher mentor at your school?	57%	58%
Who is the new teacher mentor?*		
School subject leader	28%	19%
Director of studies/deputy head teacher	20%	20%
School based mentor	43%	58%
Other	10%	3%
Do you have a 'TTC mentor?	15%	11%

Table 11.18 Participation of respondents in induction activities at their school – Control

	Pre		Post	
	Never	Once a week or more	Never	Once a week or more
Joint lesson planning together with my mentor	58%	17%	51%	14%
Observing mentor teaching	67%	12%	63%	10%
Observing another teacher teaching	37%	25%	38%	20%
Being observed by my mentor	49%	16%	42%	11%
Being observed by another teacher	75%	43%	42%	14%
Individual coaching conversation with my mentor	46%	21%	41%	15%
Developing my individual CPD Plan together with my mentor	63%	19%	48%	13%
Reviewing my individual CPD Plan together with my mentor	62%	21%	52%	13%
Being part of a Community of Practice of teachers teaching the same subject	52%	22%	38%	14%
Being part of a Community of Practice of teachers teaching different subject	43%	15%	47%	9%
Seminars/trainings on topics of concern to new teachers	81%	6%	73%	3%
Analysing student work and results on assessments together with my mentor	68%	13%	56%	8%

Table 11.19 The degree to which respondents currently need formally organized support (pre-intervention) - Control

	No need at present	Low level of need	Moderate level of need	High level of need
Knowledge and understanding of my subject(s)	14%	23%	34%	29%
Pedagogical competences in teaching my subject(s)	14%	26%	34%	26%
Student evaluation and assessment	43%	22%	21%	14%
Student behavior	33%	26%	21%	20%
Strategies to manage big classes	9%	18%	25%	48%
Classroom management and administration	17%	24%	27%	31%

a2.6 Mentoring only group

Table 11.20 Experience with induction programmes, pre-intervention measure and post-intervention measure – Mentoring

Question	Pre	Post
Are you familiar with the definition of induction programmes for new teachers?	23%	41%
There was an organized introduction in my school	23%	41%
I took part in general and/or administrative introduction to my school	84%	91%
Do you have a new teacher mentor at your school?	54%	70%
Who is the new teacher mentor?*		
School subject leader	17%	12%
Director of studies/deputy head teacher	36%	12%
School based mentor	38%	73%
Other	8%	4%
Do you have a 'TTC mentor?	20%	13%

Table 11.21 Participation of respondents in induction activities at their school – Mentoring

	Pre		Post	
	Never	Once a week or more	Never	Once a week or more
Joint lesson planning together with my mentor	58%	21%	48%	10%
Observing mentor teaching	69%	12%	57%	11%
Observing another teacher teaching	44%	21%	34%	20%
Being observed by my mentor	44%	17%	41%	11%
Being observed by another teacher	88%	41%	42%	15%
Individual coaching conversation with my mentor	43%	21%	38%	15%
Developing my individual CPD Plan together with my mentor	61%	20%	43%	16%
Reviewing my individual CPD Plan together with my mentor	61%	20%	46%	14%
Being part of a Community of Practice of teachers teaching the same subject	57%	20%	34%	13%
Being part of a Community of Practice of teachers teaching different subject	56%	15%	39%	11%
Seminars/trainings on topics of concern to new teachers	80%	10%	64%	6%
Analysing student work and results on assessments together with my mentor	62%	17%	55%	11%

**Table 11.22 The degree to which respondents currently need formally organized support (pre-intervention)
- Mentoring**

	No need at present	Low level of need	Moderate level of need	High level of need
Knowledge and understanding of my subject(s)	11%	22%	41%	26%
Pedagogical competences in teaching my subject(s)	9%	27%	36%	27%
Student evaluation and assessment	44%	22%	19%	15%
Student behavior	39%	23%	17%	21%
Strategies to manage big classes	12%	19%	29%	40%
Classroom management and administration	11%	25%	32%	32%

a2.7 Mentoring and monitoring group

Table 11.23 Experience with induction programmes, pre-intervention measure and post-intervention measure – Mentoring and monitoring

Question	Pre	Post
Are you familiar with the definition of induction programmes for new teachers?	28%	46%
There was an organized introduction in my school	29%	46%
I took part in general and/or administrative introduction to my school	83%	91%
Do you have a new teacher mentor at your school?	47%	87%
Who is the new teacher mentor?*		
School subject leader	28%	17%
Director of studies/deputy head teacher	18%	17%
School based mentor	40%	62%
Other	13%	4%
Do you have a 'TTC mentor?	13%	54%

