Tracing Educational Inequalities in Primary and Secondary Schools

Insights from a Systematic Review of Longitudinal and Repeated Cross-sectional Studies

Literature Review Report

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[1] https://www.elsevier.com/researcher/author/policies-and-guidelines/credit-author-statement

Executive summary

Introduction

Education is recognised globally as a fundamental human right. In the European Union (EU), ensuring equal access to quality education is considered pivotal for creating more equitable and inclusive societies. Still, the disparity in educational attainment between advantaged and disadvantaged groups of students has scarcely diminished within and between countries, despite the introduction of numerous "equalising" policies.

Academic underachievement, low school engagement and early school leaving cannot be attributed to a single cause or factor. These issues are complex and multi-faceted, with numerous interrelated drivers. Identifying the factors and predictors of educational inequalities and taking an evidence-based approach to policy design and implementation is of outmost importance for education systems across Europe.

When studying dynamic concepts of educational inequalities, such as student achievement in basic skills and school engagement, which are at the centre of the LINEup project, longitudinal and repeated cross-sectional data are particularly important as they take into consideration 'time' as a crucial variable. In the context of the LINEup project and the systematic review presented in this report, we analysed studies with a longitudinal research design on inequalities in primary and secondary education in several European countries. Studies with repeated cross-sectional design were also included as they provide comparable data on factors influencing school performance and engagement over time, covering also countries where longitudinal data is unavailable. Identifying and deepening the analysing of this type of datasets can significantly contribute to designing and implementing effective compensatory policies and interventions to foster students' learning outcomes.

This systematic literature review aims to provide answers to three research questions (RQs): (i) to identify studies on educational inequalities in school education with a longitudinal and/or repeated cross-sectional research design and the related datasets, (ii) to identify methods and techniques used for analysing this type of data, and (iii) to identify and categorise the variables that are factors or predictors of educational inequalities.

Review methodology

The LINEup research team conducted a systematic review of studies on educational inequalities with a longitudinal and repeated cross-sectional research design in primary, lower- and upper-secondary education, general and vocational, between February and June 2024. The systematic review was documented by using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) reporting items and workflow steps (Identification, Screening, Inclusion), increasing the dependability and reliability of the collected data.

The research team searched scientific literature databases and portals, such as Scopus, to locate the relevant academic literature (e.g., peer-reviewed journal articles, conference papers, edited book chapters, etc.) reporting studies from the 32 countries covered by the project. In addition, the research team searched international and national databases (such as Google Scholar) to identify relevant grey literature (e.g. project reports, theses, and policy documents), which are an additional important source of evidence.

The screening and inclusion process was organised in three steps. In Step 1, the title, abstract and keywords of 1399 publications were screened based on five inclusion/exclusion criteria. In Step 2, the full text of 843 publications was screened based on seven inclusion/exclusion criteria. Finally, 157 publications were selected for in-depth analysis in Step 3 through a review matrix. The review matrix approach is a well-established method for conducting an in-depth comparative analysis of the selected publications to extract relevant information and insights to answer the research questions. The quality assurance strategy of LINEup's systematic review included Inter-Rater Reliability (IRR) exercises in each of the three steps, thus ensuring that the involved researchers labelled and analysed the literature homogeneously and comparably.

All the publications identified, screened and analysed were stored in a Zotero library, which will be hosted by the end of the project in the EU Open Repository for EU-funded Research in Zenodo. In this way, the publications collected and analysed in the context of LINEup can become valuable references for future studies, particularly for researchers and policymakers interested in using longitudinal data and studying educational inequalities in Europe.

Key findings

Overall, the body of relevant literature includes 129 academic (82,1%) and 28 grey (17.8 %) literature documents. Approximately two-thirds (110 publications, 70%) of the analysed literature were published in the last decade (2015-2024), while most of them (24) were published in 2023. This could reveal that interest in the topic or the availability of studies with longitudinal and/or repeated cross-sectional design has grown recently. As expected, most of the publications identified, included, and analysed through the review matrix were written in English (94 out of 157 publications or 60%), followed by French (30 publications, 19%) and German (21 publications, 13%). Overall, relevant studies from 16 countries were identified through the review process. Almost one out of four studies (38 publications, 24%) refers to Germany, followed by France (28 publications, 18%) and Italy (21 publications, 14%). Finally, 27 publications (16%) present studies where data was collected in more than one of the 32 countries covered by LINEup. One hundred twenty-nine studies (82%) had a longitudinal research design and 25 (16%) a repeated cross-sectional research design, while only three (2%) followed a different design. The in-depth analysis of the 157 publications through the review matrix identified 77 datasets, 69 (90%) longitudinal and eight (10%) repeated cross-sectional ones.

