



SCALING TEACHER PROFESSIONAL DEVELOPMENT IN BHUTAN

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ABOUT THE LEARNING CYCLE ON TEACHER PROFESSIONAL DEVELOPMENT AT SCALE (TPD@SCALE)

This case study is a result of the KIX EMAP Learning Cycle "Teacher Professional Development at Scale (TPD@Scale)". Facilitated by the TPD@Scale Coalition for the Global South, through the Foundation for Information Technology Education and Development, Inc. (FIT-ED), this course ran from 23 September until 16 December 2022. Across 11 weeks, this Learning Cycle enabled participants to examine how Information and Communication Technologies (ICT)-mediated Teacher Professional Development (TPD) programmes can be scaled through adaptation/localization for a large number of teachers to improve students' learning outcomes. 13 national teams took part in this Learning Cycle: Bangladesh, Bhutan, Georgia, Kyrgyz Republic, Maldives, Moldova, Mongolia, Nepal, Sudan, Tajikistan, Uzbekistan, Vietnam and Yemen.



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LIST OF ACRONYMS AND ABBREVIATIONS

BLF	Building Learning Foundation
CPE	Computadores para Educar
CoPs	Communities of practice
DCPD	Department of Curriculum and Professional Development
ICT	Information and communication technology
MoE	Ministry of Education (then)
MoESD	Ministry of Education and Skills Development (now)
PD	Professional development
PLCs	Professional learning communities
SCE	Samtse College of Education
TCTP	Tu Clase, Tu Pais
TETPP	Adapting and Scaling Technology Enabled Teacher Preparation Programme
TCs	Technological coordinators
TK	Technological knowledge
TPD	Teacher professional development
TDD	Teacher Development Division

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EXECUTIVE SUMMARY

Introduction

In Bhutan, teachers are trained at the two colleges of education under the Royal University of Bhutan, which is supported by the Teacher Development Division (TDD) at Ministry of Education and Skills Development (MoESD). To meet the educational priorities of access, equity, quality and system efficiency stipulated by the MoE in 2014, a reform initiative targeted at professional development (PD) policy was introduced. This policy was specifically introduced to scale and enhance teachers' technological pedagogical content knowledge. It mandates that all teachers should receive 80 hours of needs-based PD programmes yearly.

Challenges and Solutions

The implementation of the 80-hour professional development (PD) per year policy reform has faced several challenges, such as: (i) uneven access to PD opportunities, (ii) PD experiences that are limited in duration and scope, (iii) inadequate funding for high-quality PD initiatives, (iv) a lack of professional learning communities (PLCs), (v) compromised training quality due to inexperience trainers, and (vi) teachers encountering difficulties in acquiring competence in information and communication technologies (ICT).

To address these challenges, it is recommended that the MoESD (i) improve ICT infrastructure and teacher's digital competence by adapting elements from other successful TPD programmes, including coaching, observations, feedback, support from digital advisers, school visits, monthly meetings and sharing of good practices with a PLC, (ii) design appropriate and flexible short offline and online courses using localised materials that can aid teacher learning in collaboration with the two teacher education colleges and (iii) develop a system-wide mechanism for supporting and monitoring the provision of quality TPD.

TPD Scaling Project Proposal

A three-year project (worth approximately \$162,137.00) titled *Adapting and Scaling Technology Enabled Teacher Preparation Programme* (TETPP) aims to train teacher educators, technological coordinators and pre- and in-service teachers in the Samtse District to adapt and scale good practices for technology-enabled approaches. Samtse College of Education (SCE) is the lead organisation and collaborates with several departments at the MoESD, Dzongkhag Education offices and selected secondary schools.

In this project, school technological coordinators (TCs) will be trained to deliver hybrid training and coaching on integrating and observing teachers' integration of technology. Each TC will work with 35 teachers at their school with the support of a college-based technological adviser. In planning the ICT-integrated lessons, two options will be offered: collaborative planning or TC-led planning. Both options will be followed by weekly observation, reflection and feedback. College-based technological advisers will observe lessons monthly and provide benchmarked feedback on their ICT integration. Through this model, teachers will have access to new ideas, practices, coaching and expert support. They will be able to design and test activities in their classroom and engage in peer collaboration.

To assess and evaluate this project, there will be (i) a baseline survey on secondary school teachers' use of ICT, (ii) weekly monitoring of teachers' teaching practices by TCs, (iii) an annual conference to share best practices, (iv) monthly school visits by teacher educators and a project team and (v) an end-of-project survey to ascertain TETPP effectiveness.

PART 1

POLICY BRIEF KNOWLEDGE PRODUCT OF BHUTAN

Introduction

Bhutanese Education System. Modern education came to Bhutan in the early 1960s. However, over the years, Bhutan has made much progress in its education system. The number of schools, students and trained teachers has increased. Most of the curriculum has also been adapted to the Bhutanese context.

At present, primary education covers the pre-primary class and grades I to VI; secondary education comprises two years (grades VII and VIII) of lower secondary school, two years of middle secondary (grades IX and X), and two years of higher secondary education (grades XI and XII). Upon successful completion of higher secondary education, students have the option to pursue their tertiary education within Bhutan as well as abroad. The education is free.

