

# Teacher Training for the Pedagogical Use of Digital Technologies in Central America, the Caribbean, and Mexico

## Overview

Fundación Ceibal (Uruguay) leads the project *Fortalecimiento de las Capacidades locales para generar una Transformación Digital Educativa sostenible y de impacto en América Latina y el Caribe (2025-2027)* [Strengthening Local Capacity to Drive Sustainable, High-Impact Digital Transformation in Education in Latin America and the Caribbean (2025–2027)], funded by the International Development Research Centre (IDRC, Canada). One of the project’s specific objectives is to generate evidence on the current state of educational technology integration across countries in the region.

In this context, a second **call for proposals will be launched to fund applied research projects aimed at promoting teacher training for the pedagogical use of digital technologies in Central America, the Caribbean, and Mexico.**

Teacher training for pedagogical use of digital technologies is understood as a set of systematic, context-based processes through which teachers develop the ability to integrate digital resources with a clear instructional purpose, aligning them with learning objectives, the curriculum, and students’ needs. This includes ongoing professional development, practice-based support, and participation in professional learning communities (Darling-Hammond et al., 2017; UNESCO, 2018, 2022).

The decision to focus this call on teacher training is driven by two key factors. First, teacher training was identified as one of the lowest-rated areas by both governmental and non-governmental stakeholders across 25 countries in the region, based on the diagnostic study on digital transformation in education in Latin America and the Caribbean presented by Fundación Ceibal in April 2026. This study will be discussed in greater detail in later sections of this concept note.

Second, teachers are often left out of the channels through which high-potential digital platforms and tools are shared and accessed. Bridging this gap—by connecting teachers, as central actors in an equitable and context-responsive digital transformation in education, with a rapidly evolving technological ecosystem—is therefore an urgent priority.

Teacher training is widely recognized as a critical factor in the effective integration of technology into teaching and learning processes. However, many training initiatives focus on developing decontextualized technical skills, with limited connection to actual classroom practice or local professional pathways. In this context, there is a growing need to reorient teacher training policies toward strengthening context-responsive pedagogical capabilities, enabling teachers to play a central role in instructional decision-making as digital technologies become increasingly integrated into education systems.

### ***Global Overview***

According to the 2024 Teaching and Learning International Survey (TALIS)<sup>1</sup>, more than 60% of teachers in OECD countries have participated in training in educational technologies (digital resources and ICT tools). More specifically, 67% received training in pedagogical skills to integrate digital tools into teaching, while 62% were trained in the technical skills required to use them.

TALIS also shows that, across OECD countries, around one-third of teachers use artificial intelligence in their teaching. However, seven out of ten express concern that it may facilitate plagiarism and academic dishonesty. On average, 38% of teachers in OECD education systems have participated in professional learning activities focused on the use of artificial intelligence (AI) for teaching and learning. Notably, although nearly 40% have already received training in AI, it remains the area where teachers report the greatest need for further professional development (29%), exceeding any other content area covered in the survey (OECD, 2025).

### ***Regional Overview***

In the context of Latin America and the Caribbean, additional structural challenges emerge in relation to digital transformation in education, including infrastructure constraints, institutional and cultural resistance, and the limited availability of systematic teacher training programs in artificial intelligence (Rivas, 2025). In the absence of comprehensive and sustained public policies, the integration of these technologies into education systems tends to rely heavily on individual teachers' initiative.

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<sup>1</sup> An international study led by the OECD (Organisation for Economic Co-operation and Development), and one of the leading global sources of comparative data on teachers and their working conditions.

