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Need for teachers' professional development in a low-resource context during and after COVID-19

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Need for Teachers' Professional Development   in a Low-Resource Context during and after COVID-19: A Bangladesh Perspective

Abstract

The Covid-19 juxtaposes with a global shortage of trained and qualified teachers to achieve universal primary education. Especially in a resource-restricted context, the crisis is severe. It is assumed that teachers will require new skills to compensate for the halt in education during the pandemic in Low and Middle-Income Countries like Bangladesh. Hence, this qualitative study investigated teachers' professional development (TPD) needs in Bangladesh during Covid-19. Qualitative data were gathered using semi-structured interview schedules from seventeen different stakeholders of primary education in Bangladesh. The findings revealed that teachers blend online and offline teaching methods to continue the education for all children, including those who have little or no access to online platforms. The study suggested that teachers need to develop new skills such as operating modern technologies, pedagogy for engaging students in remote teaching-learning, reflexive practice, collaboration and organisational skills. The study concludes that primary teachers' need to develop 21st-century skills in Bangladesh in the post-pandemic era when blended learning will be imperative.

Introduction

The Covid-19 crisis has caused unprecedented challenges for almost 63 million primary and secondary teachers worldwide (UNESCO, 2021). This crisis has juxtaposed with a global shortage of qualified teachers. While education in almost every context has shifted to a distance mood using modern technology from the beginning of the pandemic, according to UNESCO, only 60% of teachers appeared to have recent professional development on using ICT for teaching and learning purposes. Moreover, the majority of the children and teachers in LMICs do not have access to online teaching-learning platforms (Haßler et al., 2020). Therefore, teachers need to

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blend online and offline methods to continue education during the school closure due to the pandemic.

A blended approach to education is challenging, especially in a low-resource context where children hardly have experience of using a digital device. Therefore, engagement, participation and assessment are the primary concerns in such a blended learning environment (Kidd and Murray, 2021). Moreover, teachers' and parents' attitudes towards digital learning platforms are barriers to ensuring remote and blended teaching-learning in many rural Asian and African contexts (Pynnönen, 2019). This situation demands a revisit of the required skills of teachers to ensure quality education during and after the pandemic. Several research suggested that the traditional teaching style would not satisfy the learning needs in the post-pandemic world (Chowdury, 2020). This study argues that a blend of remote and face-to-face learning will be a reality in the post-Covid which will need new skills for teachers, especially to conduct remote teaching. Thus, the researchers argue that the need for new professional development to ensure quality remote learning must be investigated.

However, research that investigates teachers' professional needs in the changing world is minimal. Hence, it is crucial to understand the professional development needs of teachers in this challenging situation. Thus, this study attempts to explore

1. the measures are taken to continue the education of primary aged children in a Low- and Middle-Income Country (LMIC), namely Bangladesh
2. the challenges primary teachers encounter in doing so and
3. the professional developments they need to address those challenges, and whether and how they meet those needs.

The authors argue that the knowledge of this study will inform any reform in primary teachers' professional development provision in Bangladesh and similar low-resource contexts during and after the pandemic.

Research methodology

This study adopted an exploratory and descriptive qualitative design (Merriam and Tisdell, 2015) to provide an in-depth understanding of a phenomenon, in this case, teachers' professional development (TPD) in a low-resource county in Covid-19 context. School closure and remote teaching-learning have called for new skills for teachers. However, the specific need of TPD and how those are being addressed is a very new area of knowledge. Hence, qualitative data were collected through a remote interview strategy from seventeen different stakeholders of primary education in Bangladesh. The interview schedule was developed collaboratively by the two researchers. The researchers are native in the context of primary education in Bangladesh, one is a researcher, and another is a primary education professional. The collaboration helped to identify the questions needed to answer the research questions and ensure that the interview questions make similar meaning to the participants. The interview questions were devised in Bangla to ensure deeper discussion (a translated version can be found in the appendix).