Table 11.24 Participation of respondents in induction activities at their school – Mentoring and monitoring

	Pre		Post	
	Never	Once a week or more	Never	Once a week or more
Joint lesson planning together with my mentor	65%	13%	38%	17%
Observing mentor teaching	70%	14%	54%	7%
Observing another teacher teaching	35%	24%	30%	16%
Being observed by my mentor	53%	13%	31%	16%
Being observed by another teacher	112%	48%	38%	16%
Individual coaching conversation with my mentor	52%	25%	26%	24%
Developing my individual CPD Plan together with my mentor	74%	17%	28%	17%
Reviewing my individual CPD Plan together with my mentor	68%	19%	36%	20%
Being part of a Community of Practice of teachers teaching the same subject	56%	23%	26%	23%
Being part of a Community of Practice of teachers teaching different subject	57%	20%	39%	15%
Seminars/trainings on topics of concern to new teachers	90%	6%	60%	6%
Analysing student work and results on assessments together with my mentor	70%	14%	53%	9%

Table 11.25 The degree to which respondents currently need formally organized support (pre-intervention) - Mentoring and monitoring

	No need at present	Low level of need	Moderate level of need	High level of need
Knowledge and understanding of my subject(s)	15%	21%	36%	28%
Pedagogical competences in teaching my subject(s)	11%	31%	35%	23%
Student evaluation and assessment	37%	21%	24%	18%
Student behavior	33%	22%	26%	18%
Strategies to manage big classes	9%	20%	29%	43%
Classroom management and administration	18%	23%	33%	26%

appendix 3 Other tables

Table 11.26 Participation of respondents in induction activities at their school- PRE

	Never	Less than once a month	Once a month	Every two weeks	Once a week	Several times a week	Every day
Joint lesson planning together with my mentor	59%	7%	12%	5%	8%	6%	3%
Observing mentor teaching	67%	6%	11%	3%	7%	4%	1%
Observing another teacher teaching	39%	13%	18%	6%	11%	8%	4%
Being observed by my mentor	48%	9%	21%	6%	9%	7%	0%
Being observed by another teacher	45%	10%	18%	5%	9%	9%	4%
Individual coaching conversation with my mentor	45%	9%	19%	6%	11%	7%	3%
Developing my individual CPD Plan together with my mentor	58%	7%	13%	6%	10%	5%	2%
Reviewing my individual CPD Plan together with my mentor	56%	8%	13%	5%	10%	5%	3%
Being part of a Community of Practice of teachers teaching the same subject	49%	12%	15%	5%	11%	6%	2%
Being part of a Community of Practice of teachers teaching different subject	46%	15%	18%	7%	8%	5%	1%
Seminars/trainings on topics of concern to new teachers	74%	8%	8%	3%	4%	2%	0%
Analysing student work and results on assessments together with my mentor	60%	8%	14%	4%	7%	5%	2%

Table 11.27 Participation of respondents in induction activities at their school- POST

	Never	Less than once a month	Once a month	Every two weeks	Once a week	Several times a week	Every day
Joint lesson planning together with my mentor	47%	13%	22%	5%	7%	5%	1%
Observing mentor teaching	59%	10%	18%	3%	6%	3%	1%
Observing another teacher teaching	35%	21%	21%	5%	11%	7%	1%
Being observed by my mentor	40%	17%	25%	6%	7%	4%	1%
Being observed by another teacher	41%	19%	20%	5%	7%	6%	2%
Individual coaching conversation with my mentor	37%	17%	23%	6%	8%	6%	2%
Developing my individual CPD Plan together with my mentor	42%	14%	24%	5%	9%	5%	1%
Reviewing my individual CPD Plan together with my mentor	46%	12%	22%	5%	9%	5%	1%
Being part of a Community of Practice of teachers teaching the same subject	34%	20%	24%	7%	11%	2%	2%
Being part of a Community of Practice of teachers teaching different subject	42%	20%	21%	5%	7%	3%	1%
Seminars/trainings on topics of concern to new teachers	67%	14%	12%	2%	3%	1%	0%
Analysing student work and results on assessments together with my mentor	55%	15%	16%	3%	5%	3%	1%

