



INVISIBLE JOURNEYS, UNEQUAL OUTCOMES

*Longitudinal Data for Fairer
and More Effective Education Policies*

LINEup Policy Brief - 2025



Longitudinal Data
For INequalities
In Education

BACKGROUND

Beyond snapshots - Tracking equity and skills development over time

Across Europe, educational inequalities remain a persistent challenge: **learning gaps widen** as students progress through the system, and **early school leaving** continues to affect disadvantaged groups disproportionately.

However, most existing monitoring tools provide only snapshots of inequalities in academic performance. They cannot capture how risks accumulate across educational journeys, how resilience develops, or how differences between social groups evolve at **key transition points**, such as moving from primary to lower and upper secondary education, or from school to work.

Recent international evidence underlines the urgency of addressing these challenges. The latest PISA cycle¹ reveals declining performance in basic skills across many EU countries, while the International Computer and Information Literacy Study² points to uneven development of digital competencies. Together, these trends raise pressing questions about **whether education systems can ensure both solid foundations and future-ready skills** for all learners.

Despite their complexity, resource intensity, and overall cost, **longitudinal data** - tracking the same students, cohorts, or schools over time - are essential as they allow to:

- Identify when and how learning gaps first emerge and change over time.
- Assess the long-term effects of reforms, interventions, and institutional settings.
- Understand how family, school, and contextual factors shape educational trajectories.
- Provide robust evidence for systemic, inclusive responses.

The LINEup Response:

LINEup maps existing longitudinal datasets in 32 European countries, highlighting what exists, what is missing, and how these data can be leveraged as a strategic tool for equity-oriented policy design.

Where Longitudinal Data Can Drive Change: Three Priority Areas

Longitudinal data offer evidence that can inform policy choices in the following three priority areas:

Unlocking Every Student's Learning Potential

Challenge: Persisting disparities in basic skills and high rates of early school leaving challenge both equity and resilience.

How longitudinal data help: Track student progress over time, detect early signs of disengagement, and support timely, targeted interventions.

Linked to:

[EU Basic Skills Action Plan](#)

[Pathways to School Success](#)

Building Inclusive and Effective School Systems

Challenge: Inequalities can be reinforced or mitigated by community-, school- and system-level structures.

How longitudinal data help: Enable the analysis of peer, school and community dynamics, teacher roles, and the long-term impact of reforms.

Linked to:

[European Pillar of Social Rights](#)

[EU Child Guarantee](#)

Harnessing Data for Equity and Impact

Challenge: Fragmented, short-term and underused education data hinder evidence-informed policymaking.

How longitudinal data help: Support open, secure, and ethically sound systems that make evidence timely, transparent and relevant for decision making.

Linked to:

[European Education Area](#)

[Union of Skills](#)

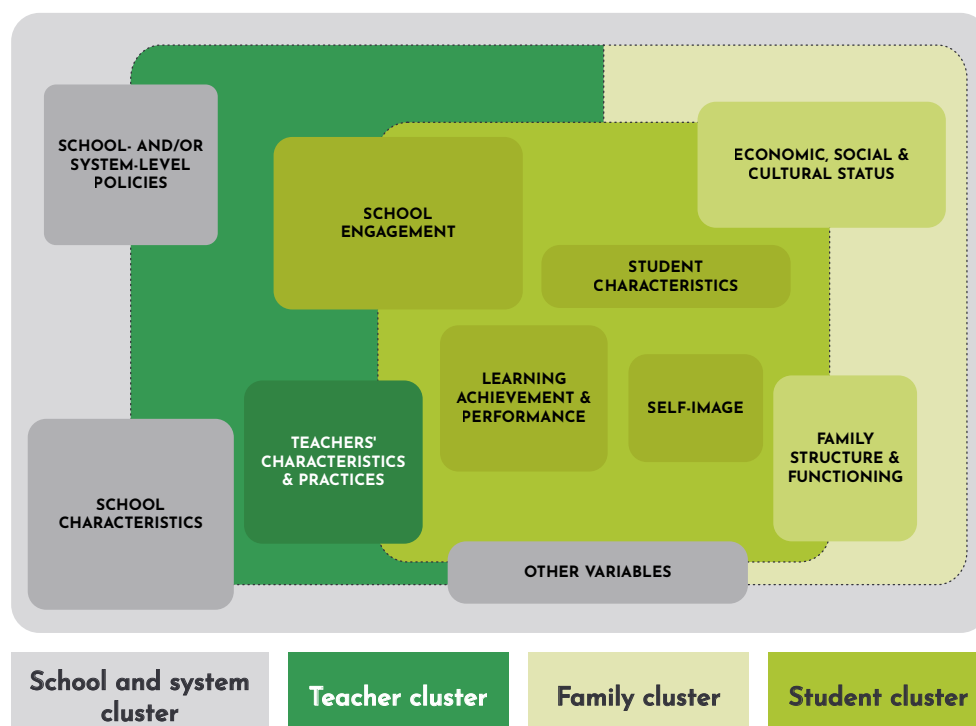
1. OECD (2023). *PISA 2022 Results (Volume I): The State of Learning and Equity in Education*. Paris: OECD Publishing.