In Bhutan, teachers are trained at the two colleges of education under the Royal University of Bhutan. However, the MoESD supports teachers' professional growth, and the TDD is responsible for it. In enhancing teachers' pedagogical and content knowledge, the Education Blueprint focuses on the four educational dimensions of access, equity, quality and system efficiency (MoE, 2014). In order to achieve these dimensions, the MoE initiated several educational reforms, including instituting a PD policy. This policy was specifically introduced to scale and enhance teachers' technological pedagogical content knowledge. The policy mandates that all teachers should receive 80 hours of needs-based PD programmes in a year (MoE, 2014). Currently, the MoESD acts as a catalyst for programme implementation.

Challenges

Lack of Opportunities. While the policy stipulates that all teachers should receive 80 hours of needs-based professional development (PD) opportunities per year to enhance their technological pedagogical content knowledge, Dhendup et al. (2020) found that many teachers did not have equal chances to engage in PD programs. Furthermore, based on our interactions with teachers, they expressed limited access to

training sessions and workshops. For instance, they noted that well-paid training programs and those offered by the Ministry of Education (MoE) tend to be attended by teachers who have well-established connections. They also raised concerns about the selection process, suggesting that undeserving candidates might be nominated. This highlights a lack of accessibility, equity, and equality, essential components of Teacher Professional Development (TPD). Teachers also mentioned that a small percentage of school participants are engaged in the planning process, with the majority coming from the MoE. This might be attributed to the structured education system, which follows a specific approach.

Low Quality PD. Furthermore, teachers reported that PD programmes in Bhutan are one shot and short-lived, ultimately affecting learning quality (L. Dorji, personal communication, September 30, 2022). In addition, with 80 hours of PD requirements imposed on teachers, the PD programmes have become exhausting and redundant, with low levels of learning taking place. Dhendup et al. (2020) stated that the current requirement of 80 hours PD has affected the quality of the programmes beyond quantification.

Lack of Funds and Quality PD. The teachers also indicated that schools have inadequate funds to obtain external expertise to run PD programmes. Therefore, they use in-house expertise to carry out the PD, which may not be very effective. This phenomenon has caused teachers to question the quality of PD, not because they lack the required knowledge and skills, but because they lack the opportunities to improve their knowledge and skills. Teachers felt that the PD might not be as effective and on par with 21st century pedagogy at regional and international levels. According to Hammond et al. (2017), effective PD is required to help teachers learn and refine the instructional strategies needed to teach complex skills that students need to learn to succeed in the 21st century. Dhendup et al. (2020) reported that schools in Bhutan use the School-Based In-Service Programme as PD for teachers to refine their instructional strategies for teaching and instilling complex skills that students need to thrive in the 21st century. However, they concluded that the development programme appeared ineffective in imparting a continuous learning platform for Bhutanese teachers. It is also evident that it did not provide

the teachers with a platform for continuous learning and development.

Lack of Guidance and Follow-Up. The discussion (with the selected teachers) also showed that the quality of the PD programmes was impaired owing to a lack of expert guidance and follow-up after the training. These factors may have interfered with the quality and efficiency of the PD. An essential part of PD is collaboration during and after the PD through networking and the creation of a PLC. This ensures the health and dissemination of the knowledge and skills acquired from the PD. However, in the Bhutanese context, learning through collaboration and networking is rarely seen or implemented. In addition, the quality of teacher PD is degraded by a lack of funds and resources, which may impede the quality of the PD.

Dilution and Distortion of Training. A popular capacity building method used in Bhutan is the cascade model or 'multiplier' effect concept. It is cost-effective, does not require long periods out of service and uses existing teaching staff as co-trainers (Gilpin, 1997). However, being a part of such a method, we have experienced crucial information being watered down or misinterpreted without appropriate mechanisms and supports to ensure the proliferation of ideas when transmitted to the next level. The literature also highlights that a shortcoming of the cascade model is dilution and distortion of the training—less and less is understood the further one goes down the cascade (Fiske & Ladd, 2004; Hayes, 2000). Hence, an appropriate model or method must be adopted by relevant stakeholders to help the implementers become fully equipped with the knowledge and skills required to implement new ideas in their classrooms. Unless the change agents are adequately trained, they may not have the competence or confidence to steer the PD forward.

Lack of ICT Competence. Information and communication technology (ICT) has the potential to improve teachers' access, engagement and learning outcomes. However, in Bhutan, it was discovered that the technological knowledge (TK) of teachers was poor (Phuntsho et al., 2022). One of the reasons contributing to teachers' poor ICT knowledge is lack of support from school administration and the MoE. This could influence teachers' unwillingness to utilise technology. In addition, teachers residing in rural areas have internet connectivity issues, which are further aggravated by the cost of mobile data. As a result, their learning is impacted. Moreover, teachers do not have access to localised, online and offline materials that are critical for enriching their classroom practice. Due to lack of this support, teachers' classroom practices are impacted,

which in turn impacts students' learning. Dhendup and Kezang (2023) revealed teachers' lack of interest in ICT integration in teacher learning. One notable factor responsible for teachers' lack of enthusiasm for integrating technology in teaching and learning is that the existing Bhutanese education system (BES) is still preoccupied with resolving pedagogical and content-related challenges rather than shifting towards technological integration (Dhendup & Kezang, 2023). This is further impeded by factors such as teachers' lack of experience and expertise, absence of teacher PD in ICT and the absence of infrastructure (Dhendup & Sherab, 2023; Kado et al., 2020; Norbu, 2014).

