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Teacher Professional Development Supported by Information and Communication Technologies: A Case Study of the "Teacher Training Program for Curricular Update 2016-2018 in Ecuador"

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Acronyms

ICT	Information and Communication Technologies
LMS	Learning Management System
MOOC	Massive Open Online Course
PACD	Programa de Actualización Curricular Docente
TPD	Teacher Professional Development
VLE	Virtual Learning Environment

Abstract

Demands have increased on governments and public policy to provide quality teacher training. The approaches and models that characterize teacher professional development (TPD) systems vary across countries, as does the level of digital technologies used for their provision. This article presents the case study of the Teacher Training Program for Curricular Update in Ecuador, 2016-2018. It is a national TPD initiative of the Ministry for Education of Ecuador based on a Massive Open Online Course (MOOC) model, which covered 187,376 teachers (out of a total population of 217,000 teachers) and achieved a high pass rate of 66.5%. The study of this program helps to understand two concepts: 1) how the state can use ICTs to substantially expand access to and improve professional learning at scale and 2) the teachers' perceptions of these learning experiences. The findings reveal tensions to be resolved between the criteria of access and quality of training, as well as discrepancies between public policy objectives and teachers' expectations of their professional learning activities.

Keywords

Teacher Professional Development, MOOCs, in-service training, online learning, learning at scale, Ecuador.

Introduction

There is a growing consensus that the work of teachers is a key factor in improving the quality of education (Elacqua et al., 2018; Education Commission, 2018, 2019; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2019). At the regional level, recent decades have shown a significant increase in enrolment in primary and secondary education; however, this has not translated into substantive improvements in the level of student learning (Elacqua et al., 2018). It is argued that Latin America is characterized by low teacher effectiveness in promoting learning (Bruns & Luque, 2014). This reality seems to be a constant in the various countries of the region, which have more than 7 million teachers altogether.

Several efforts have been developed to strengthen the teaching profession in the region (Instituto de Estudios Peruanos [IEP] & Centro de Estudios de Políticas y Prácticas en Educación [CEPPE], 2015; Vaillant, 2016). Especially relevant in this effort is how the UNESCO/Regional Bureau of Education for Latin America and the Caribbean (OREALC) Regional Strategic Project on Teachers for Latin America has highlighted central themes related to the design of policies to support the teaching profession and thereby improve the quality of education. These research efforts have identified several areas of action: 1) initial training; 2) professional development, such as that in the form of in-service training; 3) teaching careers and working conditions; and 4) teacher policy institutions. In terms of in-service training and professional development, this initiative has surfaced key factors that include recognizing differentiated needs between novice and expert teachers and the importance of professional collaboration and promoting the formation of learning communities among teachers.

In this regional context of greater concern for professional development, teaching quality in Ecuador emerged as a central issue of education policy during the 1990s. It was consolidated in the 2000s with the enactment of the ten-year Education Plan 2006-2015 (Ministerio de Educación de Ecuador, 2015a) that established the objective of revaluing the teaching profession, teacher professional development (TPD), working conditions, and the teachers' quality of life (Fabara, 2013; Ministerio de Educación de Ecuador, 2015a).

A relevant precedent in this area comes from 2008 when the Ministry of Education launched the "Sistema Integral de Desarrollo Profesional Educativo (SíProfe; Integral System of Professional Educational Development)". It promoted a "greater emphasis on continuous training through the organization of various pedagogical orientation courses", which lasted between 10 and 60 hours and were carried out through agreements with higher education institutions and several universities in the country (Narváez & Herrera, 2019; Ministerio de Educación de Ecuador, 2015a). By 2014, another nationwide program "Soy Maestro, nunca dejo de aprender (I am a teacher, I never stop learning)" incorporated more online components for teacher training, implementing blended and online programs of up to 330 hours, as well

as specialization and master's programs for national teachers, split between 70% face-to-face and 30% virtual (Narváez & Herrera, 2019; Ministerio de Educación de Ecuador, 2015b).

This trend was completely set by 2016, when the ministry of education developed a new, fully-online stage of delivery: in-service professional development was concentrated in a virtual platform (https://educacion.gob.ec/plataforma-mecapacito/) that offered massive online courses designed by the Ministry of Education itself (Narváez & Herrera, 2019). As the Ministry points out on its website, teacher training processes[1] have been carried out through the Moodle-powered Learning Management System (LMS) tool, Mecapacito, that seeks "to reach the teaching population of the public education sector on a massive scale and at low cost... thus strengthening educational practices and improving the teaching-learning processes in the education system"[2].

This has meant reaching a large number of teachers with training in various subject areas. In Ecuador, there are around 217,000 teachers, 70% of whom belong to the public sector, 24% to private institutions, and 6% to private entities with public support and municipal schools (AMIA, n.d.) According to data available on the ministry's website, Mecapacito has provided courses in different areas, with the "Programa de Actualización Curricular Docente" (PACD; Teacher Training Program for Curricular Update) having the greatest reach as evidenced by the participation of more than 187,000 teachers. Second in reach is the Environmental Education Program (97,000 teachers) and a course on Interculturality (83,000), a highly relevant topic in the Ecuadorian education system.

The PACD was designed and implemented by the Ministry of Education of Ecuador from 2016 to 2018 and was based on a MOOC modality. It consisted of a series of online modules whose main objective was to introduce the new National Curriculum that came into effect in 2016. As such, the need to reach the largest number of teachers to introduce the new curriculum made it relevant to create a MOOC to deliver the program.

The main objective of this study on the PACD is to understand its design and implementation process, the role that the online learning platform has played in Ecuador's continuing education system, and the teacher's learning experiences and perceptions of the relevance of online courses as a professional learning tool. In line with its efforts to strengthen the TPD system, the study aims to identify possible areas for improvement and offer recommendations to policymakers and, as a whole, the actors and organizations involved in delivering TPD programs as they will need to mediate the constraints and opportunities existing in their paths to advance TPD.

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1 This learning space is defined by the Ministry as a Virtual Learning Environment (VLE). One of the main objectives of this platform is to "update" in-service teacher competencies and skills through training courses.

