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ANNEX I

Hemispheric Program for the Recovery, Repair, and Reactivation of the Education Sector (3R4E) Executive Summaries Research Line 1

**Early warning system for educational continuity:** Chronic absenteeism: causes, educational exclusion profiles, and institutional mechanisms to predict it, with an emphasis on vulnerable groups

(Document prepared by the Technical Secretariat at the request of the CIE officers)

**Hemispheric Program for the Recovery, Repair, and Reactivation of the Education Sector (3R4E)**

**Executive Summaries Research Line 1**

**Early warning system for educational continuity:** Chronic absenteeism: causes, educational exclusion profiles, and institutional mechanisms to predict it, with an emphasis on vulnerable groups

a. Attendance and relinking

**Chile: Literature review on “Attendance and relinking,” a pillar of the educational reactivation policy.**

**Keywords**: COVID-19, school absenteeism, relinking.

**Frame of Reference**

Since 2022, the Ministry of Education has been working on the Educational Reactivation Plan. One of the pillars of the Plan is “attendance and relinking,” the objective of which is to “ensure educational continuity in children, adolescents, young people and adults, through measures that enable them to start, resume, and complete their educational trajectories” (MINEDUC, 2023a).

This paper delves into that pillar by means of an exhaustive review of the literature at the national and international levels, addressing, in particular, the 2022 plans of action.

**Purposes / Objectives**

The document offers an analysis of the state of the problems of absenteeism and disengagement as a result of the pandemic, and evaluates the progress and results obtained from the strategies implemented to address those problems, through the creation of information systems to monitor the educational trajectories paths of students.

**Areas of analysis: attendance and relinking**

Attendance and absenteeism are key indicators used by different educational systems. For the Chilean Ministry of Education, these indicators are an important reference for generating inputs for different educational policies, including the “Attendance and relinking” pillar of the Educational Reactivation policy.

They are also used to generate monitoring instruments, such as attendance and disengagement reports delivered to school principals or tools to prevent scholastic exclusion, such as the Early Warning System (Sistema de Alerta Temprana – SAT).

At the same time, scholastic exclusion has very negative effects both at the individual and family level, and for society as a whole (MINEDUC, 2019). One effect is an increase in social vulnerability, which can lead in the medium and long term to greater poverty, criminality, illicit-substance abuse, and unemployment, among other situations associated with social exclusion (MINEDUC, 2020).

In the last two decades, a series of research efforts have been carried out in various countries on the benefits of school attendance, the causes of absenteeism and educational disengagement, and their consequences in the short, medium, and long terms, all problems that were worsened with the onset of the COVID-19 pandemic.

As such, this paper explores experiences and examples of how student attendance and relinking were affected by the pandemic at the international and national levels. The evidence reviewed supports the importance of the work of both educational communities and the intermediate and central levels as regards specific measures to address these problems.

**Results/trends**

Severe absenteeism is one of the main predictors of scholastic exclusion. During the COVID-19 pandemic, an increase in severe absenteeism was one of the biggest problems, especially among vulnerable students, where it was most highly concentrated.

Both absenteeism and educational disengagement have adverse effects in terms of academic performance, socioemotional development, and increased risk behaviors, as well as being associated in the long term with unemployment and social exclusion, particularly among more vulnerable students.

The measurement of risk factors has led to the adoption of preventive measures at both the national and the international level. For example, the use of data management system tools that enable better-targeted interventions, complemented by actions involving the entire educational community (such as the strengthening of teams at different levels, home visits, communication campaigns, linkage of programs and agencies, etc.).

It is important to continue working, strengthening, and enhancing measures promoted by the Reactivation Plan, based on evaluations that recover inputs from experience and lessons learned in other countries in this regard (post-pandemic).

A key consideration to bear in mind is that evaluations should engage all stakeholders, so that such actions involve and mobilize them because, though absenteeism and school disengagement are problems that worsened with the pandemic, they were already present in the school system and will continue to be so unless the right preventive measures are taken to address them.

**USA: Applying a Cycle of Evidence-Based Continuous Improvement When Selecting Interventions and Project Components to Improve Attendance**

**Keywords:** chronic absence, cycle of continuous improvement.

**Reference framework**

Students who are chronically absent—missing 10 percent or more school days per year, whether excused or unexcused—are at serious risk of falling behind at school and not graduating (Bauer et al., 2018). Research shows that chronically absent preschool and kindergarten students are academically and developmentally behind their classmates who attend school regularly (Erlich et al., 2013). By third grade, chronically absent students have lower reading and math achievement (Balfanz & Byrnes, 2012). And finally, students are seven times more likely to drop out if they are chronically absent even just one year between 8th and 12th grade (University of Utah, 2012).