Conclusion and Recommendations

Research has shown that PD that focuses on classroom practices has a greater impact than programmes with a non-classroom content focus (Gaikhorst et al., 2015). However, in Bhutan, teachers reported that PD activities are often irrelevant and unconnected to the realities of the classroom, which indicates a lack of proper studies on the needs and effectiveness of the PD. To improve classroom practices, the MoESD, especially the TDD, needs to pay attention to varying systemic contexts, such as ICT infrastructure and tools, teachers' digital skills, issues of equity across different sub-groups of teachers, relevance and effectiveness. Further, the MoESD must collaborate with the two teacher education colleges to design appropriate and flexible short courses and localised materials that can aid in teacher learning. The courses and materials should be made accessible both online and offline to accommodate disadvantaged teachers. This will be a more sustainable way of propelling the ideas and ensuring that these ideas are effectively implemented in classrooms. Moreover, there is a need to streamline the PD policy to provide adequate knowledge and skills and to ensure equity, equality, quality, access and efficiency.

Additionally, teachers identified the necessity for ongoing monitoring, assessment, reflection and feedback for any programme to be successful. However, in Bhutan, this is not the case. There are practically no follow-up actions to improve the programme or large-scale research carried out to determine the impact of PD on teachers' learning and student learning, nor has any assessment been made to check if the teachers' classroom practices have evolved or changed as a result of these PD programmes. Such practice is crucial for enhancing the quality of TPD and teachers' learning. In line with this, recent literature calls for better quality assessment of such programmes and better linkages to student learning outcomes (Popova et al., 2021). Therefore, an effective mechanism for

supporting and monitoring needs to be instituted to bring about system-wide improvement and change and to enhance the quality of teacher learning through the provision of quality TPD.

In addition, the MoESD needs to rethink education from a technological perspective. Thus, the MoESD needs to develop programmes that support teachers' digital skills and equip them for 21st century education. The MoE should also develop an ICT infrastructure for schools to ensure quality teacher learning employing technology. This can be achieved by collaborating with the colleges of education, as they train teachers who are agents of change in the school system. In doing this, the project should adapt aspects from CPE, Ceará, BLF Rwanda and TCTP models to equip teacher educators, student teachers and secondary school teachers with the knowledge and skills in technology to actively engage their students in meaningful learning. Elements such as coaching, observation of technology integration, feedback, collaborative interactions with peers/experts, maintaining a digital portfolio, support from college-based digital advisers, school visits, monthly meetings, remote follow-up via WhatsApp and Telegram and sharing of good practices should be used to enhance teachers' technological skills and technological integration in the classroom practice to improve student learning.

PART 2

PROPOSAL FOR A PROJECT ON ADAPTING AND SCALING TETPP

Proposed Project Overview

1. Project Particulars

(a) Project Title:

Adapting and Scaling Technology Enabled Teacher Preparation Programme (TETPP)

(b) Project Context

The 21st century is often regarded as an era of ICT. As in any other field, technology also plays an important role in education. Considering the indispensable role technology has on education, iSherig-2 ICT Education Master Plan 2019–2023 emphasises the pervasive use of ICT in teaching and learning to make learners ‘nationally rooted and globally competent citizens through equitable and pervasive use of emerging and relevant technology’ (MoE, 2019, p. xi). Similarly, the importance of technology was reiterated in the recent Royal Decree whereby His Majesty stated the need to revisit the curriculum, pedagogy, learning processes and assessments to either transform or rewrite them in view of the challenges and opportunities of the 21st century. His Majesty further stressed that the continued focus on textbooks and content without integrating technology and social learning risks perpetuating passive modes of learning. Thus, to address these key concerns, in the current education reform initiative, technology is placed at the centre of education reform. For example, as part of a reform initiative, the MoE has started an innovative ICT-integrated pilot classroom project in Dechencholing Higher Secondary School and Loselling Middle Secondary School in Thimphu. This project aims to improve the education environment through increased access to the digital world, enhanced teacher competency, knowledge and skills in ICT and dissemination of those skills to students.

Bhutan considers teachers to be the cornerstone of the education system and they are one of the country’s most highly paid civil servants. Teachers are trained in the two colleges of education and they are also sent abroad for higher studies through government scholarships. Considering the

importance of the need to constantly update teachers with the latest knowledge and teaching pedagogies, the MoESD has mandated that every teacher receive a minimum of 80 hours of needs-based PD each year (MoE, 2014). The MoESD established the TDD in 2016 to oversee the PD process and monitor its effectiveness.

In recent times, recognising the potential of ICT in education and harnessing the opportunity and aligning teachers with the digital generation, the MoE has initiated intensive teacher training in Gelephu. During the opening ceremony of the ICT training, His Excellency Dr Lotay Tshering, Prime Minister of Bhutan, who graced the ceremony as a guest of honour, expressed that:

Until today, Dzongkha and English subjects are considered two of the main subjects to be eligible to progress to higher grades. But now, I have talked with the Education Minister, secretary and other education experts and have made ICT as the third language for all classes. You will not be promoted to the next grade if you fail in ICT subject. (Dorji, 2020)

He also added that all schools will be equipped with at least one computer lab each by March 2021. More than 270 ICT teachers and 118 general teachers have been trained to teach ICT in primary classes. Plans are underway to train additional teachers soon. While this initiative has empowered a small percentage of school teachers, the upscaling has yet to take its full roots. This plan was adversely affected by the COVID-19 pandemic outbreak, schools’ readiness in terms of infrastructure and equipment and teachers’ competencies in terms of ICT knowledge and skills. This proposed project is timely and will complement the initiatives of the MoESD.