2 https://educacion.gob.ec/plataforma-mecapacito/

Teacher Professional Development and Massive Open Online Courses

We understand TPD as the set of experiences—spontaneous or planned—that enable teachers to transform their teaching abilities; ultimately, this development is expected to benefit student learning. It is a dialogic process between teachers and the education systems, intersecting the circumstances, needs, and developmental expectations of each party (Ávalos, 2007, 2011). This concept transcends other definitions that separate initial teacher training from subsequent learning (e.g., in-service or continuing education), with the understanding that development is a continuous process that does not necessarily require third-party interventions (Vaillant, 2016). In this sense, Vaillant & Marcelo (2015) identify different stages within TPD: 1) previous stage, composed of the experiences during schooling wherein teachers-in-training construct their beliefs and representations about what it is to be a teacher; 2) initial training, or the learning experiences in the institutions where they obtain the accreditation to become teachers; 3) first years of professional practice, or the stage in which teachers are considered as novices or beginners; and 4) continuous or in-service training, which is when teachers update themselves with sufficient experience to leave the novice stage and be recognized as experienced teachers. Although TPD initiatives generally focus on the in-service stage, it is important to note that this development starts long before teachers begin their service in school institutions (Bautista & Ortega-Ruiz, 2015).

The literature on TPD has identified two dimensions of teacher learning (Ávalos, 2007; Desimone, 2009; Desimone & Garet, 2015; Opfer & Pedder, 2011): a socio-cultural and a cognitive dimension, both referring to the concept of the teachers' participation in communities of practice. It is derived from a social theory of learning and considers that learning is achieved when individuals actively participate in the social practices of specific professional communities and, through this participation, construct their identities in these communities (Wenger, 2002; Knobel & Kalman, 2016).

The notion of learning through active participation in specific communities invites us to consider that a teacher, in their professional development, continuously takes the social practices of a given school community and adapts them for their own purposes. This implies three movements: 1) that teachers are influenced by the cultural context and inherit dispositions, information, and ways of doing when they join educational systems and school environments; 2) that teachers are not passive receivers and reproducers of information but actively construct knowledge and transform or attach new meanings to such cultural offerings according to their circumstances, needs, and goals (Rockwell, 2005), and therefore 3) that teachers contribute to re-shaping the activities of their community.

TPD is of institutional and policy relevance insofar as it is based on the central idea that the quality of educational systems depends closely on the quality of teaching and skilled teachers (Barber & Mourshed, 2007). Bautista & Ortega-Ruiz (2015) reviewed national TPD initiatives in six countries (United States, Australia, Hong Kong, Finland, Singapore, and Spain) and found three main areas of intervention: 1) the updating of teaching-learning processes for the transformation of teaching practice; 2) the creation of learning communities for continuous and autonomous learning; and 3) the promotion of teachers' commitment to social justice and transformation. Korthagen et al. (2006) found another area of intervention in a review of experiences in three countries (Netherlands, Australia, and Canada): the teachers' educational research or enquiries for promoting reflection and innovation in regard to their own teaching practices.

TPD literature has identified a number of success factors that can guide the analysis of the PACD. From a systematic review[4], it is possible to identify at least the following four criteria[5]:

- *Temporality*: this refers to long-term interventions that can last from a few months to a couple of years.
- *Objectives*: the programs focus on 1) strengthening both the specific curricular content of the disciplines and the strategies and techniques for teaching them and 2) considering the teacher's subjectivity (values, expectations, beliefs, and feelings) and commitment to social justice and transformation.
- *Approach to Learning*: the use of online learning, as in other contexts, can be effective, provided it goes beyond purely rote learning. To this end, active learning is likewise exemplified in the way teacher formation relies on various efforts: how teachers process feedback from peers and/or external facilitators with expertise, how teachers create and maintain learning communities that promote their long-term development, and how teachers research and curate knowledge about their own practice.

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4 First, we collected relevant background information on successful TPD initiatives. Based on the systematic review from 2000 to 2010 by Ávalos (2011) of 111 articles, 17 of which addressed the effectiveness of TPD programs. Secondly, we collected papers published between 2015 and 2019 in the Scopus database, filtering by the keywords Teacher Professional Development and MOOC, and found 12 articles, nine of which correspond to international conference proceedings.

5 Morais et al., 2005; Fishman et al., 2003; Nir & Bogler, 2008; Nielsen et al., 2008; Van Keer & Verhaeghe, 2005; Lovett et al., 2008; Ponte et al., 2004; Cherubini et al., 2002; Ermeling, 2010; Cantrell & Callaway, 2008; Timperley & Phillips, 2003; Vogt & Rogalia, 2009; Frey & Fisher, 2009; Seymour & Osana, 2003; Vaillant, 2016; Guskey, 2002; Atapattu et al., 2019; Shah et al., 2018; Atrey et al., 2016; Wu & Ma, 2018; Warriem et al., 2016; Partanen et al., 2017; Hoekstra et al., 2009; Li & Yu, 2019; Lee & Kim, 2016; Bautista & Ortega-Ruíz, 2015; Mabuan et al., 2018; Banerjee at al., 2018; Garreta-Domingo et al.,2015.

- *Certification*: the programs provide a valid certificate or credential for the community in which the teachers operate; some can even be validated as credits in higher education programs. Correspondingly, as we shall explain further, these are relevant characteristics of effective TPD which inform the evaluation framework.

These success factors are consistent with other reviews that have sought to identify shared characteristics of effective professional development (Darling-Hammond et al., 2017) which highlight the importance of a focus on curricular and disciplinary content; has elements of active learning, contextualized to teachers' practical environments; that promotes collaboration, idea sharing, and collective learning; is oriented to focus on modelling practice and instructional strategies; uses expert support to address teachers' individual needs; provides feedback and reflection; and has a sustained duration over time.

One of the opportunities opened for TPD lies in the use of ICTs. As is, the issues of teacher professional learning do not lie only in the supply or quality of the courses offered but also in the conditions of unequal access and lack of resources, incentives, or institutional structures from which teachers organize and materialize their professional careers. ICTs emerge as an attractive solution to address this situation and the unequal distribution of teachers' pedagogical skills and capacities; it also serves to expand access to quality, equitable, and efficient training processes (Laurillard et al., 2018; Lim et al., 2020; TPD@Scale Coalition for the Global South, 2020).

New approaches have highlighted the need to provide effective TPD@Scale by focusing on a set of key components and principles, including but not restricted to the following: professional learning support; collaboration and reflection with peers; a variety of formats and platforms to make the contents available for different contexts; peer evaluation; or a career-oriented strategy for professional learning. These components can bring about specific and unique models across countries or local contexts depending on their particular educational policies and practices, the level of digital infrastructures, funding and public spending, etc. Additionally, these core components are required to simultaneously address issues of equity, quality, and efficiency to develop sustainable, inclusive, equity-focused, and large-scale TPD programs (TPD@Scale Coalition for the Global South, 2020). Alongside these efforts, it is necessary to focus on the type of actors that deliver TPD programs (e.g., the state, universities, or civil society organizations, etc.) as they have different capacities and influence in the education system.

