

## **From Launch to Institutionalization: Operationalizing Educator Development Centers and a National Recognition Pathway in Ecuador**

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## **Abstract**

This practice paper, intended for lecture presentation, reports on the transition from design to sustained operation of a nationwide network of Capacity Development Centers (CDCs) and the institutionalization of a national recognition pathway for university engineering educators in Ecuador, referenced as the iPEER register. Building on our earlier plan, we examine how curriculum-aligned professional development programs (PDPs), a learning-analytics-enabled digital backbone, and a transparency-oriented governance framework coalesced into a stable, reproducible model for engineering-education improvement at scale. The current paper targets a practice-grounded, research-informed analysis of implementation, quality assurance, and educator recognition processes.

Methodologically, we use a multi-method design: (1) implementation tracing across CDC service portfolios (coaching, micro-credentials, portfolio support, teaching innovation grants); (2) formative evaluation cycles driven by learning analytics and peer observation; (3) policy and governance reviews aligning transparency and integrity standards with institutional quality assurance; and (4) the maturation of the educator recognition pathway - mapping PDP outcomes to competency rubrics, portfolio evidence, and peer review culminating in national registration. A light, cross-cutting inclusion strand documented measures to widen participation (communication, mentoring, flexible delivery) while keeping the primary analytic focus on operations, recognition, and governance. The evidence base combines institutional resolutions, CDC implementation records, service portfolio documents, meeting notes, and stakeholder feedback, analyzed through structured implementation tracing and cross-case thematic synthesis.

Qualitative results indicate that CDCs function as durable institutional “gateways” that reduce fragmentation in faculty development, the analytics layer enables course-level improvement loops without overburdening instructors, and the recognition pathway clarifies expectations for teaching excellence while elevating educator status. Governance learnings emphasize that transparency mechanisms - public criteria, feedback channels, external peer verification - are as crucial as formal autonomy for trust and adoption. The discussion distills design principles: sequence CDC services from “quick wins” to deeper practice change; couple analytics with coaching (never dashboards alone); align PDP micro-credentials with recognition criteria from the outset; and embed open-government practices into quality assurance to sustain legitimacy beyond project life. At this stage, these findings are assessed mainly through operational adoption markers and qualitative convergence across institutions rather than causal impact estimates.

Contributions for the readers include an operational blueprint for moving from pilot to systemwide uptake, a recognition pathway that integrates competency-based PDPs with peer-reviewed registration, and a governance template that couples transparency with continuous improvement in low-resource contexts.

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## 1. Introduction

Engineering higher education systems that aim to scale teaching-quality improvement face a persistent implementation gap: promising professional development models often remain project-bound, and recognition mechanisms for teaching excellence frequently lack transparent evidence standards [6], [7]. In Ecuador, universities have invested in isolated faculty development initiatives, but fragmentation, limited coordination, and unclear links between development activities and career recognition have constrained impact [6].

This paper examines the move from “designed system” to “operational system” across two coupled reforms: (a) institutionalizing Capacity Development Centers (CDCs) as a permanent service backbone for professional development programs (PDPs), and (b) institutionalizing a recognition pathway culminating in an educator register (iPEER) based on competency-oriented learning outcomes and peer-reviewed evidence. Here, “designed system” refers to the project-stage architecture in which roles, tools, and policies are specified on paper; “operational system” refers to routinized delivery in which services are staffed, repeated, quality-assured, and tied to actual educator-support and recognition decisions.

We focus on three implementation questions: (i) What organizational design choices enabled CDCs to become durable, routinized units rather than temporary project structures? (ii) How were evaluation and improvement loops operationalized without creating excessive administrative burden? (iii) Which governance and transparency mechanisms proved critical for trust and uptake of recognition and rewarding measures?

## 2. Context and system design

The EENTITLE CDC network was established within leading Ecuadorian higher education institutions to systematize and optimize professional development offerings while aligning them with international standards and best practices [1], [4], [5]. Formal institutional anchoring varied: some institutions embedded the CDC into by-laws or formal resolutions, while others operated through organizational arrangements without by-law changes.