With particular focus on Central America, it is worth noting that the *Coordinación Educativa y Cultural Centroamericana (CECC-SICA)*, part of the Central American Integration System, identifies continuous teacher professional development as one of the five objectives of the Central American Education Policy<sup>2</sup>. According to the latest available data from the Regional Education Indicators System, across the countries considered—Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, and the Dominican Republic—the proportion of certified teachers is as follows: (a) 86.95% in pre-primary education; (b) 81.96% in primary education; (c) 78.9% in lower secondary; and (d) 79.27% in upper secondary education<sup>3</sup>. It is important to note that these averages mask significant variation across countries. In Belize, for example, the proportion of certified teachers as of 2020 is considerably lower: (a) 42.23% in pre-primary education; (b) 13.93% in primary education; (c) 29.55% in lower secondary; and (d) 30.52% in upper secondary education. Given that the share of teachers with formal pedagogical training remains limited, it is reasonable to infer that the proportion of those with specific training in the pedagogical use of digital technologies is likely to be even lower.

**Table 1. Proportion of Certified Teachers in Education Systems in SICA Countries**

	Region <sup>4</sup>	Belize	Costa Rica	Guatemala	Honduras	Nicaragua	Panamá	Rep. Dominicana
Pre-Primary	86,95% (2019)	42,23% (2020)	96,8% (2020)	n/d	51,02% (2013)	n/d	100% (2016)	90,06% (2020)
Primary	81,96% (2019)	13,93% (2020)	97,78% (2020)	n/d	n/d	n/d	90,12% (2017)	94,86% (2020)
Lower Secondary	78,9% (2016)	29,55% (2020)	99,17% (2020)	n/d	n/d	n/d	83,91% (2017)	88,11% (2015)
Upper Secondary	79,27% (2016)	30,52% (2020)	99,25% (2020)	n/d	n/d	n/d	82,98% (2017)	79,38% (2015)

<sup>2</sup> More information: [Educación | ceccsica](#)

<sup>3</sup> More information: <https://srie.ceccsica.info/regional/indicadores/23>

<sup>4</sup> Calculation based on data from Belize, Costa Rica, El Salvador, Honduras, Panama, and the Dominican Republic.

Source: Authors' own elaboration based on data from the Regional Education Indicators System of the Coordinación Educativa y Cultural Centroamericana (SRIE CECC-SICA), an institution of the Central American Integration System. The original source, as cited in the system, is the UNESCO Institute for Statistics, based on national administrative data.

In this regard, it is worth recalling that Target 4.c of the 2030 Sustainable Development Goals (SDGs) focuses on teacher training: “By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.”

The regional landscape of teacher training is further informed by the diagnostic study *Transformación Digital Educativa en América Latina y el Caribe: ¿dónde estamos y hacia dónde vamos?* (Digital Transformation in Education in Latin America and the Caribbean: Where Are We and Where Are We Headed?), developed by Fundación Ceibal with the support of the IDRC, Canada<sup>5</sup>. The study includes a pillar focused on understanding how education systems conceptualize and structure teacher training in relation to digital transformation. The analysis focuses on whether training responds to concrete pedagogical needs, is integrated into professional development policies, and includes support mechanisms such as coaching, communities of practice, and feedback processes. From this perspective, the pillar assesses not only the availability of training opportunities, but also the system's level of maturity in building teacher capacity for meaningful pedagogical uses of technology. It should be noted that, based on a four-category ordinal scale, a three-level maturity rating system was defined using the following thresholds: low (1.00–2.49), medium (2.50–3.49), and high (3.50–4.00). Alongside the “Data” pillar, “Teacher Training” received the lowest score at the regional level, with an average of 2.39<sup>6</sup>. While this provides an overall

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<sup>5</sup> The information was collected through the distribution of an assessment tool among multiple stakeholders involved in digital transformation in education across countries in the region. A total of 180 responses were obtained, across 25 countries, from five stakeholder groups: three governmental and two non-governmental: Education System Leader / Pedagogical Leader / Technology Leader / School-Based Stakeholder / Third Sector. The questionnaire was structured around nine thematic pillars, the first three strategic and the remaining six tactical: I. Education System Context; II. Problem Identification; III. Definition of Success; IV. Devices; V. Connectivity; VI. Platforms; VII. Programs; VIII. Teacher Training; IX. Data.

