





Teacher professional learning in Latin America during the Covid-19 pandemic:

lessons learned from remote teaching mediated by ICTs



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1 Introduction

The Covid-19 spread across the globe has been a major disruption for educational systems. Governments intended to prevent the virus dissemination through school closures and lockdowns. This decision has impacted 94% of the school population globally (United Nations, 2020). In Latin America, all countries -except for Nicaragua- decreed in March 2020 the closure of educational institutions and the suspension of in-person teaching practices (ECLAC-UNESCO, 2020). A more recent report on the situation globally (UNESCO, 2021) reveals that the duration of remote teaching and learning has varied widely. Latin America is the region with the longest rate of school closures, which reaches an average of five months compared to ten weeks in Europe and one month in Oceania (UNESCO, 2021).

School closures have generated an unprecedented exploration of ways to ensure the continuity of education. Most Latin American countries guaranteed continuity using remote learning practices. Research has reported online and asynchronous remote teaching (e.g., delivery of technological devices for learners, use of web pages and learning management systems), transmission of radio and TV programs and video conferencing to provide instruction has been documented to a lesser extent (CEPAL-UNESCO, 2020). Likewise, most governments have undertaken initiatives to support teachers in their transition to remote teaching. Some have offered online courses for education professionals to increase digital competencies and virtual pedagogical resources to strengthen their teaching practices (CEPAL-UNESCO, 2020). Despite the rapid shift undertaken by public policymakers and schools

to sustain educational continuity, the transition to remote education has been particularly challenging for the region. The digital divide has become more evident within and across nations. Additionally, the limitations of initial teacher training and teacher professional development (TPD) regarding digital technology use in teaching have become more visible (OECD, 2020a).

The transition to remote education has changed conventional practices in multiple ways. New professional learning processes emerged due to the shift from in-person to remote teaching (Wolfenden, 2021, Herrero Tejada et al. 2020). For instance, the pandemic established new ways of communicating between practitioners and school leaders. Using instant messaging systems (e.g., WhatsApp) to communicate with pupils has increased during the pandemic. Online collaboration has increased to share resources, materials and innovative practices. Additionally, greater teacher participation in professional courses about digital technologies, primarily offered as an institutional policy, followed by the Ministries of Education have been welcomed by schoolteachers to fortify their shift to remote teaching.

There seems to be a consensus among researchers and policymakers that the Covid-19 pandemic can foster changes and innovative teaching practices (Reimers, 2022). Recent literature provides incipient evidence about new forms of TPD in response to this particular sanitary crisis (Abaci et al., 2021; Philipsen et al., 2022; Portillo & Lopez de la Serna, 2021). For these two reasons, we found it crucial to investigate the following research questions:

- How do Latin American teachers engage in professional learning about remote teaching practices due to school closures caused by the pandemic?
- How does their professional learning relate to the digital technologies that are available for teachers in their specific teaching and learning contexts?

The aim of this study is to examine teachers' professional learning processes during the pandemic and how these learning experiences are linked to digital technology. This study is framed under the umbrella of the TPD@scale coalition approach that is concerned with fostering equity, quality and efficiency in TPD models by taking advantage of the possibilities of digital technologies (TPD@scale Coalition. This qualitative examination can help us to understand how teachers adjust or transform their teaching practices and the factors playing a significant role in that process. Consequently, findings emerging from this period of school closure might inform future strategies for teacher professional development (TPD)¹.

We do this by studying 15 teaching practices that transitioned to remote instruction due to the lockdowns generated by the pandemic in Latin American and Caribbean. Upon this general scope, this study sought the following specific objectives:

• Learn about teaching experiences of Latin American and the Caribbean about the transition to remote education practices in the circumstances of school closures and the use of digital technologies to continue the educational process.

- Construct a situated account of teacher learning, development and deployment of their teaching capacities and the role played by digital technologies in such a process.
- Identify the fundamental principles and concepts associated with professional learning that mobilize them to increase their professional knowledge during the remote teaching produced by the pandemic and beyond.
- Reveal the implications and propose suggestions for TPD and policies, especially regarding digital technology use in the Latin American and Caribbean learning and teaching contexts.

¹ This research is part of a regional project carried out by SUMMA in Latin America and the Caribbean within the framework of the Teacher Professional Development at Scale Coalition for the Global South (TPD@Scale Coalition for the Global South, https://tpdatscalecoalition.org/).

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2 Conceptual framework We sustained our investigation in two primary concepts: a) Teacher Professional Development; and b) use of digital technology in teaching and learning.

Teacher professional development (TPD) during the context of crisis

Various authors have characterized the rapid transition from in-person to remote teaching at the beginning of the pandemic as 'emergency remote teaching' (Carrillo & Flores, 2020; Hodges et al., 2020; Williamson et al., 2020). Teachers only had a few days or weeks to adjust their lesson plans in uncertain circumstances without proper guidance and articulate the curriculum and pedagogical background with their redesigns (Cuéllar et al., 2021). This reality has accelerated the need to provide professional learning regarding the adoption of digital technologies in their educational practices (Hartshorne et al., 2020).

The literature regarding TPD highlights several elements to define effective professional development (PD). For instance, Ávalos (2011) argues that professional learning requires a teacher's individual and collective cognitive and emotional participation. While integrating cognition and emotions, practitioners can increase their reflective capacity about their beliefs and practices aiming at constant refinement. Similarly, Desimone & Pak (2017) claim that in-service teacher professional learning and development need to consider aspects such as: active and situated learning, sustained

duration over time, consistency between contents, and purposes and teachers' beliefs and Teachers' involvement as a community.

In a more comprehensive way, Darling-Hammond et al., (2017) point out that it is necessary to design effective professional development and learning opportunities considering seven features: be content focused, incorporate active learning, support collaboration, model effective practice, provide coaching and expert support; feedback and reflection and be of sustained duration. In the context of the pandemic, ICTs emerged as a solution to address the lack of of teachers' pedagogical skills and capacities to deliver teaching remotely; in this scenario digital technologies have been used to expand access to quality, equitable, and efficient training processes which rematerialized what different approaches have been suggesting over the last years (Laurillard et al., 2018; Lim et al., 2020; TPD@Scale Coalition for the Global South, 2020).

Regardless of the ideal conditions for TPD, which were defined before the Covid-19 outbreak, it is noteworthy that some of them are difficult to address today. For instance, it would be problematic to ensure longterm learning opportunities for teachers in an uncertain and rapidly changing context as the current circumstances shaped by the sanitary crisis. However, other factors appear to be even more relevant to TPD and will be discussed in what follows.

The situated nature of TPD can lead to a productive reflection on how the pandemic

has affected the educational environments (Reimers & Schleicher, 2020). Such reflective processes allow teachers to make the most of emergent, unplanned, and unintentional professional learning spaces with a high contextual character (Biesta et al., 2008). These spaces are usually located in between the institutional norms and regulations regarding digital technology use in teaching. They do not circumscribe within the official guidance. On the contrary, they are configured spontaneously and try to resolve a given educational challenge by assuming reflection about the teacher's own learning as a fundamental key for professional growth (Korthagen, 2010). In other words, while situating teachers' learning in the workplace and within reflective practices, the process of TPD is assembled from biographic experiences and their relational contexts (Hernández-Hernández & Sancho-Gil, 2019). This idea is consistent with some critiques from Latin American scholarship PD provision on digital technology use in teaching before the pandemic. In the case of Chile, Sánchez et al. (2011) argue that the lack of innovative and creative digital technology integration in Chilean state-funded schools responds primarily to the fact that professional learning opportunities have taken place outside the teacher's practical context. Additionally, they claim that TPD programmes offered by Chilean public entities are not sustained over time, which affect the possibility to foresee, implement, assess and refine the practices throughout the practitioner's professional life (Claro & Jara 2020).