It is expected that the proposed project will strengthen students’ digital literacy and increase their overall learning outcomes (Dolkar, 2022). Alongside the MoESD’s initiative to build teachers’ technological skills, the two colleges of education have an equal role to play in realising the goals of the national policy and vision of the Royal Decree, as the colleges are responsible for training teachers in the country. Despite these initiatives, in Bhutan, it was discovered that the

TK of teachers was poor (Phuntsho et al., 2022). One of the reasons contributing to teachers' poor ICT knowledge is lack of resources and support from school administration and the MoESD. Burns and Lawrie (2015) indicated that headteacher/school leader support, presence of a more experienced facilitator and access to expertise (ideally a combination of face-to-face and remote support) are critical. The absence of these elements could influence teachers' willingness to utilise technology. In addition, teachers residing in rural areas have internet connectivity issues, which are further aggravated by the cost of mobile data. As a result, their learning is impacted. Teachers do not have access to localised, online and offline materials that are critical for enriching their classroom practice. Hence, due to this lack of support, teachers' classroom practices are impacted, which in turn impacts students' learning. Additionally, Dhendup and Kezang (2023) revealed teachers' lack of interest in ICT integration in teacher learning. One notable factor responsible for teachers' lack of enthusiasm for integrating technology in teaching and learning is that the existing BES is still preoccupied with resolving pedagogical and content-related challenges rather than shifting towards technological integration (Dhendup & Kezang, 2022). This is further impeded by factors such as teacher's lack of experience and expertise, absence of teacher PD in ICT and the absence of infrastructure (Dhendup & Sherab, 2022; Kado et al., 2020; Norbu, 2014). Thus, this proposed project on technology-enabled teacher preparation aims to enhance in-service and pre-service teachers' capacity to adapt and scale good practices of the technology-enabled approach in schools and the education system.

(c) Target Participants

The primary target of the project will be the faculty members of SCE and the secondary school teachers of the Samtse District in Bhutan. The project also aims to engage in-service and pre-service teacher trainees at the college.

(d) Project Duration:

3 Years

(e) Estimated Project Costs:

Nu. 13,309,720/\$162,869.70

2. Project Group Members and Partners

3. Summary of the Proposed Project

The proposed project on technology-enabled teacher preparation aims to train teacher educators and TCs to adapt and scale good practices of the technology-enabled approach to education to the school system. It also aims to build the technological competence of the TCs from the schools. The project will enhance teacher educators' and pre-

service and in-service teachers' technological capacities for teaching, learning and assessment. The pre-service teachers, along with the teacher educators and TCs, will further scale the good practices to the school system, which in turn will impact the professional practice of the school teachers and lead to improved classroom practices.

Teacher educators play a pivotal role in the application and modelling of knowledge and skills with regards to ICT in teaching, learning and assessment for pre- and in-service teachers. The pre-service teachers will practice and use ICT during their teacher preparation with facilitation and guidance from the teacher educators. The empowered pre-service teachers will take the knowledge and skills forward to the schools when they graduate and immerse themselves in the schools. Likewise, the selected in-service teachers will infuse ICT in their daily lesson plans, which will eventually make the teaching and learning process more interactive and align with the interests and competence of the digital learners. Besides their own application, they will also motivate and inspire their peers in schools. All these processes will lead to the establishment and enhancement of collaboration among the teacher educators, school teachers, school management and other relevant stakeholders to initiate and scale up other relevant PD programmes and practices in the future.

The outcomes of this proposed project are expected to further enhance the professional knowledge and skills of teachers in achieving technology-enabled practices in teaching, learning and assessment. The elevated knowledge and skills on technology-enabled practices can nurture and enhance the 21st century learning needs of students, thereby realising the national goal of 'nationally rooted and globally competent citizens through equitable and pervasive use of emerging and relevant technology' (MoE, 2019, p. 1).

Proposed Project Description

1. Main aim, objectives and deliverables in the context of a targeted set of challenges and issues

Several studies demonstrate numerous issues with teacher PD in Bhutan (Dhendup et al., 2020; Kado et al., 2020; Norbu, 2014; Sherab & Dendup, 2022). Although Bhutan's education policy mandates that all teachers should attend 80 hours of needs-based PD each year to improve their technological pedagogical content knowledge, this is not achieved. For instance, Dhendup et al.'s (2020) study with school teachers reported that many teachers did not get equal and uniform opportunities to participate in PD programmes. The authors also indicated that schools have inadequate funds to engage external experts to run PD programmes. Therefore, they use in-house experts to carry out the PD, which only adds to the quantity of PD attended and is not very effective. Further, PD programmes in Bhutan are impaired owing to a lack of expert guidance and follow-up after the training.

Burns and Lawrie (2015) reported that TPD has been successful and resulted in improved instruction and student learning outcomes due to teacher collaboration (Burns & Lawrie, 2015). However, in Bhutan, learning through collaboration and networking is minimal owing to the existing school structure, lack of exposure, funds and resources, among many other reasons.