MOOCs are a new approach to teacher professional learning. They have the capacity to concurrently enroll large numbers of learners, provide access to equitable learning experiences for teachers across many different locations and contexts, and give participants the opportunity to design their own learning trajectories (Wolfenden et al., 2017). In this sense, MOOCs seem to have the potential to widen access to quality TPD for groups of teachers in remote areas or who have difficulties physically accessing quality training processes near their places of residence.

An OECD report on "E-Learning in Higher Education in Latin America" (2015) highlighted the growing incorporation of e-learning strategies in the delivery of tertiary education in the region, and noted that MOOCs have especially set themselves apart as effective forms of e-learning. Several countries in the region have been adopting MOOCs in their systems of education provision. The report noted that the main MOOC platform in Spanish was MiriadaX, launched in 2013 by Red Universia and Telefónica Educación Digital; Veduca in Brazil, and that several regional organizations have been promoting the use of MOOCs, such as the Inter-American Development Bank with IDBx in partnership with edX (https://www.edx.org/school/idbx).

This study highlights that access to education for traditionally excluded groups has increased through the use of e-learning strategies. In the case of universities, 68% reported that the incorporation of ICT-mediated courses had benefited people living in rural areas, along with other groups such as women, low-income populations, and people with disabilities. This reality shows the potential of ICTs and various forms of e-learning to support the education system in achieving greater levels of equity in the provision of quality TPD. In the same process of opening up to new modalities of teacher training, the Ministry of Education of Ecuador designed and implemented the PACD as a type of MOOC to introduce the new National Curriculum of 2016 and thus inaugurating a new stage of teacher training with the LMS Mecapacito Platform.

Methodological Strategy

What were the PACD's main characteristics and strengths and weaknesses in terms of design, implementation, and evaluation? The answers to these questions were sought through the case study method, which proposes that the enquiry responds to the context and characteristics of the object of study. Therefore, the production of data and information can be carried out in quantitative and qualitative ways. At the end of the enquiry, it is important to note that triangulation of all the data obtained is necessary (Stake, 1998; Bassey, 1999; Scholz & Tietje, 2002)[6].

This methodological strategy involved the use of various methods for the production and analysis of information:

1. Analysis of existing official documents: unpublished reports produced in 2020 (entitled "Informe de Proceso de Capacitación Actualización Curricular") and the program descriptions presented in the Virtual Learning Environment (VLE).
2. Three semi-structured interviews with authorities who promoted the PACD: The ex-undersecretary who oversaw the creation of the PACD was asked about the background and origin of the program, as well as the characteristics of its design. The interviews with the National Curriculum Directorate and the Ministry's Research Directorate sought to understand the conditions that led to the decision on the socialization of the new curriculum under the VLE.
3. Analysis of quantitative databases: Specifically those derived from the implementation of the PACD produced by the Ministry of Education[7] with 187,365 participants and containing quantitative information on content, learning resources, the functioning of the platform, technical support, and opinions on the learning experiences of 14,332 student-teachers from two promotions of the country's two educational regimes: Costa (composed of the Costa and Galápagos regions) and Sierra (composed of Sierra and Amazonia regions).

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6 The case study is particularly fruitful in the face of contextualized (subject to a specific geographical, temporal, or cultural situation) and complex (in the sense that there are various elements or influences at play) objects of study (Scholz & Tietje, 2002). In educational research, the case study is useful as it allows for the development or construction of knowledge that in turn allows for input into educational policy and practice (Bassey, 1999), based on its more analytical and comprehensive perspective of the object of study.

7 Specifically the Dirección Nacional de Investigación Educativa and the Subsecretaría de Desarrollo Profesional Docente.

4. Review of the content in the VLE used by PACD: This contains 13 modules that were analyzed with the following categories derived from the theoretical review:
    - 4.1 *Contents of the module:* The description of the topics to be covered in each unit. This allows us to verify the contents' relevance to the objectives of the program, whether they include teaching methodologies aimed at transforming teaching practice, and whether they integrate the promotion of educators' commitment to justice and social transformation.
    - 4.2 *Module activities:* The description of all the tasks proposed in the units, their progression, and the time allocated to carry them out. From this description, we could infer the presence of active didactics in the program, collaborative work, and the creation of learning communities.
    - 4.3 *Assessment mechanisms:* The description of the evaluation methods used in each module, whether there was formative or summative evaluation, and the modalities of self-evaluation, co-evaluation, and evaluation by peers.
5. Analysis of qualitative data from the four regions (Costa, Galápagos, Sierra, and Amazonia): Four focus groups were developed between the months of July and November 2020 to identify, in an exploratory and qualitative way (Hennink, 2014), the teachers' perceptions of the factors that contributed positively or negatively to the quality of the PACD. Participation in these focus groups was voluntary, and the participants gave their informed consent before sharing their perceptions. Informants were selected according to:
    - 5.1 the geographical regions where they are located (Sierra, Costa, Amazon, and Galápagos);
    - 5.2 the division between rural and urban areas, considering that the latter has better connectivity than the former; and,
    - 5.3 gender, seeking a balance between men and women[8].

[8] Four focus groups were planned according to these geographical areas, via videoconference (due to the health emergency) and with a minimum of four and a maximum of six participants. In the end, 11 out of 16 expected teachers participated. In the case of Galápagos, it was not possible for most of the expected participants to participate due to Internet and mobility conditions on the islands during COVID-19; thus, the focus group was transformed into an interview.

Results

The findings are presented in this section, following an analysis of the main stages of the program: 1) design, 2) implementation, 3) results, and 4) evaluation.

Design of the PACD

According to interviews with Ministry of Education authorities and the unpublished report they provided, the PACD was created in 2016 because of the need to socialize the new National Curriculum and ensure its implementation by teachers in the National Education System. Due to the lack of budget, the authorities chose to rely on the MOOC modality, highlighting the benefits of potential reach and low cost.

The VLE created by the Ministry was called Mecapacito and was based on the open source LMS, Moodle. The program was compulsory for public school teachers and recognized as a professional refresher course valid for promotion and re-categorization processes. To obtain a 100-hour certificate, teachers had to obtain a mark of more than seven out of 10 in each module. In total, teachers had to take six out of the 13 modules that comprise the program: five general modules and one specialized (to be chosen by eight possible teacher profiles in terms of educational level and subject area). In the VLE, participants were told that the activities to be undertaken are completely autonomous. In the interviews, we corroborated that the PACD was designed so as not to need tutors to accompany the participants due to lack of budget. Table 1 shows the themes of each module.