Figure 1 . EENTITLE CDC Network

In parallel, an evidence-based evaluation and recognition architecture was developed to reduce overreliance on single-source metrics, consistent with broader literature on teacher evaluation and evidence-informed academic recognition [2], [3]. The tailored approach emphasized standardization with institutional flexibility: a common national-level frame (for comparability and integrity) combined with local customization (for feasibility and ownership). Digitally integrated systems were positioned as essential to transparency and scalability, supporting real-time tracking, efficient evidence management, and reproducible decision processes.

The evaluation model aligned recognition with a multi-source view of teaching practice. Core principles included transparency (clear criteria and communication), objectivity (mixed quantitative and qualitative indicators), inclusivity (access across faculty groups), flexibility (fit to institutional strategy), and international benchmarking. A practical implication is that professional development and recognition cannot be designed as independent tracks: PDP outcomes, micro-credentials, portfolio evidence, and peer review must be connected from the outset.

For readability, the operational model can be understood as four linked layers: institutional anchoring of CDCs, service portfolios for educator development, lean evidence and feedback loops, and a recognition pathway connecting micro-credentials, portfolios, peer review, and registration.

### 3. Operationalizing CDCs: from spaces to service portfolios

Operationalization proceeded through a sequence of (a) formal establishment, (b) physical readiness and hybrid delivery capability, (c) service portfolio definition, and (d) routinized coordination with institutional quality assurance and human resources processes. CDCs were positioned as gateways that consolidate previously dispersed initiatives (workshops, short courses, mentoring) into a coherent, visible, and accountable service offer.

Physical readiness supported scale and equity in participation through hybrid delivery. Sites were adapted with dedicated training spaces, interactive displays, cameras, audio systems, and reliable

connectivity to reduce dependence on ad hoc classroom availability and to enable inter-university sessions.

Physical readiness supported scale and equity in participation through hybrid delivery. Sites were adapted with dedicated training spaces and modern equipment (interactive screens, cameras, audio systems, high-speed connectivity) to reduce dependence on ad hoc classroom availability and to enable inter-university sessions. ESPOL adapted a space with collaborative furniture and immersive audio-visual capacity for approximately 30 participants. UNEMI prepared a space for approximately 25 seated participants with infrastructure upgrades (electrical/data networks, lighting, sound improvements) and interactive screens. ESPOCH equipped two learning environments with a combined capacity for up to 40 participants and space for administrative support. UNL adapted an existing area, including a video conference room with interactive touch screens, integrated cameras, and HD audio/video for approximately 30 participants in face-to-face and hybrid formats.

Service portfolios were defined to move beyond training events toward sustained practice change. Across centers, CDC offers clustered into: (i) foundational PDP modules (course design, assessment, learning outcomes alignment, active learning); (ii) coaching and peer observation cycles linked to course-level improvement; (iii) portfolio and evidence support for educator recognition; (iv) micro-credentials mapped to competency rubrics; and (v) small-scale teaching innovation supports that create “quick wins” while building momentum for deeper curricular and pedagogical redesign.

### 3.1 ESPOL’s CDC: FARO (Formación Avanzada para el Reconocimiento y la Optimización docente)

FARO was established as a permanent institutional unit through ESPOL’s by-laws (Art. 46, approved in September 2024) and is positioned under the Vice-Rectorate for Teaching. It was conceived as a national pilot for continuous professional development of engineering educators, offering structured workshops and training programmes and providing support for international educator certification and recognition processes.

ESPOL adapted a dedicated training space for FARO. The upgrade included acoustic treatment, installation of electrical and data networks, and a collaborative furniture layout designed for active learning, with capacity for approximately 30 participants in face-to-face and hybrid formats.