Likewise, other scholars have suggested that, during the pandemic, teachers need to be provided with opportunities that allow them to learn from each other's innovative practices actively. These possibilities should aid them to replicate successful experiences adjusting them to the specificities of their contexts (Darling-Hammond & Hyler, 2020; Darling-Hammond, Schachner & Edgerton, 2020). Collaborative professional development offers broad learning prospects for practitioners, dialogue, and the construction of experiences and shared knowledge (Laurillard, 2012), a culture of open to innovation and experimentation (Montecinos, 2003) and a horizontal interchange of ideas and practices, and the awareness of problems that need solutions (Ávalos, 2011).

In the current emergency context, the educational landscape presents challenges specific to the region that could have impacted the teachers' PD and learning in response to the remote teaching.

Remote teaching and digital technology use

The primary purpose of the transition from in-person to remote teaching was to provide temporary access to teaching and learning and on-time educational support (Hodges et al., 2020). Such objectives implied safeguarding stable and trustworthy connectivity during the emergency. Teaching with digital technologies is more effective when sustained in active pedagogies, such as frameworks inspired by social constructivism. One of the central arguments of this approach is that knowledge is socially situated and constructed through collaborative learning. Socio Constructivist approaches usually seek to promote collaborative problem-solving, experiential learning, building new upon previous knowledge, metacognition, critical thinking skills, among other considerations (Biggs & Tang, 2011; Voogt et al., 2013). Recently, scholars have explored how digital technologies can facilitate effective learning and teaching experiences based on the marriage between social constructivism and digital technology use in teaching (Dourish, 2017; Luckin, 2018; Stone Wiske et al., 2013).

Selwyn (2017) asserts that digital technology is a valuable tool to support teaching and learning, allowing teachers to offer students genuinetasksinsignificantcontexts.Inthisway, learners can focus on knowledge construction instead of knowledge reproduction. Teachers, then, can promote collaborative learning through social relations, activating deep reflection about their learning experiences. Notwithstanding some progress in the literature surveyed for this investigation and the potential affordances associated with digital technologies in teaching, studies still report a slight improvement in this matter (Ricoy & Sánchez-Martínez, 2019; Tallvid, 2016).

For instance, two models of technology integration in education have received a great deal of professional and academic attention, that is, the Substitution, Augmentation, Modification and Redefinition (SAMR) model (Puentedura, 2014) and the Technological, Pedagogical and Content Knowledge framework (TPACK) (Koehler, Mishra & Cain, 2013). These approaches have become strong illustrations of pedagogies that support the marriage between Social Constructivism and technology use. The SAMR model constitutes a guide for teachers to select technologies and to situate themselves in the level of technology adoption (i.e., the substitution of existing practices, augmentation of previous teaching experiences without digital technology, modification of the practices sustained before the technology use, or redefinition of the practice into a new one). Hamilton et al., (2016) claim that the SAMR model must guide teachers to differentiate technology as a medium to examine what they can and should do to enhance learning among pupils. Koehler & Mishra (2009) developed the TPACK framework to aid teachers in integrating three kinds of expertise (i.e., pedagogical, or the knowledge about the teaching strategies, students' learning needs, assessment methods; technological, or the teacher's technical proficiency; and content knowledge, or the subject areas' expertise). When practitioners articulate these three domains, they are more capable of ensuring students can achieve learning gains (Koehler et al., 2013).

The use of digital technologies for TPD can offer affordances and challenges. These challenges have become particularly visible during the COVID-19 crisis. Hartshorne et al. (2020) assert that the transition to remote education has required new models where the use of digital technologies can support teachers' learning as long as it provides time and space to synchronous as well as asynchronous interactions. It offers personal and collaborative reflective opportunities about their practices. A similar viewpoint, Perraton (2010) highlights that digital technology use in teaching has provided positive outcomes to initial teacher training and PD in areas with low opportunities, particularly in the Global South (Laurillard & Kennedy, 2017; Perraton, 2010).

Perraton (2010) also states that open and distance training has taken advantage of diverse digital technologies to contribute to teachers' PD, innovation, and curricular change. Along with that, Burns (2011) points out that the choice of technologies for distance PD must be guided by suitable access and connectivity conditions, the capacity of these technologies to facilitate effective formative activities and the ease of use in relation to the technological instructors and teachers' competencies. Yet, Hartshorne et al. (2020) caution that more detailed in-context investigation is needed without dismissing the problems associated with connectivity, accessibility, equity and mental and emotional health of education professionals. Some of these issues are considered in the current study. Particularly, we focus explicitly on the context and specific challenges for Latin America.

3 Methodology

We conducted a multiple case study design that explored the teaching practices of fifteen Latin American teachers during the school closure and the transition from in-person to remote education. A purposive sampling was carried out based on two main criteria for selecting countries and teachers (Bryman, 2012; Teddlie & Yu, 2007). (i) An ITC index: this seeks to capture the heterogeneous situation of teachers in the region according to the national ICTs capacities in which they work (countries with high, mid-high, mid-low, and low ICT infrastructure)². (ii) A teacher condition index: this index of teacher conditions seeks to capture the heterogeneous situation of teacher in terms of their credentials and work conditions³. We understand each country has internal differences and inequalities that show differing teacher working conditions, but from a structural point of view these two criteria should satisfy the aim to capture the diversity of situations in which teachers faced the transition to remote teaching.

Based on these criteria, five countries were selected. Honduras. México. Colombia. Uruguay and Chile. We selected three educators in each of the five countries that took part in the research. The sampling was intentionally emphasized to capture the regional diversity of experiences instead of focusing on the particularities of each country. We restricted the sample to teachers who teach a core subject area (math, language and science); have implemented solutions for educational continuity and keep regular communication with their students (regardless of their effectiveness) and have some access to ICT devices and connectivity to participate adequately in remote interviews. The group of fifteen teachers are distributed based on geographical location, dependency, level of education, sex and age. Table 1 shows the distribution of the sample⁴.

² This index was built on five indicators taken from national databases of the LAC countries (CEPAL Statistics (2017, UIT Statistics (2018), and BID (2020b): percentage of homes with computers, percentage of homes with Internet, mobile phone subscription per 100 inhabitants, percentage of Internet users and baseline digital conditions level for online learning in schools. The information available for 13 Latin American countries in each indicator was standardized on 0-1 scales.

³ This index was built on three main indicators taken from national databases of the LAC countries (TERCE ciencias Database (2013) and WorldBank data (last year available in each country): percentage of teachers with teaching certificate, percentage of teachers with professional development courses, primary school student/teacher ratio. The information available for 13 Latin American countries in each indicator was standardized on 0-1 scales.

⁴ SUMMA and its partner institutions supported the specific selection of teachers from each country. It also provided contact information for three teachers who met the defined criteria after consultation.