Respondents in this study included an officer from the Directorate of Primary Education (DPE)- the central body for primary education in Bangladesh, one divisional Deputy Director (DD), three District Primary Education Officers (DPEO), three Upazila Education officers (UEO), three Headteachers and six Assistant Teachers (AT). ATs are the actual classroom teachers; headteachers are the school leaders and conduct classroom teaching. The headteachers and teachers were recruited from three different schools from three Upazilas (administrative units of the country).

The central and local education authorities were interviewed to understand the government initiatives for continuing education during school closure and teachers' professional development. Headteachers were interviewed to understand the socio-economic situation where the school is located and the school-based teacher professional development provision in general and during the pandemic situation. Teachers' interviews helped to understand the TPD needs in the new situation.

The interviews were conducted remotely, over the phone, as it was the only means during the pandemic. Phone interview has been considered an alternative to the traditional interview method and is often used in a difficult circumstance of an epidemic and provides timely and

actionable findings (Abramowitz et al., 2015). McNall and Foster-Fishman (2007) noted that some methodological features were adopted in previous studies that used a remote interview approach to compensate for the drawbacks of remoteness, such as not capturing the body language. They suggested that such an interview approach tended to be participatory, adopt multiple research methods and triangulated data during data analysis. In addition, the studies were iterative because data collection and analysis tended to be carried out in parallel, and emerging findings shaped the data collection process (McNall & Foster-Fishman, 2007).

In this current study, the researchers tried to ensure the active participation and engagement of the respondents by sending the interview schedule beforehand through email and Facebook messenger. It was assumed that prior knowledge of the discussion points would prepare and engage the participants in-depth during the interview. Detailed notes were taken during the interview to do a simultaneous analysis. Some participants were approached more than once to understand some phenomenon further, and the preliminary analysis was helpful for that. For instance, ATs from one Upazila indicated that they, with the help of the local community, established low-cost studios to record better quality videos (asynchronous lessons). Teachers from other Upazilas were interviewed again to see if they had similar stories.

A bottom-up approach was adopted in the chronology of the interview. For instance, teachers were interviewed first, followed by headteachers, UEOs, DPEOs, DDs and the official from the DPE. This bottom-up approach to the interview chronology helped us understand the need for TPD and the measures taken by the government to address those needs.

Although a single data collection method was used, cross-referencing was conducted among the data from different stakeholders to identify solid and authentic themes. At the end of all interviews, data were analysed adopting a thematic approach (Braun & Clarke, 2006) using a qualitative data analysis software (NVivo). This approach helped us make meaning of the data rather than merely describing implicit ideas (Guest et al., 2012). Braun and Clarke (2014) suggest that a six-phase process gives the necessary rigour for analysing qualitative data. These stages are a) familiarising with the data by reading the notes and discussing them between the two researchers; b) coding, the researchers discussed between us before creating any code to ensure

that they make similar meaning to both of us. This stage resulted in 105 codes; c) the codes were revisited and similar codes were merged into 14 preliminary themes; d) the themes were scrutinised based on the demands of the research questions. At this stage, three overarching themes were produced; e) the previous stages were revisited taking research questions into account to rectify the themes (e.g. taking irrelevant codes from the themes), and f) The last stage was writing this article. This study followed the 'Revised Ethical Guidelines for Educational 'Research' of the British Educational Research Association (BERA, 2018). The participants were recruited voluntarily. The purpose and process of the research were explained in detail in an information letter that was sent to the participants before recruiting them. The participants were assured that all the information about the school and their opinions would be kept confidential. Oral consent was also obtained before interviewing them.

Findings

In this study, the researchers tried to understand the challenges teachers encountered in teaching children who have limited or no access to different online platforms from the beginning of the school closure; how they responded to the challenges; what new skills and knowledge they needed for that, and how those needs were addressed. Hence, in this findings section, first the teachers' challenges and how they responded to them were discussed, then the need for TPD and how the needs were addressed were explained.