The facility also includes a dedicated videoconference room for approximately 20 participants and is equipped with an interactive display, conferencing camera, microphones, speakers, a sound amplification system, network support, and associated control devices. In line with accessibility goals, the setup also incorporated conference-system features for participants with disabilities and acoustic enhancement equipment.

The facility includes a dedicated videoconference room for approximately 20 participants and was equipped with an interactive 86-inch touch display, a 55-inch OLED screen, an auto-tracking camera, ceiling microphones, speakers, a sound amplification system with mixing

console, network switch, and supporting devices (tablet and desktop). In line with accessibility goals, the setup also incorporated conference-system features for participants with disabilities and acoustic enhancement equipment.

The inauguration positioned FARO as an outward-facing institutional gateway: university leadership emphasized its role in serving not only ESPOL faculty, but also educators from other institutions, supporting a regional vision and national-scale impact through coordinated professional development and transparent recognition pathways.

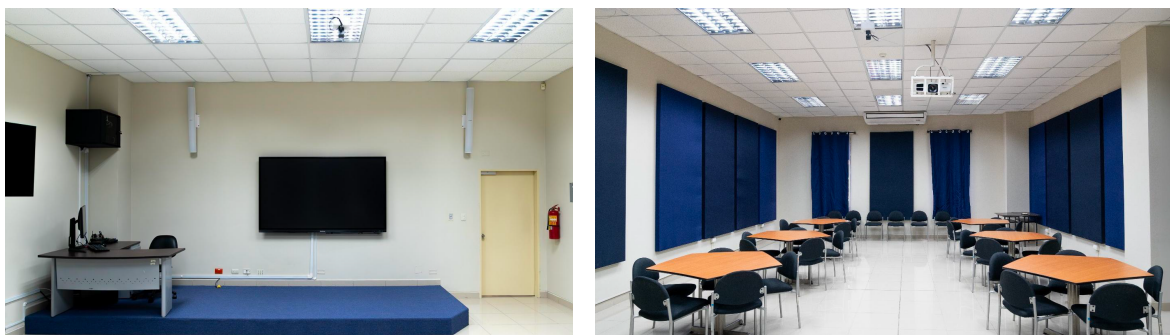


Figure 2. ESPOL's CDC: FARO

### 3.2 ESPOCH's CDC: YANKAY

ESPOCH's Capacity Development Center is officially named YANKAY, combining Quichua words that convey "to know" (yachay) and "to work/serve" (llankay). YANKAY was created under the Rectorate and is managed by an appointed commission responsible for directing the center's work, establishing policies, fostering spaces for academic dialogue, and supervising compliance with faculty duties associated with training, recognition, monitoring and evaluation, and outreach and communication within the capacity-building framework.

To support hybrid learning and align with inclusion objectives, the center was equipped with an interactive display, a video-conferencing camera with speaker-tracking, ceiling microphones and speakers, a sound amplification system, network infrastructure, UPS backup, and desktop workstations. The ceiling-based microphone and speaker configuration additionally strengthens auditory accessibility for participants with disabilities.

To support hybrid learning and align with inclusion objectives, the center was equipped with an 86-inch interactive display (Android and Windows), a video-conferencing camera with speaker-tracking, ceiling microphones and speakers, a sound amplification system, network infrastructure (switch and access point), UPS backup, and 31 all-in-one computers (free software model, 13th generation). The ceiling-based microphone and speaker configuration additionally strengthens auditory accessibility for participants with disabilities.

YANKAY's commissioning structure and multi-space design operationalize the CDC as a service gateway: it consolidates dispersed development activities and enables both short-cycle training and longer-cycle monitoring and evaluation routines across faculties.

