THE ROAD TO EDUCATIONAL INCLUSION: FOUR STEPS TO DEVELOP SYSTEMS TO PROTECT EDUCATIONAL PATHWAYS

STEP 4
Four experiences in Latin America

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1 Introduction

This document is the fourth and last publication in the series *The Road to Educational Inclusion: Four Steps to Develop Systems to Protect Educational Pathways*. This series aims to guide education ministries and secretariats in Latin America and the Caribbean (LAC) that are interested in designing and implementing systems to protect educational pathways.

The series consolidates existing knowledge about protecting students' educational pathways in a context where the challenge of educational exclusion[1] is ever more widespread in LAC. Given this scenario, a system to protect educational pathways aims to build the conditions so that the journeys of children and adolescents within the education system are continuous, complete and high-quality, reducing lags and early dropout and generating equality of opportunities for learning and development (UNICEF, 2020a).

These systems are usually structured around two main components: i) detection (early warning systems are the primary tool) and ii) timely interventions. Both components work in coordination: the former identifies students at risk of exclusion or already excluded, and the latter implements targeted and timely interventions to reduce the risk of exclusion.

Step 1 of the series summarizes the central notions related to pathway protection systems: conceptualization, objectives, components, evidence and lessons learned. Step 2 presents the different approaches to designing early warning systems, the key aspects for creating an effective system and sets out essential guidelines for using data, defining indicators and potentially applying artificial intelligence (AI) in this process. Step 3 focuses on timely interventions for protecting educational pathways and presents evidence of effective interventions that reduce the risk of educational exclusion organized into four modules: guidance and learning acceleration programs, flexible educational programs, monetary incentives and nonmonetary incentives.

Step 4 presents four outstanding experiences that protect educational pathways in the region: Costa Rica, Chile, Uruguay, and Sergipe (Brazil). This analysis aims to systematize the good practices, lessons learned, and challenges of each experience, promoting the exchange of knowledge on the models implemented to build systems to protect educational pathways. Four key areas are ad-

1. In this series, "educational exclusion" is preferred to "school dropout" because educational exclusion is multicausal, and its factors do not depend exclusively on students. This distinction takes the responsibility away from the students and focuses on recognizing the disconnect between student needs and the characteristics of the educational systems, which ultimately leads to early school dropout.

dressed in each case: (i) institutional framework and governance, (ii) integration of information and early warning systems, (iii) timely interventions, and (iv) results. This structure allows us to compare the cases and cross-learn from them.

The cases were selected to reflect the diversity of approaches implemented when building systems to protect educational pathways. Each case stands out for its maturity and the new practices it has implemented in at least one of the areas analyzed. This selection, which is not meant to be exhaustive, illustrates the growing momentum for protecting educational pathways in the region,[2] showing both the progress achieved and the challenges ahead.

The document begins with a synthesis of the conceptual framework for protecting educational pathways. It then explains the framework's pillars of detection and intervention and highlights how they coordinate to make efforts more targeted and effective. Then, the four selected regional experiences are systematized. Finally, lessons learned and good practices are presented, identifying the key elements in implementing systems to protect educational pathways.

2. Please see Vinacur et al. for a detailed study of these efforts in Argentina, with a focus on subnational experiences (2024).

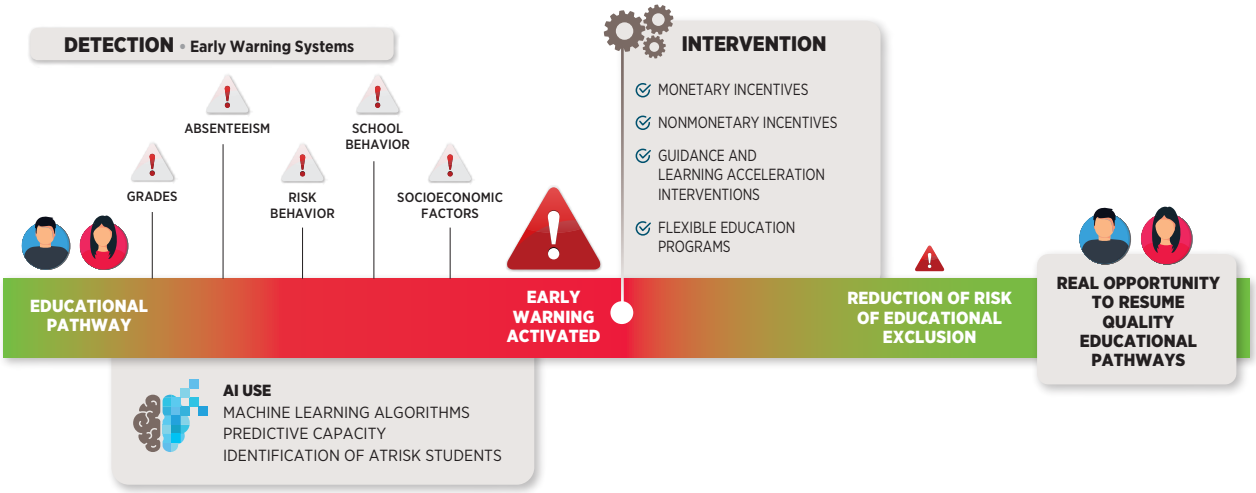
2 Recap: systems to protect educational pathways[3]

The region has witnessed significant progress in access to primary education, with practically universal coverage levels. However, the region's education systems face substantial challenges in addressing educational exclusion, especially in secondary education. In LAC, almost one in three 18 to 24-year-olds (27%) have dropped out of the education system without completing secondary school. Moreover, only 67% of 21 to 23yearolds have completed secondary school, with considerable differences by socioeconomic status: a gap of 28 percentage points between the completion rates of students in the poorest quintile and those in the wealthiest quintile (Arias Ortiz et al., 2024).

Given this challenging context, education systems can develop systems to protect educational pathways to build the conditions so that the journeys of children and adolescents in the education system are continuous, complete and high-quality, reducing lags and early dropout and generating equality of opportunities for learning and development (UNICEF, 2020). The systems to protect educational pathways are structured around two coordinated components, detection and interventions, to identify students at risk of exclusion and implement timely actions to prevent school dropout (see Figure 1).

3. Section based on steps 1, 2, and 3 of this series. For more information, please see Arias Ortiz et al. (2021a, 2021b) and Almeyda et al. (2022).

FIGURE 1 ▪ SYSTEMS TO PROTECT EDUCATIONAL PATHWAYS



Source: Arias Ortiz et al. (2021a).

2.1 Detection: early warning systems

Before school exclusion occurs, students are in a situation of potential exclusion, which is generally associated with a very poor quality of learning, recurring absences and typically fragile and precarious schooling (UNICEF, 2012). This is a long and multicausal process of disconnection between students and the education system, which manifests through various indicators throughout their school pathway (Freeman and Simonsen, 2015; Jimerson et al., 2000; Lamb et al., 2010; Román, 2013). Identifying these indicators correctly and promptly enables systems to diagnose and take timely action to avoid exclusion accurately.

Early warning systems (EWS) are key for identifying students at risk of exclusion. These systems feed directly from the Education Management and Information Systems (EMIS), using the information produced to manage various education system levels. In particular, the student and learning management process is especially relevant because it allows us to continuously monitor school pathways, covering data on the single student register, learning levels, attendance, behavior, study certificates, transfer registers, exams and news related to promotion and repetition (Arias Ortiz et al., 2019). EWS models range from the simplest, based on traditional indicators and expert knowledge, to the most

complex, including AI and machine learning. These systems are essential in protecting educational pathways because they allow us to identify risks of exclusion before they materialize and provide crucial information for timely and effective decisions (Arias Ortiz et al., 2021b).

2.2 Timely and effective intervention

After identifying at-risk students, a pathway protection system should activate the relevant actions and interventions to reduce the risk of exclusion.[4]

These interventions operate at different levels of granularity and through different modules or mechanisms of action. Granularity—or the level at which the public policy is applied—can be universal, targeted or individual, depending on the number of students supported, the degree of individualization implemented to address the problems and the associated cost. Module-based interventions can focus on learning support and acceleration programs, flexible education programs, and monetary and non-monetary incentives. Evidence shows these modules can significantly impact educational exclusion (Almeyda et al., 2023).

4. The signs generally identified by EWS are not necessarily the factor contributing to or associated with exclusion, but rather a manifestation of the problem or causes of student dropout. Therefore, systems need diagnostic action protocols to determine the problems to address by using the information produced in the EWS.

3 Four experiences of protecting educational pathways for inclusion in Latin America and the Caribbean

This section presents four selected experiences of protecting educational pathways in Latin America and the Caribbean organized around four key areas: (i) institutional framework and governance, (ii) integration of information and early warning systems, iii) timely interventions, and (iv) results. These areas allow us to comprehensively address the dimensions of the protection systems, reflecting both progress and challenges in each case. Information on each case was collected with a structured questionnaire with closedended questions and semistructured interviews conducted with relevant teams from each system to delve into the processes, evolution, challenges and decisions.

These cases were selected to reflect diverse approaches in building systems to protect educational pathways, highlighting the maturity achieved and the new practices implemented in at least one of the areas analyzed. We do not aim to compare the experiences directly, but instead, we systematize the cases to highlight the lessons learned that can be shared and adapted to different contexts. Despite the differences in the stages of implementation and the approaches used, the experiences illustrate how we can identify standard practices and strategies that have proven effective in protecting educational pathways.

The order in which the cases are presented reflects each country's emphasis on a specific area, either because of their level of maturity in the area or because of the priorities addressed in their current context. Costa Rica provides key lessons on the institutional framework needed for protecting educational pathways; Chile contributes its experience integrating information and early warning systems; Uruguay stands out for its workflows and support systems seeking to connect warnings with interventions, with a territorial approach in addressing the problems; and Sergipe, in Brazil, stands out for the results obtained in its pilot experience backed by an experimental evaluation.

This selection highlights the growing momentum behind efforts to protect educational pathways in the region. However, this is not an isolated phenomenon, as other cases, such as Argentina, also showcase relevant experiences (in Latin America and the Caribbean (see Box 1).

BOX 1

Systems to protect educational Pathways in Argentina

A study conducted in 2024 in Argentina carried out a virtual survey of systems to protect educational pathways across the country's different jurisdictions (provinces). It found that three of them (Corrientes, Entre Ríos, and Mendoza) have their own functioning systems, while five others (Buenos Aires, City of Buenos Aires, Córdoba, La Pampa, and Río Negro) are in the process of developing one (Vinacur et al., 2024). The developments in these eight jurisdictions occurred after the COVID-19 pandemic.

Additionally, nine provinces are working with the National Secretariat of Education (formerly the National Ministry of Education) to implement SInIDE School Management (SGE), a web application for the administrative and academic management of educational institutions. This system enables digital management of schools and includes student information. The SGE was developed by the Secretariat and includes an EWS module, which generates warnings based on absenteeism and establishes four levels of risk.

Of the three jurisdictions with a functioning system, Corrientes and Entre Ríos issue warnings based on indicator-based models (absenteeism and grades in Corrientes; and in Entre Ríos age-grade disparity and the educational level of the student's parent or guardian are also considered). Mendoza, on the other hand, has a system based on artificial intelligence that considers variables such as absenteeism, grades, behavior, age-grade disparity, and the educational level of the parent or guardian. Alerts are communicated through the system itself and, in Corrientes, also via email. In all three cases, central-level staff, supervisors, and school leadership teams have access to the system. Teachers and school monitors also have access to the EWS in Corrientes and Entre Ríos.

Regarding interventions aimed at strengthening students' educational pathways as part of the systems, all three jurisdictions offer academic support courses, tutoring, and adapted learning plans. Corrientes also provides family support plans; Entre Ríos offers scholarships; and Mendoza provides both scholarships and mentoring programs. All three provinces have developed guides detailing the available interventions. Furthermore, in Entre Ríos and Mendoza, schools are required to record in the system the reasons they believe explain the risk of exclusion and the interventions they plan to implement to address it.

Source: Vinacur et al. (2024).

3.1 Costa Rica: The importance of the institutional framework

Costa Rica has developed a system to protect educational pathways with a strong institutional framework. This ongoing process began in 2015 under *Yo me apunto* (I'm in), an institutional strategy seeking to coordinate the work of various education system stakeholders to mitigate educational exclusion in the most vulnerable schools. The system has evolved progressively, integrating multiple tools and strategies to identify and support students at risk of educational exclusion. This began as a strategy focused on reducing educational exclusion in some prioritized third-cycle schools of general basic and diversified education. However, it now includes all options, modalities, and cycles in the Costa Rican education system.