ICT has the potential to improve teachers' access, engagement and learning outcomes. However, in Bhutan, it was discovered that the TK of teachers was poor (Phuntsho et al., 2022). One of the reasons contributing to teachers' poor ICT knowledge is lack of support from the school administration and the MoE. Burns and Lawrie (2015) indicated that headteacher/school leader support, presence of a more experienced facilitator and access to expertise (ideally a combination of face-to-face and remote support) are critical. The absence of these elements could have influenced teachers' willingness to utilise technology. In addition, teachers residing in rural areas have internet connectivity issues, which are further aggravated by the cost of mobile data. As a result, their learning is impacted. Moreover, teachers do not have access to localised, online and offline materials that are critical for enriching their classroom practice. Due to this lack of support, teachers' classroom practices are impacted, which in turn impacts students' learning. Additionally, Dhendup and Kezang (2023) revealed teachers' lack of interest in ICT integration in teacher learning. One notable factor responsible for teachers' lack of enthusiasm for integrating technology in teaching and learning is that the existing BES is still preoccupied with resolving pedagogical and content-related challenges rather than shifting towards technological integration (Dhendup & Kezang, 2023). This is further impeded by factors such as teachers' lack of experience and expertise, absence of teacher PD in ICT and the absence of infrastructure (Dhendup & Sherab, 2023; Kado et al., 2020; Norbu, 2014).

Thus, in the context of these challenges and issues, this project on technology-enabled teacher preparation aims to achieve the following key objectives:

1. Enhance 49 teacher educators' and five TCs' competency in the use of technology;
2. Identify five TCs from five higher secondary schools;
3. Develop teacher educators and TCs' technological skills to improve their professional practice;
4. Enhance the capacity of 35 teachers from five secondary schools to adapt and scale up good practices of the technology-enabled approach to education to the school system;
5. Enhance teacher educators' and teachers' capacity for quality classroom teaching and learning;
6. Strengthen Communities of Practice (CoPs) through collaboration with five secondary schools of the Samtse Dzongkhag and then with the higher secondary schools of other Dzongkhags in the country;

7. Maintain teachers' personalised digital portfolios (personal reflections, digital resources in any format and lesson plans);
8. Develop one blended learning course supported by digital resource packages; and
9. Equip schools and colleges with required ICT equipment and accessories to support technology-enabled teaching and learning.

Addressing and balancing quality, equity and efficiency

issues: Considering the existing inconsistencies in the PD practices in the system, the proposed project commits to ensure quality, equity and efficiency as its utmost priorities throughout the project. To ensure quality, the core project team members will incorporate knowledge, skills and best practices learnt from the TPD@Scale workshop. The project members, including teacher educators and TCs, will be trained on TETPP through online and face-to-face sessions. The overall quality will be ensured through participatory planning, collaboration, capacity building, timely monitoring and support systems. To ensure equitable participation and opportunity for all, the team will work in close collaboration with all its project partners through inclusive and participatory planning, implementation, monitoring and evaluation processes. Critical social aspects relevant to the project, such as gender representation, inclusion of participants with special needs, location of the school and critical needs analysis, will be prioritised. Throughout the project, as per the plan, periodic monitoring, meeting, consolidation and timely reporting will be carried out to ensure the efficiency of the project. A constructive feedback system will be established among the project team and participants through the use of effective digital tools. Thus, the project aims to create a large community of learners and innovators inspiring and supporting each other.

2. The approach/framework/model and strategies of the project

TPD@Scale programmes need to be sustainable, flexible and adaptive to changing needs if they are to support the drive for transformative change in teaching and learning and increased teacher professionalism.

Recent evidence from Ecuador (SUMMA, 2020) highlights the importance of TPD being contextualised, focusing on classroom practice and conditions and providing guidance for experimenting with new practices in an exploratory way that relates to the subject matter, students and context of each teacher. More importantly, the TPD content needs to align with the learning needs of the teacher, which in turn must connect to the learning needs of their students (Allier-Gagneur et al., 2020; Bainton et al., 2016; Burns & Lawrie, 2015; Haßler, 2020; Haßler et al., 2020; Power et al., 2019, as cited in Boateng & Wolfenden, 2021). In contextualising any TPD programme, according to Haßler et al. (2019), there are particular meso factors (e.g.,

country, region, school level, subject, national languages) and micro factors pertaining to the distinct circumstances of the school and the teacher that are significant for such adaptation. In Bhutan, meso factors, such as location of the schools, teacher-student ratio, teachers' workload, access to TPD and availability of resources, need to be considered. Micro factors include teachers' classroom practices, teachers' ICT competency levels, teachers' ICT preferences and choices along with cultures, structures, relationships and resourcing levels that shape the conditions in which teachers work will be given due consideration. Though tailoring at the school and individual teacher level will be challenging, greater consideration of how TPD can be decentralised and tailored to school contexts and teachers' needs is vital.