Measures are taken to continue the education of primary children in Bangladesh

Remote learning strategies: The officer from the Directorate of Primary Education (DPE)- the central body for primary education, has provided an overview of the government strategies for remote teaching during the school closure. The information was also evident in local academic and media narratives.

According to the official, the government has taken multi-level initiatives to continue education through different virtual platforms after the school closure from 17 March 2020(Daily Star, 2020). The initiatives include developing and broadcasting instructional and e-learning video and audio

content. The contents were distributed through Shangshad TV (National Parliament Television), Bangladesh Betar (a state-owned radio channel) and Social Media.

The central official explained that 27 pedagogic experts, content experts and validation experts, and 20 primary school teachers were deployed to develop video content for the first-ever remote learning TV programme called 'Ghore Boshe 'Shikhi' (means, Learning at Home), aiming at 20 million primary students from grade 1 to grade 5. A total of 200 e-learning video contents was developed to broadcast and telecast through television and social media. Similarly, with the support from UNESCO, the government has started the 'Ghore Boshe 'Shikhi' radio programme on 12 August 2020. The goal of this program is to ensure learning continuity and raise awareness on social issues regarding COVID-19. The radio lessons are aimed at grade 1 – 5 students. An expert committee and 40 teachers developed 7 to 10 minutes audio lessons on Bangla, English, Mathematics and Bangladesh and Global Studies subjects. These lessons are being aired on Amplitude Modulation (AM) and Frequency Modulation (FM) radio.

Besides, social media and other online platforms are also being used informally for teaching-learning. For example, teachers use Facebook pages and YouTubes to conduct live and recorded lessons. As per the Bangladesh Telecommunication Regulatory Commission, the total number of Internet Subscribers has reached more than 110 Million at the end of November 2020 (BTRC, 2020), which is a motivating factor for teachers and other educational stakeholders in Bangladesh for conducting online classes. However, a UNICEF-International Telecommunication Union (ITU) report found that 63 per cent of Bangladesh's school-age children have no internet access at home (UNICEF, 2020). The teachers and other stakeholders took several local and community-level initiatives to address this access issue.

Alternatives to remote learning strategies- taking schools to home:

This study tried to understand how the issue of access was being mitigated. Responses from local education authorities, headteachers and teachers helped to answer the questions. According to the participants, to reach all the children, they blended various alternative ways, including phone communication, deploying the agency of religious institutions and conducting home visits (by

maintaining government social distancing guidelines). For example, a teacher said, 'as students can come to school due to the pandemic, we bring the school home'.

The teachers reported that they conducted live classes on Facebook and uploaded their recorded classes on YouTube in addition to the TV and radio programmes. A teacher said, "We have a Facebook page for our school and district primary education. We conduct live classes and upload recorded classes on the pages." [AT1_U1]

 A DPEO said, "We are collaborating with community cable TV network providers. We have made a pool of expert teachers who record classes, and the cable TV providers broadcast those in their local channel every morning and afternoon." [DPEO3]

In addition to that, teachers contact students through mobile phone calls, which is the most effective way to contact students during the pandemic. As per the telecommunication authority, by November 2020, Bangladesh had more than 116 million mobile phone subscribers (BTRC, 2020), which means almost all adults now have access to a mobile phone, be it a smartphone or a featured one. One of the teachers said, "When every measure fails, mobile is the last resort to communicate with the students." [AT3_U2]

Teachers also think that through mobile, they can get parents and students simultaneously, and they can consult and instruct parents too for children's learning. A teacher said, "Parental engagement is most important during this school closure, but engaging parents in 'children's study is very challenging. However, when we call the parents on their mobile, we can talk to both the parents and students, this is very helpful. We can motivate parents and children to continue learning." [AT2_U2]

Mobile has enabled teachers to contact the children even if they do not have a mobile in their household. Teachers request the parents who have mobile to lend their mobile to the children who do not have one for a few minutes. The closely knitted social relationship (Haque & Mohammad, 2013) in rural Bangladesh has enabled such communication. Students and parents are aware of the Coronavirus and the protection measure over the phone. They have also been supported emotionally over the phone by the teachers.