	Primary								Secondary							
	Public				Private				Public			Private				
Countries	Male		Female		Male		Female		Male		Female		Male		Female	
	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R
Colombia		≥45	<45										<45			
Honduras				<45						<45			<45			
México				<45			≥45		≥45							
Uruguay		≥45									≥45				<45	
Chile		<45					≥45⁵		≥45							

Table 1. Distribution of the 15 cases of teachers

Research phases: methods and and techniques

We considered three sequential phases, which were triangulated during the final analysis.

Phase 1: Creating a background framework of the countries selected. The framework was intended to have a general contextualization of the country composed of different features, such as the structure of their school systems, TPD policies, and the technological preconditions for distance education. It also considered a synthesis of the national strategies to sustain the educative continuity during school closures, including teachers' support. We carried out a document analysis of each school system, available in reports published by international organisms (e.g., UNESCO, 2020a, b; UNESCO-BID, 2020; CEPAL-UNESCO, 2020; BID, 2020 a, b; PNUD-UNICEF, 2020).

Phase 2: Developing fifteen case studies of the teachers' experiences In the second phase, we conducted a multiple case study. We investigated fifteen teacher practices during the school closures due to the pandemic and their transition to remote education. To give prominence to teachers' voices, each case study comprised three sequential interviews with a narrative-episodic orientation (Flick, 2009; Mueller, 2019). The interviews sought to reconstruct their experiences of facing the transition to remote education due to Covid-19. The interview emphasized their educational practices and learning processes in generic terms and concerning the use of digital technologies for teaching. Alongside the teachers' narrative accounts, we supported the interviews with audio records of their experiences (Allen, 2012). Depending on each case, materials developed for the classes (e.g., plans, worksheets, slides), evidence of ICTs used in the period, photographs of student work returns and/or examples of the training activities was also requested⁶.

The three interviews were conducted remotely. The 1st Interview was oriented to have a background of the teacher, identify the context and teaching conditions before school closures and the general experiences they had when schools closed and during the transition to remote teaching. The 2nd Interview sought information on the educational practices

⁵ This case corresponds to a preschool educator who teaches at the preschool level and primary education.

⁶ The research was reviewed and approved by the Research Ethics Committee of the Universidad Católica Silva Henríquez, within which the teacher participants signed off an informed consent before they participated in the study.

implemented during the school closures and remote teaching, how teachers maintained links and communication with students and their professional learning process and how that was linked to digital technologies during school closures. The 3rd Interview sought information on their evaluation of the experience, the principles and key concepts associated with teachers professional learning during distance education and suggestions to strengthen remote education and support teacher professional learning.

Phase 3: Collective meeting session with fifteen teacher participants. After most of the interviews concluded, we carried out a virtual session with all the teacher participants. This encounter had a twofold purpose: on the one hand, we aimed to disclose the preliminary findings with the participants; secondly, we intended to generate an opportunity for the teacher participants to share the primary professional learning outcomes they had developed during the period of remote teaching⁷.

Data analysis

Data was organized into five dimensions to characterize the teaching experiences in response to school closures and the transition to remote education: (i)an account of each teacher's personal background concerning their motivation, training experiences, and professional career; (ii) teacher's social and educational context, alongside a brief characterization of their educational practices and their knowledge and beliefs about the use of digital technology before the pandemic, (iii) the experience during the school closure and transition to remote education. Examples of educational practices with their students were provided; (iv)the professional learning experience of each teacher during the remote teaching period and (v)an account of the main changes experienced by teachers in their practices and professional learning, their conceptions about the use of technology, and how they may be projected in the future.

⁷ Before the activity, we shared an invitation with the slogan 'think of a relevant professional learning that you have developed during the period of remote education and that you want to share in this opportunity'. The meeting had a 90-minutes length. Nine teachers participated, including at least one of the five countries considered in the study.



4 Primary findings This section describes the teacher participants' backgrounds and their experiences facing the school closure and professional development processes. After that, we present a general picture of the teacher participant's narratives about the transition from in-person to remote teaching. Finally, the section concludes by exhibiting the teachers' voices regarding how they foresee and suggesting amendments to enhance teachers' practices with digital technology in Latin America in the future. To contextualize the reader throughout the analysis, we provide general information about each case/teacher in Table 2.

Name ⁸	Sex	Country	Urban/rural	Education Sector	Education level
Lucía	Female	Mexico	Rural	Public	Primary
Elena	Female	Mexico	Urban	Private	Primary
Óscar	Male	Mexico	Urban	Private	Secondary
Raúl	Male	Honduras	Rural	Public	Primary
Silvia	Female	Honduras	Rural	Public	Primary
Esteban	Male	Honduras	Urban	Private	Secondary
Carlos	Male	Colombia	Urban	Private	Secondary
Catalina	Female	Colombia	Urban	Public	Primary
Ismael	Male	Colombia	Rural	Public	Primary
Gonzalo	Male	Chile	Urban	Public	Secondary
Alicia	Female	Chile	Urban	Private	Primary
Pablo	Male	Chile	Rural	Public	Primary
Diana	Female Uruguay		Urban	Public	Secondary
Paula	Female	Uruguay	Urban	Private	Primary
Lucas Male Uruguay		Uruguay	Rural	Public	Primary

Table 2. Cases overview

4.1 Contexts, educational practices and technology integration before the pandemic

Before the pandemic, teachers' educational practices and digital technology use were relevant issues. Teachers valued the potential affordance of digital technologies for teaching, referring mainly to the possibilities they offer to transcend traditional class formats and capture students' attention and motivation, judging them as highly favorable for their learning.

"I believe that [digital technologies] are for the better. But it depends on not abusing, not overusing them, leaving everything to technology. We need to be selective and organized in such a way that technology helps us precisely to stimulate that curiosity and those who desire to learn from the children or bring them closer to the information they have at hand. (Óscar, public sector, urban, Mexico)

Teachers' narratives about their educational practices before the school closures show that integrating digital technologies in their daily practices was relatively low and limited to support existing conventional pedagogic strategies. They tended to use digital technologies to reinforce teacher-centered pedagogies that implied a passive role of pupils in their learning. There were some exceptional cases in more developed countries regarding technology integration in schools (i.e., Uruguay) and teachers working in private schools. Broadly speaking, three significant aspects, intertwined and manifested nuances in each case, affect teachers' underdeveloped use of technologies:

 Lack of formal training and skills concerning digital technologies;

- Precarious conditions regarding ICT infrastructure and connectivity in schools and homes;
- Scant digital technology use associated with conventional methodologies and curricular models followed by professionals.

a) Lack of formal learning about digital technologies for teaching before the pandemic

The professional development (PD) trajectories show a variety of paths that teachers have undertaken to reach their professional degrees. Despite these differences, the majority of the participating teachers have followed formal learning programs, such as postgraduate degrees (i.e., diplomas, master's degrees) and short specialization courses. In addition, the teachers' highlight the importance of training through informal learning before the pandemic. The learning generated from these informal instances was frequently collaborative, situated and contextualized to their professional learning needs. Conversely, formal programs were generally carried out under the institutional guidelines and educational policies without a consistent correlation between the potential benefit of the programme and the teacher's professional learning need.