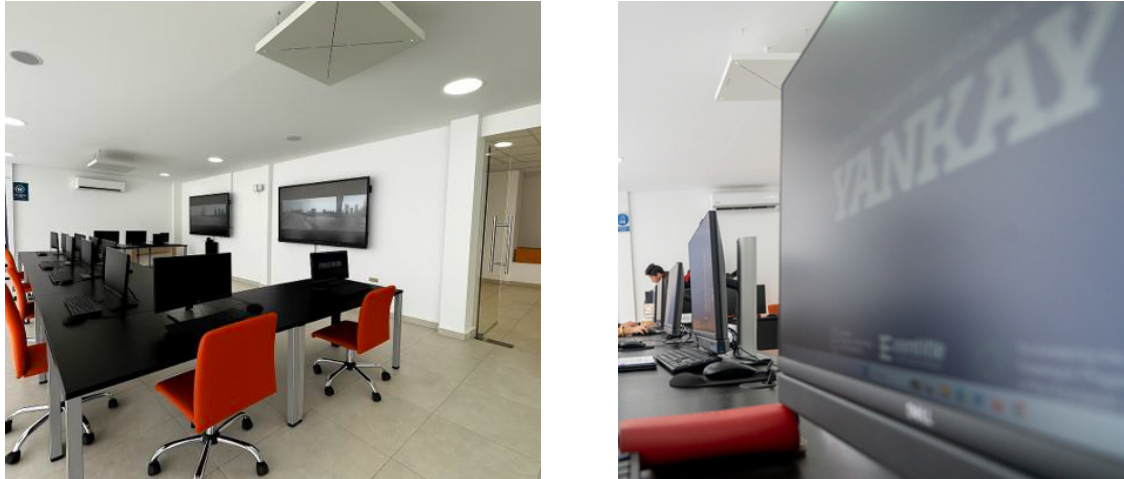


Figure 3 . ESPOCH's CDC: YANKAY

### 3.3 UNEMI's CDC

UNEMI's Capacity Development Center was formally established through Resolution OCS-SO-5-2025-No. 3 (25 April 2025) under the coordination of the Directorate of Evaluation and Academic Improvement. Its mandate is to transform teaching practices through innovative methodologies, faculty development programmes, and pathways to postgraduate and continuing education opportunities, while functioning as a hybrid hub open to partner institutions.

UNEMI prepared a dedicated training space with capacity for approximately 25 seated participants in a closed environment. The venue was configured to support interaction and collaborative work, and infrastructure improvements were carried out in electrical and data networks, lighting, and sound quality to ensure an effective hybrid environment.

The technical setup includes interactive screens, ceiling microphones, and a videoconferencing system with a high-resolution camera, alongside a sound amplification system. For inclusion and accessibility, the audio configuration was designed to provide broad room coverage and to support remote configuration for hybrid delivery.

The technical setup includes two interactive screens, ceiling microphones, and a videoconferencing system with a high-resolution 4K camera, alongside a sound amplification system. For inclusion and accessibility, the ceiling microphone system is specified as high-fidelity and designed to cover up to 40 m<sup>2</sup>, with analog and PoE/Dante outputs and remote configuration options for advanced IP-audio integration.

UNEMI inaugurated its CDC on 9 May 2025 as part of EENTITLE implementation, positioning the unit as a reference point for academic innovation, continuing education, and inter-university collaboration for faculty development.



Figure 4 . UNEMI's CDC: YANKAY

### 3.4 UNL's CDC

UNL's Capacity Development Center was inaugurated as part of the university's academic innovation strategy and is coordinated by the Vice Rectorate for Undergraduate Education. The CDC aims to broaden access to professional development and to support international certification pathways for engineering educators, combining physical and virtual delivery to reach wider audiences.

UNL allocated and adapted an existing area, including a modern videoconference room designed for hybrid delivery. The site supports approximately 30 participants in face-to-face and hybrid sessions and includes workstations and equipment to support the production of study guides and professional development workshop materials.

The videoconference room equipment includes an interactive display with an all-in-one videoconferencing system, a control module, and dedicated support hardware. Accessibility design emphasizes integration of assistive software, such as subtitles and voice assistants, to support participation of persons with disabilities.

The videoconference room equipment includes an interactive display with an all-in-one videoconferencing system, a control module, and dedicated support hardware for the interactive display. Accessibility design emphasizes integration of assistive software (e.g., subtitles and voice assistants) within the all-in-one system to support participation of persons with disabilities.