2. IEA (2024). *ICILS 2023: An International Perspective on Digital Literacy*. Amsterdam: International Association for the Evaluation of Educational Achievement.

KEY FINDINGS & IDEAS FOR POLICY ACTION: PART I

Key Factors and Predictors of Unequal Learning Paths - Insights from the Literature Review

Identifying turning points in students' learning paths, cumulative effects and predicting factors driving educational inequalities is essential for designing effective policies and interventions. The LINEup **systematic review of academic and grey literature** focuses on studies with longitudinal and repeated cross-sectional designs. A total of 1,399 publications in seven languages were identified and screened. Of these, 157 publications met predefined inclusion criteria and were analysed in depth. The review provides rich insights into how inequalities emerge, persist and evolve, identifying 70 structural risk factors and predictors, which vary in their relative influence on educational outcomes.



What Did We Learn from the Review?

The primary outcome of the review is a **comprehensive conceptual model** that organises the **70 factors and predictors** of educational inequalities identified, capturing the complexity of the phenomenon and providing a foundation for both the subsequent LINEup research activities and future policy action.

The key features of the conceptual model are:

- **Captures the complexity of educational inequalities.** The model is multilevel by design: educational inequalities do not arise in isolation but emerge, accumulate and evolve over time from the interaction of factors across four levels: Student, Family, Teacher, School and Education System.
- **Distinguishes between structural risk factors and predictors.** The former refers to variables associated with an outcome of interest (e.g. low socioeconomic status or migration background, typically considered structural risk factors). The latter refers to variables that reliably anticipate an outcome

(e.g. low school engagement or a weak sense of belonging, which can signal a higher likelihood of poor performance).

- **Provides a basis for longitudinal data mapping and analysis.** The model underpins the subsequent phases of the LINEup project, including the mapping of existing longitudinal datasets across Europe. It also serves as a reference for other initiatives on educational inequalities, highlighting less-explored factors such as student-teacher relationships and social and emotional skills.
- **Links research insights to policy action.** The model illustrates where inequalities originate and how they evolve, helping policymakers identify entry points for intervention – from targeted support for teachers (e.g. training on early leaving) to broader system reforms.

Pathways to Equity - Ideas for Policy Actions

1. Design reforms through a multilevel lens.

Educational inequalities are shaped by the interplay of student, family, teacher, school and system-level dynamics. Unidimensional policies will not close the gap. Policymakers could consider:

- **Evaluating how a planned reform is expected to affect** learners, families, teachers, schools and system dynamics **before** rollout.
- **Aligning support and coordinating policy actions at all levels**, such as support measures for families, teacher training for inclusive teaching and fair funding mechanisms.
- **Performing equity checks** when planning budgets, curricula or accountability systems.