Given this evidence, many states, districts, and schools are developing strategies to reduce chronic absence and ensure students attend school regularly. While many proposed interventions to reduce chronic absence and support attendance exist, it is important to view them within a cycle of continuous improvement.

**Purposes / Objectives**

The purpose of this non-regulatory guidance is to support educators that are focused on reducing chronic absence by providing an example of how to apply a cycle of continuous improvement based on the U.S. Department of Education Non-Regulatory Guidance: Using Evidence to Strengthen Education Investments to select evidence-based interventions and project components, aligned with local needs, to improve student attendance.

**Evidence-Based Continuous Improvement Cycle**

The U.S. Department of Education emphasizes the use of evidence-based activities, strategies, and interventions (collectively referred to in the non-regulatory guidance as “project components”) in the design of education programs across the education spectrum. This resource uses the terms interventions, project components, and strategies interchangeably.

The non-regulatory guidance describes a five-step process of learning and improvement that includes: (1) identifying local needs, including the needs of the learner population being served; (2) selecting evidence-based project components that organizations have the capacity to implement, including implementing with partners; (3) planning for and then (4) supporting and refining the implementation of the project components; and (5) examining and reflecting upon how the project components are working.

Evidence-based improvement cycles, like this one, recognize that using evidence to inform decisions is a process, not a product; is continuous; is aligned with state and local goals; requires capacity building; and can improve student outcomes (see Hale et al., 2017). This resource focuses on the first two steps in the cycle: Identify Local Needs and Select Relevant, Evidence-Based Project Components.

In order to effectively address chronic absenteeism, schools should use a continuous improvement cycle to select interventions and project components that are applicable to their local context. The non-regulatory guidance provides several key questions for teams to consider at each step of the cycle. Additional key questions for schools to consider in this process are:

* *Identify local needs*: What are our needs related to chronic absence? For example, do we need strategies to improve our overall approach to attendance or do we need strategies for students who have the most attendance issues? What are the root causes of our issues and what strategies will directly address them? What strategies are we already using?
* *Select relevant evidence-based Project Components*: What are our needs related to chronic absence? For example, do we need strategies to improve our overall approach to attendance or do we need strategies for students who have the most attendance issues? What are the root causes of our issues and what strategies will directly address them? What strategies are we already using?
* *Plan for implementation*: Which strategies would be viable for us to use and ft our context and constraints? For example, do we have the number of staff needed and the time needed to implement the strategy? If not, do we have the budget to be able to hire staff to carry out the strategy or partnerships with organizations who could help us? What will we need to have in place to successfully implement the strategies? How do we ensure we have it in place before we begin implementation?
* *Implement*: Are we implementing the core features of the strategies with fidelity? What adjustments do we need to make to how we are implementing these strategies to get the best results possible?
* *Examine and reflect*: What data do we need to examine to see if our strategies to address chronic absence are working? What will we do if these strategies are not helping us improve our chronic absence issues?

**USA: Can Texting Parents Improve Attendance in Elementary School? A Test of an Adaptive Messaging Strategy**

**Keywords:** chronic absence, improved attendance, cost-effective strategy: texting.

**Reference framework**

Almost 4 million elementary school students were chronically absent during the 2015–2016 school year. Chronic absences is typically defined as missing 10 percent or more of school days. Missing this much school in early grades is linked with lower reading and math achievement by Grade 3 and higher absenteeism in middle and high school. In addition, chronically absent students are at greater risk of dropping out of high school, using drugs and alcohol, and engaging in crime.

One low-cost way to improve attendance in early grades may be to use text messages. Texting is of particular interest because it has been effective in changing behavior in other fields, such as public health and prevention. And, unlike mailings, texts can reach most parents quickly: cell phone ownership is high and most received texts are read within minutes.

**Purposes / Objectives**

This study examined an adaptive text messaging strategy to see if low-cost, low-burden messaging to parents could improve their children’s attendance in elementary school, and the impact of the texting strategy on chronic absence rates.

**Methodology**

After an initial period of “basic” text messaging in the fall, the messaging was “adapted” by sending additional “intensified” texts in the spring to parents of children who were still frequently absent in the fall.