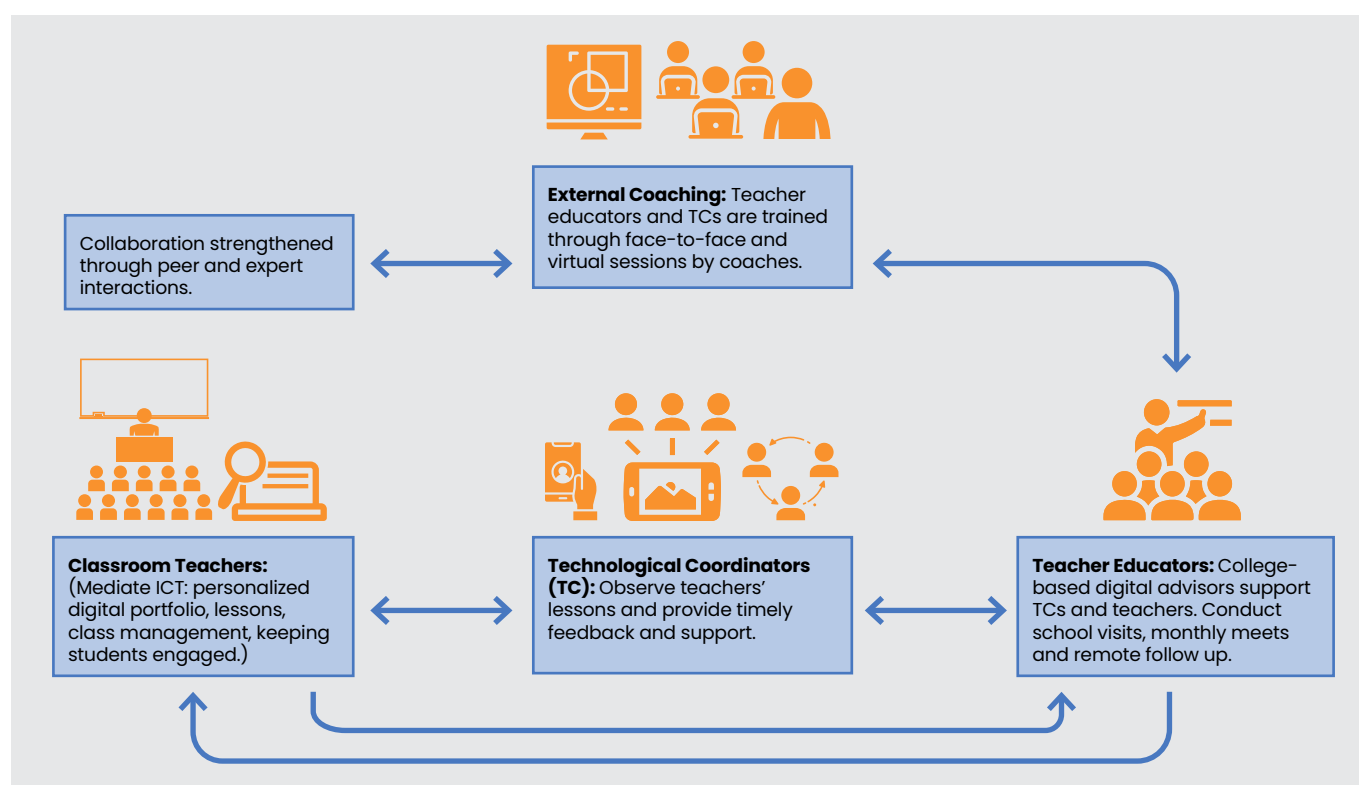
To accomplish the project's goals, a blended learning model that was established by fusing elements of the Computadores para Educar (CPE), Ceará, Building Learning Foundation (BLF) Rwanda and Tu Clase, Tu Pais (TCTP) models will be used in this study. The models are discussed briefly below.

With the goal of developing teachers' technological, pedagogical, communicative, managerial and research skills at various levels of complexity, CPE offers ICT-mediated TPD in collaboration with local universities to accompany the provision of computers and internet access to Colombian schools. The Ceará model involves providing feedback to secondary school teachers on their classroom practices from in-school coaches who, in turn, are supported by expert educational coaches through one-on-one Skype sessions. It aims to encourage best practices in lesson planning, classroom management

and student engagement while increasing teacher interaction on a professional level. It also aims to increase professional interaction among teachers and to promote good practice techniques for lesson planning, classroom management and engaging students.

The BLF model aims to provide inclusive education practices for children with special education needs, including those with disabilities. It is designed to provide support and capacity building to teachers and all workforce roles that directly support TPD in the system. Of particular promise is its comprehensive approach to TPD, which includes promoting guided, not prescriptive, materials; focusing on complimenting, supporting and enhancing existing systems and structures at national, district, sector and school levels; embedding change; and utilising a comprehensive teacher assessment approach. The TCTP model offers TPD to primary and secondary school teachers through online and blended learning courses. It works with country partners who contextualise the TCTP model (programme content, support and platform) to meet local needs. This working model is based on five principles: a) personalisation and teacher agency, b) strengthening of peer work and PLCs, c) focus on classroom practice, d) PD as an ongoing process and e) professionalisation of teacher knowledge and competencies. These models were found to be suitable for the context of the proposed project. Thus, using insights and ideas from these four models, the adapted model was created as indicated in the conceptual framework below. As shown in the figure, this adapted model will equip teacher educators, pre-service teachers and in-service secondary school teachers with quality TPD. Evidence suggests that to

Figure 1. Conceptual Framework



ensure quality TPD, teachers have access to new ideas and practices, design and try out activities in their classroom, have peer collaboration, have access to coaching or other forms of expert support and take time for reflection and feedback (Wolfenden, 2022).