Teachers integrated a broad range of technologies, however, it was difficult to carry out innovative practices suitable to remote or distance learning and teaching experiences. This issue can be explained by the lack of training and further support during the teachers' professional careers on integrating digital technologies in their professional practice. It also reveals a gap between the practitioners' discourse and what they actually can do in practice, given the material conditions they faced during the sanitary crisis. For example, Pablo points out that, "in my time, well, when I studied, we were encouraged to work on playfulness, back then it was learning by doing; teaching through games, dynamics, but not by using digital technologies. This idea of digital technology was not covered". The absence of digital technology in teacher training is consistent with the gaps outlined in this section.

On the contrary, Uruguay constitutes an exceptional case because the teacher participants completed distance specialization courses. Other exceptional cases are linked to the development of degree projects, such as Carlos from Colombia. Some teachers participated in distance courses delivered by higher education institutions. This is the case of Esteban from Honduras. Although teachers declared they participated in these programmes, there seemed to be a standard agreement that these experiences did not necessarily prepare them to transition to remote education. We will delve deeper into this matter later.

b) Barriers to the use of digital technologies in teaching

We have mentioned before that the ICT infrastructure and connectivity available for teachers and learners in their countries, at school and home, constituted a pivotal factor that facilitated or constrained the transition to remote teaching. Teachers' experiences reveal a profound digital divide among cases. It was possible to observe countries with extreme differences, such as Honduras and Uruguay. Additionally, we identified gaps between urban and rural areas within each country. According to teacher participants' experiences, the precarious conditions of equipment and connectivity in schools and students at home mainly affected rural and/or marginalized urban areas. They highlighted this issue as a fundamental barrier to use digital technologies even before the pandemic. In cases where students and their families had mobile phones with an Internet connection, teachers were concerned about the potential limitation for families from low incomes contexts to access and download files and documents.

"In this context, the situation already determines some things. It is the lack of skills to deal with them, added to the lack of equipment and the slight connectivity that is also present in the houses where in rural areas you have a mobile phone with data plans" (Ismael, public sector, rural, Colombia).

This quotation shows how some barriers influenced the teacher's perception regarding his or her capacity to respond to the pandemic. It also reveals a lack of willingness towards change because the technical conditions were insufficient. This fact raises ethical and political demands in integrating digital technologies in teaching. To what extent and how can education professionals integrate digital technology if they and their pupils do not count with the minimal conditions for its use? Teaching with digital technology implies being responsible for students' learning (Carrillo & Flores, 2020).

c) The pedagogical divide: conventional v/s active approaches supporting technology teaching practices

Two models seem to be present in the five countries. Table 3 describes how teachers express these models. On the one hand, a 'conventional' or teacher-centered approach is evident, emphasizing the relevance of content delivery and a passive role of students in their learning processes. This model was visible with a more prominent presence in secondary and urban education contexts. In these contexts, technology integration is limited to communication purposes or used exclusively by teachers with little student participation.

On the other hand, there is an 'active' pedagogical perspective. Such an approach

provides greater prominence and responsibility to students' role in their learning process. It also encourages teachers to seek curricular integration among different subject domains. This perspective was observed more frequently in urban and rural primary education contexts, offering opportunities to integrate technology differently. However, it is important to recall the contextual limitations raised in the section above.

Conventional	Active
"[my colleagues] have been in the school for 20-25 years and are not open to change. When someone new comes and proposes a transformation, they view it as a threat. In these contexts, technology integration is limited to communication purposes or used exclusively by teachers with little student participation" (Carlos, secondary school teacher, Colombia).	Lucía took advantage of certain digital technologies available at her school before the sanitary crisis, she transformed the way students get involved in the teaching process. In this sense, learners adopted an active role increasing their motivation to learn. Ismael works with the Escuela Nueva pedagogical model. Within the approach, he promoted active, participatory, collaborative and student- centered learning. The model also aims at strengthening the school- community relationship.

Table 3. Evidence of the pedagogical divide across cases

4.2. Responses to school closure and use of technologies in remote education

In all the cases explored, the school closures and the transition to remote education occurred in March 2020. This situation extended until the first months of 2021, except for Uruguay and partially Colombia. This new reality was highly uncertain for school leaders, teachers and families. Although the transition to remote education was surprising, and teachers did not feel prepared enough for these new circumstances, the different participants' experiences show that they searched for solutions and carried them out. This actiontakingonthepartofteachersconstitutedaform of professional learning that is noteworthy to discuss. Thus, throughout the schools' closure, the cases reveal diverse responses to support educational continuity for students. Digital

technology played a prominent role in three significant areas:

- Distance teaching and learning processes;
- Teacher-student bonds;
- Colleague-to-colleague communication to enhance the teaching practice.

a) Digital technology use among teachers

The teacher participants also used digital technologies to communicate with colleagues and support each other's practices. Ismael declared holding virtual meetings with fellow teachers and using other digital technologies for administrative purposes. For instance, Lucas transitioned to a 'zero-paper' scheme. His institution utilized digital technologies to foster professional collaboration, requiring practitioners, for example, to build their lesson plans exclusively through Google Drive.

In other cases, the use of technology among teachers transcended the limits of a given school, serving to connect with other teachers of similar contexts. Silvia points out that using Google Meet has facilitated coordination and collaborative work with her colleagues at school. Additionally, it has encouraged her participation in meetings and teacher training organized by the public entity in charge of developing the educational policies (e.g., school district, municipality or Ministry of Education). This result has allowed her to share the learning she gained from these experiences with other professionals, contributing to the generation of an educational network in her area. The Mexican teachers reveal a similar situation. Lucía and Oscar participated in the Technical Councils programme through Google Meet or Zoom. They shared practices with colleagues from other institutions in their school zone, exchanging experiences or receiving information from the local educational supervision.

Similarly, Pablo mentioned the micro-centre meetings. Such encounters consisted of learning communities among rural schools located in the same area. Supervisors from the Ministry of Education participated in the encounters. In those opportunities, teachers could share ideas of interest and utility to address the challenges of the pandemic.

b) Primary challenges concerning the transition to remote teaching and digital technology use in schools

Multiple challenges influenced teachers' decisions regarding how to ensure educational continuity. The first one refers to material

conditions and the profound digital divide, particularly in the public and rural sectors of the five countries. Equipment, devices, and connectivity at home and/or their limitations to afford data plans for those who had mobile devices. These conditions were addressed with creative strategies, like using analogue technologies for the continuity of teaching. For example, although several teachers initially intended to conduct online classes through videoconferencing, they had to reverse their efforts when they realized the practical difficulties in carrying them out.

"I stopped working with this application, because it was difficult for the children and some could not connect because of their limited resources, or because they did not have a computer or in some cases because they had other siblings who also used the computer and could not do it" (Oscar, urban public high school, Mexico).

A second area is related to teachers' technical proficiency and their capacity to adapt educational practices to remote teaching (e.g. adjustments of curricular contents and activities, planning and assessment). This situation generated overload, stress or resistance among teachers. However, the data also revealed that the adaptation to remote teaching had different nuances depending on their disposition and previous conditions. Some teachers -especially in the private sector- adapted quickly due to their previous experiences using technology. Such is the case of Paula from Uruguay. She was trained before and was already using technological platforms in her teaching. However, other teachers, mainly in the public sector, had more difficulties with this change, partly because of teachers' level of ICT skills and partly because of the limited support provided by national or local authorities at the beginning of the health crisis. For example, Oscar recognizes his poor previous abilities to handle technological platforms and tools and the lack of methodological guidelines for the new scenario, especially in terms of student assessment.