Along with remote communications, teachers reach children and parents through home visits. Although regular formal 'home visits' are suspended during the pandemic, teachers in many schools and local areas decided to visit homes to ensure students do not drop out and keep learning. They said that they strictly maintained social distancing during home visits. Teachers, students and parents meet outside the house in a courtyard, wearing a mask and keeping physical distance. A teacher explained what they do during a home visit, "We explain the lesson to the children when we visit them and assign tasks. On the next visit, we evaluate the progress." [AT3_U3]

Some schools have made home visits as a routine activity for teachers during the school closure. A headteacher said,

"We divided our colleagues into three groups. We have six '''Para' (Local neighbourhood) in our catchment area. We make small groups of children maintain social distancing and conduct lessons from 10 am to 12 am each working day." [HT1_U1]

Additionally, religious institutions such as mosques and temples were encouraged to remind parents and students to attend remote classes and perform homework through public preaching. The mosques and temples have been open during the pandemic for public use. Muslim male adults gather for weekly afternoon prayer on Fridays in local mosques.

The combination of the strategies to ensure the education of primary children during the pandemic has created a unique situation for teachers which they did not come across before. Such a situation has posed several challenges for them. The data have indicated some major challenges teachers encounter to combine different channels.

<u>Challenges in teaching-learning during the pandemic</u>

An analysis of the interview data from local educational authorities, headteachers, and teachers indicated four major challenges the teachers encountered during the school closure: teachers' and students' restricted access to technology, engagement, assessment, and stakeholders' attitudes towards teaching-learning using the technology. While the participants from the local educational

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authorities predominantly pointed to the issue of access, teachers and headteachers seemed to be more concerned with ensuring engagement, assessment and stakeholders' negative attitudes towards the use of technology for teaching-learning.

Access: Students' access to education during the pandemic has been the most cited concern in the data. Teachers and education officials reported reaching a small number of students despite making many online teaching efforts. For example, a UEO said that only 40% of children could be reached with all the remote teaching endeavours during this pandemic.

According to the UEOs (all three mentioned this), attending online classes using smartphones and computers is not feasible for most children in rural Bangladesh. They reported that most students do not have access to a smartphone to attend a synchronous or asynchronous online class. Students who have access to smartphones also face problems accessing online education due to a lack of internet data and proper bandwidth. The education officials also pointed out that students and many teachers have limited access to smartphones and the internet. This reflects previous studies. According to Dutt and Smita(2020), due to a high internet price, many teachers often cannot conduct remote online teaching.

Alternatives to online synchronous teaching are TV, radio and social media. Teachers in this study said that although most of the children in Bangladesh now have access to a TV in their or 'neighbours' homes, irregularity of electricity supply in rural areas is one of the main issues in using IT in education (Sultana & Shahabul, 2018).

Engagement: Most of the teachers in this study expressed concern about the engagement of students in remote learning. According to the teachers, students need to open their mobile/tv/radio at the scheduled time for the classes. They need to follow the instructions given in the class. In the asynchronous classes, whether they are following the instruction is not possible to monitor. The teachers suspect that most of the students do not follow the instructions. They blamed the lack of 'parent's awareness for this. They argued that parents need to motivate students to attend the classes and perform the activities instructed in the remote classes. A teacher said

"The students used to follow a routine when the schools were open in regular time. However, now they are in their home, and they are supposed to watch classes on TV and live classes on Facebook that are broadcasted on a scheduled time. Parents need to motivate their children to watch the classes, but this is not happening in most families." [AT2_U1]

Another teacher said, "We assign tasks to students when we conduct classes online. For completing those tasks, the students need support from someone in their family. We can assume that the parents do not offer such help in most of the cases." [AT1_U1]

These findings echo previous research. Such as Crick et al., (2020) suggested that engaging students, especially children with restricted access to mobile, internet, tv and radio, in remote learning effectively is challenging and needs specific teaching skills.