Each pillar included between three and six dimensions, for which respondents were asked to provide a rating. The data collection instrument included both closed-ended responses (dimension ratings analyzed statistically) and open-ended responses (narratives from the five stakeholder groups). The assessment report is available at: [https://documentos.ceibal.edu.uy/portal/2026/04/informe\\_TDE.pdf](https://documentos.ceibal.edu.uy/portal/2026/04/informe_TDE.pdf)

<sup>6</sup> This assessment is based on the views, perceptions, and perspectives of the stakeholders who responded to the questionnaire. In this sense, the findings reflect context-specific interpretations of ongoing digital transformation in education processes and are not intended to constitute a comprehensive or official evaluation of national education policies or systems. Their value lies in

assessment, it is worth taking a closer look at how the different dimensions within this pillar perform.

**Table 2. Average Scores by Dimension within the “Teacher Training” Pillar**

<b>Dimension</b>	<b>Definition</b>	<b>Average Score</b>	<b>Maturity Level</b>
Training Objective	Existence of teacher training strategies aimed at supporting digital transformation	2.74	Medium
Capacity	Extent to which the teaching workforce has the preparation and experience to use technological resources in teaching.	2.29	Low
Policy Alignment	Existence of an institutional strategy to engage key stakeholders in the design and implementation of teacher training programs (e.g., committees, technical working groups, training networks)	2.49	Low
Equity	Extent to which teachers and education professionals in vulnerable contexts are prepared to use technology to improve learning.	2.13	Low
Lifelong Learning	Extent to which teachers use active teaching methodologies that foster autonomous learning through the use of technology	2.27	Bajo

Source: *Transformación Digital Educativa en América Latina y el Caribe ¿Dónde estamos y hacia dónde vamos?* Fundación Ceibal, 2026.

As shown in Table 2, the region has made the greatest progress in defining teacher training objectives aimed at supporting digital transformation in education, based on the identification of teacher profiles and needs. In contrast, the most critical areas are those related to current capacity to use technological resources in teaching (Capacity), the use of methodologies that promote autonomous, lifelong learning (Lifelong Learning), and the training of teachers in schools serving vulnerable contexts, including incentives to use technology to reduce gaps (Equity).

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providing an analytical perspective grounded in the experience and knowledge of the five stakeholder groups considered.

**Table 3. Differences by Type of Stakeholder**

Type of Stakeholder	Objective	Capacity	Policy Alignment	Equity	Learning	Average TT Pillar
Governmental	3.02	2.46	2.72	2.35	2.43	2.60
Non-Governmental	2.46	2.11	2.26	1.91	2.10	2.17

Source: *Estado de la Transformación Digital Educativa en América Latina y el Caribe ¿Dónde estamos y hacia dónde vamos?* Fundación Ceibal, 2026.