From the beginning, the country implemented a decentralized governance model[5] where the school would have the primary responsibility for detecting and addressing exclusion, with the support and assistance of the regional school administrations and the central authorities. In 2018, the Ministry of Public Education (MEP) issued an executive decree creating an administrative unit responsible for coordinating, articulating, designing and supporting the recording and management of warnings and interventions: the *Unidad para la Permanencia, Reincorporación y Éxito Educativo* (Unit for Permanence, Re-entry and Educational Success–UPRE) under the Vice Ministry of Institutional Planning and Regional Coordination.

Institutionality and governance have been essential to ensure the sustainable implementation of the pathway protection system. Costa Rica had a 2.7% intra-year exclusion rate in secondary education: almost 10 percentage points lower than 10 years before (12% in 2012). Interinstitutional collaboration and a clear and well-defined governance structure have improved the articulation of resources and strategies, maximizing the impact of interventions and ensuring that at-risk students are properly served. This section systematizes the institutional design, the operation of the EWS and its integration with the national EMIS (the *Saber* ministerial platform), the connection with timely interventions and the main results regarding educational exclusion.

5. This decentralization is a defining characteristic of Costa Rica's education system. See Beirute, Biehl et al. for a recent study on the funding model (2024).

A) Institutional framework and governance

The school is the essential unit in the operating model of the pathway protection system in Costa Rica. Each of the more than 5,000 schools in the country needs an *Equipo para la Permanencia Institucional* (Institutional Permanence Team–EPI) that analyses, monitors, and follows up on at-risk cases, ensuring that the actions needed to support students are taken. The composition of the EPIs varies according to the nature of each school. In the most extreme cases (single-teacher schools), EPIs are made up of a single person. However, they usually include the school administration, a group of teachers, student representatives, family representatives and community stakeholders. At the beginning of the school year, each school must draft a work plan following the protocols and guidelines set by the central authorities. This plan should address educational exclusion with results and indicators for permanence, early warning strategies and re-entry. The school's principal must record the students' risk factors and update the information on the Saber platform. However, the model promotes the participation of the teaching staff (the school administration may appoint a teacher as the EPI lead), caregivers, and other community stakeholders.

Regionally, the 27 regional school administrations and the education area supervising authorities—responsible for overseeing and leading a group of schools—must supervise and monitor the implementation of the system in the schools. The document entitled *Lineamientos para el abordaje de la exclusión, permanencia y reincorporación educativa*[6] (Guidelines for addressing exclusion, permanence, and educational re-entry) —official mandatory regulation updated annually by the UPRE and issued by the Vice Ministry of Planning— establishes that an *Equipo Regional de Permanencia* (Regional Permanence Team–ERP) must be created in each region, led by the principal and including the area supervisors, the financial-administrative heads, the pedagogical advisory heads and the team of regional advisors. These structures are essential to supervise and monitor the system, harnessing their expert knowledge of the territory. This intermediate-level authority has another vital role: liaising with the MEP's technical teams (including the UPRE advisors and those of the Directorate of Management Information Technology) and other institutions when necessary.

Centrally, the MEP's Institutional Planning Directorate manages the *Saber* platform, with the technical support of the Directorate of Management Information Technology and UPRE to implement the early warning module. Policies, programmatic strategies, financing, monitoring and evaluation of the system are determined at this level. In addition, this level coordinates the work with other institutions so that strategies and resources effectively address the areas or populations in greatest need.

6. Please see: https://www.mep.go.cr/sites/default/files/2024-04/lineamientosabordajeexclusion.pdf.

The UPRE has nine advisors who support the regional administrations, annually review the instruments that keep the system in operation (guidelines and protocols) and carry out advisory and support tasks through webinars, regional training and coordination with the regional school administrations.

> *"The UPRE advisors are a technical team that supports the various regional school administrations in the country. One of the strongest principles in our working model is precisely the support provided in the territory. Our premise is that things can change in the territory. Change does not happen from desks; instead, lives are transformed in the classrooms themselves. As advisors, we work very closely with the regional teams. This is why we also mentioned the prioritized centers so that together, as a team, we can provide support where it is most needed."*
>
> (UPRE Officer).

Interinstitutional collaboration is a key component of the system, in which the UPRE and the regional administrations play a key role. The MEP works with other entities, such as the *Instituto Mixto de Ayuda Social* (Joint Social Welfare Institute–IMAS), to ensure that students receive the necessary support to stay in school. This collaboration helps coordinate resources and strategies, maximizing the impact of interventions and ensuring that at-risk students are adequately served. In summary, the institutional framework of the EWS in Costa Rica has a well-defined governance structure, with clear responsibilities at central, regional and school levels, and strong interinstitutional collaboration to support at-risk students and improve educational permanence.

B) Integration of information and early warning systems

The EWS in Costa Rica is based on schools recording warnings, with the strong engagement of school principals. It operates at all levels and modalities of school education, from early childhood education to youth and adult education, including technical and diversified education. The EWS provides universal coverage, but the specialized support and timely interventions are targeted based on the aggregate analysis of the warnings recorded in the system (and also, in some cases, those not recorded when they do not match the expert knowledge of the regional administrations and area supervising authorities). The primary variable for prioritizing regions and schools is the number of people excluded, which is defined as those who have not attended school for more than one month. People are also identified as being at risk of exclusion, that is, students participating in the education system but facing vulnerable circumstances that compromise the continuity of their educational pathways.

The EWS was first implemented in 2016 by manually identifying and recording warnings (using Excel formats developed by the UPRE). However, digital recording began in 2020 by adding a specific EWS module in the national EMIS: the *Saber* ministerial platform. School principals must enter this data into the platform, which regional and central school administrations can access for supervision and monitoring.

This must be done twice a year when conducting the education (mid-term and final) censuses. However, it is encouraged that the cases in the system be reviewed and updated monthly. In addition, a recent update has allowed the system to update warnings at any time during the school year. The status of each student must be recorded for the census, i.e., whether they are active, at risk, excluded or deceased. Each student who appears as "at risk" must have at least one associated warning by default. This recent innovation has made it easier to identify the causes of educational exclusion more accurately (which, according to the latest measurements, are academic performance, socioeconomic difficulties and school coexistence issues, in that order. according to the records of the last two years).

There is a catalog of warnings with 87 variables grouped into 7 vulnerability dimensions (see Table 1). The variables of interest to identify at-risk students include attendance, grades, behavior, overage, parents' education level and whether they receive state benefits through conditional transfers. Digitalizing the recording process of the warning system has made it possible to deploy coordination strategies with institutions like IMAS, which currently receives a monthly update of the participation status of students. This allows IMAS to validate compliance with the school attendance requirement before making the conditional transfers.

The information recorded by the system has the relevant level of aggregation. It can be accessed by the school authorities (each school is given access, which the school administration manages), supervisors, regional authorities and the central level. Interestingly, the UPRE has restrictions on the information it can access due to the data protection law, so it must request the information from the agency managing the platform (the Directorate of Institutional Planning). This individualized information allows the system to target its support, services and resources to serve schools with the greatest needs and vulnerabilities.

TABLE 1 ▪ TYPES OF WARNINGS BY VULNERABILITY DIMENSION

VULNERABILITY DIMENSION	TYPES OF WARNINGS
Educational performance	Absenteeism, recent re-entry, low academic performance, educational demotivation, grade repetition, and over-age according to education level.
School coexistence	Bullying and cyberbullying, physical or psychological violence, criminal behavior (e.g., drug use or trafficking, possession or use of weapons), racial discrimination, demotivation, isolation.
Economic situation	Student living in poverty or extreme poverty, recipient of conditional cash transfers, head of household, inability to pay (in the case of young and adult students), unemployment (students of legal age or the adult in charge of the minor student), informal or temporary work (of students of legal age or the adult in charge of the minor student).
Family situation	Domestic violence, lack of support for child care, caregivers addicted to licit and illicit drugs, caregivers with lower schooling, death of caregiver, negligence in educational support.
Access situation	Lack of curricular educational support (learning and language problems, significant, non-significant and access adaptations), disabilities or gifted students, no transportation benefits, no food service, affected by natural or anthropic disasters or emergencies, physical/technological difficulty to access the school.
Health condition	Nutrition-related developmental disorders, visual acuity, auditory development/acuity (screening), no immunizations, oral and dental disorders, suicidal ideation and attempts, self-inflicted injuries, eating disorders, recurring health conditions after treatment, hospitalization or convalescence, drug, vector and food allergies.
Cultural status	Risk of being stateless, risk of deportation, foreigner status (regular migrant, irregular migrant, refugee or refugee seeker), incompatibility of the student's culture with the educational regulations (schedules, customs, language and food), language, indigenous language.

The EWS module on the Saber platform became a helpful tool during the pandemic for tracking the status of students despite interruptions in face-to-face service. This is how school communities recognized its importance, and it consolidated as a valuable baseline asset. This contrasts with a scenario where many EMIS faced challenges updating data and even entire modules became obsolete. As the module in the *Saber* platform was launched when the pandemic was beginning, the schools considered the module a timely response to help them individualize the monitoring of students at risk of dropping out.

C) Timely interventions

Timely interventions are implemented once risks have been identified through the EWS. Each type of warning has a protocol or regulation with specific recommendations for teachers. These interventions include a wide range of support possibilities from the MEP itself and external agencies, including psychological and emotional support, academic support, extracurricular activities, and managing monetary transfers or subsidies, among many others, to motivate and support at-risk students. The interventions addressing warnings are recorded in a follow-up log integrated into the recording module of the digital platform that must be submitted for each risk case identified. The actions taken, dates, people responsible and results of the interventions are recorded.

> *"Costa Rica has an institutional structure that works mainly through networks. There are several networks of institutions in the different regions where the regional teams are also involved, so they have their mechanisms (to implement solutions), or even from the school itself, they can also make referrals, provide care and coordinate actions with other institutions. So, the central authorities would be in charge globally or of massive coverage policies and strategies. However, there are also regional territorial strategies and the need to pay specific attention to each situation in the schools."*
>
> (UPRE Officer).

At the regional aggregation level, prioritization can help mobilize services such as student transportation and other equity programs. Specific interventions can also be coordinated on such problems as violence and other risk factors, working with the Directorate of Student Life and other relevant areas of the MEP. Active search strategies are implemented for student re-entry under the UPRE and in close coordination with the regional administrations in addition to the usual preventive permanence work.

Schools are prioritized in the EWS recording and updating process and when developing timely response interventions. The schools may adapt programs of study for students with special needs or lagging upon agreement with their school institutional support committees. Some schools offer tutoring and academic support, sometimes collaborating with universities and NGOs. According

to the interview, "interventions include psychological and emotional support for students facing difficulties, providing a safe and supportive environment that makes it easier for them to continue studying." They can also encourage students to switch to learning modalities more suited to their needs, such as evening education for adolescent mothers.

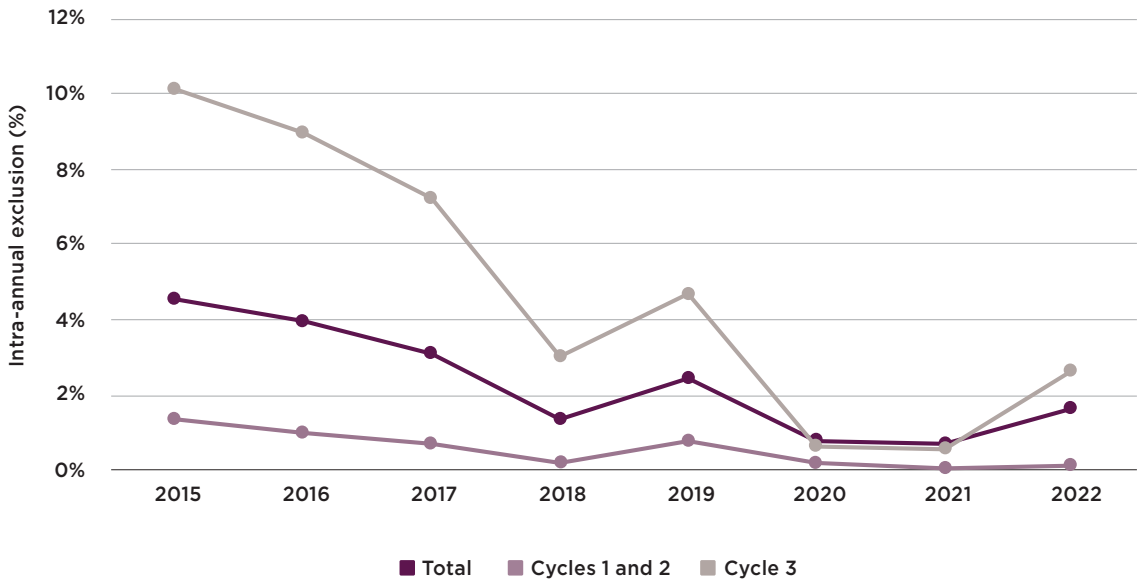
A recent project, supported through an Inter-American Development Bank loan operation and closely linked to UPRE, involves mobilizing community teachers working in vulnerable communities to support student permanence and re-entry in coordination with the Civic Centers for Peace and with a comprehensive approach to the engagement with the students.