Moreover, teachers in this study reported that their lack of experience in remote teaching and ICT skills engaging students in their synchronous and asynchronous classes becomes even more challenging. This long-standing scenario in Bangladesh is considered a barrier to implementing ICT in education (Obaydullah & Rahim2019). A teacher said, "We have never conducted an online class before. We did not know what a live session was. We had to learn all these things during this pandemic." [AT3_U2]

Another teacher said, "Many colleagues still do not feel comfortable using smartphones, and they never used a laptop before." [AT3_U3]

Assessment: Most of the teachers in this study expressed their concern about assessment. Teachers said that they set tasks for the children when they record or conduct an online class. However, whether children perform those tasks or achieve the learning outcome is not understood by them. Teachers also informed that there is a concern about giving the children a promotion at the end of the year. Usually, an end of year summative exam is taken to promote the students to the next grade. The traditional assessment system is difficult to apply using technology, according to the teachers. However, they said that they do not have any alternative to such an assessment yet. Assessing 'students' learning remotely has been a concern worldwide

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(König et al., 2020). While many measures have been taken for remote teaching-learning during the school closure, a framework for assessment is still to be developed.

Attitudes towards technology: Teachers are also concerned about the parents' attitudes towards remote learning using technology. They reported that parents in rural Bangladesh are often reluctant to allow their children to use mobile phones because they doubt the usefulness of digital technology for educational purposes. They fear that children's lack of skills they consider can only be achieved through traditional studying methods (Pynnönen, 2019). In addition, learning by watching TV is a new phenomenon to most rural parents. A TV is considered as a means of entertainment only by the rural people in Bangladesh.

A teacher said, "We need to convince parents that children can learn from TV and Facebook." [AT1_U1].

Teachers have reported that this negative attitude not only persists among parents but also in teachers. A teacher said, "Some of our colleagues do not cooperate with us in conducting classes online; some of them laughed at us in the first instance." [AT2_U3]

While the government, teachers and other stakeholders put effort to continue the education of primary children during the school closure by combining different channels, teachers reported that they encounter several challenges to continue teaching-learning in the new situation. They also indicated that they need to develop new skills to cope with the new ways of teaching. The following section illustrates the need for teacher professional development in the new context.

<u>Need for TPD during the pandemic:</u>

Stress management: The new situation is seen as a '''forced' change (la Velle et al., 2020;). The sense of 'force' has frustrated and uncertain the stakeholder (Hadar et al., 2020). Teachers in this study indicated that they also feel anxiety about the situation. As they started teaching remotely, they reported that the first attempts were full of nervousness. One of the teachers said, 'I was very nervous; it was the first time I conducted an online 'class'.

Hence, the first development they needed is to adapt to the new ways of teaching. It involved a significant emotional engagement. A teacher said, 'I had to go through lots of ups and downs in my mind for adopting online classes, and cope myself with the new technologies…'

Technological skills: Since there were urges from the government and a sense of professional responsibility, teachers started to take different initiatives to continue teaching remotely. For this, the apparent need for them was to develop or strengthen skills of using modern technology. Almost all of the participants in this study reported that they needed to develop their mobile, laptop, internet, and social media skills. A respondent said, "There are many online tools and software. You just need to know some of those for being able to conduct class online.". Most of them mentioned that they had to gain the skill of conducting Facebook live, zoom meetings, using google meet and communicating through Facebook messenger and email. A similar need was reported in the pandemic in the teacher and teacher education sector across the world (Van Nuland et al., 2020).

Blended learning: Teachers said that they need to develop skills for using different channels of teaching-learning and assessment. They mentioned blending several online channels as well as different technologies. A teacher said:

'I need to use Facebook, google meet and zoom for teaching and to communicate with colleagues. I also use a mobile phone for contacting the children and parents who do not have internet access. Some of our colleagues are engaged in producing lessons for TV and radio. We sometimes visit children in their homes too. So, it is mixing several channels. This is not only blending online and offline methods but many other aspects.' [AT3_U1].