Data used: a) *absences*: daily school-reported attendance in the study year (2017-2018) was used to create two types of measures within each of three time periods (fall, defined as October 1 through the end of fall semester; spring, defined as January 2 through the end of spring semester; and over the school year, defined as October 1 through the end of spring semester): (1) whether a student was chronically absent, defined as missing 10 percent or more of school days, and (2) number of days absent; b) *achievement*: state assessment test scores in math and reading for students in Grades 3 through 5 for the study year; c) *implementation of the texting*: data on messages sent and delivered, collected daily from the text messaging provider’s text messaging platform.

**Results / Trends**

This study showed that it is possible to text parents about attendance on a large scale at relatively low cost. Texting can reduce the chronic absence rate in elementary schools by as much as 18 percent in one year. Although the study provides some direction and ideas for districts, it does leave a few important questions unanswered.

However, it remains unclear whether any of the versions would have outperformed a simpler strategy that just used “basic messaging” for the entire year and did not “adapt” by adding intensified messaging for families with students who were frequently absent in the fall.

This study did find some evidence suggesting that intensified messaging had an added benefit for students with a prior history of high absences, but not for students overall.

It was conducted during one school year. A longer study is needed to see whether texting sustains a positive impact on attendance over longer periods, and whether parents continue to pay attention to attendance texts over time.

Texting is a light-touch strategy that reduced chronic absence, but these reductions did not lead to higher academic achievement. It is possible that improved learning, facilitated by an increase in instructional time, takes longer and could be observed after multiple years of messaging.

It is unknown whether text messaging would be cost-effective for all types of districts and schools. It is possible texting could have greater impacts on attendance in districts with few other attendance initiatives because the texts would stand out more to parents. It is also possibly more cost-effective for districts with many attendance initiatives to use text messaging in place of other higher-cost strategies.

While one district experienced some challenges with their infrastructure, the effects of text messaging were similar across the four districts. This finding suggests that messaging strategies could reduce chronic absence even in districts without the infrastructure to send texts out perfectly every day of the year. Nevertheless, it is unclear whether text messaging about attendance would be cost-effective in smaller non-urban districts, in districts with few other attendance initiatives, or in districts with very low capacity, no existing infrastructure for texting, and no external support.

This study was the first of its kind to examine an adaptive approach to communicating with parents about elementary school students’ attendance. School attendance and chronic absence may be reconceptualized and monitored in new ways as districts continue to grapple with the COVID-19 pandemic. Still, texting could potentially be an effective means for districts to communicate with parents about attendance and participation in school activities – whether in-person, virtually, or blended.

Shedding light on remaining questions about the approach through targeted future studies will help districts maximize the potential of texting to combat chronic absence.

b. Early Warning Systems

**USA: Identifying Students At Risk Using Prior Performance Versus a Machine Learning Algorithm**

**Keywords**: students at risk, early warning systems, machine learning algorithms.

**Reference framework**

Many school districts use a prior performance early warning system that tracks attendance, behavior, and course performance to identify students at risk of dropping out.

Pittsburgh Public Schools (PPS) requested this study to compare the district’s prior performance early warning system to a more sophisticated algorithm that uses a range of in-school and out-of-school data to identify at-risk students.

PPS would like to know how these two different early warning systems compare regarding who is identified as at risk and how often each prediction method correctly identifies students who ultimately experience academic problems.

**Purposes / Objectives**

The goal of the study is to provide information to PPS about the comparative performance of the predictive model risk scores and the PPS flags in identifying students at risk for academic problems.

**Prior performance versus a machine-learning algorithm**

In the 2017/18 school year, PPS rolled out a system that identifies at-risk students based on their prior attendance, behavior, or course performance problems. Support staff can use the flags to identify at-risk students, monitor them, or provide additional support.

The system creates four flags relevant to this study:

* *Chronic absenteeism flag*: every day the system identifies the students who have been absent more than 10 percent of days in that quarter.
* *Course failure flag*: at the end of each quarter, the system identifies the students who failed a course.
* *Low GPA flag*: at the end of each quarter, the system identifies students with a low-grade point average, or GPA (less than or equal to 2.2).
* *Suspension flag*: at the end of each quarter, the system identifies the students with any out-of-school suspension.

A 2020 Regional Educational Laboratory Mid-Atlantic study developed an alternative approach to identifying students who are at risk: a sophisticated early warning system for PPS that generates risk scores based on a machine learning algorithm and the district’s unique dataset incorporating in-school and out-of-school data (Bruch et al., 2020).

Machine learning models use data-driven algorithms designed to extract the most relevant information from a dataset, with a focus on maximizing the predictive performance of the model. The risk scores indicate the likelihood that the student will experience chronic absenteeism, course failure, low GPA, or a suspension in the following quarter.