appendix 4 Full model estimates

Table 11.28 Full model estimates

	Job Satisfaction	Work Related Needs	Needs for Autonomy	Needs for Relatedness	Teaching Efficacy
(Ref. Control group)					
Mentoring only	-0.0671 (0.1085)	-0.0404 (0.0738)	-0.0876 (0.1470)	0.0525 (0.0242)	-0.1052 (0.0736)
Mentoring&Monitoring	-0.1333 (0.1223)	-0.1740 (0.0897)	-0.3676 (0.1767)	0.0167 (0.0380)	-0.1747 (0.0865)
(Ref. No Induction)					
Mentoring only	0.1912 (0.0966)	0.1099 (0.0710)	0.1592 (0.1464)	-0.0437 (0.0273)	0.2513 (0.0633)
Mentoring&Monitoring	0.2659 (0.1200)	0.2213 (0.0937)	0.4247 (0.1903)	0.0204 (0.0459)	0.3073 (0.0979)
Pre-Score	0.4864 (0.0478)	0.4122 (0.0484)	0.2913 (0.0517)	0.1749 (0.0522)	0.3688 (0.0629)
Male	-0.0317 (0.0492)	-0.0359 (0.0286)	-0.1213 (0.0653)	0.0051 (0.0168)	0.0582 (0.0305)
Age	-0.0022 (0.0069)	-0.0069 (0.0036)	-0.0202 (0.0083)	-0.0025 (0.0021)	0.0020 (0.0036)
Teacher in primary vs. secondary	-0.0439 (0.0648)	-0.0421 (0.0432)	-0.1604 (0.0927)	-0.0084 (0.0243)	0.0332 (0.0482)
(Ref. level-1)					
level-2	0.0125 (0.0911)	-0.0720 (0.0599)	-0.2032 (0.1302)	0.0076 (0.0240)	-0.0039 (0.0763)
level-3 or 4	0.0324 (0.1155)	-0.0681 (0.0672)	-0.2290 (0.1578)	-0.0042 (0.0420)	0.0161 (0.0655)
Teaching experience (since graduation)	0.0174 (0.0097)	0.0150 (0.0051)	0.0439 (0.0116)	0.0020 (0.0027)	0.0065 (0.0050)
Teaching experience (in this school)	-0.0154 (0.0246)	0.0139 (0.0150)	0.0278 (0.0352)	-0.0040 (0.0093)	-0.0177 (0.0150)
Travel time	0.0001 (0.0009)	-0.0003 (0.0005)	-0.0012 (0.0010)	-0.0002 (0.0002)	0.0000 (0.0005)
Constant	1.9891 (0.2821)	2.0098 (0.2078)	2.8414 (0.3211)	2.5715 (0.1602)	2.1249 (0.2632)

Table 11.29 Full model estimates (Continued)

	Personal Accomplishments	Emotional Exhaustion	Intrinsic Motivation	Identified Regulation	Amotivation
(Ref. Control group)					
Mentoring only	-0.0860 (0.0839)	0.0997 (0.0765)	-0.1639 (0.1136)	-0.3255 (0.2175)	-0.1912 (0.0783)
Mentoring&Monitoring	-0.1700 (0.1017)	0.2930 (0.0984)	-0.1891 (0.1656)	-0.4974 (0.2817)	-0.0102 (0.0973)
(Ref. No Induction)					
Mentoring only	0.1815 (0.0760)	-0.1292 (0.0728)	0.1249 (0.1211)	0.5576 (0.1942)	0.1218 (0.0795)
Mentoring&Monitoring	0.2321 (0.1054)	-0.3370 (0.1034)	0.1891 (0.1804)	0.6494 (0.3092)	0.1345 (0.1217)
Pre-Score	0.2640 (0.0567)	0.6131 (0.0589)	0.3940 (0.0639)	0.2967 (0.0428)	0.1941 (0.0410)
Male	0.0036 (0.0300)	0.0409 (0.0343)	-0.0514 (0.0597)	-0.0404 (0.1040)	0.0158 (0.0555)
Age	0.0027 (0.0042)	-0.0048 (0.0042)	0.0109 (0.0066)	0.0242 (0.0132)	0.0028 (0.0081)
Teacher in primary vs. secondary	-0.1507 (0.0456)	0.0894 (0.0509)	-0.1303 (0.0824)	-0.3874 (0.1310)	-0.0109 (0.0722)
(Ref. level-1)					
level-2	0.0151 (0.0611)	-0.0314 (0.0785)	-0.1560 (0.1328)	0.1140 (0.2016)	0.2384 (0.1553)
level-3 or 4	-0.0118 (0.0666)	0.0310 (0.0542)	-0.0395 (0.1717)	-0.2432 (0.2164)	-0.1077 (0.0821)
Teaching experience (since graduation)	0.0118 (0.0056)	0.0005 (0.0063)	-0.0023 (0.0097)	-0.0043 (0.0181)	-0.0131 (0.0101)
Teaching experience (in this school)	0.0012 (0.0143)	-0.0120 (0.0187)	0.0160 (0.0309)	-0.0214 (0.0584)	0.0118 (0.0252)
Travel time	0.0005 (0.0004)	0.0000 (0.0006)	0.0007 (0.0007)	0.0004 (0.0016)	0.0007 (0.0008)
Constant	2.6380 (0.2299)	0.7798 (0.1366)	2.4406 (0.3428)	1.8668 (0.3926)	1.0720 (0.2069)