 **Why it matters:** *Inequality is not only about who students are (e.g. their socioeconomic and cultural background) but also where and with whom they learn, and how families, schools and education systems support (or fail) them.*

2. Embed student engagement with school and well-being as a strategic policy focus.

Research shows that achievement gaps often widen when students feel disconnected from school, unsafe or unseen. A supportive school climate can boost motivation, confidence and resilience, especially in contexts of structural vulnerability. Policymakers could consider:

- **Making student engagement with school and well-being key success indicators** of policy interventions alongside academic outcomes.
- **Investing in teacher training on inclusive and relational pedagogy**, while also safeguarding teachers' well-being.
- **Ensuring ongoing access to support services**, such as counsellors, mentors, and psychologists, especially in communities at greater risk of exclusion.

Why it matters: *Students who feel supported and engaged with their peers, teachers and school are more likely to thrive, regardless of their socioeconomic and cultural background. This is consistent with evidence on the central role of student-teacher relationships and social and emotional skills in sustaining student engagement and academic performance.* 

3. Detect risks early and act fast.

Longitudinal research indicates that educational inequalities accumulate over time, but warning signs can be detected early. Policymakers could consider:

- **Tracking predictive indicators**, such as frequent absences, behaviour issues and poor academic performance, from the start of schooling, planning tailored interventions, especially at key transition points.
- **Equipping schools with early-warning data-driven systems and trained staff** to respond.
- **Providing flexible funding** for local support such as mentoring, tutoring, and transition programmes.

 **Why it matters:** *Early detection of warning indicators, along with timely and targeted support, can prevent dropout, strengthen sense of belonging, and improve academic performance.*

4. Bridge research and policy through sustained collaboration.

Research evidence often struggles to inform practice effectively, partly due to data constraints and limited opportunities for sustained dialogue. Therefore, policymakers could consider:

- **Setting up education policy labs**, where researchers, policymakers, school leaders, teachers, and families can discuss and co-design interventions.
- **Promoting the collection and analysis of longitudinal data** to track inequalities and evaluate reforms, ensuring timely dissemination of results to stakeholders.
- **Expanding access to anonymised education data** for independent research and innovation.

Why it matters: *Sustained research-policy collaboration ensures that policies are evidence-informed, responsive and focused on what works over time.* 

Read the Literature Review Executive Summary & Report [HERE](#)

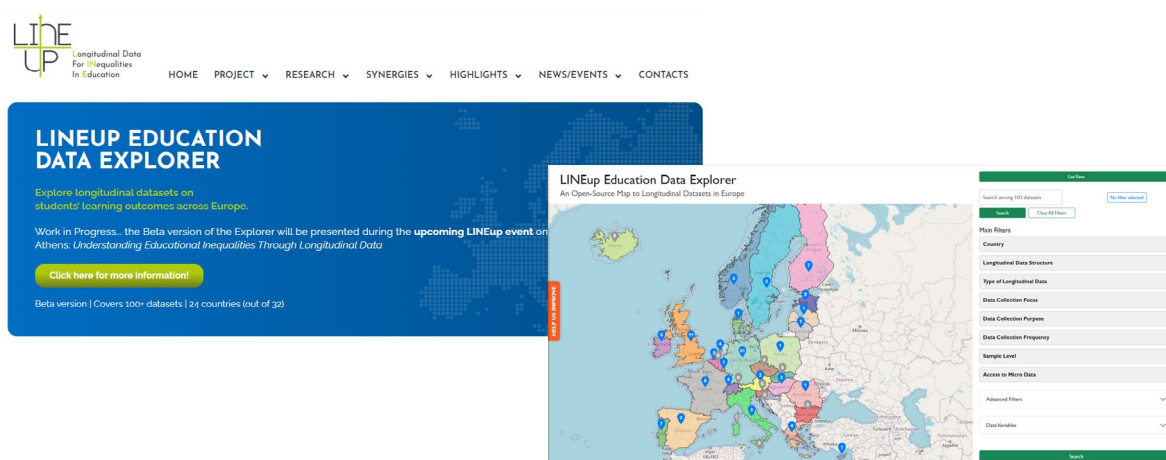
KEY FINDINGS & IDEAS FOR POLICY ACTION: PART II

Evidence on Unequal Learning Paths - Insights from Data Mapping

To understand how educational inequalities evolve, it is essential to understand what longitudinal data exist, where they are collected, what research design they adopt, and how they can be used. The LINEup project conducted a **comprehensive mapping of longitudinal datasets across 32 European countries**, spanning the EU-27, three European Economic Area-associated countries (Iceland, Liechtenstein, and Norway), as well as Switzerland and the United Kingdom.