The algorithm generates risk scores based on in-school data on academics and behavior combined with out-of-school data from the Allegheny County Department of Human Services (DHS), such as child welfare involvement and justice system involvement.

While the predictive model risk scores and the PPS flag system both are predicting the same outcomes, the two approaches have several key differences:

* *Data*: the PPS flags only use in-school data, whereas the predictive model risk scores also use out-of-school data from DHS.
* *Methods*: the PPS flags simply rely on the binary performance in a prior time period (such as failed a course in the prior quarter to predict failing a course in the next quarter).

In comparison, the predictive risk scores are developed from a machine learning model that accounts for many input variables from the previous quarter. The machine learning model automatically determines the relative importance of each input variable. The PPS flags are binary yes/no predictions of student performance, whereas the predictive risk scores are a likelihood from 0 to 1. The risk scores are converted to binary predictors using a cutoff that sorts students into high- and low-risk categories. This study tests two cutoffs.

**Results / Trends**

The report compares the accuracy of using simple flags based on prior academic problems in school (prior performance early warning system) to an algorithm using a range of in- and out-of-school data to estimate the specific risk of each academic problem for each student in each quarter. Schools can use one or more risk-score cutoffs from the algorithm to create low- and high-risk groups. This study compares a prior performance early warning system to two risk-score cutoff options: a cutoff that identifies the same percentage of students as the prior performance early warning system, and a cutoff that identifies the 10 percent of students most at risk.

The study finds that the prior performance early warning system and the algorithm using the same percentage risk score cutoffs are similarly accurate. Both approaches successfully identify most of the students who ultimately are chronically absent, have a low-grade point average, or fail a course. In contrast, the algorithm with 10-percent cutoffs is good at targeting the students who are most likely to experience an academic problem; this approach has the advantage in predicting suspensions, which are rarer and harder to predict than the other outcomes. Both the prior performance flags and the algorithm are less accurate when predicting outcomes for students who are black.

The prior performance early warning system is just as accurate as the algorithm for some purposes and is cheaper and easier to set up, but it does not provide fine-grained information that could be used to identify the students who are at greatest risk. The algorithm can distinguish degrees of risk among students, enabling a district to set cutoffs that vary depending on the prevalence of different outcomes, the harms of over-identifying versus under-identifying students at risk, and the resources available to support intervention.

**USA: Forum Guide to Early Warning Systems**.

**Keywords:** early warning systems, strategies, best practices.

**Reference framework**

The National Forum on Education Statistics (Forum) is an entity of the Cooperative System and, among its other activities, proposes principles of good practice to assist state and local education agencies in meeting this purpose.

This document provides information and best practices that will help to plan, develop, implement and use an early warning system to inform interventions that improve student outcomes.

**Purposes / Objectives**

This resource aims to help state and local education agencies plan, develop, implement, and use an early warning system in their agency. It strives to:

* provide background information on early warning systems and their use in education agencies;
* illustrate the ways in which these systems can help education agencies act on early warning data to improve student outcomes;
* explain the essential role of timely and actionable quality data in early warning systems;
* recommend strategies and best practices for education agencies that are considering implementing, or have already implemented, an early warning system.

**The Guide to Early Warning Systems**

This resource includes the following chapters and appendices:

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| Chapter 1 | Defines early warning systems, reviews their use in education agencies and explains how to adopt an effective early warning system planning process. |
| Chapter 2 | Reviews the role of indicators and quality data in early warning systems, summarizes techniques for analyzing early warning data, and previews trends and innovations in early warning systems, indicators, data, and analytical models. |
| Chapter 3 | Recommends best practices in developing, implementing and using early warning systems. |
| Chapter 4 | Highlights case studies from state and local education agencies that have implemented, or are in the process of implementing, an early warning system.Case Study: Fairbanks North Star Borough School District, AK. Case Study: Delaware Department of Education. Case Study: Appoquinimink School District, DE.Case Study: Montana Office of Public Instruction.Case Study: Bozeman School District #7, MT.Case Study: Metro Nashville Public Schools, TN.Case Study: Wisconsin Department of Public Instruction. |
| Appendix A | Checklist of Early Warning System Tasks and Activities contains a checklist of tasks and activities involved in planning, implementing, using, and evaluating an early warning system. |
| Appendix B | Select List of Early Warning Indicators and Data Elements lists early warning indicator topics, student-level indicators, and related data elements. |

In summary, this resource focuses on early warning systems and their data from the perspective of the education data community. It does not attempt to present a comprehensive account of the many issues related to the design, implementation and use of early warning systems in education agencies.

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