appendix 5 Additional information on costs

List of total costs	Total
Total costs TTC training programme (TP)	46,155.88 €
Total costs SBM TP	109,201.44 €
Total costs developing materials TTC TP	7,411.59 €
Total costs developing materials SMB TP (for 399 participants)	5,780.00 €
Total salary costs staff VVOB	140,243.23 €
(Total costs SSL TP (not part of research project, but needed to calculate proportionate costs of VVOB staff costs)	50,444.09 €
Calculate proportion of VVOB office costs attributable to TTC TP and SBM TP	
Total costs TTC TP, SBM TP, SSL TP (not included in this research project, but part of the total VVOB staff costs)and developing materials	213,213.00 €
Share VVOB staff costs attributed to TTC TP	0.22
Share VVOB staff costs attributed to SBM TP	0.51
Costs VVOB staff costs attributed to TTC TP	39,768.34 €
Costs VVOB staff costs attributed to SBM TP	94,088.99 €
Costs TTC TP	
Training Programme costs	46,155.88 €
Developing materials costs	7,411.59 €
VVOB Staff costs	39,768.34 €
<i>Total costs TTC TP</i>	93,335.80 €
Total number of TTC tutors trained for this amount	39
Total number of TTC tutors in the research project	19
Total number of schools in research project with trained TTC tutor	52
Costs SBM TP	
Training Programme costs	109,201.44 €
Developing materials costs (for 399 participants)	5,780.00 €
VVOB Staff costs	94,088.99 €
<i>Total costs SBM TP</i>	209,070.44 €
Total number of SBMs trained	223
Total number of TTCs trained in SBM TP	19
Total participants in SBM training	242
Cost calculation per school	
Costs TTC TP per school (total costs/((39*19)/52) - Without VVOB staff costs	501.86 €
Costs TTC TP per school (total costs/((39*19)/52)	874.45 €
Costs SBM TP per school - Without VVOB staff costs	465.73 €
Costs SBM TP per school	878.41 €
Cost per programme per school	

List of total costs	Total
Monitoring and mentoring programme - without VVOB staff costs (costs for training TTC tutor and for training SBM)	967.60 €
Monitoring and mentoring programme (costs for training TTC tutor and for training SBM)	1,752.86 €
Monitoring only programme - without VVOB staff costs (costs for training SBM)	465.73 €
Monitoring only programme (costs for training SBM)	878.41 €