The third set of challenges, transversely observed, was the concern about the effects of the transition to remote education on students. Several accounts mention that the closure of schools caused permanent preocupacion about the lack of interaction among peers, lack of motivation to study, and the potential risk of absenteeism and dropout. The latter two are observed mainly in urban and rural public education contexts. For example, in the case of Silvia her main concern was reaching all her students, motivating them, and preventing them from losing the link with the school. Also, in the case of Diana, one of her challenges was the search for didactic strategies that would promote interest and learning among distance students: "I have to find a way to make a connection, because live and in real time I manage it differently, but here I always have the little black cameras because they do not turn on the cameras. so I have to motivate them in some way".

Finally, another challenging area refers to emotional difficulties linked to confinement and the problematic compatibility of family life with teaching at home. This challenge is mainly expressed by female teachers who participated in the study. Such is the case of Catalina from Colombia, Alicia from Chile and Diana from Uruguay. Diana points out that "the anguish we lived through every day... I was suddenly with virtual classes all day, all day long, I could not keep my head and on top of that I had to learn about all this that I did not know and I was with my son, who is 9 years old".

4.3. Professional learning developed during the transition to remote education

Despite the challenges posited in the previous section, the teachers' accounts describe the pandemic as a professional learning opportunity. This issue was highlighted in a cross-cutting manner by the different cases, although with nuances and dissimilar degrees of depth. The learning that emerged from this period combined technical and pedagogical issues, moving from concrete aspects to broader and more abstract ones. Thus, their narratives show that the two years of remote teaching stimulated their professional growth and allowed them to extract relevant lessons for their educational conceptions and teaching practices. The teachers' learning during the period can be organized in five primary interrelated areas:

- new ideas and conception strengthening;
- rethinking and incipient modification of their educational practices;
- technical proficiency;
- transversal skills development;
- enhancement of their educational practices and their fundamental pillars.

a) Strengthening teachers' conceptions, knowledge and skills concerning their digital technology use

With different levels of intensity, teachers' approach to digital technology implied the development of competencies for their use, despite the existing digital divide and lack of prior knowledge due to the absence of systematic professional learning provision before the pandemic. The transition to remote teaching has reinforced the importance of digital technologies in education, making it easier for teachers to identify different tools, resources and devices previously unexplored. As the following excerpts show, they lowered their resistance to technology integration and began to conceive them as allies:

"The positive thing is all the tools we learned to use and all the new world we discovered and that many people may have accepted that technology is not an enemy and has to be part of education because kids are all the time with technology and that one is only talking and writing on the blackboard for them can be more terrible than we think" (Paula, private sector, urban, Uruguay).

Teachers were able to learn how to use technology to teach students and work with colleagues. In addition, the cases studied here show the use of technological platforms by local authorities to monitor the work of schools and train their teachers and administrators. Teachers in the private sector had a greater diversity of digital technologies at their disposal. They were provided with more sophisticated learning about digital technologies functionalities. In the public sector, teachers used fewer digital technologies.

Carlos and Silvia's cases portray this point. Firstly, Carlos declares that the learning developed out of the platform used by his school for educational continuity:

"Then, when this Teams tool arrived, and I realized what it was for, I learned many things. First, there's a different way of understanding the 'classroom' as a concept. One thinks that a classroom is simply a space made up of chairs and walls, and in Teams you can really load a digital classroom with multimedia files, PDF, Word, with synchronous meetings. In other words, it is quite complete" (Carlos, private sector, urban, Colombia).

In contrast, Silvia reports a similar but limited improvement in her skills in the use of platforms:

"I had used Zoom, but I had never had to create a meeting, I had never had to create a virtual room. (...) From the beginning I was taught how to replicate [in Google Meet], so it was the first tool that I got to know more deeply (...) then I always remember how to do the whole process and I like it (...), I can organize my own meetings" (Silvia, public sector, rural, Honduras).

During the pandemic, teachers learned to use ICT tools and resources previously unknown or superficially handled. Again, the context in which teachers work influenced their professional learning and decisions regarding their digital technology use. Data also reveals that all the teacher participants increased their knowledge and innovative use of digital technologies, some of which are widely used, such as learning new WhatsApp functions or becoming more competent in integrating the Google search engine. For instance, Catalina took advantage of WhatsApp for educational continuity such as: "sharing a link with students, so that they can organize themselves in work groups, share information, assemble images, videos, but also listen to them and give feedback". In contrast, Elena -a Mexican teacher working in the private sector- shows that she has learned to use new specialized platforms, such as Google Meet, Classroom and Jamboard, or Apple for Education applications. Her institution provided training opportunities to learn about these technologies.

As the pandemic progressed, teachers' disposition towards digital technologies became more favorable. However, it is essential to note that learning and professional development in this line is still in progress and mostly focused on the development of remote teaching. Thus, teachers' accounts show that practitioners -with some exceptions in the private sector- learned to use technologies to solve the specific challenges to maintaining bonds with students and ensuring educational continuity during school closures.

b) Reframing and incipient transformation of educational practices

The different challenges faced during the transition to remote education have contributed to questioning the conventional teaching practices they used to develop. This new situation has offered the opportunity to generate spaces to revisit existing educational practices:

"(...) for me it has been, in the best sense of the word, favorable, because, on the one hand, it sharpened things that were there, that we had serious problems, and that face-to-face attendance did not reveal (...). So, for me, the aspect of digital competencies for the teacher is very key, in the use of ICT resources, the use of new methodologies for the student's work remotely or even when we are face-to-face" (Ismael, public sector, rural, Colombia).

In different cases, newborn changes in educational practices are identified, with the emergence of innovative, creative, close, flexible strategies adapted to the students' learning rhythms and styles and the contexts in which they exert their profession. The changes brought about by the pandemic in this area are not similar among the cases in their intensity, with some teachers showing more evident and more decisive transformation. In contrast, others reveal slight reflections and initiatives. Likewise, teachers generated changes in different areas of their remote teaching practices. For example, practitioners developed prioritized learning objectives and curricular content (e.g., Alicia in Chile and Diana in Uruguay). Teachers also reported technology use to integrate different subject areas and articulate teaching activities with the students' context (e.g., Ismael in Colombia and Oscar in Mexico). Lesson plan development based on students' expected competencies and skills, self-regulated and personalized learning principles was also declared (e.g., Lucía in Mexico).

Student assessment and feedback were particularly relevant for introducing innovative teaching practices through remote education. This area generated concern among teachers. In some cases, the use of digital technologies increased teachers' fear of plagiarism among students. Esteban from Honduras highlighted this issue. Other professionals were concerned about the impossibility of taking exams (i.e., Diana from Uruguay). In general, teachers recognize the need to make the evaluation strategies previously used more complex to support and capture the authentic learning generated by students. To this end, evaluative instances were designed to examine the development of skills (e.g., Lucía in Mexico), to monitor in practice the achievement of learning objectives (e.g., Pablo and Alicia in Chile), and to provide feedback through individualized accompaniment (e.g., Ismael and Catalina in Colombia).

Pablo's experience illustrates these changes, highlighting among his most outstanding professional learning the rethinking of his teaching practices, feedback and support for student learning achievement:

"So that thought [rethinking their practices] to me was given, for example, by the remote classes, because before, when a child was missing, you gave him only the guide. So, we worked on additions and the child was absent and the next day you gave him a little sheet with exercises. But now, we give them feedback, we make sure that they really solve the problem and that they are really learning. I think that is one of the things we have learned, that there is more concern on our part that they are learning". (Pablo, public sector, rural, Chile).