Table 1. List of modules of the Teacher Curricular Update Program 2016

General Modules	Specialized Modules
• Module 1. An open and flexible curriculum to cater to diversity in classrooms • Module 2. The institutional curriculum • Module 3. The collaboration of teaching teams in the development of the institutional curriculum • Module 4. Planning at the second and third levels of curriculum development • Module 5. Assessment in the classroom	• Module 6. Development of the Preparatory GBS curriculum, working with learning experiences • Module 6. Curriculum development for elementary and secondary GBS, an interdisciplinary approach • Module 6. Development of the Language and Literature curriculum in Upper GBS and BGU • Module 6. Curriculum development for Mathematics in Upper GBS and BGU • Module 6. Development of the Natural Sciences curriculum in Upper GBS and BGU • Module 6. Development of the Social Sciences Curriculum in Upper GBS and BGU • Module 6. School Physical Education Curriculum Development • Module 6. Cultural and Arts Education Curriculum Development

Source: Mecapacito (https://eva-mecapacito.educacion.gob.ec/), the VLE of the Ministry of Education of Ecuador.

For each module, a systematic observation was carried out to identify the level of presence of the quality factors identified in the review on TPD (using MOOCs). In the following table is an overview of the modules according to the observables raised in the content analysis and calculated from a total of 58 units distributed in the 13 modules:

Table 2. Overview of the main characteristics of the modules of the Teacher Curricular Update Program

Aspect	Valuation	Frequency	Percentage
Relevance of content[1]	Yes	58	100%
	No	0	0%
Level of active learning[1]	High	6	10.3%
	Medium	37	63.8%
	Low	15	25.9%
Justice/social transformation[2]	Yes	22	37.9%
	No	36	62.1%
Collaborative work[3]	Yes	34	58.6%
	No	24	41.4%

[1] Further explanation in the main text.
[2] Integrating the promotion of educators' commitment to social justice and transformation.
[3] Integration of activities that involve collaborative work or encourage the formation of learning communities.

Source: Systematic observation of Mecapacito, the VLE of the Ministry of Education of Ecuador, with our own elaboration.

We found that the content of the VLE, the Mecapacito platform, is consistent with the objectives of the PACD. In the first five modules are the meaning and logic of the 2016 curriculum, its general objectives, organization into levels of concreteness (macro, meso-, and micro-curriculum), the planning mechanisms, and the nature of the required assessment. In the sixth module, disciplinary content is examined in depth, divided into areas that teachers study according to their profiles (see Table 1).

Some notes on contents can be highlighted. First, the aim of the PACD is to socialize the new curriculum to be implemented across the system; therefore, references on what teachers have to do in their everyday practices of teaching are few as the course is mostly formed by theoretical content. Second, in the same line, the course content does not directly include activities where teachers have to reflect or advance in a logic of enquiry about their teaching practices. Lastly, the content only integrates general notions of the relationship between education and social transformation in 22 units (37.9%), which is a positive aspect in the quality of the TPD programs.

Taking into account that the learning experiences of successful programs are based on active pedagogy, it is found that 25.9% (15) of the units lack active learning dynamics. The majority of units in the program (63.8%, or 37), on the other hand, follow a structure that includes activities that enrich the learning experience, mainly through forums to discuss contents and peer interaction. The units with active pedagogy (10.3%, or six) include the use of questions for reflection on audio-visual materials, the use of social networks to disseminate collaborative processes among teachers, micro-curricular planning exercises, critical analysis of cartoons, and participation in forums to comment on audio-visual materials. All the units present complementary materials to enable teachers to autonomously deepen their engagement with the ideas presented. Bearing in mind that collaborative work is a factor of success within TPD programs, it is important to point out that this was promoted through forums for reflection on the contents in 34 of the 58 units (58.6 %). Only one module of the 13 (the one specializing in Natural Sciences) did not use forums. Despite there being a formal space for teacher dialogue through forums, this does not guarantee the level and quality of its utilization by teachers.

A formative assessment is present at the end of each unit; a summative assessment likewise concludes each module (the passing score being seven out of 10 for both assessments). The summative assessment is based on multiple-choice questions with automatic feedback indicating the correct answers.

Implementation of the PACD

The PACD was implemented from 2016 to 2018 with a total of 18 cohorts. Table 3 presents the number of participating teachers, according to their contexts (rural or urban) and their geographical regions (Costa or Sierra). With nearly 87,000 and 100,000 teachers belonging respectively to the Sierra and Costa regimes, the average of 10,000 teachers per cohort trained in the VLE shows the Mecapacito Platform's capability of reaching a substantial number of teachers.

Table 3. Cohorts in the PACD by geographical areas

Cohorts	Sierra			Costa			No information	Total
	Urban (N)	Rural (N)	No data (N)	Urban (N)	Rural (N)	No data (N)	(N)	
1	4,847	4,284	1,020	68	55	2	2	10,278
2	9,633	6,908	1,672	91	67	3	6	18,380
3	9,556	3,610	439	45	36	2	2	13,690
4	8,384	2,914	1,505	107	85	-	2	12,997
5	5,770	2,836	1,018	63	36	3	1	9,727
6	461	235	4,812	34	15	41	18	5,616
7	3,550	2,133	592	152	77	14	4	6,522
8	64	29	181	3,083	1,453	879	2	5,691
9	336	207	267	6,147	3,848	1,192	9	12,006
10	176	114	195	7,194	3,034	1,304	20	12,037
11	113	66	204	7,616	2,623	1,373	5	12,000
12	56	40	232	7,831	1,433	2,402	8	12,002
13	97	57	189	8,407	2,160	1,086	7	12,003
14	57	67	95	8,405	2,687	890	21	12,222
15	37	38	101	9,937	771	1,332	7	12,223
16	34	23	65	1,149	277	215	13	1,776
17	1,097	839	14	976	545	6	47	3,524
18	4,136	3,010	147	4,608	2,191	34	545	14,671
Total general	48,404	27,410	12,748	65,913	21,393	10,778	719	187,365

Source: Ministry of Education of Ecuador.