Organisational Skills: Teachers and headteachers suggested that they need to be more organised than before. This is because teachers are continuously learning themselves along with teaching children using new technologies. They also need to communicate with several stakeholders for teaching and learning purposes. A headteacher described,

'We were engaged in routine school activities in a normal situation. Now, in this new situation, we are learning many new technologies and online teaching aspects. We divided our daytime

into segments to ensure that we learn appropriate techniques for teaching, share our learning with colleagues and teach using new ways. Without being more organised, it is not possible to maintain all these activities.' [HT2_U3].

Reflective practice: Another skill the participants mentioned that they needed to strengthen was reflective practice. They think that reflective practice has been an integral part of a teacher education program (Farrell 2017), and it became even more evident in their current practice. One of the participants said, "I have been gaining new experience as I am conducting and recording classes virtually. Every day I learn new skills, and I try to adjust those in my next lesson. I think I am more and more reflective, and I need to be more reflective."

Collaboration: Collaboration has become a crucial aspect of teachers' day to day life during school closure. They collaborate with their colleagues within their school and with teachers from all over the country. A teacher said,

'I started to maintain a Facebook group shortly after the start of school closure. I did so because I think by sharing knowledge and experience, we can grow together in this difficult time. We have more than two thousand members in this group, and we conduct the regular live meeting so that other people can also watch our discussion and let us know their comments.' [AT3_U2]

A headteacher said, 'collaboration becomes more necessary than any other time now. A single teacher cannot gain all the necessary skills alone to conduct teaching in this new situation. We only can learn a little skill and share with colleagues.' [HT2_U2]

A UEO said, 'collaboration is a skill, and teachers must develop this. We always encourage teachers to observe colleagues classes, share an opinion and work together in normal time. In this pandemic, this has been even crucial. We are trying to establish more collaborative relationships among teachers through a regular online meeting.' [UEO3]

Addressing TPD needs

The data of this study show that teachers are addressing their professional development needs in three ways. First, by attending government-provided training; second, through school-based-

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teacher-development provisions; finally, they explore different platforms and collaborate with colleagues. While the education officials pointed out the government initiatives, headteachers and teachers in this study reported how school-based activities and personal initiatives of teachers helped them to develop some skills required to address the challenges discussed above.

Government training: The central government and local authorities organised several professional development meetings. The aim of those meetings was mainly equipped teachers with IT skills. Almost all central and local educational authorities that interviewed mentioned Zoom meetings to provide teachers ICT skills.

A district primary education officer (DPEO) said that this ICT training is regularly held to keep teachers' skills updated. He said, "to minimise the effect of Covid-19 on 'children's learning we are regularly conducting meetings including education officers, headteachers and teachers to share our experiences and to prepare and conduct training to meet teachers' professional needs." [DPEO1]

A Upazila Education officer said, "We are providing virtual training to teachers for using and maintaining the ICT equipment.". [UEO1]

Some local authorities are taking advantage of this school closure time to provide teachers with basic educational training. Since there is a considerable backlog in Bangladesh in terms of 'teachers' initial training (Ministry of Education, 2010), the time during the school closure helps provide some basic training to novice teachers.

School-Based Teacher Development: Besides government initiatives, schools have also adopted the new situation, rescheduled their work, and included necessary professional development activities. In some schools, regular online meetings have been organised to share experience and expertise. A headteacher said, "We meet every week to share our experience. Expert teachers teach us about new technology. I try to motivate them to collaborate". [AT3_U1]

Another teacher said they had formed a WhatsApp group, including their colleagues, and they communicate whenever they need any assistance. They also organise in-house training on this platform.

The online collaboration has enabled teachers to learn from each other more than at any other time. One of the teachers said, "Now we can observe each 'other's class whenever we want because those are on Facebook. It helps us to learn new techniques from our colleagues."