Amid this rethinking, teachers developed new approaches to their role as teachers and the role of learners within the learning and experience. In several cases, teachers shifted their practices from a relatively vertical and unidirectional approach to the construction of emerging spaces with greater horizontality, flexibility, and students' self-regulation. The professional's role changed from occupying a prominent space in the experiences to constituting a mediator or orchestrator of the process.

"Now that we are with this modality at home, I feel that we are educating for change, educating for today. There is a lot of flexibility, just in respecting the students' rhythms or times, now we are really for them. Here it is no longer what the teacher says: 'You have 10 minutes to finish'. No, now it's the other way around. All the roles have shifted (Lucía, public sector, rural, Mexico).

Finally, the experiences of several teachers allude to the fact that teachers adopted a new approach towards digital technology use. For instance, they produced their own materials to rethink and innovate in their teaching practices.

"[it was a challenge] to make them fall in love with knowledge [so that] they would stay in class, participate in class and interact with the proposed work (...) We try to involve them a lot in participation, so with videos, with stories as well or with texts, well, with songs as well" (Catalina, public sector, urban, Colombia).

c) Transversal skill development: improvement orientation, reflective inquiry, collaboration and resignification of the act of educating

The teacher participants' recognize the development of transversal skills in response to the challenges posed by the abrupt transition to remote education. In the first place, the schools' closure and the need to seek strategies to ensure educational continuity in remote mode allowed strengthening the orientation towards continuous improvement, reinforcing a positive attitude towards innovation and professional updating, which contributed to the development of a sense of self-efficacy and openness to change or adaptation among teachers. The teachers recognized all these aspects as relevant for innovation during the pandemic. For instance, Esteban mentioned that "I have learned the need to prepare myself more, to develop myself more, to be more innovative, to be more dedicated to work." In the same vein, Pablo highlights:

"learning in the ability to adapt to different realities. For example, I don't know, when we do a class, and there is a child who cannot connect, we immediately generate feedback. Immediately we generate feedback... how? through guides or through a call." (Pablo, public sector, rural, Chile)

Secondly, teachers reported strengthening their practice of inquiry and reflective skills. They explored solutions to the challenges generated by the pandemic. Some professionals developed spaces to review their practices. They researched educational strategies and carried out a critical analysis of their experiences for further refinement. In this sense, Lucía -a Mexican teacher in the rural sector-points out that: "I have had to force myself to investigate more things and I have been very involved in the question of assessments, to find ways to make my work easier,", and Ismael supports the above by stating that "the processes of pedagogical reflection have been nourished by everything, and adjustments have been made in favor of improvement".

Thirdly, the teachers' experiences show a favorable disposition towards collaboration and teamwork among peers, which -although it tends to be transversal among the cases- is emphasized by those teachers who evaluate themselves as more individualistic in their professional performance before the sanitary crisis. That is Esteban's case who alludes that *"from this pandemic, I have learned to collaborate. I have learned to trust the work of others. I have learned to delegate responsibilities to my colleagues"*. This aspect is similarly stated by Lucas when he says that *"the greatest learning I had in this time of pandemic was to share, because I was one of those who did not share"*.

Fourthly, the experience of these teachers during the pandemic has triggered a resignification of the act of educating, which invites them to rethink the meaning of teaching, marked by the delivery of a more significant role to the socio-affective and family dimension of students to facilitate their learning. Catalina, a primary school teacher in Colombia, explains that during the pandemic, "one is able to identify which [students] need more attention than others, which ones manage to be more autonomous". Raúl (...) expressed something similar, in the sense that the development of this skill facilitates rethinking the role of families in the education of their children, as well as the bonds and collaboration between school and family.

"I learned to treat the students differently because sometimes you don't know how they arrive and where they come from. So, learning about the intimacy of their homes makes you think differently". (Raúl, public sector, rural, Honduras).

4.4. Factors associated with professional learning during the transition to remote education

In addition to characterizing the primary learnings achieved by teachers during the pandemic, the data provided information about the factors, conditions and processes that contributed to teachers' professional learning.

a) Professional learning in response to the emerging demands of practice

A first factor associated with the learning process developed by teachers in the context of the sanitary crisis is the recognition that they were not prepared to teach remotely. Teachers were driven (in their own words, 'forced') to spend great efforts to ensure educational continuity and equity.

"It was a challenge for everyone in the field in which they worked. And in my case, it was to think about school in a different way. A feeling of uncertainty at the beginning: 'How are we going to do this?' 'What's going to happen to the children?' 'What's going to happen to the dynamics of the school?'" (Catalina, public sector, urban, Colombia)

This emerging condition leads to the fact that the learning developed throughout the transition to remote education was progressive, being built and nurtured from and in the educational practice. Thus, learning increased gradually over time and was based on the implementation of 'trial and error' approach. They designed, tested, assessed and applied different modifications according to the results obtained and/or the limitations visualized in the performance contexts for their execution. This is particularly relevant for learning about digital technologies in practically all the cases studied.

"We were not prepared for a situation of this nature, but as we have progressed we have been making adjustments and we have also been learning. Through trial and error we have been overcoming some deficiencies" (Oscar, public sector, urban, Mexico).

It is important to mention, though, that this iteration (i.e., design, testing, assessment, refinement) was spontaneous and not formally established as a PD program. Teachers carried out these activities autonomously because they perceived the need to perform them. This finding places interesting questions regarding the role of teacher agency in their professional learning about digital technology use in teaching. For instance, to what extent and how are the teachers' voices heard concerning the decisions of the digital technology integration in education? At this point, it is significant to highlight that teachers' are in direct contact with pupils. No one knows the 'classroom' reality better than them. Therefore, institutional and national policymakers should ask themselves how it is possible to articulate teachers' professional learning needs with the knowledge, skills and motivation they already have to integrate technology in practice.

b) Professional learning supported by digital technologies

The transition to remote teaching has made visible and contributed to a better understanding of the potential affordances of digital technologies to foster teachers' professional learning. The teacher participants emphasized that technologies have been a critical resource. They have used them to build support groups among colleagues. They also reported to participate in formal training activities and/or educational networks. The digital technologies they used to support these learning instances were broad: video conferencing platforms (i.e., Meet or Zoom), social networks (i.e., WhatsApp) and cloud computing tools (i.e., Google Drive).

In this regard, the teacher participants emphasize that new technology-supported professional development modalities that emerged during the period facilitated and optimized time, resources and the organization of meetings. Likewise, technology also enabled teachers to share knowledge and learning resources to ensure they are accessible for all. Particularly in rural environments, using digital technologies aided the participants to overcome the geographical barriers that prevented them from engaging in face-to-face training activities.

"Now I prefer to do virtual courses because of the pandemic. You see, because, what happens? The courses were only for one day in Montevideo, and we had to travel to Montevideo, which is 800 kilometers (...). And it was only for the day: you make a 16-hour trip to spend 8 hours in Montevideo. (...) Now, with everything virtual, everything is spectacular, everything is learned, everything is typed, everything is typed, everything is transformed. Nothing is lost. That is very good" (Lucas, public sector, rural, Uruguay).

c) Colleague-to-colleague collaborative profesional learning for reflection and sharing

Transversally, teachers highlight colleague-tocolleague learning in professional collaboration spaces. Such opportunities usually were facilitated by technological platforms to strengthen their pedagogical practices for the educational continuity of their students. The configuration of professional collaborative spaces had different formats and scope among the cases. Regarding the format, we found collaborative examples created during the pandemic, but also experiences that had former professional collaborative experiences both informally and formally. Some cases reported engaging in professional collaboration within the framework of educational networks generated by local authorities.