In brief, the pathway protection system in Costa Rica recognizes that it is not enough to identify at-risk students. Instead, timely interventions are essential to ensure that at-risk students receive the necessary support to continue their studies. Hence, the regulations state the need to identify specific protocols and rules for the multiple types of warnings included in the classification. This brings each school team closer to information and resources to develop strategies tailored to each student.

D) Results

Although the system's impact has not been rigorously assessed, there has been a significant reduction in school exclusion rates since the system came into operation, allowing more students to complete their studies. This trend has been evident at all levels and modalities since the early stages of the EWS creation. Ultimately, timely interventions also aim to improve the academic performance of at-risk students, ensuring that they acquire the skills needed for their personal and professional development, which provides an opportunity to produce experimental evidence.

FIGURE 2 ▪ INTRA-ANNUAL EXCLUSION IN COSTA RICA'S TRADITIONAL EDUCATION SYSTEM



Source: Prepared by the authors with data from the MEP's Department of Statistical Analysis.

The teams emphasized that this significant reduction in educational exclusion in Costa Rica has been mainly possible thanks to a substantial change in the institutional culture of the MEP. This change has led to greater awareness, understanding and a sense of urgency regarding educational exclusion and a commitment to the institutional objectives of permanence, re-entry and educational success. This cultural change has been possible by consolidating a clear operational structure, with specific teams at central, regional and school levels and with up-to-date guidelines, specific action protocols for each type of warning and a recording and monitoring system included in the national EMIS that is being optimized permanently.

> *"We receive emails from families that say, look, I am writing because the school did not implement an early warning. In other words, when you see an email like this sent by a parent, you realize there has been progress indeed, right? Or, for example, the National Children's Foundation, which is the governing body for child care, when dealing with education-related situations, always ask: what have you done concerning the permanence protocols? Have you implemented the early warning system? And there's truth in that. And it's another institution that has mapped the system, that considers it."* (UPRE Officer).

The consolidation of the EWS has facilitated collaboration with other institutions, such as the National Children's Foundation and the Joint Social Welfare Institute, to address educational exclusion comprehensively. It also allows us to imagine new steps on the progressive development horizon, such as automated alerts based on specific indicators and even including AI-powered predictive models trained with the growing amount of data recorded in the particular EWS module of the *Saber* platform. The data available also allows us to trace educational pathways throughout people's lives. This could be implemented institutionally and would imply a broader approach, not only with intra-annual exclusion but also with greater opportunities to address inter-annual exclusion, particularly transitions between cycles.

BOX 2

Main milestones in the evolution of the EWS and its connection to timely interventions in Costa Rica

- Cultural change in the education system. Student exclusion has become significant to and recognized by institutions and communities. It has created demand and acceptance by the school community and significant aggregate results.
- Institutional framework and governance. Creating a specific administrative unit to address this problem at the central level and formal monitoring structures in regional administrations and schools facilitates the deployment of a targeted, comprehensive policy with universal coverage.
- Progressive development. The pathway protection policy has resulted from a process of expansion in scope (from the third cycle to all cycles and modalities) and functionality, notably by developing and integrating an EWS module as part of the Saber ministerial platform.
- Identification and intervention are integral parts of the process. The system defines the number of people excluded from the education system as a central variable for evaluation, which allows it to identify risk but also reward timely intervention.
- Interinstitutional coordination. Strengthening management tools and adopting the EWS at scale and sustainably has enabled its integration with other social policy strategies, such as conditional cash transfers, which has consolidated the effectiveness of the Costa Rican State.

3.2 Chile: From an early warning system to a system to protect educational pathways[7]

The EWS in Chile was first implemented in 2019 as a preventive tool to identify students from grade 7 of lower secondary education to grade 12 of upper secondary school at risk of school exclusion. It aimed to provide the school principal and administration team with timely information to anticipate the student leaving the education system.

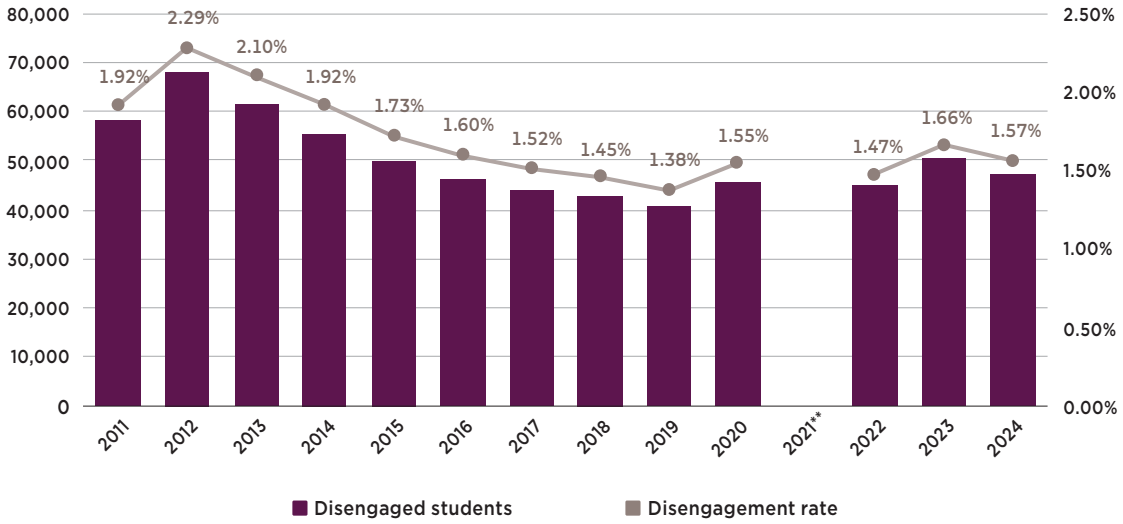
The EWS was implemented through the joint efforts of the Ministry of Education (MINEDUC) and the Ministry of Social Development (MDS) because administrative data additional to those held by the MINEDUC were considered given that exclusion is a multicausal phenomenon where factors external to the school are relevant. These data include: (i) the Specialized Protection Service and Juvenile Social Reinsertion Service; (ii) the Social Household Registry, (iii) *Chile Crece Contigo*, (iv) the census; and (v) the Ministry of Health. These indicators identify at-risk students as a priority by applying advanced analytical methodologies (machine learning) based on the historical behavior of students who dropped out of the education system.

To date, the information produced by the EWS is delivered through an information platform (www.comunidadescolar.cl). Its access is voluntary and exclusively for school principals. They access a platform that provides information on the 10% of students most at risk of exclusion, with information regarding their attendance, academic performance and years behind. In turn, this information sheet can be used to record the actions taken to address students marked as at risk.[8]

The EWS was first implemented in all schools in 2020, coinciding with the onset of the COVID19 pandemic. Therefore, the voluntary return to facetoface classes remained restricted during 2020 and 2021. It was not until March 2022 that the mandatory facetoface return to school was decreed.[9] In administrative terms, there are no attendance records for these two years. The EWS remained in operation during this period and was declared one of the support tools to prevent dropouts during the pandemic.[10]

7. To draft this report, we interviewed three officials from the Strategic Area of Educational Pathways and Lifelong Learning of the General Education Division of the Chilean Ministry of Education, led by Paula Bustos.
8. Guía de Usuario: Sistema de Alerta Temprana (SAT).
See: https://cadadiacuenta.mineduc.cl/assets/pdf/Guia%20de%20usuario%20SAT.pdf.
9. See: https://www.latercera.com/nacional/noticia/fin-a-la-voluntariedad-clases-presenciales-seran-obligatorias-desde-marzo-para-alumnos-y-sostenedores/76UIOPBXL5ENFCFYZMBR5XLE5A/.
10. See: https://www.revistadeeducacion.cl/revista_pdf/reveduc_391/files/assets/basic-html/page-1.html.

FIGURE 3 ▪ 2011-2024 DISENGAGEMENT RATES



Source: Official data from the MINEDUC's Center of Studies.

Note: The 2021 information is not fully comparable with that of other years due to limitations in data collection during the pandemic.

As shown in Figure 3, both the social outbreak (2019) and the pandemic (2020) impacted the disengagement rate,[11] which increased from 2020, thus halting its downward trend, with approximately 10,000 more students disengaged in 2023 than in 2019. Furthermore, the national average attendance decreased by 5%, and the number of students with serious absenteeism rates increased by 10% by 2022 (CEM, 2023).

The impact of the pandemic made it clear that the country needed to create a pathway protection system with a more comprehensive and systemic approach to monitor at-risk students and coordinate the institutional support and management processes involved in promoting school permanence and re-entry.

11. The number of disengaged students refers to students who were enrolled in period t-1 but are not enrolled in period t, without having left the school system in that interval. The rate represents the ratio of these cases regarding the total number of students.

This context led to the need to address the protection of pathways more systemically in a way that would not only consider the risk of disengagement warnings but also updated information on student pathways for decision making, an institutional framework to support atrisk students, as well as training for designing support strategies for atrisk students and in using and understanding warning systems.

The following components allowed the EWS to evolve into a system to protect educational pathways.

A) Institutional framework

Gradual progress has been made since 2022 in creating an institutional framework for the *Sistema de Protección de Trayectorias Educativas* (System to protect Educational Pathways–SiPTE). As a first step, following the return of students to school after the pandemic, the MINEDUC's *Centro de estudios* (MINEDUC's Center of Studies–CEM) began to draft quarterly reports. These reports include lists of students with serious attendance issues12 and those who lose their enrollment rights during the year. The information is provided to the schools so they can monitor the most urgent cases. At the end of that year, MINEDUC hired the InterAmerican Development Bank to help design and implement a system to protect educational pathways. This entailed creating an institutional framework, developing a data tracking system and designing capacitybuilding strategies.

In 2023, educational "reengagers" (*revinculadores*) were hired in the territory for the first time. These teams, including professionals and territorybased community managers, are linked to MINEDUC's provincial departments or public school administrators, such as municipalities and Local Education Services. Their work focuses on developing and coordinating strategies to ensure the permanence of students in the education system. Their functions include designing and implementing actions to contact, locate, and reengage those who have interrupted their school pathway and supporting students with low attendance rates. They also support and guide educational communities in implementing various initiatives and strengthen coordination with other public institutions and social organizations to develop direct intervention strategies.[12]

Finally, in 2024, the Area of Educational Pathways and Lifelong Learning was created. Its team was in charge of coordinating the implementation of the SiPTE in the *División de Educación General* (General Education Division–DEG):

12. https://reactivacioneducativa.mineduc.cl/revinculacion-y-garantia-de-trayectorias-educativas/.

> *"Before the creation of this area, the concept of 'school reengament' had always been more operational in youth and adult education. But, starting with this system, the DEG and the CEM began to work collaboratively, and not until the beginning of this year (2024) was an area created (...). By 2025, the SiPTE will become a nationwide system operating in every school."*

The main functions of this area at the central level are to integrate the notion of "pathway" in the work of different ministerial teams and to articulate the available programs and regulations in the education system to guarantee the continuity of interrupted and/or at-risk pathways. It must also monitor and manage the SiPTE's platform,[13] which implies monitoring and following up on educational pathways.[14]

Until now, the implementation has been limited to four provinces of the country,[15] but in 2025, the SiPTE will expand its operation to the rest of the country. Locally, leading teams have been created to implement the system and strategies to support school administrators and schools, training in the SiPTE platform, and support strategies for at-risk students in their pathways and reports. These teams include the regional pathway coordinators (Secreduc), supervisors (Deprov), reengagers (Deprov, Slep, Munis) and regional and/or community representatives of ACE, SIE, Integra, and Junji.