Regarding the implementation of the program, teachers expressed their mixed reactions concerning its content: Some teachers said that they did not expect practical activities related to the content (e.g., teaching strategies or classroom evaluation mechanisms). Others did expect practical training in the implementation of the curriculum within the course, especially those that would respond directly to the needs and circumstances of the classroom:

> *The course was basically about updating the curriculum. It was not about methodological strategies; it was not about assessment methods. It wasn't about that, so what we should have expected, and I think it exceeded that expectation to a large extent, was to know the curriculum, how it is structured, the criteria that were made precisely because of the changes that were made* (KO, teacher from the Costa).

> *Something I would say that perhaps did not make much of a mark, and I think that what most of the courses I have received have also lacked is the operational part, going to the classroom itself, being there with the children, developing what methodologica1 strategies would be useful to work with them, how to ground this curriculum* (CA, teacher from the Sierra).

> *Maybe that's where the flaw lies a little bit, that it doesn't become fully established in the classrooms, since it is imposed from the ministry, in a certain way, hierarchically, isn't it? So, from the higher level they say "this is done" and we, as it were, try to take it to the classrooms. So, together, what the ministry offers us, perhaps to facilitate the situation, is almost like a small setback that happens there, isn't it?* (MM, teacher from Amazonia).

Concerning the learning experiences of the program, teachers did not recall many details; however, their overall assessment was positive. They explained that all module activities and resources fulfilled the purpose of informing the main features of the 2016 curriculum:

> *As it was the new 2016 curriculum, there was an innate curiosity on our part to learn, we were eager for information, in that sense it fulfilled its purpose, its approach in that sense. So I remember that the materials were solving each of the doubts we had* (MM, teacher from Amazonia).

In relation to the use of forums for reflection on content and feedback among participants, there was a perception that they were not relevant or useful at all:

> *Little is achieved through virtual platforms with these apparently collaborative spaces. (...) For me, the course was not at all beneficial in that respect* (KO, teacher from Costa).

In general, the teachers know from experience that collaboration and the formation of learning communities in their institutions are most helpful for understanding and putting this new curriculum into practice. As such, they question the virtual modality of the course:

I don't know if virtual tools help a lot in this sense, because eh... I'm speaking from my experience. Understanding how to do things, how to make the curriculum applicable has been learned from the interrelationship with colleagues, experiences in the area, daily conversations, sitting down, uh... talking about what happened this day? In other words, it is a highly experiential and face-to-face experience (MD, teacher from the Sierra).

According to the teachers' experiences expressed in the focus groups, there were several limitations to the delivery of the course which were not limited to physical resources but also included ICT skills not available to teachers:

- *Technological equipment*: Some teachers did not have a computer or smartphone to participate in the course.

  I think that now, with the new teaching, one is already getting used to the technological realities. I think that now the majority, in my case, in my institution, here in the province of Orellana, my colleagues are gradually acquiring a computer and a mobile phone, it is essential (EE, teacher from the Amazonia).

- *Connectivity*: Internet access and electricity are limited or non-existent in rural areas.

  There are courses that have to be followed via the internet. Now, if the teacher doesn't have internet at home, that's a problem, or if the electricity goes out, that's another problem, because for example here in the province of Orellana, sometime s the electricity does go out (EE, teacher from Amazonia).

- Digital literacy: Some teachers did not have sufficient command of the necessary software to participate adequately in the program.

  I had to tell my son to help me and that is another limitation, many colleagues don't manage the platforms, they don't manage the programs, I couldn't make this thing bigger so that I could solve it. I could see those small letters and I couldn't see anything, and my son had to help me (AA, teacher from Costa).

- Time allocated for training: Officially, the workload of teachers does not guarantee time for training.

  (...) when they forced us to do a training... there were, as I told you, colleagues who stayed up until the early hours of the morning to do ... the course because they needed their diploma, their certification (BD teacher from Galápagos).

The convergence of the above factors eventually led the teachers to experience a lack of motivation to continue or complete the training and, in some cases, to pay for someone to participate in the program in their place:

There is also a miniscule group that, due to their advanced age, considers that "I am going to retire", "I no longer need a course", "for what they are going to pay

me in return", "I don't need one" and so sometimes they ask us for courses, and there are cases where they pay other people to complete the courses for them (MM, teacher from the Amazonia).

They were so straightforward as to tell me: "You know what, I don't want to know anything about that, I'm not interested in that, if I have to pay you twenty dollars, I'll pay you to have that" (KO, teacher from Costa).

PACD results

Table 4 shows the number of successful and unsuccessful participants by year of program implementation. It is worth noting that the overall pass rate of the program was 66.5%, and 2017 is the year with the highest participation. Female teachers (70.84%) pass more than males (57.28%; Table 5). As previously noted, Ecuador's education system has two school regimes (Costa and Sierra), and the pass rate is higher among teachers in Costa than in Sierra regime with 71.5% and 61.1% respectively (Table 6).

Table 4. Number of successful students per year of the PACD

Course status	Year						Total	
	2016 (N)	%	2017 (N)	%	2018 (N)	%		
Passed	16,108	100%	102,294	66.8%	6,191	34%	124,593	66.5%
Failed	0	0%	50,768	33.2%	12,015	66%	62,783	33.5%
Total	16,108	100%	153,062	100%	18,206	100%	187,376	100%

Source: Own elaboration with data from the Ministry of Education of Ecuador.

The vast majority of teachers who participated in the program have official appointments. This means they have entered public service through merit-based competitive examinations and that they are career teachers in the teaching profession. Occasional teachers are those hired under contracts with an end date, generally every year. Table 5 shows that 80.4% of appointed teachers passed the program, compared to 43.1% of teachers under temporary contracts. This implies that having an official appointment increases the likelihood of passing the course because of the consequences associated with the career of teachers.

Table 5. Number and percentage of teachers who participated the Curricular Update Program by gender and type of employment relationship

Gender	Course Status	Employment Modality				
		With temporary contract		With official appointment		No data
		N	%	N	%	N
Female	Passed	7,114	47.3%	77,952	83.9%	5,136
	Failed	7,937	52.7%	15,013	16.1%	14,177
	Total	15,051	100%	92,965	100%	19,313
Male	Passed	2,215	33.4%	29,242	72.4%	2,933
	Failed	4,408	66.6%	11,127	27.6%	10,111
	Total	6,623	100%	40,639	100%	13,044
Total Participants		21,674		133,334		32,357
Total Passed		9,329	43.1%	107,194	80.4%	8,069

Source: Own elaboration with data from the Ministry of Education of Ecuador.