**Table 4. Differences by Subtype of Non-Governmental Stakeholder**

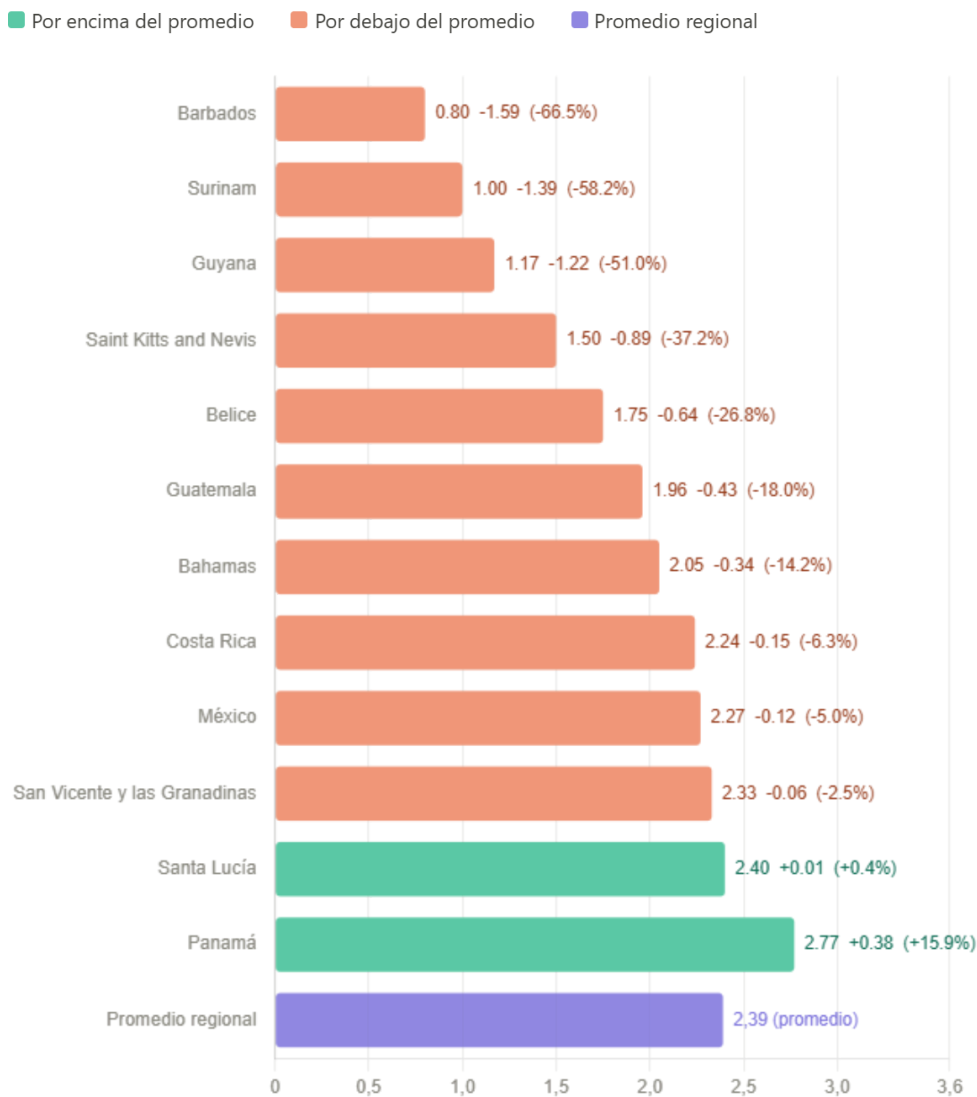
Subtype of Non-Governmental Stakeholder	Objective	Capacity	Policy Alignment	Equity	Learning	Average Pillar
School-based stakeholders (teachers, school leaders)	2.46	2.11	2.26	1.91	2.10	2.17
Third sector / universities / CSOs	2.30	1.98	2.11	1.66	1.91	1.99

Source: *Estado de la Transformación Digital Educativa en América Latina y el Caribe ¿Dónde estamos y hacia dónde vamos?* Fundación Ceibal, 2026.

*Government stakeholders tend to express higher levels of satisfaction with teacher training programs and rate all dimensions more positively. Among non-governmental stakeholders, school-based actors point to practical constraints in accessing training opportunities, while the third sector offers the most critical perspective.*

Focusing on the countries included in this call, the “Teacher Training” pillar tends to receive lower scores than the regional average in most cases.

**Figure 1. Scores for Central America, the Caribbean, and Mexico on the “Teacher Training” Pillar, and Absolute and Percentage Differences from the Regional Average**



Las etiquetas muestran: calificación | diferencia absoluta | diferencia porcentual respecto al promedio regional (2,39)

Source: Author's own elaboration based on *Transformación Digital Educativa en América Latina y el Caribe ¿Dónde estamos y hacia dónde vamos?* Fundación Ceibal, 2026.

Regarding the qualitative analysis included in Fundación Ceibal's diagnostic report, a recurring theme within this pillar is geographic inequalities in access to training opportunities. Teachers in rural and socioeconomically vulnerable areas report that training opportunities do not always reach them.