B) Integration of information and early warning systems

One of the qualities of the Chilean education system is the quality and diversity of the data available for monitoring students. To this end, Chile's system has census, identifiable and quality data on student enrollment (since 2004), attendance (since 2004), annual performance (since 2002) and socioeconomic indicators (since 2006). It also has annual schoollevel data on standardized tests (since 2012) and reports and sanctions (since 2012), among others.

All this information is available in the education system. However, as it is formed by multiple independent organizations, the data is held by several institutions. Furthermore, schools report attendance, enrollment and grades through the Ministry's *Sistema de Información General de*

13. The technological installation and operation is carried out by MINEDUC's National Technology Center. However, this team is directly responsible for case management, follow-up, user registration, among other tasks.
14. The CEM carries out the official studies, but it is this team that monitors the pathways to develop policies and strategies.
15. Four provinces were selected for the initial implementation with a focus on learning. This made it possible to improve the design before nationwide expansion. We selected provinces with large urban centers in different areas of the country, with different types of public school administrators (municipalities and local services) and territories with high levels of disengagement and migration.

Estudiantes (General Student Information System–SIGE) as inputs for paying subsidies.[16] However, school administrators[17] and schools do not have a reporting system for the advanced monitoring of the data submitted.

In this context, one of the first objectives of the SiPTE was to develop an integrated information system to monitor educational pathways, regardless of the student's location (whether in a public or subsidized private school). The system provides a student record that shows the schools they have attended (regardless of educational dependence), statistical evolution of grades, attendance and enrollment, among other things. It also produces aggregate information for monitoring the educational pathways at different course levels: school, school administrator and territory.

This platform updates data periodically (enrollment twice a week and attendance once a month) for delivering timely information and includes information from all educational institutions nationwide. It contains data from the Ministry of Education, with records of school enrollment of regular and adult education; from the *Junta Nacional de Jardines Infantiles* (National Preschool Education Board) and the *Integra* Foundation, with information on students in preschool education; the *Agencia de la Calidad de la Educación* (Education Quality Agency), with standardized test results and personal and social development indicators; from the *Superintendencia de Educación* (Superintendency of Education), with data on complaints and sanctions; and from the *Junta Nacional de Auxilio Escolar y Becas* (National Board of School Assistance and Scholarships), with information on access to programs. It also incorporates data from institutions outside the education system, such as the Ministry of Social Development, with the family's contact information; the Ministry of Justice, with information on students in state residences; and, finally, the Civil Registry, with identification data.

In turn, the monitoring system has a universal approach for all schoolage individuals: it includes information on students from preschool to secondary education[18] through highschool graduation at all levels and modalities. It also provides performance data from self-study exams for adult or special education.

16. The Ministry of Education has functionally and territorially decentralized bodies in the regions: the Regional Ministerial Secretariats (Secreduc); and the Provincial Departments (Deprov) in the provinces. At the regional level, regional coordinators of educational pathways were appointed to bring together various stakeholders in the region to work on educational pathways. At the provincial level, there are technical-pedagogical supervisors who provide advisory services to schools and who include monitoring educational pathways into their work objectives with schools. At the regional level, teams from the Quality Agency and the Superintendency will also have access to the platform and its indicators and will be able to monitor or support its use in their visits to schools. Finally, preschool education administrators/providers also have access to the platform and can monitor the pathways in their work activities, such as attendance committees.
17. Intermediate levels of school management: there are public school administrators (municipal and Local Education Services including more than one commune), as well as private and subsidized private school administrators.
18. In Chile, kindergarten education ranges from nursery school (from 6 months) to kindergarten (6 years). Pre-kindergarten and kindergarten levels can take place in kindergartens or schools.

One of the main challenges in integrating the systems was establishing rules for information filtering and data visualization. Thus, specific weaknesses were detected in previous data reports, such as identifying international students, and strategies were developed for data cleaning and guidelines for schools and school administrators when reporting to improve data quality. Additionally, institutional definitions were created to update frequency and interpret and read the data.

> *"This is a conversation between different institutions, both in the Ministry of Education and other educational institutions. New conversations emerge every time you talk about how to integrate data. For example, a new conversation with the Sistema de Admisión Escolar (School Admission System–SAE) regarding the best data to present, what type of interference may exist, etc. It also happened with special education on how to present the data and what the most relevant data is for the people who work with that information. The same goes for preschool education. So, the integration challenge goes beyond how the data is managed, how it is received and how it is programed. We need conversations on issues that are not fully resolved, which imply taking positions on how to present the data because it will be useful and make the message explicit."*
>
> (SiPTE official).

The following is a detail of the data that make up the pathway protection system:

TABLE 2: MONITORING INDICATORS INCLUDED IN THE PATHWAY PLATFORM

TAB	INDICATORS
Pathways	• Enrollment and withdrawals • Cumulative attendance in the current year • Monthly attendance • Promotion, repetition and years out of the system • School admission • School environment • Standardized assessments • Years of experience in preschool education
Log	Student timeline: • Changes of schools • Modality changes • Attendance, non-enrollment or user-created warnings • Actions taken with the student • Self-study examinations
Characterization	• Personal and contact information • Access to programs and benefits • Demographic characteristics • Information about special educational needs • Stay at state residences (only for case managers) At the aggregate level: • Demographic characterization of your students • Superintendency complaints and sanctions • Progress of educational improvement plans
Warnings	List of students with the following warnings: • No enrollment • Critical assistance • user-created warnings It also allows users to take actions regarding the students on these lists.
Analysis	All platform indicators for advanced cross-referencing of organized data: • Evolution (longitudinal analysis) • General (cross-sectional analysis) • Cohort (flow analysis of a cohort in time)

Early warnings

One of the evaluations of the EWS implemented to date showed that end users did not fully understand it and that its level of use was low. At the beginning of 2022, the CEM drafted a report on EWS use in 2021, indicating that only 7.9% of the schools had used the system between May and December of that year.

In this context, and given the critical situation caused by the pandemic, the CEM began to issue manual reports on attendance and disengagement, which were sent to schools and school administrators three times a year. These reports included the list of students who were not enrolled and had a cumulative attendance of less than 85%, the minimum percentage required by law to pass the course.

> *"We used to have the EWS, which included enrollment and attendance data and many other things. However, it was difficult to understand what it means for a student to be at risk or flagged by the EWS warning. There's a big difference between the EWS and the SIPTE: the SiPTE warnings are very easy to understand by the territorial teams: they directly indicate if a student has dropped out or dropped below 85% attendance."*
>
> (SiPTE official).

Simultaneously, work started developing the integrated pathway monitoring system, which included automated alerts previously generated manually by the CEM. Given the system's universality, preschool, adult and special education were included during the automation process, creating different warning levels according to the legal definitions of pathways. Finally, the possibility of creating manual warnings was added to allow schools, school administrators and employees to identify atrisk students whose situation is not directly reflected in attendance or enrollment records.

In this way, the system went from a more sophisticated warning (machine learning) to basic warnings based on a single indicator. Thus, not only is the alert simplified, but its scope is also broadened. While the EWS focused on the population between grade 7 of lower secondary education to grade 12 of upper secondary school, SiPTE warnings are universal: from preschool through highschool graduation.

Below is a table with the details of the new SiPTE alerts:

WARNING TYPE	INFORMATION				
Serious absenteeism	Preschool education: nursery and lowermiddle level[19]	Preschool education: prekindergarten and kindergarten[20]	Adult education[21]	School education[22]	Special education[23]
	<70%	<75%	<80%	<85%	<85%
Enrollment	Withdrew from a school and is not actively enrolled in another school				
Manual	It is recorded directly by territorybased officials or schools. The categories are as follows: - Internal protocol applied - Drop in school participation - Behavior/coexistence - Lower grades - Reengaged - Mental health - Serious family situations				

Enrollment and attendance administrative warnings are automatically resolved when the student re-enrolls or exceeds the attendance threshold defined for the warning. On the other hand, manual warnings can be manually canceled by the people who created the case.

19. Aged between 6 months and 3.
20. Aged between 4 and 5.
21. The minimum age to enter Youth and Adult Education (YAE) is 15 years old for Elementary/Middle school and 17 years old for High school. There is no maximum age limit.
22. From 6 to 18 years of age. The maximum age for this level is 21 years old for repeating students.
23. The age of entry into special education depends on the support needs and educational offerings of the school. In general, students can enter a special school from the age of 2, when the disability is diagnosed, up to the age of 26.

C) Timely interventions

Finally, three intervention strategies associated with the SiPTE were implemented with the new institutional framework and the warning system. They are presented in detail below:

Support

The support strategy was developed by reshaping the functions of the Ministry's supervisory staff: pathway protection became the core of their work. The implementation prioritized advisory services for schools, which involve periodic visits to the prioritized schools. Work is carried out jointly with the school on designing and implementing actions related to the students' pathways.

A group of priority schools is defined to implement monitoring and supervision tasks according to territories: "Priority is not assigned per student in a centralized manner, but by schools that will be supported. This is decided based on the criticality of attendance and disengagement. The list of priority schools is addressed with each territory". (SiPTE official).

Training and capacity building

The staff members of the Pathway Unit are deployed to implement several training activities, including facetoface sessions in the territories, platform management workshops and training courses for principals of priority schools.

> *"Unlike the previous EWS, the Pathway Protection System includes these reports and capacity-building efforts in educational communities (...) It is not just a matter of having the data to know how many students are missing school or how enrollment or indicators of one type or another are falling. This approach aims to use these data so the technical teams from the ministry and the educational community can create a support strategy, in the understanding that the recovery of educational pathways is not automatic or voluntary; it is necessarily a process that requires support."*
>
> (SiPTE official).

In addition to direct training sessions with priority schools, general strategies have been implemented for capacity building activities in all schools. These include organizing webinars and distributing supplementary materials available to everyone. These resources will consist of ways to navigate the platform and a map of resources/policies for reengagement, specifically geared toward the type of problem each student has.

To date, training has been concentrated in four territories. However, in December 2024, it was extended to the entire country through annual planning days. In the same year, three socialization and system feedback days were organized to include other territories not part of the initial pilot projects.

Direct intervention

In 2024, the person directly responsible for addressing an enrollment warning locally was the territory's reengager. As previously mentioned, this person was hired to contact, locate and reengage the students who have dropped out of school. Reengagers are trained in various reinsertion strategies, such as re-entry classrooms or flexible education mechanisms and deciding on actions to be conducted jointly with the students and their families. In addition, there are teams in charge of coordinating reinsertion mechanisms, selfstudy exams, adult education and flexible programs that provide support by offering reentry alternatives in addition to regular education. By 2025, one of the system's functions will be managing warnings.

In the case of attendance warnings, given that the school is directly responsible for the student, it is expected to take preventive actions to increase the attendance of those students on alert and avoid possible disengagement. Also, reengagers focus on working with students with low attendance.

The pathway monitoring platform can record the interventions associated with enrollment and attendance alerts. Manual alerts can be triggered by the school's teams and the reengagers. So far, there is no general action protocol for these cases, as its operation is still being tested.

D) Results

The results have not yet been evaluated, nor has a success indicator been formally defined because the system is in the initial stages of intervention.

Regarding key indicators, attendance and intermediate targets have been established for 2036, which will be monitored annually through administrative data. In addition, another internally defined performance indicator will involve making the pathway monitoring platform available to various users (teachers, principals and management teams, school administrators and Ministry of Education employees) as of 2025.

Finally, the Ministry of Education and the Laboratory for Research and Innovation in Education for Latin America and the Caribbean (SUMMA) applied for international funds to assess the policy. As part of this process, the *Centro de Estudios de Políticas y Prácticas de la Educación* (Center for the Study of Educational Policies and Practices–CEPPE) of the Catholic University was hired. At the time of writing, the CEPPE was assessing the process of implementing the SiPTE, which included recommendations for improving its implementation.

3.3 Uruguay: A sustained path towards the protection of educational pathways

In Uruguay, access to and completion of primary education has been virtually universal for decades. However, educational pathways become more fragile from the first year of secondary education, reflected in progressively decreasing promotion[24] and graduation[25] rates. The promotion rate in basic secondary education (from grade 7 to grade 9) has shown a favorable trend,[26] reaching 90% in general secondary education but still showing low figures in technical education (78%). Regarding graduation, only 66% of young people aged between 15 and 16 complete secondary education on time, with a gap of 30 percentage points between those from very high and very low socioeconomic households.

In the case of upper secondary education (from grade 10 to grade 12), the figures are even more worrying: only 37% of young people aged between 18 and 19 graduate on time. There are significant disparities in gender, region, and socioeconomic level. Socioeconomic level shows the most significant inequality, with a gap of 51 percentage points between young people from very high and very lowincome households. These figures reflect the persistence of deep disparities in educational pathways and underscore the need to develop public policies that address these challenges.