References

- Algozzine, B., Gretes, J., Queen, A. J., & Cowan-Hathcock, M. (2007). Beginning teachers' perceptions of their induction program experiences. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 80(3), 137-143.
- Broeck, A., Vansteenkiste, M., Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-related Basic Need Satisfaction scale. *Journal of Occupational and Organizational Psychology*, 83(4), 981-1002.
- Cabus, S.J., Haelermans, C., Flink, I., Peraer, J. and Gasozintwali, A. (2019). Better Teachers, Better Students? The Role of Induction Programmes for Beginning Teachers. Unpublished Manuscript of KU Leuven, Research Institute for Work and Society (HIVA) & VVOB.
- Evertson, C. M., & Smithey, M. W. (2000). Mentoring effects on proteges' classroom practice: An experimental field study. *The Journal of Educational Research*, 93(5), 294-304.
- Fernet, C., Senécal, C., Guay, F., Marsh, H., & Dowson, M. (2008). The work tasks motivation scale for teachers (WTMST). *Journal of Career assessment*, 16(2), 256-279.
- Furnham, A. (1986). Response bias, social desirability and dissimulation. *Personality and individual differences*, 7(3), 385-400.
- Glazerman, S., Isenberg, E., Dolfen, S., Bleeker, M., Johnson, A., Grider, M., & Jacobus, M. (2010). Impacts of comprehensive teacher induction: Final results from a randomized controlled study (No. 691d9603eb074051b57684e4affae4d4). *Mathematica Policy Research*.
- Glewwe, P. W., Hanushek, E. A., Humpage, S. D., & Ravina, R. (2011). School resources and educational outcomes in developing countries: A review of the literature from 1990 to 2010 (No. w17554). *National Bureau of Economic Research*.
- Hackman, J. R., & Oldham, G. R. (1974). The job diagnostic survey: An instrument for the diagnosis of jobs and the evaluation of job redesign projects (No. TR-4). *YALE UNIV NEW HAVEN CT DEPT OF ADMINISTRATIVE SCIENCES*.
- Hanushek, E. A. (2011). The economic value of higher teacher quality. *Economics of Education review*, 30(3), 466-479.
- Hanushek, E. A., & Rivkin, S. G. (2010). Generalizations about using value-added measures of teacher quality. *The American Economic Review*, 100(2), 267-271.
- Hanushek, E. A., & Woessmann, L. (2017). School resources and student achievement: a review of cross-country economic research. In *Cognitive Abilities and Educational Outcomes* (pp. 149-171). Springer International Publishing.
- Ingersoll, R. M., & Strong, M. (2011). The impact of induction and mentoring programs for beginning teachers: A critical review of the research. *Review of educational research*, 81(2), 201-233.
- Levin, H. M. & C. Belfield (2015). Guiding the development and use of cost-effectiveness analysis in education. *Journal of Research on Educational Effectiveness*, 8 (3), 400-418.
- Maandag, D. W., Deinum, J. F., Hofman, A. W., & Buitink, J. (2007). Teacher education in schools: An international comparison. *European Journal of Teacher Education*, 30(2), 151-173.
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of organizational behavior*, 2(2), 99-113.
- Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual review of psychology*, 52(1), 397-422.
- Ministry of Education (2016). 2015 Education Statistical Yearbook. Ministry of Education: Kigali. 123pp.

- Ngendahayo, E. & Askill-Williams, H. (2016). Rwanda's new competence-based school curriculum: New approaches to assessing student learning needed. In D. Curtis & J. Orrell (Eds), *Publishing higher degree research: Making the transition from student to researcher*. Rotterdam: Sense Publishers.
- Rajan, S., & Engelbrecht, A. (2018). A cross-sectional survey of burnout amongst doctors in a cohort of public sector emergency centres in Gauteng, South Africa. *African Journal of Emergency Medicine*, 8(3), 95-99.
- Richter, D., Kunter, M., Lüdtke, O., Klusmann, U., Anders, Y., & Baumert, J. (2013). How different mentoring approaches affect beginning teachers' development in the first years of practice. *Teaching and Teacher Education*, 36, 166-177.
- Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *The American Economic Review*, 94(2), 247-252.
- Rockoff, J. E. (2008). Does mentoring reduce turnover and improve skills of new employees? Evidence from teachers in New York City (No. w13868). National Bureau of Economic Research.
- Roehrig, A. D., Bohn, C. M., Turner, J. E., & Pressley, M. (2008). Mentoring beginning primary teachers for exemplary teaching practices. *Teaching and Teacher Education*, 24(3), 684-702.
- Schwarzer, R., & Hallum, S. (2008). Perceived teacher self-efficacy as a predictor of job stress and burnout: Mediation analyses. *Applied psychology*, 57(s1), 152-171.
- Smith, T. M., & Ingersoll, R. M. (2004). What are the effects of induction and mentoring on beginning teacher turnover?. *American educational research journal*, 41(3), 681-714.
- Stanulis, R. N., & Floden, R. E. (2009). Intensive mentoring as a way to help beginning teachers develop balanced instruction. *Journal of Teacher Education*, 60(2), 112-122.
- Strong, M. (2005). Teacher induction, mentoring, and retention: A summary of the research. *The New Educator*, 1(3), 181-198.
- Thomas, L., M. Tuytens, G. Devos, G. Kelchtermans, & R. Vanderlinde (2020). Transformational school leadership as a key factor for teachers' job attitudes during their first year in the profession. *Educational Management Administration & Leadership*, 48(1), 106-132.
- Wang, J., Odell, S. J., & Schwillie, S. A. (2008). Effects of teacher induction on beginning teachers' teaching: A critical review of the literature. *Journal of teacher education*, 59(2), 132-152.



VVOB vzw
Julien Dillensplein 1 bus 2A
1060 Brussels
Belgium

T • +32 (0)2 209 07 99
E • info@vvo.org

 www.facebook.com/vvobvzw

 [@VVOBvzw](https://twitter.com/VVOBvzw)

 www.youtube.com/VVOBTube

 www.linkedin.com/company/vvob

www.vvob.be | www.vvob.org



Belgium
partner in development



Flanders
State of the art