Table 6. Number and percentage of teachers who passed the different modules by school regime

Modules	Regime					Total	Approved%
	Status	Costa (N)	%	Sierra (N)	%		
1	Passed	70,485	71.8%	54,997	62.1%	125,549	67.2%
	Failed	27,599		33,565		61,817	32.8%
2	Passed	70,267	71.6%	54,443	61.4%	124,777	66.8%
	Failed	27,817		34,119		62,589	33.2%
3	Passed	70,297	71.6%	54,465	61.5%	124,828	66.8%
	Failed	27,787		34,097		62,538	33,2%
4	Passed	70,074	71.4%	54,137	61.1%	124,276	66.5%
	Failed	28,010		34,425		63,090	33.5%
5	Passed	70,196	71.5%	53,905	60.8%	124,166	66.4%
	Failed	27,888		34,657		63,200	33.5%
6*	Passed	69,435	70.7%	53,127	59.9%	122,616	65.6%
	Failed	28,649		35,435		64,750	34.3%

**Specific curricular module. Minor differences in the total numbers can be explained by lack of information about on school regimes.*

Source: Own elaboration with data from the Ministry of Education of Ecuador.

We can observe that Costa teachers were consistently passing the PACD at a significantly higher rate. Various factors could account for this, including the fact that teachers in the Amazon, in the Sierra regime, are in more remote regions and suffer from weaker connectivity.

Evaluation of the PACD

At the end of the course, teachers completed a satisfaction survey on different aspects of the program. For the databases available, 95% of teachers, including those who did and did not pass the PACD, responded. The instrument consisted of a Likert scale-based evaluation. Responses from three content items stand out, specifically those referring to enabling knowledge and application of the new curriculum and the relevance of the resources used (see Table 7). The majority of teachers (more than 95%) rated the course content positively ("Strongly agree" plus "Agree"), asserting that the program enabled them to apply the new curriculum and supported their teaching activities, and the course design contributed to their learning.

Table 7. Responses to the three content items of the satisfaction survey

	Agreement	Costa		Sierra	
		N	%	N	%
The course contents allow me to apply the new curriculum.	I fully agree	3,441	57.7%	4,573	54.7%
	Agree	2,431	40.8%	3,632	43.4%
	Disagree	24	0.4%	61	0.7%
	Strongly disagree	69	1.7%	101	1.2%
	Total	5,965	100%	8,367	100%
The course design contributed to their learning about the new curriculum.	I fully agree	3,595	60.3%	4,715	56.4%
	Agree	2,263	37.9%	3,445	41.2%
	Disagree	35	0.6%	99	1.2%
	Strongly disagree	72	1.2%	108	1.3%
	Total	5,965	100%	8,367	100%
The available resources are a support for the teaching activity (planning and classes).	I fully agree	3,268	54.8%	4,165	49.8%
	Agree	2,594	43.5%	3,984	47.6%
	Disagree	38	0.6%	118	1.4%
	Strongly disagree	65	1.1%	100	1.2%
	Total	5,965	100%	8,367	100%

The satisfaction survey also sought feedback on the functionality of the platform and the technical support teachers received while using it. In this respect, the evaluation received generally positive feedback: Table 8 shows that most teachers in the Costa regime found that the platform worked adequately (96%) and that they had sufficient technical support (87%). In contrast, feedback from teachers from the Sierra regime averaged at 52% and 63% respectively. This less noticeable positive evaluation implies the need to direct increased attention to the learning experiences of teachers in the more remote regions throughout the course.

Table 8. Responses to the three items on learning experiences in the satisfaction survey

	Answers	Costa		Sierra	
		N	%	N	%
The operation of the platform was adequate.	I fully agree	2,772	46.5%	877	10.5%
	Agree	3,007	50.4%	3,570	42.7%
	Disagree	140	2.4%	2,906	34.7%
	Strongly disagree	46	0.8%	1,014	12.1%
	Total	5,965	100%	8,367	100%
Timely technical assistance was provided throughout the course.	I fully agree	1,725	28.9%	1,088	13%
	Agree	3,371	56.5%	4,212	50.3%
	Disagree	692	11.6%	2,332	27.9%
	Strongly disagree	177	2.9%	735	8.8%
	Total	5,965	100%	8,367	100%

Source: Own elaboration with data from the Ministry of Education of Ecuador.

Concerning the teachers' preference for a virtual or face-to-face modality for in-service training, Table 9 shows how most teachers in the Costa prefer the virtual mode (84%). Data for the Sierra regime was unavailable from the Ministry. This indicates a good disposition towards online learning environments in those with experience in the said environment.

Table 9. Preferred modality for in-service training

Response	What is your preferred option for further training?	
Virtual	5,042	84.53%
On-site	923	15.47%
Total	5,965	100%

Source: Own elaboration with data from the Ministry of Education of Ecuador.

In the focus groups, teachers were also asked about their perception of the program's outcomes. In general, they did not perceive that the program had an immediate impact on their teaching practices; putting the new curriculum into practice would take place later, beyond the PACD and in their day-to-day work. According to teachers, the impact of the program on school's classrooms would be ensured by receiving continuous support from a tutor or advisor:

> *It would have been good if, at that time, we had been required to interact with a course tutor in a different way, to be able to exchange ideas, and also to have spaces for collaboration between fellow teachers in order to start to tackle the disaggregation of skills, the disaggregation of objectives and more or less to start to put together the work that was planned at that time* (XZ, teacher in the Amazonia).

Discussion

The analysis of PACD begins with asking how and to what extent this program materializes the core components of effective TPD@Scale, such as professional learning support, collaboration and reflection among teachers, various formats and platforms to make contents available for different contexts, peer evaluation, or a sustained strategy to provide professional learning (TPD@Scale Coalition for the Global South, 2020). Through the lenses of these key components and the good practices identified in the literature on MOOCs and TPD, it is identified that PACD only partially put in place the components needed to provide effective ICT-mediated TPD. This finding suggests that new versions of the program or similar training processes need to be designed and structured in a way that gives more centrality to these core components.

Based on the information gathered, the PACD achieved its objective of introducing the new curriculum to a large number of teachers in the National Education System who participated in the program. Specifically, it reached 86% (187,365) of Ecuador's 217,024 teachers[9]. When considering that the international success rate remains below 10% (Ricart et al., 2020; Warriem et al., 2016), the percentage of people who passed the course, in relation to other MOOCs, is comparably high at 66.5%. However, we must take into account that this MOOC was compulsory and that the certification at stake has important consequences for promotion and the re-categorization processes in Ecuador's public education system. In this sense, **having a certification is one of the strengths of the program** because it connects the MOOC-based training process undergone by teachers to their professional careers and the official recognition of such (Atrey et al., 2016; Wu & Ma, 2018; Partanen et al., 2017; Mabuan et al., 2018; Banerjee et al., 2018; Garreta-Domingo et al., 2015).