24. The promotion rate is defined as the proportion of students in the basic cycle of public secondary education, both in general and technical secondary education, who are promoted at the end of the school year. The data were prepared by the Education Observatory of the National Institute for Educational Assessment (INEEd) from administrative records of the General Secondary Education Directorate (DGES) and the General Directorate of Technical and Vocational Education (DGETP).
25. The timely graduation rate in basic secondary education refers to the percentage of young people aged between 15 and 16 who have completed this level of education, while the timely graduation rate in higher secondary education corresponds to the percentage of young people aged between 18 and 19 who have completed upper secondary education. The data presented was prepared by the INEEd based on the Continuous Household Survey (ECH) of the National Statistics Institute (INE).
26. In 2020, the promotion criteria were modified, increasing from 3 to 6 the maximum number of pending subjects to pass the year. Beginning in 2023, repetition was eliminated in the first year of lower secondary school, corresponding to the seventh grade in the new Integrated Basic Education system (1st to 9th grade).

FIGURE 4A ▪ PROMOTION RATE AT LOWER SECONDARY EDUCATION BY TYPE (2006–2023)

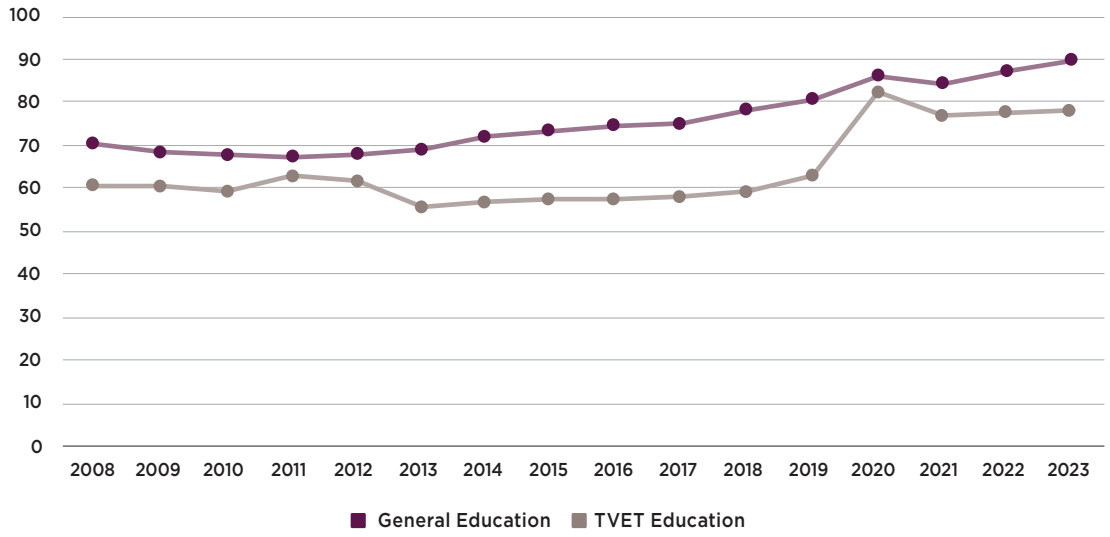
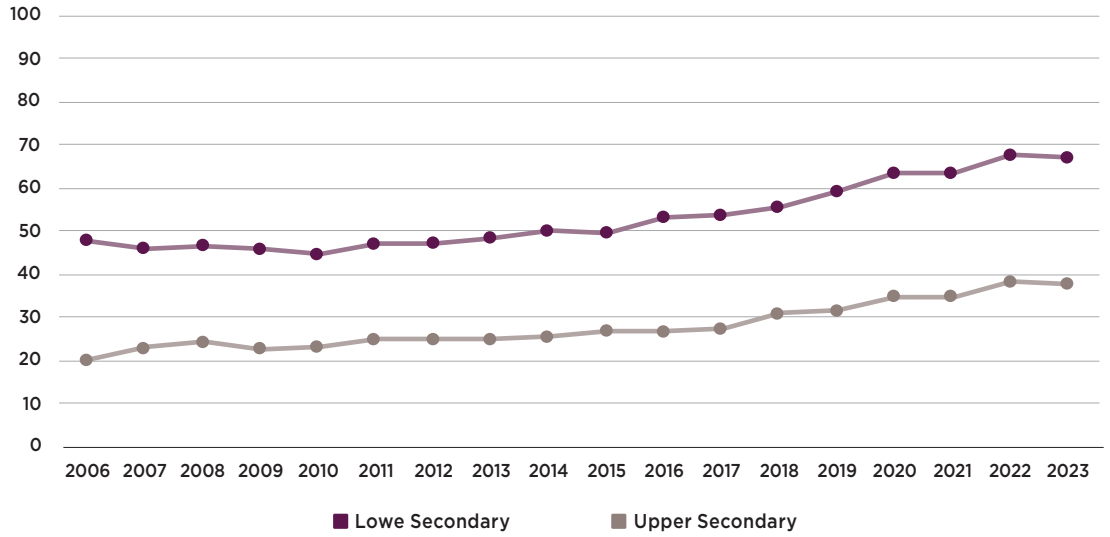


FIGURE 4B ▪ TIMELY GRADUATION RATE FROM LOWER AND UPPER SECONDARY EDUCATION (2006–2023)



Source: National Institute for Educational Assessment (INEEd).

A) Institutional framework and governance

The *Sistema de Protección de Trayectorias Educativas* (System for the Protection of Educational Pathways–SPTE) was established in 2015 by resolution of the Consejo Directivo Central (National Council of Education–CODICEN),[27] in compliance with the provisions of General Education Law No. 18,437 (ANEP, 2019). Its main objective is to enable the monitoring of students' events relevant to their educational trajectory , the timely detection of educational vulnerability and early intervention, both during the school year and in the medium and longterm educational pathway, especially in cases of students at imminent risk of dropping out of school" (ANEP, 2016).

The SPTE was designed to guarantee the right to education and, hence, aims to address the complex problems that hinder the continuity and completion of secondary education pathways. In this sense, the country recognized the need for a comprehensive response to promote continuous and complete pathways, addressing critical issues such as the transition between educational levels, supporting students in vulnerable situations and preventing dropout to ensure comprehensive education for all students (IBX Network, 2021).

The SPTE's structure was defined following four principles: (i) student-centeredness, (ii) inclusion, (iii) territoriality, and (iv) the concept of educational pathway. These principles are implemented through four key components: (i) education management and information systems; (ii) creating early warnings and enrollment monitoring; (iii) the work of monitoring and support teams in schools; and (iv) the institutional and pedagogical framework (Muñoz Stuardo, 2020).

In terms of governance, the SPTE operates under a model of articulated work between the subsystems of the *Administración Nacional de Educación Pública* (National Public Education Administration–ANEP), with a territorybased approach that considers local particularities and facilitates the relevant connections. In May 2015, the *Dirección Sectorial de Integración Educativa* (Sectoral Directorate for Educational Integration–DSIE) was established shortly before the formal creation of the SPTE. This was a key milestone in formalizing the system. The DSIE took on essential responsibilities, such as identifying students outside the education system, promoting interinstitutional agreements and integrating formal and nonformal education (Croce, 2020). Just nine days after the creation of the SPTE, in December 2015, the Unidades Coordinadoras Departamentales de Integración Educativa (Departmental Coordinating Units for Educational Integration–UCDIES)[28] were formally established. These units are essential in strengthening the territorial perspective and in supporting cohorts, promoting a decentralized model that strengthens capacities in the territories:

27. CODICEN Resolution No. 80, Minute 95 of 2 December 2015.
28. For more information, see: https://www.dges.edu.uy/sites/default/files/normative/6772_14.pdf.

a central challenge in the Uruguayan education system (Muñoz Stuardo, 2020). In 2017, the role of the *Equipos Referentes de Trayectorias Educativas* (Educational Pathway Guidance Teams–ERTE) in schools was made official, consolidating the SPTE nationwide.[29]

The design of the SPTE began in the 2015–2019 fiveyear period and was deployed in a sustained manner over two administrations, which entailed changes in authorities. During the 2020–2021 period, the SPTE faced the challenges posed by the COVID-19 pandemic, which disrupted face-to-face classes. However, the system adapted to the new circumstances, consolidating its actions and demonstrating its capacity to adapt to changing contexts.

B) Integration of information and early warning systems

Data and systems: the challenge of data integration

Education management systems in Uruguay have evolved significantly since the early 2000s, with the consolidation of statistical monitors that have improved the quality of information. The creation of the *Gestión Unificada de Registros e Información* (Unified Management of Records and Information–GURI) system in primary education and the subsequent developments in the secondary and technical education, have been essential for managing identifiable data comprehensively in each subsystem.

However, Uruguay's main obstacle lies in the technological heterogeneity of the various subsystems' information and education management systems, which reflects the complex institutional structure of the education system. The lack of a comprehensive management system covering the entire education system makes it challenging to integrate information between levels, and the incentives to facilitate the integration process are insufficient.

A relevant SPTE milestone in data integration was developing a business technology solution that made it possible to replicate the subsystems' databases and consolidate them in a data warehouse. This integration facilitated the transversality of educational pathway data and was the starting point for better articulated educational policies on transitions and pathways, such as the case of the centralized assignment of students (see Box 3). This change in information management complemented and boosted a transformation previously led by the educational policies, which guided the pedagogical approach towards students and promoted more comprehensive monitoring of their educational pathway at every level.

29. For more information, see: https://www.anep.edu.uy/sites/default/files/images/Archivos/publicaciones-direcciones/secretaria-administrativa/circulares/2017/CIRCULAR 9-17.pdf.

"We did not fully manage the entire education system, which is also a challenge since policies were not necessarily developed jointly by the subsystems (...) The early enrollment process—a policy created to support this transition through a centralized student assignment mechanism—led us to consider a potential integration policy (...) I believe this process was truly significant because it boosted a pedagogical approach at the foundation of the pathway protection system (...) This approach implies viewing the student as a whole and monitoring them according to their paths, instead of organizing the work based on the subsystems that provide educational services; the organization should focus on the student who navigates multiple subsystems."

DSIE.

BOX 3

Digital enrollment system for transitioning between cycles

The transition between primary and secondary education is one of the main bottlenecks in Uruguay's educational pathways. To address this challenge, the SPTE introduced early enrollment to ensure that all students completing primary school successfully transition into lower secondary education.

The pre-enrollment process includes two phases: pre-enrollment, where families choose three schools on the GURI Familia platform, and confirmation, where they formalize the enrollment in the school assigned. This promotes the educational pathway vision by coordinating the various subsystems of the education system, helping schools plan in advance and facilitating the organization of transition (ANEP, 2019).

The process has significantly impacted educational continuity rates, with an increase in the transition from primary to secondary school from 96.7% in 2015 to 99% in 2019 (Red BIX, 2021). The system allows users to monitor the students who do not pre-enroll and/or confirm their enrollment. It facilitates the implementation of follow-up and support strategies to ensure the continuity of their pathways between cycles.

Most students have managed to enroll in their preferred school since the creation of the SPTE pre-enrollment system: while the ratio of 2016 students enrolled in their preferred school was almost 6 to 1, in 2020, the ratio was nearly 9 to 1 (Red BIX, 2021).[30]

30. This trend is significant, as the choice of preferred school by students and their families may be influenced by key factors that impact future educational achievements, such as the desire to maintain links with peers, avoid barriers related to the distance between home and school, or prior knowledge of the educational community.

Types of early warnings

Uruguay has early warning tools at various education levels, including primary education, lower secondary education (from grade 7 to grade 9) and upper secondary education (from grade 10 to grade 12th).[31] However, implementing the SPTE and its early warnings has focused mainly on basic secondary education, where transition and educational progression are relevant challenges for the country. Therefore, this analysis focuses on considering general and technical education at this level, on which the SPTE has focused its efforts and resources, and where early warnings play a key role in a comprehensive approach to protecting educational pathways.

Within the SPTE, early warnings in basic secondary education are divided into automatic and manual. Both, available through the Educational Pathways System,[32] are essential for student monitoring but play different roles within the overall strategy. Most of the warnings generated in the system are automatic warnings.

Automatic warnings are linked to the school attendance record and are triggered when a student accumulates consecutive absences. Although the automatic warning system initially aimed to combine several indicators, such as academic grades, previous educational pathway and attendance, it was decided that the automatic warnings would be based only on attendance. Attendance is the most reliable predictor due to its high coverage and updating in terms of data, but mainly because it is easy to understand and use. The threshold for the automatic warning to be activated is five consecutive absences, although it used to be three. This adjustment in the cut-off point aims to reduce the number of false positives, which used to include, for example, justified absences due to illness, which were erroneously considered risk situations.