The exercise systematically identified, validated, and analysed existing longitudinal datasets on student learning outcomes at the primary and secondary education levels (ISCED 1, 2, 3), documenting their scope, availability, and potential for research and policy use. Out of more than 200 sources initially identified, 104 datasets from 24 countries met the project's inclusion criteria and were described in detail³.

Together, the mapping report provides a unique overview of how Europe monitors student learning trajectories and inequalities. An ongoing feasibility study further explores possibilities for cross-country harmonisation.



What Did We Learn from the Mapping?

The mapping highlights both the richness and the fragmentation of the European longitudinal data landscape:

- **Wide but uneven coverage.** Longitudinal data exist in many European countries, but their availability, quality, and comparability vary considerably. Strong infrastructures are concentrated in Western and Northern Europe, often based on administrative systems or long-standing assessments. At the same time, no eligible datasets were found in parts of Central and Eastern Europe.
- **Different designs and scope.** The datasets adopt diverse longitudinal designs – pure panels, repeated cross-sections, and pseudo-panels – and draw on survey, administrative, or hybrid sources. Almost half are survey-based, one-fifth are administrative, and one-third are hybrid. Administrative data provide scale and continuity, while survey and hybrid designs add contextual detail on students, families, and schools.
- **Limited data on schools and teachers.** While student outcomes are widely measured, fewer datasets systematically cover school- and teacher-level dimensions such as classroom composition, resource allocation, or pedagogical practices – factors known to influence learning trajectories. Data collection often clusters around key transition points (grades 8–10) and tends to decline at higher levels. Data are more available at ISCED 1 and 2, but fewer datasets extend to upper secondary (ISCED 3), limiting analysis of long-term pathways.
- **Barriers to access and use.** Even where high-quality longitudinal datasets exist, they are often underused due to legal, technical, or institutional barriers. Access to microdata is frequently restricted, linkability with other sources is limited, and metadata and documentation are inconsistently reported or inaccessible. These factors reduce transparency and comparability, hindering secondary analysis and the broader use of data for research and policy learning.
- **Opportunities and limits of harmonisation.** While some shared variables and assessment frameworks offer entry points for cross-country comparison, the lack of harmonised definitions, coding schemes, and measurement instruments remains a major obstacle. Moving towards a European knowledge infrastructure will require not only technical work but also political commitment and sustained institutional coordination.

3. Including one dataset from the United States, considered as a comparative reference, given this country's experience with large-scale longitudinal educational datasets.

Building on Evidence - Ideas for Policy Actions

1. Strengthen and broaden longitudinal data systems.

Many countries still lack robust infrastructures to track students over time, and existing datasets often overlook schools, teachers, and contextual factors. Moreover, when data exists, they are often not linkable to other data sources. Policymakers could consider:

- **Supporting stable funding** beyond project-based initiatives, enabling integration across existing data sources.
- **Ensuring data coverage spans key transition points and multiple education levels.**
- **Capturing equity-relevant variables and contextual dimensions.**



Why it matters: *Without comprehensive and robust longitudinal data, inequalities remain to some extent invisible, and reforms cannot be evaluated appropriately.*

2. Build analytical and institutional capacity to use data.

Even where high-quality datasets exist, they are often underused. Policymakers could consider:

- **Investing in training** for ministries, agencies and institutions to work with complex datasets.
- **Supporting partnerships** between research and policy institutions.
- **Encouraging secondary analysis and open calls for research use of public data.**

Why it matters: *Data are valuable only if they are used to inform, guide and improve policy decisions.*



3. Make access and governance more transparent.

Restrictive access protocols and unclear governance structures hinder the use of existing datasets. Policymakers could consider:

- **Establishing transparent and fair access procedures** for researchers and practitioners.
- **Ensuring full and up-to-date documentation** of datasets.
- **Clarifying governance frameworks and responsibilities for data sharing.**