This adapted TCTP model will allow teacher educators, pre-service and in-service teachers to access new ICT skills and practices to actively engage their students in an inclusive and enriching learning cycle. For the TPD, following a selection interview co-hosted by the college and participating schools, the TCs will be trained in one face-to-face (F2F) module consisting of eight F2F sessions and four virtual sessions by internal college-based and external coaches (international). They will be trained on how to observe teachers' technology integration in the classroom and how to hold individual coaching sessions with teachers to provide specific feedback on it. For the training, entry and exit ICT knowledge and skill tests will be conducted and a certificate will be awarded. After completion, the TCs, with support from college-based technological advisers, will take the innovative blended learning to schools and try it out for a year. Each TC is expected to work with 35 teachers from their respective schools. The TCs, in collaboration with college-based technological advisers, are expected to train secondary school teachers' to utilise ICT in their daily classroom practices so that they can adapt and scale technology-enabled approaches to education to the school system, particularly to the higher secondary schools in other regions of the country. In doing so, TCs and teachers can access the course content via a Moodle platform (online) or an Android app (offline) if they have no internet. Additionally, the teachers will be expected to plan their lessons and incorporate at least one or two ICT tools that are particularly aligned with the lesson topic. The ICT tools can be used in the beginning and end to assess the intended learning outcomes or during the lesson to impart content or lesson activities. In planning the ICT-integrated lesson, two options will be offered: a) collaborative planning with a peer whereby the peer provides suggestions and solutions followed by peer observation, reflection and feedback, or b) ICT-integrated lesson planning guided by the TC and followed by observation, reflection and feedback. Moreover, TCs are expected to observe teachers, at least weekly, while college-based technological advisers will observe their lessons at least monthly and provide benchmarked feedback on their ICT integration in their teaching practice.

To ensure the scaling of the course to other secondary schools in the region, college-based technological advisers will support the TCs and teachers. Collaboration through peer/expert interactions will also be encouraged. During the process, teachers will be expected to complete a digital portfolio that includes personal reflections, resources and video documentation of their 'micro-practices' (authentic exercises in the classroom). Formative assessment will be conducted by TCs with support from college-based technological advisers

through co-assessments and self-assessments. As a follow-up, the college-based technological advisers will visit schools, conduct monthly meetings or provide remote follow-up via WhatsApp or Telegram. The project coordinators, based at the colleges and schools, will pay equal attention to the implementation and evaluation of the project to understand what is working in a specific context and how different features of the project can support the diverse needs of the teacher educators, pre-service and in-service teachers. This will be ensured through a continuous cycle of improvement to the project, which will be supported by timely and continuous interaction, evaluation and follow-up between the school-based TCs and college-based TCs. Such a process will help to ensure the equity, quality and efficiency of the project.

A paradigm shift in TPD programmes requires increasing availability and affordances of ICTs, as ICTs offer tremendous potential to transform teacher teaching for better student learning. In doing this, Rogoff's (1995) framework will be employed. At the institutional level, SCE will initiate dialogue with the TDD to support the programme and will work with the division to enhance effective and smooth implementation of the programme. SCE will also look for funds to support the TETPP. At the interpersonal level, SCE, in partnership with participating schools, will ensure that the TPD is made accessible to all secondary teachers through a fair and transparent selection process; particularly, the teachers working in remote secondary schools will be given access to such opportunities. Likewise, factors such as gender, age and access will be considered.

At the intrapersonal level, in order to harness maximum teacher learning for the betterment of student learning, individual teachers and teacher educators will be introduced to multiple ICT tools that will respond to the multiple learning needs of their students. In supporting the learning needs of diverse learners, teachers will have access to powerful and affordable handheld digital devices, including smartphones and tablet computers. Such devices will enable teachers to access resources, collectively create materials, engage in new forms of collaborative inquiries and problem solving and interact with their peers and experts to share experiences and receive feedback. Through these ICT-mediated activities, professional learning experiences can become deeply personalised and teacher-owned. Further, this scaling of the project aims to address the teachers' lack of ICT competence that leads to a less technology-enabled environment, given that the current education reform demands ICT-rich environments in teacher preparation colleges and the school system.

3. Proposed partner agencies and organisations and their roles

Many TPD@Scale programmes recognise that teachers and teacher educators (e.g., district officials and staff at colleges of education) are part of a holistic, interdependent community engaged in the 'activity' of teaching and learning in a specific

environment. Change in the 'activity' of teaching and learning in one part of the community necessarily has an impact on other parts of the community. Thus, involving actors across the community is essential for sustainable change.

The project will be driven primarily by the SCE. This programme will represent a major shift in how TPD is provided for schools in Bhutan from a traditional cascade design to the use of an online platform offering access to the same quality of materials and activities for all teachers regardless of their location and status. As a lead organisation, SCE will play a key role in planning, coordinating, implementing and evaluating the whole project process and activities. SCE will initiate collaboration with the MoESD—specifically, the Department of Curriculum and Professional Development (DCPD), Teacher PD Division, Dzongkhag Education Offices and selected secondary schools based on region to train teacher educators and TCs to adapt and scale up the technology-enabled approach to education in the school system.

The MoESD, specifically the DCPD and TDD, are the most relevant institutions capable of contributing to the project through partnership. They will provide the necessary direction and support to the district education office and school management for carrying out activities related to the project. As any PD programmes root through the district education office as a focal point, partnering with the district education office will enable the project team to ensure the conduct of project activities more systematically through official correspondence and collaboration. Selected secondary schools will play a key role in implementing the project activities. Management and leadership support at the school level is fundamental for the success of the project. It is important that the selected schools understand the aims and objectives of the project. The school principals will be the focal people and contact points for the initial phase of the project. However, after the identification of TCs by the project team, school principals will encourage and support TCs and play a facilitative role to ensure that the project activities are implemented as planned. The project identifies TCs as a key implementing partner at the school level. Therefore, TCs, after receiving periodic training, will then scale up the technology-enabled knowledge and skills to teachers in the school. To achieve the proposed project objectives, TCs will conduct weekly lesson observations, submit reports and video lessons and monitor and communicate with the project team whenever necessary.