Furthermore, manual warnings depend on the pedagogical criteria of the educational teams, who observe and record other factors that may indicate a risk situation, such as domestic violence, economic hardship or school coexistence problems. This type of warning is based on how close the educational team is to the student, which allows them to identify other risk situations that do not always appear in absence indicators.

Manual warnings were created during the first months of school closures in 2020 when the lack of facetoface classes made it difficult to use the existing automatic warnings. Although the SPTE later introduced a new automatic warning for students not logging into the Ceibal platforms, the first strategy was to apply manual warnings. The relevance of manual warnings and their complemen-

31. In primary education, the GURI system includes nonattendance alerts, while manual alerts have been enabled since 2020 in (general and technical) upper secondary education.
32. See: https://ste.anep.edu.uy/manuales/modulo-asistencia/modulo-de-seguimiento-de-estudiantes.

tarity with automatic warnings led to their integration into the system as a new type of warning once facetoface instruction resumed.

New components to strengthen early warnings

A new IT support system is being developed within an Inter-American Development Bank operation to replace the Educational Pathways System solution. This new system maintains the automatic and manual warnings for early identification of atrisk students,[33] but includes a new module that will centralize key information about each student. This module will allow educational teams to access the primary data of the students' previous pathway, social needs and the pedagogical support received in one place. This will enable the teams to understand the students' situation fully, thus improving their ability to detect any at-risk situation.

Integrating data spread in several databases, portals and systems, eliminating duplicate records and consolidating them in a single accessible source will overcome limitations such as the lack of continuity in characterizing students during the transition between educational cycles or subsystems. This centralized process will optimize management by providing one place with the key information needed to interpret and effectively address risk situations detected through warnings.

> *"This is not a new type of alert, but information relevant to the school. This is key information to build a comprehensive view of the risk situation. The idea is, for example, to know where this student was before and their educational history. Knowing this allows us to characterize better and understand what is going on. It is also relevant to know if they have access to social benefits, what type of health coverage they have or if they have received educational support (...) It is essential to consolidate dispersed data to develop a proposal for individualized monitoring. In addition, schools don't have to do additional surveying since many of these data were obtained by asking the families or the students, a process that takes administrative time and duplicates recording. This will save time, freeing up administrative time to devote to pedagogical tasks, which is the main purpose. It's something that the schools demand and need."*
>
> DSIE.

33. The technical teams decided to keep the algorithm and rules used to generate automatic warnings outside the new software solution, so that it would only use them and not process them. The pandemic showed the relevance of maintaining warning generation flexible, allowing the system to adapt quickly to changes and new realities in education.

C) Timely interventions

The various SPTE stakeholders organize the management of warnings and interventions in a coordinated manner. Automatic and manual warnings are managed through the IT support module of the Educational Pathways System, mainly by the ERTE of each school, which includes educators, psychologists and/or social workers. These teams must contact the student or their significant adult, diagnose the situation and decide on the first actions to protect the educational pathways. The pathway teams collaborate with school management to address the problems in more complex cases. Over 90% of warnings are resolved at the school.

The workflow follows a clear and structured outline reflected in the IT support module. The flow usually begins with an initial contact with the student and/or their significant adult, followed by a facetoface interview where the participants agree on specific educational commitments or adaptations relevant to the student's unique situation. Interventions and support are structured not through rigid protocols but through guidelines designed to adapt to each student's needs.

This flexible approach allows customized actions and strategies to be implemented according to the characteristics and circumstances detected. The SPTE does not have any specific programs. Instead, it adapts the policies and resources available in the education system. The most commonly used intervention strategies include modifying programs of study, adapting the curricula, exploring pedagogical approaches and providing tutoring or academic support courses.

Family support is a key element in this framework, structured through the "pedagogical agreements," which establish commitments between students, their families and the school to promote educational pathway progress. These interventions are designed and implemented in the schools under the leadership of the ERTE, seeking shared agreements among the parties involved as a starting point.

Cases requiring more intervention, such as active search or coordination with other government agencies, are referred to the UCDIES or the corresponding supervisory entity. These units facilitate interinstitutional collaboration with public agencies to address issues affecting the students' educational and social development, such as access to health services and social protection programs. In addition, the UCDIES play a key role in aligning the programmatic lines with the educational options provided by the various subsystems in the territory.

At the central level, ANEP's educational planning areas and CODICEN authorities can access consolidated information through dashboards to check general statistics and specific details of each case. However, they can monitor the indicators and use the information but not manage cases directly.

The focus on pathway protection has included changes in educational and general regulations, which, although not directly part of the SPTE as a specific policy action, are essential to favor permanence in the education system. These modifications include adjustments to the regulations on repetition, the conditions for promotion by subject, and other regulations that ensure educational continuity, which are key elements that ensure that students can complete their school trajectory without interruptions.

Training

Training users in the Educational Pathways System is essential for its correct implementation. Three types of training are provided. First, massive training for the ERTE covers technical aspects of the IT system and reaches about 500–600 people annually, achieving coverage in 94% of schools. Second, training workshops that combine the use of the IT system with warning analysis and interpretation, strengthening the teams' intervention capacity. Finally, an annual course on pathway protection, developed with the support of UNICEF, provides accredited training with a comprehensive conceptual approach. The latter, which has been in force for three years, has a demand far exceeding its availability, underscoring its importance in strengthening users' skills.

New components for strengthening interventions and providing support in risk situations

The new IT system was developed to strengthen the module for recording and monitoring interventions, promoting more effective coordination among the various stakeholders involved in the monitoring process. In addition, it will allow for more effective follow-up and monitoring, facilitating the recording of medium-term actions.

One of the main innovations will be the individual support module, which will be activated when, after an initial contact with the student or their significant adult/s it is determined that a positive outcome is not possible without sustained follow-up. This module aims to record all the actions necessary to support the student over an extended period, covering multiple dimensions: teaching and learning, social and community life, connections and access to support services. In addition, it will help teams inside and outside the education system coordinate their work, creating a comprehensive approach to ensure educational continuity.

In the module, the ERTE will be able to set clear monitoring objectives, establish specific deadlines for achieving them and assign the resources and stakeholders involved. A strategic review system will be added periodically to evaluate compliance with the goals set. The ERTE will carry out this follow-up, which can adapt the interventions to the student's progress, ensuring that the support matches each stage.

A key functionality of the system will be the activity log, which will allow users to record each step of the support process. Every action will be accurately documented, from the initial planning to the

end of the intervention, enabling detailed monitoring and traceability of the decisions taken. This history will serve as a tool for ongoing review and allow guidance teams to adjust their interventions based on the results.

In addition, the system will add a module for group support, designed for situations where a group of students requires a common approach. This module will be beneficial when several students need joint interventions due to pedagogical, social or community needs. For example, group support may be provided for students, those who need curricular adaptations, or students who face similar situations in their educational pathway. This support will be organized through predefined filters, which may be based on the students' educational or social and community characteristics or the selection made by the teams, optimizing resources and shared strategies.

Finally, the new system will facilitate communication between stakeholders, such as the ERTE, school administrations and the UCDIES, through real-time notifications. These notifications will ensure that everyone is aware of the actions taken, thus avoiding duplication and ensuring they are aligned with the objectives. In addition, the system will alert administrators to any relevant changes in the intervention, such as the action of the school administration or the UCDIE, allowing them to make decisions quickly and ensure that interventions are timely and effective.

D) Results

The SPTE does not have impact evaluations; however, qualitative and process evaluations have been conducted, most notably the external evaluation conducted by Red BIX in 2022. It analyzed the progress and results of the policy by monitoring cohorts, reviewing the mechanisms implemented and evaluating the implementation processes in the territories. One of the main findings was the favorable evolution of educational permanence indicators in the 2016 to 2019 cohorts, reflecting an improvement in school continuity. However, this trend reversed in the 2020 cohort, showing values similar to those of 2016, which could be related to the instability caused by the COVID-19 pandemic, which affected both courses and school activities.

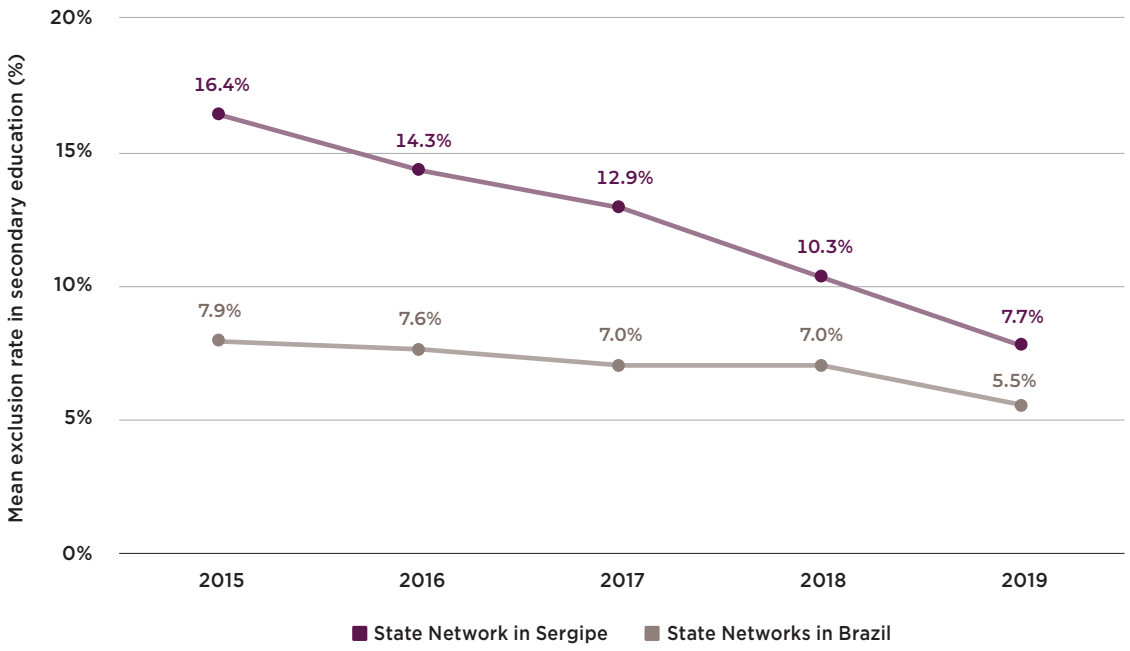
The education system has goals related to educational permanence and continuity, but these are not directly linked to the specific SPTE results. The DSIE team highlights the importance of reflecting on how to establish and weigh outcome goals in diverse educational contexts, recognizing that educational pathways depend on multiple factors, many of which go beyond the education system and are not comparable among groups of students with different socioeconomic characteristics. In this sense, they emphasize the need for evaluations to consider the diversity and complexity of situations, ensuring that the efforts and achievements of educational teams are appropriately assessed.

3.4 Sergipe: An incipient but experimentally evaluated pathway protection system

Since 2021, the Secretaria de Estado da Educação (State Secretariat of Education–SEEDSE) and the Instituto Sonho Grande (Sonho Grande Institute–ISG), with the support of the Inter-American Development Bank, have implemented a project to develop a pathway protection system to address students at risk of educational exclusion in the state of Sergipe, Brazil. The system was designed for state primary and secondary schools (*Ensino Fundamental*, from grade 1 to grade 9, and *Ensino Médio*, from grade 10 to grade 12). This pathway protection system, partly possible by the digital and nominal roll call implemented from 2022 onwards, made it possible to implement a more preventive approach to support student permanence. This was the case because it made it possible to create warnings when students had two consecutive absences. It was also possible to link the warnings with actions of varying degrees of intensity according to the risk detected. Sergipe already had interventions to promote student permanence, but they mainly focused on students with more absences.

Sergipe had high rates of educational exclusion in state secondary education. In fact, in 2017, it was the state with the third highest levels of educational exclusion in secondary education. However, the evolution of the indicator shows a decrease in educational exclusion rates that began before implementing the pathway protection system. Between 2015 and 2019, this indicator improved nationally (-1.4 percentage points, equivalent to a 30% reduction) and in Sergipe (-8.4 percentage points, equivalent to a 53% reduction). However, the decline was more significant in Sergipe (Figure 5). These improvements coincided with prioritizing actions for reducing educational exclusion in secondary education (ISG, 2024; Cossi et al., 2024).