*“Significant efforts have been made to strengthen teacher training in digital competencies and innovative methodologies, leading to progress at different levels of the education system. However, challenges remain in achieving more equitable coverage, particularly for teachers working in vulnerable contexts, who require greater support and resources to effectively integrate technology into the classroom. While existing coordination mechanisms and ongoing professional development*

*strategies are a positive step, these efforts need to be expanded and deepened to ensure a sustainable and equitable impact on pedagogical practice.”*

— El Salvador – University Representative

*“Most teachers lack training in technology-enabled active learning. There is no national framework, and limited access to devices and connectivity—especially in rural areas—hinders sustained implementation.”*

— Belize – School-based stakeholder (School leader)

*“Although some efforts have been made to train teachers in the use of digital tools, they are neither sufficient nor sustainable, particularly in vulnerable sectors. Most teachers lack technical support and ongoing professional development programs that would enable them to effectively integrate technology into their pedagogical practices.”*

— Guatemala – School-based stakeholder (Teacher)

*“The teaching workforce in Suriname is not yet fully prepared and lacks sufficient experience to integrate digital resources into everyday teaching. While some teachers—particularly in urban schools—have basic digital skills, many still lack confidence, hands-on experience, or access to adequate equipment. In rural and interior regions, the digital skills gap is even wider due to limited training opportunities, connectivity challenges, and reduced access to devices.”*

— Suriname – Pedagogical leader

At the same time, the report highlights a disconnect between training and classroom practice, noting that many training initiatives fail to align with the realities of the classroom.

*“The courses offered to us do not take into account our actual conditions or pedagogical needs.”*

— Honduras – School-based stakeholder (School leader)

In addition, frequent references were made to the lack of evaluation and continuity mechanisms. Both civil society representatives and members of the

academic community emphasize the absence of systematic impact evaluations and sustained, long-term planning.

*“Teacher training has improved by incorporating access to and use of technology in the classroom, but it must be monitored and evaluated to determine its effectiveness.”*

— Barbados – University Representative

Many training strategies continue to focus on broad, poorly contextualized approaches with limited continuity.

*“Training tends to be large-scale and generic, losing the specificity needed to address teachers’ diverse needs based on their level of experience and technological context (e.g., a connected school versus a rural school without internet access).”*

— Mexico – Technology leader

Overall, the Teacher Training pillar highlights the existence of programs and strategies currently in place. In many cases, however, their reach, equity, and effectiveness remain limited. Territorial gaps and the lack of impact evaluation emerge as the most critical challenges. While government stakeholders emphasize progress, school-based actors point to barriers related to access and relevance. To strengthen this pillar, it is essential to move toward more coordinated, context-responsive training, supported by robust evaluation mechanisms that ensure a meaningful impact on educational practice. There is also a need to consolidate sustained, context-based teacher training that strengthens classroom support, professional learning communities, and ongoing professional development. This requires aligning training with curricular priorities, strengthening local pedagogical support teams, and ensuring dedicated institutional time for reflection and collaborative work among teachers.

*“It is necessary to design training pathways that take into account the different levels of teachers’ digital competencies.”*

— Costa Rica – Technology leader

*“Although many training programs have been developed around specific platforms, teachers make limited use of devices to support teaching. They need greater support in using digital platforms and tools.”*

— Dominican Republic – Pedagogical leader

### **Reconceptualizing the Teaching Role and Potential Pathways for Professional Development**

Recently published, *El profesor ampliado* (Brito, Parente & Mesquita, 2025) describes a scenario in which the traditional role of the teacher as a “content transmitter” is gradually evolving into that of a “designer of learning experiences.” The book outlines concrete pathways for rethinking the teaching role, strengthening both its pedagogical and human dimensions. This reconfiguration must move beyond the theoretical level and translate into changes in teachers’ professional development (Brito, Parente & Mesquita, 2025). The use of artificial intelligence to identify learning gaps, the possibility of designing more personalized learning pathways, and the importance of incorporating moments for reflection within digital platforms to support deep learning all point to new opportunities—ones for which teachers require new tools.