This initiative will help transform teaching for better student learning. In addition, the TETPP can be scaled to other agencies, including the Ministry of Information and Communications.

4. Evaluation plan and methods

Assessment in TPD is critical to measure the progress and achievement of teachers using defined quality criteria to support the development of their professional practice. This study will adopt mixed methods to evaluate the overall purpose of the project and to assess whether the project achieved its specific stated objectives. The research team will develop a questionnaire and discussion guide to address the above stated purpose and objectives.

If the technology-enabled teacher preparation programme has a measurable and useful impact on teacher educators and student teachers, this would support the wider implementation throughout higher secondary schools, and potentially throughout Bhutanese schools. Other considerations include whether the technology-enabled teacher preparation programmes will be acceptable and endorsed by different sub-groups of students within different programmes and whether they are cost-effective in improving teachers' professional practice and students' learning. Analysis of these aspects will help determine if and how the programme should be scaled.

The project will involve teacher educators, TCs from secondary schools, teachers and students of SCE as beneficiaries of the project. It will train them to manage, integrate and monitor technology-enabled teaching and learning environments. The trained teacher educators and some of the selected pre-service teachers will take over the implementation of acquired knowledge and skills in a few of the selected higher secondary schools of Samtse Dzongkhag. During the processes of training and implementation, as part of evaluation, day-to-day implementation and rigorous individual as well as collaborative reflection, exercises in the classroom will be carried out. A report from Ecuador indicated that the process of transformation was achieved not via training but as a result of day-to-day experimentation and reflection (SUMMA, 2020). Anecdotal records of technology adaptation in teacher education and secondary schools will be maintained. Additionally, assessment of teacher educators', TCs' and teachers' teaching through classroom observations on how technology is used will be carried out weekly. This will be done through video recordings, analysis of the lessons taught, journal writing and reflections on planning and implementation of technology-enabled practices.

The TC teachers from the selected higher secondary schools will be attached to the research team and have an active role in analysing data and writing up results. The schools that participate in the project will be selected by the project team in partnership with the participating schools. A longitudinal study of the transformation of teacher educators' and secondary school teachers' teaching practices in the context of technology use will be conducted over a three-year period using baseline data, midline data and post-intervention data.

The assessment and evaluation of the project will be carried out in the following primary phases:

Phase I: A baseline survey for secondary school teachers in the Samtse District will be conducted regarding the use of ICT for teaching, learning and assessment, followed by analysis and reporting. Entry and exit tests will be conducted to test teacher educators', pre- and in-service teachers' ICT knowledge and skills.

Phase II: Quantitative and qualitative monitoring and evaluation of secondary school teachers' practice in classroom teaching, learning and assessment will be done through weekly lesson observation, reflective writing and feedback on the practice. The weekly monitoring will be carried out by TCs and the reports will be shared among teachers and project members. At the end of the first project year, the first online conference among teachers, TCs and teacher educators will be conducted to share best practices, key challenges and areas for follow-up.

Phase III: Teacher educators and the project team will carry out monthly school visits and discuss the implementation of practice. The team will evaluate the progress of the project using tools such as classroom observations, pulse surveys, interviews and focus group discussions. The key success indicators will be developed and shared prior to the monitoring and evaluation period. A second online conference for teachers, TCs and teacher educators will be conducted to share best practices, key challenges and areas for follow-up.

Phase IV: At the end of the project, a survey will be administered to explore the effectiveness of the TETPP. To aid the quantitative data, a focus group discussion will be carried out with teacher educators and pre- and in-service teachers from the selected schools. It will be aimed at collecting their perceptions, beliefs and attitudes regarding the technology-enabled teacher preparation in which they took part.

Finally, the sharing of best practices will occur at an international conference in Bhutan or any other consortium partner country. Discussion and sharing about the adaptations and scaling of technology in teacher education and secondary schools will occur with delegates from the MoESD and all other relevant government agencies, including parliamentarians and policymakers. This will pave the way for the discussion of further scaling of this project into the entire school system.

5. Time scale of the project (not exceeding three years)

6. Proposed budget

Table 1. Proposed Budget

Output 1 (ensure link with A1):		
Budget Item	Unit	Number of Units
Honorarium for the regional cooperation coordinator	Year (3 years)	1xNu. 85000/year= Nu. 255,000
Expert fee for 2 days (Resource persons)	Monthly (10 sessions)	5xNu.4000x10=Nu. 200,000
Daily Sustainance Allowance (DSA) for travel (4 days monthly)	10 days	45 teacher educators (45x2x2000x10=1,800,000) 40 teacher participants (40x1500x4x10=3,060,000) 4860000 Mileage and meals for 40 teacher participants = (Nu. 6,120,020)
Expert fee for designing tools for FGD/Survey/ classroom observation	Per expert	2x35,000=70,000
Honorarium for researchers for classroom observation (DSA plus Mileage for 2 days)	Per expert	10xNu. 4000=Nu. 200,000+ Nu. 75,000=Nu. 20,75000
Travel cost	Travel	(5xNu. 2368 x 8 times)= Nu. 94,7200
Methodology	Data collection tool development and report writing	Nu. 600,000/-
Miscellaneous	Miscellaneous	Nu. 50,000/
TOTAL		Nu. 13,309,720/- \$1,62,869.7 (Nu. 13,309,720/ USD 81.72)

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