FIGURE 5 ▪ EVOLUTION OF EDUCATIONAL EXCLUSION RATES IN SECONDARY EDUCATION (ENSINO MÉDIO), STATE SECTOR



Source: ISG (2024) y Cossi et al.(2024).

A) Institutional framework and governance

Between 2020 and 2021, the SEED-SE had been working to support students with high school absences as it aimed to focus on student permanence (ISG, 2024; Cossi et al., 2024). To this end, the schools had two key tools: the Ficha de Comunicação do Aluno Infrequente (Infrequent Student Communication Forms or FICAI) and the Active Search platform. Schools completed the FICAI forms when they detected a student who repeatedly missed school. These forms activated a set of actions for protecting and supporting the students, jointly with the Guardianship Council and, if necessary, with the Public Prosecutor's Office. Furthermore, the Active Search platform, developed jointly with UNICEF and used in public schools and municipal networks, identified students who were missing school on consecutive days for three weeks and created warnings to trigger support from the municipality's team of social workers. These teams were in charge of contacting the families and starting the necessary actions to reengage the students.

In addition, in 2021, SEED-SE implemented electronic attendance tracking. In the first year, the data was recorded on an aggregate basis, i.e., attendance was not tracked for each student (nominal), but only the total numbers of students present and absent. This changed in 2022, when attendance tracking became nominal (ISG, 2024), with teachers recording attendance in a webbased application. These expansions and improvements in student attendance records made it possible to identify students missing class more easily and trigger active search initiatives (ISG, 2024).

A new tool was added in 2022: the system to protect educational pathways focused on preventing educational exclusion, which was developed by the Secretariat of Sergipe, ISG, and the IDB. This system, integrated into the Secretariat's system modules, combines two main components: (i) an earlywarning module, which creates lists of atrisk students based on the number of missed school days, and (ii) a module for monitoring and managing actions, with action protocols for the different risk levels. This system has made it possible to take preventive actions at earlier stages.

Implementing this solution involved three stages. First, the prototype was developed and tested jointly with the Secretariat's technology and IT, student permanence, pedagogical and management teams. It was tested in seven selected state schools during the second semester of 2021. The usability and convenience of the system were evaluated, and areas for improvement were identified. The aim was to create a tool that is easy to understand, has an intuitive interface, and provides relevant information to prevent educational exclusion. Overall, the seven schools rated the system positively and found that the actions recommended for students at different levels of risk were helpful. Some users provided recommendations on how to present information more intuitively. This feedback allowed the team to improve the tool's usability and correct the errors detected.

Second, an impact assessment was conducted. This experimental study was conducted in state primary and secondary schools during the first semester of 2022. A rigorous methodology was used to analyze the causal effect of the modules implemented on identifying atrisk students and recording dropout prevention actions (measures on account of student absences).

The third and final step was extending the system to the entire network of state schools in Sergipe.

B) Integration of information and early warning systems

The mechanism is simple and based on the electronic recording of students' class attendance. Teachers must record daily attendance in a web application for every class.

One of the main challenges when developing the system was obtaining reliable student attendance data. When the system was first deployed, not all teachers were uploading information thoroughly and daily, which affected the effectiveness of the warning system. Awarenessraising activities were

organized with the Education Department (DED) and the School Inspection Department (DIES) on the importance of recording attendance daily and training to improve attendance recording. SEED-SE also developed user manuals. All these actions improved the frequency of records, which provided the information necessary to create the warnings (ISG, 2024).

In this way, students are classified into one of the following categories based on class attendance records: "low risk," when the student misses two consecutive school days; "medium risk," when the student misses four of the last five school days; "high risk," when the student misses eight of the previous ten schooldays; or "no risk," when none of the above applies to the student.

The cut-off points of the risk levels were determined based on the Secretariat's expert knowledge and also on testing the system in the initial trial phase in seven schools. Thus, the different states in Brazil set the relevant cut-off points or criteria according to their context.

The generation of alerts based on class absences was a decision made by the Secretariat of Education after a process of internal discussion and analysis. Although, when designing the system the team considered designing a more complex algorithm that considered several events, the final choice was to use a rule associated with specific individual events (absences). This decision prioritized keeping the warnings simple and easy to understand. Thus, the fact that stakeholders understood why the warnings were triggered contributed to the system's adoption by school teams. The EWS focused more on the active search process and identifying the reasons behind the risk situations, rather than having an incredibly accurate but more complex algorithm:

> *"...We decided to implement an EWS based only on class absences because, at a certain point, we discussed whether we should have a more robust algorithm. Besides the technical and cost implications, the difficulty with this was that, at the time of testing, we thought it was good for schools to feel confident about what was being calculated. And if it is a simple rule based on the number of absences and so on, they feel more confident. They understood how this figure was calculated, and it made adoption easier at the beginning."*
>
> (ISG Technology Coordinator).

The warnings automatically created by the system are lists of atrisk students, ordered according to their level of risk. They are updated daily and can be viewed directly in the system.

C) Timely interventions

Different stakeholders have access to the EWS module, although their roles differ. In each school, the pedagogical coordinators and principals can see the list of at-risk students in the system and must implement support actions to help them. Regionally, the experts in the regional school administrations, who supervise several schools, can also access the EWS and the warnings triggered, both in nominal format (per student) and in aggregate on a school or regional scale. The regional school administrations supervise the situation of the schools by monitoring their actions. The administrations hold follow-up meetings with the schools every two weeks to support those with the most significant difficulties, consolidate training and promote good practices. These meetings were crucial for improving the effectiveness of the pathway protection system, as well-structured monitoring routines were created with the schools, and a continuous learning environment was fostered by exchanging experiences (ISG, 2024). Finally, at the central level, the student permanence team of the Secretariat of Education (SEGCAP-CEAVE) manages the system and defines the actions for each type of risk. In addition, the Secretariat's technology team provides indirect support by offering training on using the tool.

The warnings are linked to interventions to prevent educational exclusion. Each school must use the lists of atrisk students to implement initiatives to prevent their potential exclusion. The Secretariat of Education recommended interventions for each level of risk, although schools can define and implement the actions autonomously (ISG, 2024). The recommended actions are: (i) contacting the adults responsible for the student in a lowrisk case; (ii) filling out the FICAI, if it is a mediumrisk case; and (iii) activating active search networks when a student is at high risk of educational exclusion. The system has a module that records the actions taken for each student, which makes it possible to monitor each case in the system itself. The system displays the various warnings and interventions for each at-risk student and how they evolve.

The pathway protection system showed positive results, reducing the risk of educational exclusion in Sergipe. It also promoted the creation of other initiatives to reduce the risk of educational exclusion, such as the Student Monitor program, assigned to one student per school. It provides financial support to atrisk students and involves them in monitoring actions to prevent educational exclusion in their schools. Implementing the EWS also fostered connections with current initiatives to prevent exclusion, such as the active student search platform developed with UNICEF.

D) Results

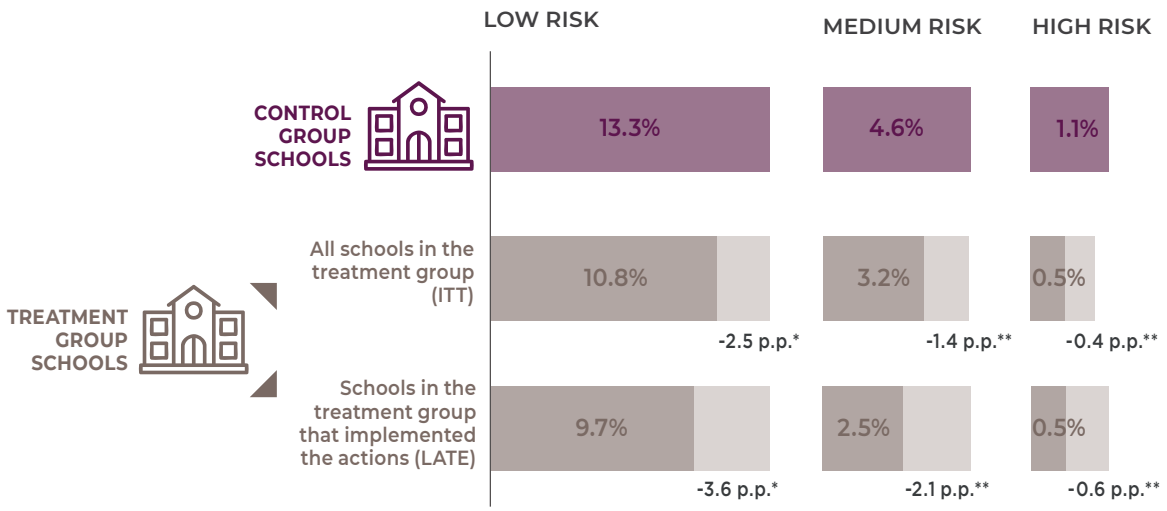
The impact of the warning system and student monitoring actions was assessed through a randomized controlled trial (RCT) conducted during the first semester of 2022. The study involved a randomization process for assigning the intervention, which resulted in two groups: the treatment group, consisting of 150 schools randomly selected to benefit from the intervention at the beginning of the school year, and the control group, made up of 149 schools that were able to access the system one semester later. This division allowed for a comparison of the results between groups and thus made it possible to evaluate the effects of implementing the two new system modules: identifying atrisk students and recording and managing support actions.

The results show that implementing the EWS reduced the risk of educational exclusion (measured as the number of absences). First, the analysis focused on evaluating the intention-to-treat effect,[34] comparing the results between schools assigned to the control group —without access to the new modules in the system— and those in the treatment group, who had access to these modules, regardless of their actual use.

The results show that, at the end of the second semester of 2022, the schools in the treatment group, with access to the EWS and action monitoring modules, had lower levels of risk of educational exclusion than the control group (Figure 6). Regarding low risk of exclusion, schools in the control group had a 13.3% level, while those in the treatment group reached 10.8%, which shows a reduction of 2.5 percentage points, equivalent to 19%. For the average risk of exclusion, the levels were 4.6% in control schools and 3.2% in treatment schools, a difference of 1.4 percentage points, implying a 31% decrease in average risk in the treatment group. Finally, the difference between the two groups was 0.4 percentage points regarding high risk of exclusion, with 1.1% in control schools and 0.7% in treatment schools, corresponding to a 39% reduction in schools with access to the pathway protection system (ISG, 2024; Cossi et al. 2024).

34. ITT, for its acronym.

FIGURE 6 ▪ LOW, MEDIUM AND HIGH LEVELS OF EDUCATIONAL EXCLUSION RISK IN THE TREATMENT AND CONTROL GROUPS AT THE END OF THE FIRST SEMESTER OF 2022



Source: ISG (2024) and Cossi et al. (2024).
Note: *: Significant at 1%. **: Significant at 5%e. ***: Significant at 10%.

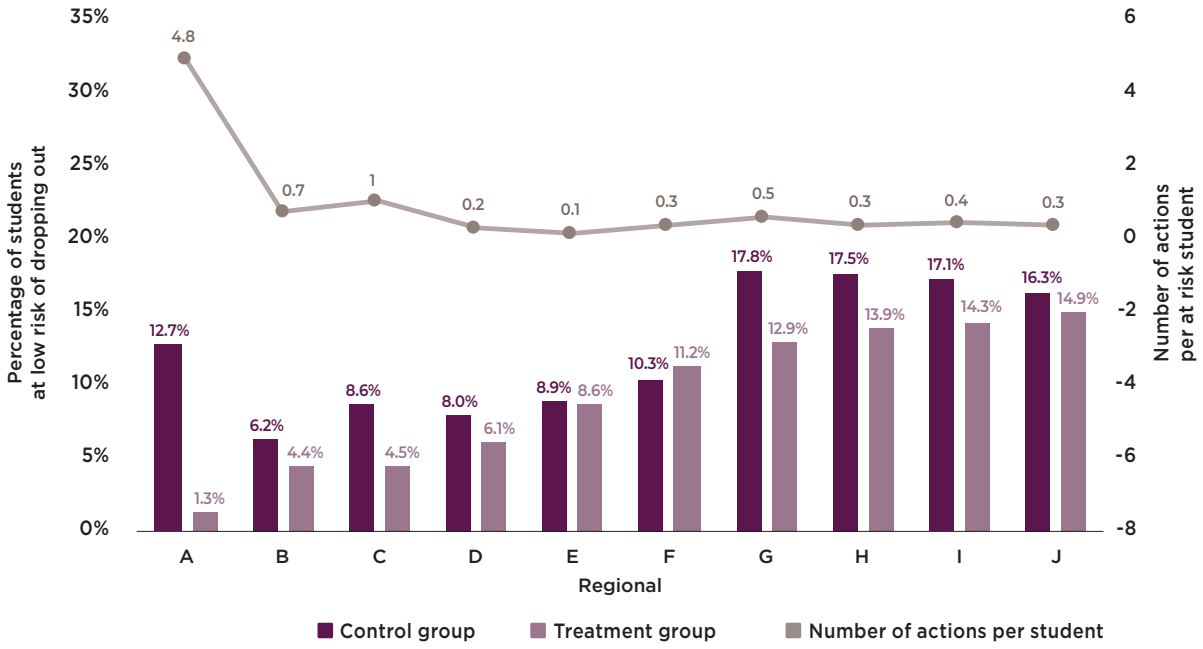
An even more significant impact is observed when analyzing the effect on schools that used the EWS and recorded student monitoring actions. This analysis, known as Local Average Treatment Effect (LATE), measures the average treatment effect in the schools that effectively recorded support actions in the system after being assigned to the treatment group. This made it possible to isolate the direct impact of the active use of the modules, highlighting a more significant reduction in dropout risk: the low risk of exclusion was reduced by 3.6 percentage points, the medium risk by 2.1 percentage points, and the high risk of dropout, by 0.6 percentage points.