Personal effort: Participating teachers reported that they jointly learn new skills. They communicate with their colleagues formally and informally and share their expertise. According to regulations in Bangladesh, teachers are eligible to take a placement in a school in their locality (Ministry of Primary and Mass Education, 2018 article 3.7 & 3.9). Thus, teachers in a school are likely to be from the same locality and know their colleagues personally. This has enabled them to contact informally frequently. This situation is reflected in the response of the participants in this study. Many of the teachers said they contacted their colleagues almost every day and solved any technological problem they might encounter.

Teachers reported that they have been learning new skills independently from different platforms, including YouTube, online courses. Some of them also suggested that they have formed collaborative groups including skilled teachers from different parts of the country to use advanced technologies.

According to the participant teachers, YouTube and Massive Open Online Courses (MOOC) have become means of professional development for many primary teachers in Bangladesh. They said that they learnt using Zoom, Facebook live, recording classes, mixing voices and other applications from YouTube. In addition, some online courses such as HarverdEx have helped them to learn different aspects of teaching online.

A Couple of teachers informed that they have formed collaborative groups including enthusiastic teachers from primary and secondary schools in the district and developed their studio where they record classes and conduct live lessons. They have collaborated with some experts from different media (e.g. television) to learn about studios. They use either a room in their own house or hired

a room in the local market to develop the studios. They have improvised the studio with available material. For instance, a teacher said, "we pasted cloth on the wall of our studio so that sound does not echo. We have a whiteboard and draw different pictures on it as a background". [AT3_U3]

Discussion and implication

In this paper, the researchers tried to understand what initiatives are taken to continue the education of primary children, especially in rural Bangladesh, by the teachers, what professional development they feel that they need to address and how or to what extent they can develop those skills.

The analysis shows that primary teachers in Bangladesh have taken several initiatives to continue teaching-learning of all rural children, including those with limited or no access to online platforms during the school closure due to the pandemic. The initiatives include online and offline communications. It is evident from the data that teachers and government emphasise integrating technology in education to ensure the continuation of education during the social distancing and school closure time. However, the ways of teaching-learning have posed several challenges, including students' lack of access to remote learning platforms, students' engagement in the learning process, a framework for assessing remote learning and parents' attitudes towards the use of technology for teaching-learning. The government and teachers have identified several ways to address those issues. They use alternative remote learning platforms, phone communications and home visits. Nonetheless, the situation calls for a new set of skills for teachers that the government and teachers are trying to address in several ways. Yet, teachers and policymakers need to pay attention to some aspects.

Teachers and the government in Bangladesh have put effort into ensuring primary children's education during the school closure. Like other nations, remote learning through TV, radio and the internet has been initiated for primary education in Bangladesh. Experts have been deployed to prepare virtual lessons. National and local TV and radio channels broadcast those lessons in a routine manner. Yet, a significant amount of students are out of reach.

Moreover, engaging students in remote learning is a major challenge reported by almost all participants in this study. Additionally, assessment is one of the crucial challenges yet to address. These findings echo other studies from across the world (e.g. Scull et al., 2020, Moyo, 2020, Kidd & Murray, 2020). In addition, due to resource constrain, teachers in Bangladesh need to maintain other channels including mobile communication and home visits. These all have called for new set of skills of teachers including IT and other soft skills.

Government officials reported several initiatives to develop teachers' IT skills. Teachers also frequently mentioned the need for developing their technology skills. However, skills of using modern technology might not be adequate to bring sustainable change in teaching practice in the changed context of the world.

The teachers in this study have mentioned some soft skills that they need to develop to cope with the new situation. According to the data, teachers think they need to develop blended teaching-learning skills to ensure education during the school closure and after the pandemic. Their claim is supported by previous research, which indicates that the blend of online and offline teaching-learning will remain in demand from now on (Xie, Siau & Nah, 2020). The Bangladesh government has prepared a blended learning framework that is being followed and will continue. In such a situation, it is vital to consider three components of technology-assisted teaching: content, pedagogy, and technology, as well as the relationships within and between them (Koehler and Mishra 2009). Therefore, teachers need to develop skills in using digital devices and understand the interaction between technology, pedagogy, and content knowledge (TPACK) (Shulman,1987).