Why it matters: *Transparency increases trust, enhances usability, and promotes the potential for cross-country learning across diverse contexts.*

4. Advance step-by-step harmonisation and lay the groundwork for a European knowledge infrastructure.

The comparability of datasets is limited due to divergent definitions and coding schemes. Policymakers could consider:

- **Promoting gradual alignment of key indicators and metadata standards.**
- **Taking stock of existing best practices** in data governance and integration.
- **Piloting European-level initiatives on data harmonisation.**

Why it matters: *Incremental steps towards shared infrastructures can enhance transparency, comparability, and the cumulative use of education data across Europe, paving the way for greater convergence between countries and more equitable educational outcomes.*



Read the Mapping Research Report [HERE](#)

Access the LINEup Education Data Explorer [HERE](#)

CONCLUSIONS

Reducing educational inequalities requires **acting both early and structurally**. As the literature review shows, disparities and disadvantages accumulate over time through the interaction of individual, family, teacher, school, and system-level factors. Policies addressing only one dimension at a single point in time will not close the gap - only concerted, multilevel action can ensure more equitable learning pathways.

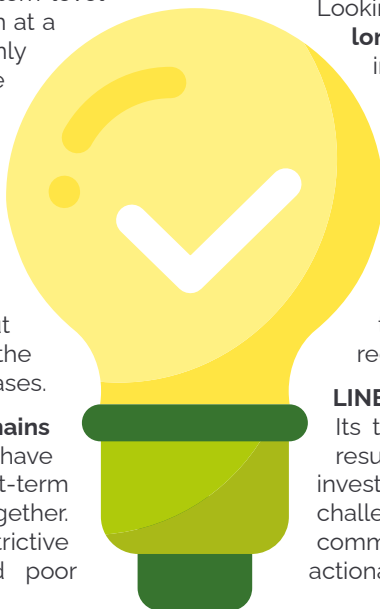
The mapping confirms that **longitudinal data are indispensable for this**. They are not mere technical instruments but strategic levers - when robust and well-governed, they enable policymakers to identify critical transitions, monitor cumulative disadvantage, and evaluate the effectiveness of reforms. Without them, inequalities remain partly invisible, and the risk of ineffective or short-lived measures increases.

However, the **European data landscape remains fragmented and uneven**. Some countries have consolidated systems; others rely on short-term local projects or lack basic infrastructures altogether. Even where high-quality datasets exist, restrictive access rules, fragmented governance, and poor

documentation limit their use. This reduces comparability both within and across countries, undermining the potential for shared learning.

Looking ahead, Europe needs a **shared vision for longitudinal data systems**. This means investing in secure, interoperable infrastructures, expanding what data systems capture - covering students, teachers, schools, and various contexts - and building the analytical capacity to use them effectively. At the same time, step-by-step harmonisation and European-level cooperation can pave the way towards a knowledge infrastructure that strengthens transparency, comparability, and the accumulation of evidence on what works to reduce inequalities.

LINEup shows both the potential and the gaps. Its typologies, validation framework, and mapping results provide an evidence base to guide national investments and European collaboration. The next challenge is to turn this evidence into long-term commitments that make equity measurable and actionable across education systems



“ *Supporting students from entry to exit requires longitudinal, multi-level data systems that track inequalities, guide targeted policies, and enable sustained, evidence-based action to ensure equitable educational pathways across Europe.* ”
- Roberto Ricci, President of INVALSI -

About the Project

LINEup is a three year Horizon Europe research project (2024–2027) carried out by a consortium of 14 partners from six countries.

By making these data systems more visible and comparable, LINEup seeks to improve both research opportunities and policymaking capacity across Europe.

The project maps and analyses longitudinal data on student learning outcomes at primary and secondary levels to shed light on educational inequalities and support evidence-informed policy.

In its second phase, LINEup will conduct qualitative case studies in schools across six countries, examining how family choices, school-level factors, and community contexts shape students' engagement with school and learning trajectories.

Want to know more?

- Visit the [website](#)
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- Navigate the [LINEup Education Data Explorer](#)
- Get in touch: info@lineup-project.eu