Regardless of the format and scope of the spaces, the teachers emphasize that colleagueto-colleague learning enabled two key processes. On the one hand, emerging spaces for collective pedagogical reflection arose in the transition to remote education, marked by discussion and dialogue concerning the needs visualized in daily practice and the orientation towards its improvement. "For us, it was very necessary to meet constantly. So, we had a kind of catharsis. 'I have this situation with these kids', 'I have this strategy', 'I have this difficulty with the students'. And we planned the four teachers together: 'What are we going to do?' 'How do we plan it?' From these reflections, which are very valuable, I feel that teachers should think about what they do. Not when the year is over, but in situ. The week is over, 'guys, let's get together, how did it go, what happened'". (Catalina, public sector, urban, Colombia).

On the other hand, collaboration among teachers is pointed out by the participants as a relevant space for the exchange of knowledge, strategies and educational resources, which were fundamental to face the challenges imposed by remote education. In several cases, younger teachers -and/or those closer to technologies- trained their colleagues (as in the cases of Esteban in Honduras, Gonzalo, Pablo and Alicia in Chile, and Carlos in Colombia):

"In our sector, the teachers in the professional technical area decided to start meeting together. We, on our own initiative, started to get together. And in these discussions and meetings, which enriched our work, we began to share our experience. 'Look, I can do this', 'Look, I know this', 'I am doing this'." (Gonzalo, urban public sector, Chile).

d) Self-learning or individual inquiry

The teachers' accounts reveal that they rapidly experienced emerging training needs during school closures. At first, they were left alone to learn about the best way to carry out the transition to remote education. This situation implied the deployment of their own selftraining capacities or individual inquiry skills, both in terms of digital technologies and their educational strategies and practices.

The teachers' narratives show their interest broadening their knowledge about in digital technology. They searched for online resources (such as Dania, Esteban and Raúl in Honduras, and Ismael and Catalina in Colombia). They demonstrated their own 'curiosity' (or 'cacharreo') to learn from technological platforms and resources (such as Carlos in Colombia and Paula in Uruguay). They used tutorials available for the use of ICT devices and or to adapt their existing teaching practices (like Ismael in Colombia, Elena and Octavio in Mexico, Gonzalo in Chile and Diana in Uruguay). They also conducted personal research in complex areas, such as evaluating learning in remote modalities (in the case of Esteban in Honduras and Lucia in Mexico).

"...always looking for tutorials. I became a fan of a Spanish guy (...) I really liked how he explained, the way he explained the use of Google, Meet, Jamboard and all that kind of stuff" (Elena, private sector, urban, Mexico).

e) Formal and informal professional learning opportunities

PD during the sanitary crisis included informal and formal instances of learning, albeit with different levels of relevance from the teachers' narratives. On the one hand, there is evidence of formal training received by educators in using platforms at the beginning of the transition to remote teaching. Generally, these instances include private sector teachers, who received training in their schools to learn the platforms and other digital technologies to be used during the period (for example, Carlos in Colombia, Elena in Mexico, Esteban in Honduras, and Alicia in Chile). For teachers in the public sector, formal instances were fewer and were carried out by educational authorities (as in the case of teachers in Mexico) or private foundations (as in the case of Pablo in Chile) with a focus on the use of ICT devices and the socioemotional aspects of the teaching and learning process. It is worth mentioning that, on occasions, the topics addressed in these formal meetings with public sector teachers responded to previous consultations on the training needs of teachers.

"Then there was a monitoring by the supervision of my school zone. And they asked us what we wanted them to help us with, in what areas did we need help, in terms of training? Then, I think that most of them opted for the use of ICTs [acronym for 'Information and Communication Technologies], to use the platforms, for example, Zoom, Google Teams, Classroom, which was much talked about, it was very popular, then we said 'oh, but I hardly know how to use WhatsApp!'" (Lucía, public sector, rural, Mexico).

It is interesting to highlight the experience of Pablo, who took a Foundation course on how to make the most of WhatsApp resources for educational continuity.

"It was not something programmed, we said: 'ah look, a WhatsApp training, let's take this'. I think that later we realized its relevance when we did the survey with the parents who told us 'look, we prefer WhatsApp because of the free social networks'". (Pablo, public sector, rural, Chile)

On the other hand, teachers' experiences, especially in the public sector, also highlight the informal instances of professional development and learning. These opportunities emerge in response to the critical view of teachers regarding the lack of support received from educational institutions, especially in countries with wider gaps in this matter (such as Honduras) or in rural areas that have traditionally been marginalized from teacher development policies. These informal instances are closely related to the factor associated with collaborative learning among peers described above. They are generally used to address practice problems based on individual experiences and expertise.

"At the beginning I had to be in meetings via Zoom and I had never received any training on how to use it, how to share a screen. I entered the first time like that, without a base, without anything [...] and sometimes we gave each other some training and that has been very beneficial for education, because we are sharing ideas or experiences with colleagues" (Raúl, public sector, rural, Honduras).

f) Professional learning through nontraditional technological means

Finally, the cases show a set of other virtual spaces generated during this period, such as Webinars, talks given by university scholars, or Facebook Live, in which some teachers participated. This technological means broadened teacher reflections and their educational practices.

"During the pandemic, we actually had some webinars where we talked about different strategies that we could use. Some were optional and I obviously decided to sign up because I was interested and others were mandatory, let's say." (Paula, private sector, urban, Uruguay).

The teachers generally evaluated these opportunities positively since they usually

respond to their personal and professional concerns. These concerns are related, in part, to what has already been mentioned regarding self-learning and individual inquiry. Still, they also generated an evaluation of their own performance as teachers, in particular, and of the work they carried out in their schools during remote teaching, in general.

"That specific talk [about changing the purpose of school education, which was offered by a university] allowed me to be very flexible (...) I have tried to be very flexible in my practices, trying to understand a lot of the reality of the children. In this pandemic, I believe that this was multiplied much more, because they are the realities of the children (...). The school became more humanized, the teacher had the need to rethink." (Catalina, public sector, urban, Colombia)

Finally, it should be noted that, although these instances are positively valued, some teachers express certain limitations. The absence of means to facilitate the exchange of experiences among webinar attendees is an example of this idea, which could have enriched the learning and professional development process.

"They were good, I liked them. I think that maybe there could have been a possibility afterwards to exchange among us... I loved all the topics that were discussed. I think it was very enriching". (Paula, private sector, urban, Uruguay)



5 Conclusions and implications

Although schools closures and the transition to remote education have had a negative impact on student learning and teacher well-being (ECLAC-UNESCO, 2020, UNESCO, 2021), the results of this study suggest that it was a fertile period of learning and PD for teachers, who were able to sustain the educational process in the face of significant difficulties associated with the conditions of the social, technological and political context in Latin America (OECD, 2020a), and from which we derive implications for thinking about these processes on a broader level.