The UNL inauguration convened representatives from multiple national institutions and partner universities, reinforcing the CDC's role as a regional gateway for professional development and a node for cross-institutional collaboration within the national CDC network.

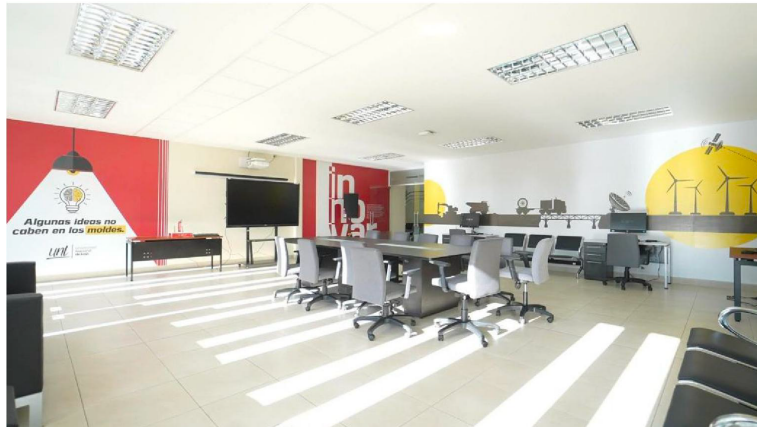


Figure 5 . UNL's CDC: YANKAY

#### 4. Recognition pathway and rewarding measures

Recognition was framed as a pathway rather than a single award: PDP participation and demonstrated teaching practice were linked to structured evidence, multi-source review, and transparent registration outcomes. The evaluation model combined (a) structured teaching portfolios (syllabi, course materials, pedagogical innovations, evidence of student engagement and outcomes), (b) peer review with criteria-based rubrics and cross-departmental panels to reduce bias, (c) student feedback strengthened with alumni perspectives to capture longer-term impact, (d) departmental review that includes innovation and curriculum contributions, and (e) external review for benchmarking and credibility.

The iPEER international register institutionalizes the culmination point of the pathway: educators can present evidence mapped to competency criteria, undergo peer verification, and obtain registration that signals recognized teaching competence and development. By making criteria and evidence expectations explicit, registration supports fairness perceptions and clarifies what “teaching excellence” means in practice for engineering educators.

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To avoid “evaluation fatigue,” operational design emphasized lean evidence workflows. Rather than producing dashboards as an end in themselves, learning analytics were used as prompts for coaching and course-redesign conversations. Analytics inputs included participation data from PDP modules, micro-credential completion, selected course-level indicators, structured peer-observation notes, rubric-based feedback, and brief educator reflection records. In practical

terms, the workflow followed a repeated loop: identify a manageable improvement target, implement a small teaching or assessment change, review the resulting evidence with a peer or coach, and document the next adjustment. At this stage, success was assessed mainly through process markers - repeated cycle completion, continuity of participation, incorporation into CDC routines, and documented redesign actions.

Peer observation and structured feedback within the iPEER-aligned process were integrated as a quality mechanism consistent with the multi-source evaluation model. Importantly, the centers acted as intermediaries that reduce transaction costs: they schedule observation cycles, curate tools and templates, and translate findings into actionable micro-interventions (assessment rubrics, activity redesign, feedback practices). This intermediary function was critical to scaling improvement while protecting instructor time.

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Governance learnings show that autonomy is necessary but insufficient. Trust and adoption depended on transparency mechanisms that made decisions explainable and contestable: public criteria, documented rubrics, feedback channels, and external peer verification. This is consistent with the evaluation and quality-assurance literature, which emphasizes clarity of criteria, multiple evidence sources, and procedural fairness [2], [3], [4]. Institutional visits and stakeholder engagement phases (leadership meetings, mid-level focus groups, validation panels) supported contextual fit while maintaining a common integrity frame.