In relation, one of the key factors of effective TPD programs is that teachers can decide and take part in the definition of their learning experiences or the courses they take (Lee & Kim, 2016; Morais et al., 2005; Nir & Bogler, 2008; Van Keer & Verhaeghe, 2005; Cherubini et al., 2002). Based on the observation of the VLE and the reflections of teachers in the focus groups, it is noted that the program was designed to introduce the main features of the new curriculum, which tended to make its content markedly theoretical. TPD requires not only the understanding of theoretical concepts about teaching and learning but also for programs to be designed to allow the connection between theory and practice in authentic contexts. In effect, teachers expressed the desire to be included actively in the definition of the course and its contents. In this case, **the PACD seems to be defined and delivered by the authorities without considering the teacher's opinions and demands**. The fit between a TPD program and the practical needs of teachers

[9] https://educarecuador.gob.ec/visualizador-estadistico/

to bring what they learned from it to life with their students can often be better achieved with teacher participation in the design of the TPD program.

Despite that, the content of the course and the activities in the VLE were relevant and followed the logic of the main features of the curriculum. **The content was considered meaningful by teachers, and the topics covered in the training were understood as a starting point for transforming their teaching practice**. This feature is in line with one of the quality factors highlighted in the literature; the content is consistent with the teacher's needs (Atapattu et al., 2019; Shah et al., 2018; Atrey et al., 2016; Wu & Ma, 2018; Warriem et al., 2016; Partanen et al., 2017; Mabuan et al., 2018; Lee & Kim, 2016; Banerjee et al., 2018).

Equally relevant is that teachers accepted the contents of the program because it integrated ideological aspects of education that are concretized in the training objectives (Bautista & Ortega-Ruíz, 2015; Ponte et al., 2004). In the analysis of the VLE, it was found that the new curriculum manifests social transformation towards a just, innovative, and caring country within its long-term objectives. In the focus groups, some teachers highlighted that **the course content was directly related to subjective aspects associated with the teaching profession, such as values, beliefs, and attitudes of teachers about their practice**.

In the VLE is another positive feature: **all modules provided supplementary materials, so teachers can independently deepen the content taught** (Shah et al., 2018; Mabuan et al., 2018). These materials were mainly PDF texts, which also integrated videos, graphics, or audio files to present information. This is a quality factor mentioned in the literature because it transcends the use of plain texts by using different media to present information (Atapattu et al., 2019; Shah et al., 2018; Warriem et al., 2016; Partanen et al., 2017; Lee & Kim, 2016; Banerjee et al., 2018; Garreta-Domingo et al., 2015).

TPD activities have the transformation of teaching practices and their continuous improvement as their ultimate goal. Teachers perceive that PACD effectively established the initial conditions for the transformation of their teaching practices. However, as they explained, they gradually gained more mastery over the implementation of the curriculum or its application after the program. Several teachers affirmed that the process of transformation is achieved not solely through training but on a day-to-day basis, through experimentation and reflection in the classroom. This highlights the need to design TPD experiences that allow practices of implementation and reflection in authentic contexts (Vaillant, 2016; Guskey, 2002; Morais et al., 2005; Fishman et al., 2003; Nielsen et al., 2008; Van Keer & Verhaeghe, 2005; Vogt & Rogalia, 2009; Ponte et al., 2004; Seymour & Osana, 2003; Cherubini et al., 2002). In this respect, **a weakness of the program is the lack of a more active learning strategy for putting the new curriculum in place**.

The activities in the VLE were predominantly focused on the presentation of information. The presence of active learning was relatively scarce: of the 58 units, 15 (25.9%) had a low level, as their activities only comprised the presentation of plain information; 37 (63.8%) had a medium level, insofar as they enriched the

presentation of information with forums for reflection; and only six (10.3%) obtained a high level. In this sense, the course was relatively poor in the use of active learning in the design of activities. It was found that forums designed for interaction between participants were promoted in 37 out of 58 units (63.8%), and only a single module did not make use of this component. In the first instance, we recognize the value of this integration in the program design as it promotes the formation of learning communities and their inherent collaboration. However, **teachers' perceptions indicated that the forums were not fully utilized: participation was superficial or poorly argued, and there was low interest in completing the activities to pass the modules**.

In relation to that, another difficulty in PACD is the capacity of the program to create sustainable professional learning communities. This can be explained by the need of the Ministry to rapidly expand and scale the new curriculum across the teacher workforce. The program suffers a tension between the need to make the new curriculum accessible to all teachers in the shortest period of time and the desire to create more spaces for teacher reflection and collaboration through learning communities. Teachers recognized this tension and stated that the course on the platform can be enriched by the formation of working teams and learning communities beyond the forums to allow the sharing of ideas and experiences throughout the training process. **PACD was weak in strengthening the creation of learning communities and in integrating other activities such as peer review of curriculum planning, didactic proposals, research questions, or sharing ideas related to curriculum implementation**.

Under the expectation that teachers are going to take further training in the Mecapacito Platform, the program did not directly specify a long-term follow-up approach. **A weakness of the PACD, following the literature review, lies in the lack of a sustained strategy related to the implementation of the new curriculum** (Morais et al., 2005; Fishman et al., 2003; Nir & Bogler, 2008; Nielsen et al., 2008; Van Keer & Verhaeghe, 2005; Lovett et al., 2008; Ponte et al., 2004; Cherubini et al., 2002; Ermeling, 2010; Cantrell & Callaway, 2008; Timperley & Phillips,2003). PACD was conceived as a one-off course to train teachers in the updated curriculum enacted in 2016. As a course, PACD does not have a sustained strategy for TPD, however **the Mecapacito Platform, in which this course was hosted, represented a major shift in the strategy of the Ministry of Education of Ecuador to offer courses for professional learning**.

As a MOOC, PACD lacks a clear component of expert support for teachers. They did not receive learning support in the form of tutoring or mentoring, since the learning experience was organized around the idea of participants doing autonomous work. Based on the literature review, specialized guidance from experts and its consequent feedback is a key factor of TPD, regardless of the didactic approach. This characteristic is another dimension that needs to be addressed in new courses in order to provide effective TPD programs.