In what follows, we present five ideas that to be considered in policy making when planning teacher professional development strategies. These recommendations shed light on what teachers can put in place in periods of change under conditions of social and systemic uncertainty. All these lessons can serve as principles or guidelines for TPD@scale in the post-pandemic educational scenario in the region.

5.1. Multiple professional development strategies during the remote teaching context due to the Covid-19 outbreak

The teachers' experiences in the study offer preliminary evidence of an appealing diversity of PD strategies in the context of remote teaching, according to the structural and professional conditions of their local and national contexts. In the experiences reviewed, there was a marked emphasis on *informal or unstructured instances of PD*, where colleague-tocolleague and teacher self-learning predominated. Although less relevant, formal training also played a role in PD in the context of remote teaching. The latter was primarily associated with platforms provided by educational authorities.

These different PD strategies boosted situated and contextualized learning. This finding echoes Desimone & Pak (2017), who evaluate these factors as instances of effective professional learning. Likewise, among these diverse strategies, they all developed collective or collaborative reflective spaces alongside individual investigation and experimentation. According to some authors, these activities characterized the pandemic context (Darling-Hammond & Hyler, 2020). It should be noted that the diversity of informal professional development strategies gained strength in the absence of formal and intentional policies to support teachers' professional digital skills. This issue increased with the lack of relevance for local contexts or due to access limitations to formal training in specific zones, such as rural areas.

In this sense, although the pandemic forced the transition to remote teaching in Latin America, it has opened professional learning opportunities. Informal instances and how they are adjusted to their teaching contexts have fashioned such spaces. Despite teachers' complex individual situations, these experiences privileged instances from which they could build new pedagogical knowledge and generate favorable learning conditions. In the Latin American teachers' experiences, the new conditions demanded an active disposition of teachers to investigate, test, assess, and refine their practices. They stimulated collaborative reflection among colleagues, which facilitated the socialization of professional learning.

5.2. Relevance of digital technologies to TPD during remote teaching

Digital technology integration positively influenced the teacher participants' informal instances of PD. Digital technologies can contribute to the rapid search for information, the mobilization of resources and knowledge among teachers from the same or different schools, the creation of networks for coordination, collaboration and reflection, as well as the generation of virtual spaces for selflearning. These results support prior findings regarding the role that digital technologies play in TPD as a means of dissemination and communication of professional learning (Flores & Swennen, 2020; Hartshorne et al., 2020; Mutton, 2020).

As noted in the previous point, in the absence of formal and intentional policies, the experiences studied show that digital technologies enabled teachers to cope with the emerging needs of remote teaching. Digital technologies offered concrete solutions while stimulating teacher creativity. It is particularly striking that using these resources, devices, and services enabled a 'trial and error' mode of learning where teachers could test their pedagogical practices 'in action' to solve students' learning problems and needs. In this sense, teachers figured out their own solutions to the challenges imposed by the pandemic. They integrated digital technologies to ensure educational continuity. It could be hypothesized, then, that the assumption that policymakers will always have the 'recipe' to overcome emerging issues in educational practice was left behind. This idea offers significant implications for teacher agency. Before the pandemic, some authors highlighted the need to bridge the gap between policy and practice regarding the field of educational technology (González et al., 2020; Damşa et al., 2021; Lowyck, 2013). They suggest that policymakers have expectations and generate regulations regarding which and how technology should be used in teaching outside the practical domain of practitioners. In this sense, a more profound discussion regarding the extent to which policymakers can collaborate with teachers in the decisionmaking process regarding 'how' teaching with digital technologies is needed. This argument presupposes that teachers have more knowledge than the TPD providers assume they have. It also implies that teaching and learning are situated and must be rooted in the context. Therefore, professional development opportunities also must enable teachers to reflect on how to adjust their learning about digital technologies to the specificities of their teaching contexts.

Finally, digital technologies also facilitated disseminating teachers' pedagogical judgments to other colleagues. They made their learning available to peers through synchronous encounters (i.e., virtual meetings or webinars) and asynchronous activities (i.e., resource repositories or video tutorials). According to their profile or specific support needs, this way of working allowed other teachers to access peer-tested resources easily.

5.3. The social and temporal dimensions of teacher profesional learning

Two types of factors, associated with the temporal and social dimensions of learning,

strongly influenced teachers' professional learning during this period of educational crisis. On the one hand, the temporal dimension is related to a progressive, albeit irregular, deployment of PD strategies. These strategies were accommodated according to the needs identified by teachers in their social and educational contexts. Latin American teachers' professional learning during the Covid-19 did not follow the linear and sustained temporal patterns that characterized effective PD programs provided before the pandemic (Darling-Hammond, Hyler, & Gardner, 2017).

Concerning the social dimension of teacher learning, the collective and individual spaces for PD permanently iterated and mutually enhanced each other. Several PD strategies were carried out in this context, as indicated in the first point. However, they all sought to stimulate professional learning by encouraging teachers to review their previous experiences. Practitioners were motivated to ask colleagues and experiment and investigate independently. As indicated in the last point, they were also required to disseminate and share their pedagogical knowledge through different technological means. Thus, this context of uncertainty opened up as a substantive learning opportunity in emerging or existing spaces of colleague-to-colleague collaboration, which supported teachers' independent learning.

These two dimensions seem significant aspects to be considered by educational policies because of their potential to stimulate professional learning that turns teachers into researchers of their own practices. In this sense, they can be part of a professional learning community. They can (re)define their PD expectations according to the learning needs or problems they observe among their students (Borko et al., 2010).

5.5 Advancing equity in professional development and digital technology use in Latin America

Although the study's conclusions highlight significant progress related to PD about digital technology use during the period of remote teaching in Latin America, they also reveal crucial disadvantages associated with the inequity that characterize the region. On the one hand, connectivity and access to technology issues in educational institutions and the digital divide affected their responsiveness to educational continuity. Also, this situation allows us to understand the learning differences achieved by both teachers and students. On the other hand, the lack of policies and resources to stimulate professional learning and the burden produced by the incessant demands of remote teaching were positioned as crucial barriers to teachers' pedagogical work. Such issues reproduced and amplified pre-existing gaps in the educational systems (Claro & Jara, 2020). They revealed notorious differences, especially between the private and public sectors, as well as between rural and urban contexts.

This finding echoes what recent research in the context of the pandemic has pointed out as equity issues that must be addressed to stimulate PD and digital technology use (Hartshorne et al., 2020; Williamson, Eynon & Potter, 2020). The findings lead to highlight the importance, given the gaps evidenced in the region, of sustaining intentional efforts to advance in equipment, infrastructure and connectivity at the level of schools, homes and teachers -which are the indispensable and essential basis for rethinking learning and teacher PD in its articulation with digital technologies, without becoming an unnecessary burden on teachers' work and, on the contrary, contribute to effective teaching practice. Therefore, it is essential to develop educational policies that consider multiple strategies sensitive to local contexts and teachers' professional capacities. In this sense, teacher agency appears as a crucial concept to consider when thinking about TPD regarding digital technologies. According to Albion & Tondeur (2018), the implications of the notion to teachers' professionalism is twofold. First, it must address practitioners' capabilities to search, assess, design, implement, redesign, and refine their digital technology practices. Second, it must consider learning provisions about how they carry out their decisionmaking processes and make a difference when developing their teaching practices with digital technologies. Policymakers should aim at reducing the digital divide, mitigate the adverse effects on teachers' and students' well-being, and ensure access to effective teaching.

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