Finally, it is important to revisit two key ideas highlighted in the report by the Teacher Task Force, a global alliance convened by UNESCO: teacher agency and professional autonomy. These are essential elements for adopting a reflection- and action-oriented approach that ensures teachers retain control over pedagogical processes, rather than being reduced to mere implementers of technology (International Task Force on Teachers for Education 2030, 2025). According to this international cooperation platform—bringing together governments, international organizations, NGOs, the private sector, and UN agencies to strengthen the teaching profession and improve education policies—it is critical that decision-making authority does not shift away from teachers and teacher educators toward designers and developers of AI systems. For this reason, it is essential that teachers develop the competencies needed to critically assess technological tools. Teachers must be able to determine when technologies do not align with educational goals or human values. In this regard, the concept of “professional metacognition” is introduced to describe the ability to consciously decide which functions should remain under “strict human control” (International Task Force on Teachers for Education 2030, 2025, 23). In addition, teacher digital sovereignty requires that AI systems be transparent and explainable. In other words, teachers must understand how these systems operate, how data are

processed, and how algorithmic recommendations are generated, in order to trust these tools and use them critically and effectively (International Task Force on Teachers for Education 2030, 2025, p. 35).

### **In Search of Studies, Models, Methodologies, and Digital Tools to Strengthen Teacher Training for the Pedagogical Use of Digital Technologies in Latin America and the Caribbean**

The pedagogical use of digital technologies refers to their integration with the aim of improving learning outcomes, aligned with curricular objectives and assessment criteria. It is grounded in instructional decision-making—what to teach, how, for whom, and for what purpose—and is shaped by context: the classroom, the institution, and the broader educational environment. Its consolidation requires reflective practice, collaboration, and continuous improvement.

This approach is explicitly distinguished from purely technical or instrumental training, decontextualized approaches that lack grounding in classroom practice, one-off interventions without follow-up, and access to digital resources without clear pedagogical criteria.

At the same time, it is important to note that the emphasis placed on artificial intelligence throughout this document reflects the central role this topic has taken on in the education agenda in recent years. However, this does not mean that proposals are limited to this area: the call is open to initiatives addressing the pedagogical use of digital technologies in a broader sense.

This call represents a strategic opportunity to generate evidence through one of the following types of projects:

#### **A. Context-based and context-responsive training models for the pedagogical use of digital technologies**

Design of training pathways that prepare teachers to take on one or more of the following roles:

- I. Critical selection of digital tools and content to strengthen learning outcomes.
- II. Adaptation of the pedagogical use of technologies to different social and cultural contexts.
- III. Integration of individual and collective learning. Support and personalization of learning pathways through digital technologies.

#### **B. Research focused on teacher training for the pedagogical use of digital technologies**

- I. Comparative studies and innovations implemented and analyzed using treatment and control group designs, enabling the identification of institutional and systemic conditions that facilitate or hinder effective teacher training for the pedagogical use of digital technologies.
- II. Impact evaluations and monitoring of teacher training for the pedagogical use of digital technologies.

### **C. Mechanisms for teacher participation in the pedagogical use of digital technologies**

- I. Communities of practice and collaborative learning networks for sharing context-based experiences in the pedagogical use of digital technologies.
- II. Mechanisms for teacher participation in the design of digital tools and platforms for pedagogical use.

### **D. Strategic systems and methodologies to strengthen the pedagogical use of digital technologies**

- I. Systems and methodologies to institutionalize the monitoring and evaluation of the effectiveness of teacher training programs in digital technologies, analyzing their real impact on student learning and on the transformation of pedagogical practice.<sup>7</sup>
- II. Projects focused on ensuring that digital tools effectively reach teachers. Dissemination and access methodologies that directly connect teachers with platforms, resources, and tools, and generate evidence on which strategies are most effective in promoting their adoption and pedagogical use across different institutional contexts.

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<sup>7</sup> Unlike Section B.II, this does not refer to one or more one-off evaluations, but rather to the consolidation of a system for monitoring and evaluating the impact of teacher training on the pedagogical use of technologies and on learning outcomes.

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