In the VLE, the logic of assessment remained entirely automated. It involved questionnaires limited to memorization of the content covered throughout the modules. These had informative materials followed by multiple-choice questions and

automatic feedback (i.e., the platform immediately reported the correct answers). At the end of each module, the same items were used to assess teacher learning. However, other methods could have been applied to promote active learning in the assessment process, such as having the teachers themselves propose and discuss questions and critical items with peers, do post-test discussions on what they got right and wrong, or engage in other activities to promote learning via peer reflection.

Finally, it is important to recall actual issues that teachers reported in relation to their experiences with PACD: 1) lack of equipment (scarcity of computers or smartphones to take the course) is a basic gap to be narrowed if a TPD@Scale strategy is meant to be equitable and inclusive; 2) lack of time as PACD does not consider official time for trainings, so teachers were asked to use their personal time to participate in the program (which affected their motivation and led some of them to pay other teachers to take the trainings instead); and 3) issues with digital knowledge and online learning competencies as seen in teachers who had difficulties in using the digital tools and following the learning process through a digital platform requiring initial training to get used to virtual learning environments. All these aspects remain fundamental to accessing quality TPD.

Conclusions

In general, the PACD was a program designed with a "top-down" type of logic: it has been defined entirely from positions of educational authority in the national Ministry of Education. This factor does not necessarily go against quality TPD, since the need to socialize a new curriculum is evident and does not need to be justified with further extensive diagnosis. However, in light of the participants' input on the conduct of the program, this structure seems to need revisiting, as there is a marked need for the participation of teachers in the design and elaboration processes of the training programs, including didactic tips for how to bring the new theoretical elements of the curriculum to life.

In relation to the difficulties encountered in the implementation of PACD, it appears necessary to preempt the implementation of an online TPD program with a diagnosis of teachers' needs in order to anticipate difficulties in relation to access to resources, availability of equipment and time, strength of connectivity, and teachers' digital knowledge.

At the learning level, TPD involves not only providing information to teachers but also introducing elements that enrich their practice. In PACD, the foundations of the curriculum were a preamble, but there is still a need to consolidate this knowledge in practical contexts. One of the elements to consider in TPD programs is that while the presentation of information and its discussion are necessary activities, they are not sufficient in themselves to guarantee that the information received by teachers will transform their teaching practices.

The authorities in charge of PACD argued about the lack of financial resources to equip teachers with a support group dedicated to providing a more active learning environment with formative feedback and assessment. As such, a budget should be allocated to the creation and strengthening of learning communities, either in the present MOOC or further TPD MOOCs. These communities may enrich learning experiences with opportunities aimed at generating greater interaction between teachers and/or incorporating elements of mentoring and coaching during the learning processes. This could be done between members of the same institutions, as well as in interinstitutional collaborations.

Independent of additional resources potentially given to a program, there is still room to strengthen ICT-mediated TPD programs with existing resources, such as the designs providing opportunities for teachers to plan their classes with the TPD-sourced content, reflections on the practical applications of said content, feedback shared in and obtained from professional learning communities, and the effective use of forums and Q&A sections, among others. In short, as a matter of learning design, the potential of VLE to dynamize learning communities could be better exploited. The incorporation of in-person learning communities in TPD programs also opens up the possibility of using a blended model. The experiences investigated by Atrey et al. (2016) and Mabuan et al. (2018) were successful in combining MOOC training activities with synchronous meetings to strengthen collaboration and mentoring among teachers.

Teacher training programs such as PACD could be strengthened by incorporating action research-related activities. According to the literature review, teachers' research about their own practice promotes continuous and long-term development. In addition, scholars have found that teachers who research their own practice are more flexible to innovate and have better student academic outcomes (Morais et al., 2005; Korthagen et al., 2006; Ponte et al., 2004; Ermeling, 2010).

As Wolfenden et al. (2017) suggest, based on a study in India, to increase the impact on teacher learning via a MOOC, a program such as PACD and the Mecapacito Platform would require providing contextually appropriate contents, learning activities rooted in local and authentic contexts, dialogic forms of assessment and peer-reviewed task, support from peers and facilitators, and the possibility for participants to have local contact sessions throughout the period of the course. Consequently, the PACD and other MOOC-style programs in Ecuador might be enhanced by adopting these components to improve the skills and capabilities of specific groups of teachers.

However, in summary, the PACD has opened the way for new modes of TPD in Ecuador. First, the PACD case study has made it possible to see how the state and public policy can substantially expand access to in-service training using ICTs and the implementation of online learning systems, such as the Mecapacito Platform. And second, it has allowed us to learn about the teachers' perceptions of these online learning experiences. These findings reveal the existence of tensions that need to be addressed in TPD activities in Ecuador, for example, safeguarding the criteria of access and equity in teacher training. This means providing access opportunities for traditionally excluded groups and, at the same time, ensuring the quality of training with e-learning experiences that take into consideration the conditions and characteristics of teachers and their teaching contexts.

On the other hand, this case represents an opportunity to reflect on the principles and components of the TPD@Scale Model. As we know, TPD is seen as an opportunity to improve the competencies of teachers to deliver better opportunities for learning. This goal can be achieved by adapting and localizing the core components to specific institutional contexts. However, the capacity to adapt and design core components in order to integrate with existing structures is unevenly distributed among stakeholders. A necessary focus on the type of actors that deliver TPD programs—such as the state, universities, or civil society organizations, among others—should be considered. They are expected to deploy different pathways to overcome structural constraints and leverage opportunities, based on their competencies and resources, to train large proportions of teachers. In this sense, a TPD@Scale approach needs to put more attention on the actors and organizations that design and implement TPD programs.

As Lim et al. (2020) suggest, within the context of the TPD@Scale Coalition (2020), to address the tensions between equity, quality, and efficiency, "TPD@Scale adopts an ICT-mediated and context-focused approach to blend face-to-face with online learning, modalities, resources, and activities appropriate for teachers living and working in diverse and under-resourced contexts across the Global South".

Additionally, this approach should adopt an actor-centered dimension, based on who is delivering the TPD activity, to better define the strategies, capacities, and resources to strengthen the provision of more effective TPD@Scale programs.

Finally, it should be noted that subsequent studies should focus on analyzing the impact of this massive program on classroom teaching and, subsequently, student learning, the ultimate target of TPD programs (Fishman et al., 2003). Likewise, attention should be given to the need to draw attention to existing mismatches between the objectives of public policy and its "top-down" design and the expectations of teachers, marked by a demand for greater recognition and participation in the definition of teacher professional learning designs.

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