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A key governance trade-off emerged between standardization (to ensure comparability and legitimacy) and flexibility (to support feasibility across heterogeneous institutions). The adopted approach treats the CDC network and recognition pathway as a modular system: core national guidelines define baseline expectations and evidence standards, while institutions choose from a menu of rewarding measures and calibrate service delivery modes based on resources and priorities.

Transparency also supported inclusion. Participation-widening measures—clear communication, mentoring, and flexible delivery—lowered barriers without shifting the analytic focus away from operations and evidence. In practice, hybrid delivery capabilities and portfolio support services were the most immediately actionable levers for widening participation while maintaining quality safeguards.

## 7. Discussion: design principles for scaling beyond projects

Across institutions, three principles stand out. First, sequence services from quick wins to deeper practice change. Early, high-visibility offerings (short modules, hybrid workshops, portfolio clinics) create uptake and legitimacy; they should be followed by longer coaching cycles and innovation supports that change classroom practice and assessment design.

Second, couple analytics with coaching. The implementation evidence indicates that analytics become productive when embedded in human processes—peer observation, coaching conversations, and structured reflection—rather than being treated as a standalone monitoring process.

Third, align PDP micro-credentials with recognition criteria from the outset. When learning outcomes and assessment of PDPs map directly to portfolio evidence and peer review criteria, the recognition pathway becomes predictable and fair, and educators can plan their development strategically.

These lessons are broadly consistent with professional-development literature that emphasizes sustained duration, coaching, feedback, and coherence with institutional goals rather than isolated workshops [7]. They also align with evaluation literature calling for multiple evidence sources and transparent criteria [2], [3], while extending that discussion by showing how the same logic can be embedded in an operational recognition pathway and linked to institutionally anchored support centers. Compared with the team's earlier project-stage framing [5], the added contribution here is the shift from planning to routinized implementation: the paper focuses less on launching centers as physical entities and more on how CDC services, evidence flows, and recognition decisions are connected in day-to-day practice.

This analysis is practice-grounded and draws primarily on implementation tracing, stakeholder synthesis, and qualitative interpretation of operational design choices. While this approach is appropriate for a practice paper and consistent with implementation-focused analysis [7], it identifies patterns and design principles rather than causal attribution between specific CDC services and student learning outcomes. Future work should integrate longitudinal studies linking educator participation trajectories and course-level redesign with student performance and retention indicators.

## 8. Limitations and future work

This analysis is practice-grounded and draws primarily on implementation tracing, stakeholder synthesis, and qualitative interpretation of operational design choices. While it identifies robust patterns and design principles, it does not attempt causal attribution between specific CDC services and student learning outcomes. Future work should integrate longitudinal studies linking educator participation trajectories and course-level redesign with student performance and retention indicators.

The Ecuadorian CDC network and the iPEER recognition pathway illustrate how educator development can move from pilot design to sustained institutional operation. CDCs function as durable gateways that reduce fragmentation and enable hybrid, scalable delivery of PDPs. A multi-source, transparency-oriented evaluation model strengthens trust while limiting

administrative burden when coupled with lean evidence workflows and coaching-supported analytics. The recognition pathway clarifies expectations for teaching excellence and elevates educator status through peer-reviewed registration.

## 9. Conclusion

The Ecuadorian CDC network and the ILO/UN aligned iPEER recognition pathway illustrate how educator development can move from pilot design to sustained institutional operation. CDCs function as durable gateways that reduce fragmentation and enable hybrid, scalable delivery of PDPs. A multi-source, transparency-oriented evaluation model strengthens trust while limiting administrative burden when coupled with lean evidence workflows and coaching-supported analytics. The recognition pathway clarifies expectations for teaching excellence and elevates educator status through peer-reviewed registration.

For institutions seeking systemwide uptake, the main lesson is integration: operational services (CDCs), evidence standards (individual portfolio evaluation), and recognition (register-based pathways) must be designed as one coherent system, with transparency embedded as a continuous quality assurance practice.

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