Teachers also mentioned that they need to develop organisation skills to cope with the overwhelming workload. Usually, teachers are overburdened with teaching in Bangladesh primary schools (Rahman, 2020). The additional pressure of preparing the virtual lessons and contacting individual students using different mediums and continuous professional development activities multiplied their workloads. To perform the responsibilities within the workload, they think that they need to be more organised.

They also reported that in the new situation, every day, they are encountering new challenges. To overcome those, they need to be reflective of their actions. They said that skills of reflective practice might help them to develop professionally and address arising challenges. Additionally, they need to learn from colleagues by sharing experiences. Such collaborative practice is reported as crucial by the teachers, which proves the claim of some previous studies (e.g. Little, 1982; Westbrook, 2013). However, they also mentioned that there is no framework within their curriculum to practice professional collaboration.

These findings underpin the necessity of ensuring 21st-century skills among teachers for ensuring sustainable change in teachers' teaching practice. These skills comprise '4Cs' – communication, cooperation, critical thinking, and creativity (21ST CENTURY SKILLS: A Handbook, 2020).

Although the government and teachers are trying to address the new needs for professional development in various ways, a central reform in teachers' professional development may be necessary. The primary central teacher development provision, called Diploma in Primary Education (DipEd), is often criticised for not fulfilling the need for practical skills for primary teachers. The 21st-century skills need to be adopted in the course. Moreover, as the teachers in this study mentioned, primary teachers in Bangladesh often suffer from a lack of framework for professional collaboration (Rahman, 2020). Such a lack often minimises the potential of teachers' collaboration within a school. Hence, the researchers recommend a framework for teachers' collaboration for school-based teachers' development for sustainable changes in teachers' practice.

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Appendix (Interview schedules)

The following tables shows the interview schedule for different types of participants. Please note that this is not an exhaustive list of questions. While this schedule worked as a structure of the interview, the researchers rather established an open discussion with the participants during an interview where there were many prompt question.

Questions for all participants
1. What impact you can see on the primary students' education during the school closure? Do you have any statistical data in your school/area/nationally? 2. What initiatives have taken to continue the education of primary children during school closure? 3. What initiatives have taken to continue the education of primary children especially who have limited access to online platforms during school closure?

Teachers	Headteachers	Upazila Education Officials	District Education Officials	Central government official
1. As a teacher, what challenges you encountered in educating children during the school closure? 2. How did you address the challenges? 3. How are you supporting children who have limited access to remote learning platforms? 4. What skills you needed to develop in the new covid-19 situation as a teacher? 5. To what extent you can achieve those skills and how? 6. What is your colleagues' role in developing those skills?	1. Information about the school a) How many students (girls/boys) do you have in your school? b) what is the occupation of majority of parents? c) approximately, what proportion of students have access to remote learning? 4. What initiatives did you take to address teachers' professional development	1. What initiatives did you take to address teachers' professional development need in the new situation in your school/area? 2. In addition to the central government initiatives, what steps have you taken to address the	1. What initiatives did you take to address teachers' professional development need in the new situation in your school/area? 2. In addition to the central government initiatives, what steps have you taken to	1. Are you forecasting any changes in primary education in near future due to the pandemic? 2. How the government is going to support teachers to continue the education of primary children during school closure?

7. What is your role in developing your colleagues' skills? 8. What is your headteacher's role in developing those skills?	need in the new situation in your school/area? 5. What are the challenges in your school in addressing the challenges for TPD?	TPD needs in your area? 3. What are the challenges in your Upazila in addressing the challenges for TPD?	address the TPD needs in your area? 3. What are the challenges in your district in addressing the challenges for TPD? 4.	3. What initiatives is the government takes to address teachers' professional development need in the new situation in your school/area?