The evaluation also included a heterogeneous effects analysis to determine whether the solution had differential effects according to various characteristics. The results showed no significant differences in socioeconomic level, performance in the *Desenvolvimento da Educação Básica* (Basic Education Development Index–IDEB), location or school size. However, the results suggest that the more actions recorded by the schools in the different regions in the monitoring module, the better the results. For example, in region A,[35] the treatment schools with the pathway protection system

35. Fictitious name. The names of the regions in Figure 7 were anonymized.

recorded 4.8 actions per student on average, and the percentage of students at low risk of exclusion was 1.3%. In contrast, in the same region, the control group schools had an exclusion risk of 12.7%: a difference of 11.4 percentage points. In other regions where the average number of actions recorded was lower, the difference in the levels of low risk of exclusion between treatment and control schools was also smaller on average (Figure 7).

FIGURE 7 ▪ PERCENTAGE OF STUDENTS AT LOW RISK OF EDUCATIONAL EXCLUSION AND NUMBER OF ACTIONS RECORDED IN THE SYSTEM FOR STUDENTS AT RISK BY REGIONAL SCHOOL ADMINISTRATION



Source: ISG (2024) AND Cossi et al. (2024).
Note: Regional school administrations were anonymized.

In addition, no statistically significant results were found when analyzing the effect of the pathway protection system in fulltime schools. The lack of results in this group could be either because the educational exclusion rates are low (0.34%, 0.02% and 0% when considering low, medium and high risk of exclusion, respectively, considering both treatment and control schools) or because the fulltime schools have supplementary practices that tend to strengthen the link between students and schools.

Thus, the impact assessment results show that implementing the pathway protection system in Sergipe had positive and significant effects since it led to considerable reductions in the likelihood of educational exclusion in the schools where the system was implemented.

4 Lessons learned

This section presents the main lessons learned from the analysis of the cases studied for the four pillars analyzed in this document. The following table summarizes the characterization of the cases by dimension:

TABLE 3 ▪ SUMMARY OF THE FOUR PILLARS IN THE CASES ANALYZED

		Costa Rica	Chile	Uruguay	Sergipe
Institutional framework	¿Is there an agency that administers the system?	✓	✓	✓	✓
	At what levels	Central, regional and school	Central, provincial and school admnistrator	Central, regional and school	Central level
	Types of responsibilities at the central level	Policy making, financing, monitoring and assessment	Policy making, monitoring and assessment	Policy making, monitoring and assessment	Policy making, financing, monitoring and assessment
	There is a person directly responsible for the warnings	✓	✓	✓	✓
Information systems, management and warnings	Educational information and nominal management system	✓	✓	✓	✓
	Early warning systems (EWS)	✓	✓	✓	✓
	EWS variables	87 variables organized into 8 dimensions	School attendance (No) Manual enrollment	Manual School Attendance Tracking	School Attendance
	Warnings based on AI predictive models	x	x	x	x
	Update frequency	Quarterly	Weekly/monthly	Daily	Daily
	Allows for recording actions	✓	✓	✓	✓

		Costa Rica	Chile	Uruguay	Sergipe
Interventions	Standardized intervention protocols	✓	✓ (for enrollment only)	x	✓
	Types of interventions at intermediate level	• Active search programs • Flexible modalities • Monetary incentives	• Active search programs • Flexible modalities • Guidance and learning acceleration	• Active search program • Coordination with other agencies	Monetary incentives
	Types of intervention at school level	• Flexible modalities • Guidance and learning acceleration	Guidance and learning acceleration	• Flexible modalities • Guidance and learning acceleration	• Active search programs • Guidance and learning acceleration
Results	Impact assessment	x	x	x	✓
	Process assessment	x	✓	✓	x

The following lessons and recommendations are highlighted based on the analysis above. They are structured around the four areas of study that have guided this document:

INSTITUTIONAL FRAMEWORK AND GOVERNANCE

Institutionalize to ensure sustainability. A pathway protection system must be highly institutionalized and supported by regulations, mandatory protocols, and administrative units within the ministries responsible for its implementation. As the first Chilean experience demonstrated, an EWS without an institutional structure that can respond to warnings and without clearly established protocols for action runs the risk of becoming mere additional information for schools that is not translated into actions. The four cases analyzed have an administrative unit in charge of the system, and three have a person directly responsible for managing the warnings. The more institutionalized the system is, the more sustainable and effective it becomes to fight educational exclusion. However, its institutional structure must be flexible enough to adapt and evolve according to the changing dynamics in educational exclusion.

Recognize the reengagement and protection of educational pathways as an essential role of the education system. This requires specialized professional teams with the capacity to operate in the territory. The models studied have different degrees of intensity. Some include a network of central-level advisors coordinating efforts with pre-existing structures at intermediate levels. Schools must ensure they have available trained staff with hours devoted to planning, implementing and monitoring the support provided. This approach seeks to increase the number of human resources and to guarantee their strategic allocation, prioritizing the most vulnerable schools and students to offer satisfactory and effective support.

INTEGRATION OF INFORMATION SYSTEMS AND EARLY WARNINGS

Implement digital systems for pathway tracking and management. Integrating information provides updated and centralized student data, avoiding fragmentation among different institutions and stakeholders. Additionally, it facilitates a holistic approach to making decisions about support interventions, making it possible to consider each student's specific needs and past activity history. A key element in the cases analyzed is the implementation of digital systems for monitoring student pathways and recording the actions implemented. These platforms allow users to monitor each case individually, identify best practices, and strengthen coordination among key stakeholders. In addition, they facilitate coordination between schools and other agencies, promoting comprehensive and coordinated care for students at risk of dropping out of school.

Design warning types based on information systems' maturity. Three of the four cases identified selected simple warnings based on a single indicator: frequent absences. This type of warning has the advantage of helping teams understand the reason for the warning. It also enables continuous monitoring, as they are based on indicators that are frequently updated and that have a greater coverage. Advancing towards more sophisticated warnings, which combine multiple indicators or use AI or machine learning, will only be possible with education information and management systems with a high degree of maturity and interoperability.

TIMELY INTERVENTIONS

Diversify and prioritize educational solutions. A range of programs tailored to the specific needs of students, such as tutoring, scholarships, and academic or psychosocial support, is essential to reduce dropout rates. A pathway protection system that identifies at-risk students but lacks programmatic resources cannot be truly effective. For these resources to be impactful, it is crucial to prioritize their allocation to the schools with the highest risk indices, thus guaranteeing equity in learning opportunities and permanence in the education system.

Placing schools at the core of the pathway protection strategies. Allowing schools to adapt their interventions to the specific context within a framework of general recommendations strengthens their capacity to respond to each community's needs. This implies granting them autonomy to design and implement actions that address the unique challenges of their students while ensuring consistency with the objectives and guidelines of the education system. It also entails empowering and training educational teams to manage risk cases.

Strengthen intra- and inter-institutional coordination at multiple levels. It is essential to create interinstitutional working groups, including key agencies such as health, social development and justice, to address the various dimensions of school dropout. These regional bodies play a key role in referring cases to other institutions and guaranteeing timely attention in critical situations, effectively coordinating efforts and resources to address students' needs comprehensively.

Promote the adoption of evidence-based support actions. Having interventions with proven effectiveness in the portfolio of strategies to combat educational exclusion can have a significant impact. The review of the experiences of pathway protection systems in Costa Rica, Chile, Sergipe (Brazil) and Uruguay highlights how the two pillars of an SPTE– detection and intervention—complement each other. The combination of both pillars leads to more effective results thanks to better targeting and cost-effectiveness.

RESULTS

Implement continuous system testing and improvement. The case studies show how improving the systems as potential enhancements to their development or use of has enhanced their use and scope. Piloting can also be helpful when implementing an EWS for the first time, as it helps to understand which aspects of the system can be optimized before scaling up the initiative to a larger number of schools.

Overcoming methodological challenges in the impact assessment of pathway protection systems. One of the most relevant challenges in evaluating pathway protection systems is the coexistence of non-exclusive interventions, which makes it difficult to isolate the system's causal effect. Sergipe is a good example of this, as it has managed to measure the impact of the use of two modules of the system: one for generating and visualizing alerts and the other for recording the actions implemented.

Define specific goals and expand monitoring of indicators. Monitoring and assessing this type of initiative can be enhanced by setting specific goals and relevant indicators, ensuring they can be measured and monitored frequently.

The analysis of the experiences of Costa Rica, Chile, Uruguay and Sergipe shows that systems to protect educational pathways are a viable and fundamental policy for guaranteeing continuous, complete and quality educational paths. The lessons learned highlight that institutional strengthening, integrating information systems, implementing timely interventions and continuous assessment are essential pillars for developing more equitable and inclusive education systems. As the closing of the The Road to Educational Inclusion series, this document seeks to help design and implement comprehensive policies to protect educational pathways in Latin America and the Caribbean.

Glossary

Country	Term	Definition
Costa Rica	CEM	*Centro de estudios del MINEDUC* (MINEDUC Center of Studies)
	EMIS	Educational Management and Information System
	EPI	*Equipo para la Permanencia Institucional* (Institutional Permanence Team
	ERP	*Equipo Regional de Permanencia* (Regional Permanence Team
	EWS	Early Warning System
	IMAS	*Instituto Mixto de Ayuda Social* (Joint Social Welfare Institute)
	MEP	*Ministerio de Educación Pública* (Ministry of Public Education)
	UPRE	*Unidad para la Permanencia, Reincorporación y Éxito Educativo* (Unit for Permanence, Reentry and Educational Success)
Chile	ANEP	*Administración Nacional de Educación Pública* (National Public Education Administration)
	CEPPE	*Centro de Estudios de Políticas y Prácticas de la Educación* (Center for the Study of Educational Policies and Practices)
	DEG	*División de Educación General* (General Education Division)
	MINEDUC	Ministry of Education
	SAE	*Sistema de Admisión Escolar (*School Admission System)
	SIGE	*Sistema de Información General de Estudiantes* (General Student Information System)
	SiPTE	*Sistema de Protección de Trayectorias Educativas* (System to protect Educational Pathways)
	SUMMA	Laboratory for Research and Innovation in Education for Latin America and the Caribbean
Uruguay	CODICEN	*Consejo Directivo Central* (National Council of Education)
	DED	Education Department
	DSIE	*Sectoral Directorate for Educational Integration* (Dirección Sectorial de Integración Educativa)
	ERTE	*Equipos Referentes de Trayectorias Educativas* (Educational Pathway Guidance Teams)
	GURI	*Gestión Unificada de Registros e Información* (Unified Management of Records and Information)
	SPTE	*Sistema de Protección de Trayectorias Educativas* (System for the Protection of Educational Pathways)
	UCDIES	*Unidades Coordinadoras Departamentales de Integración Educativa* (Departmental Coordinating Units for Educational Integration)
Sergipe	DIES	School inspection department
	FICAI	Infrequent Student Communication Forms
	IDEB	*Índice de Desenvolvimento da Educação Básica* (Basic Education Development Index)
	ISG	*Instituto Sonho Grande* (Sonho Grande Institute)
	RCT	Randomized Controlled Trial
	SEED-SE	*Secretaria de Estado da Educação* (State Secretariat of Education)

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