For **RQ1**, the systematic review highlights that (i) longitudinal and repeated cross-sectional data are widespread only in some European countries, and the data collection can happen through different means (e.g. standardised competency-based tests, surveys, etc.) and at different levels (national, regional and local); (ii) there is a growing body of literature and studies with a longitudinal or repeated cross-sectional research design; (iii) these studies are mainly quantitative, even though in few cases they are based on a mixed-method approach, (iv) the available studies differ significantly as some are based on significant larger dataset and/or longer timespan, compared with others.

For **RQ2**, the systematic review highlights a wide range of statistical and causal analysis methods and techniques (54 in total) that are chosen depending on the research questions of each study, the processes the researcher wishes to explore, the underlying technical or theoretical assumptions, the restrictions posed by the nature of the data, or by the type of data collected or available. The review also identified a few qualitative methods that complement the quantitative ones.

For **RQ3**, the systematic review confirms the complexity and multifaceted nature of inequalities in education, with a wide range of factors related to students, families, schools, teachers, and the (education) system. The variables identified through the systematic review are presented through a

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conceptual model (see next section) that highlights how each of them plays an important role individually and in connection with others, making the design and implementation of effective policies and interventions even more challenging.

Discussion and conclusions

Educational inequalities represent a complex and critical topic with many interrelated and interconnected variables. The review results indicate that despite many policy initiatives to promote equity, conceived as fairness and inclusion, educational inequalities remain a considerable challenge across Europe. With more details, the analysis of 157 publications confirms the importance of academic achievement as well as school engagement and well-being.

Academic performance and students' engagement and well-being: two sides of the same coin

The review results show that educational inequalities often emerge early in a child's life and persist throughout their educational journey. For example, children from lower socioeconomic and disadvantaged cultural backgrounds start school with fewer cognitive and socio-emotional skills than their more privileged peers, and these initial gaps tend to persist or even grow over time. Overall, the review shows worrying trends in acquiring reading, mathematics and science skills in European countries correlated with educational inequalities. Analyses relying on longitudinal data from several European countries show that a considerable proportion of students (at all education levels) is still not proficient in these key areas, which are fundamental for personal development, employability, and active citizenship.

On the other side, school engagement emerges as a critical factor in academic achievement and overall educational outcomes. The review shows that students who engage with their schoolwork, participate in extracurricular activities and connect to their school community are more likely to achieve better academic outcomes and less likely to drop out. Students' well-being also emerges from the literature as essential for their school engagement and academic performance. A strong sense of belonging and subjective well-being is linked to better educational outcomes and helps creating more supportive learning environments, particularly for disadvantaged students.

LINEup conceptual model of educational inequalities

Research in the sociology and economics of education has mainly focused on the individual factors affecting students' educational achievement and attainment, such as students' gender, social origin, and migratory background. In the literature, these factors producing differences in students' learning outcomes have been interpreted as sources of 'primary' and 'secondary' effects: students' characteristics directly influence their educational achievement and are also connected to students' and parents' choices at turning points in education careers, beyond their performances.

A more recent strand of research has then introduced the concept of 'tertiary effects' to refer to the role that school's community members, and in particular teachers, can play through their expectations, evaluations and suggestions towards students with different backgrounds. In fact, inequalities can also be reinforced and reproduced by a complex set of micro-mechanisms at play within the school context and between school players (teachers and school leaders) and families. Moreover, specific policies and characteristics of the education system also shape educational inequalities. Examples include, among others, the level of schools' autonomy and public expenditure on education.

One original contribution of the systematic review of academic and grey literature presented in this report is the clustering of the 70 variables identified as factors or predictors of educational inequalities in primary and secondary education across Europe. The proposed conceptual model offers a

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comprehensive overview and an initial categorisation of the identified variables. Apart from the variables associated with individual students (primary and secondary effects), the model stresses the importance of the teacher-related variables and those referring to the role of family, school and system (tertiary effects). See the figure at the end of the document for further details.
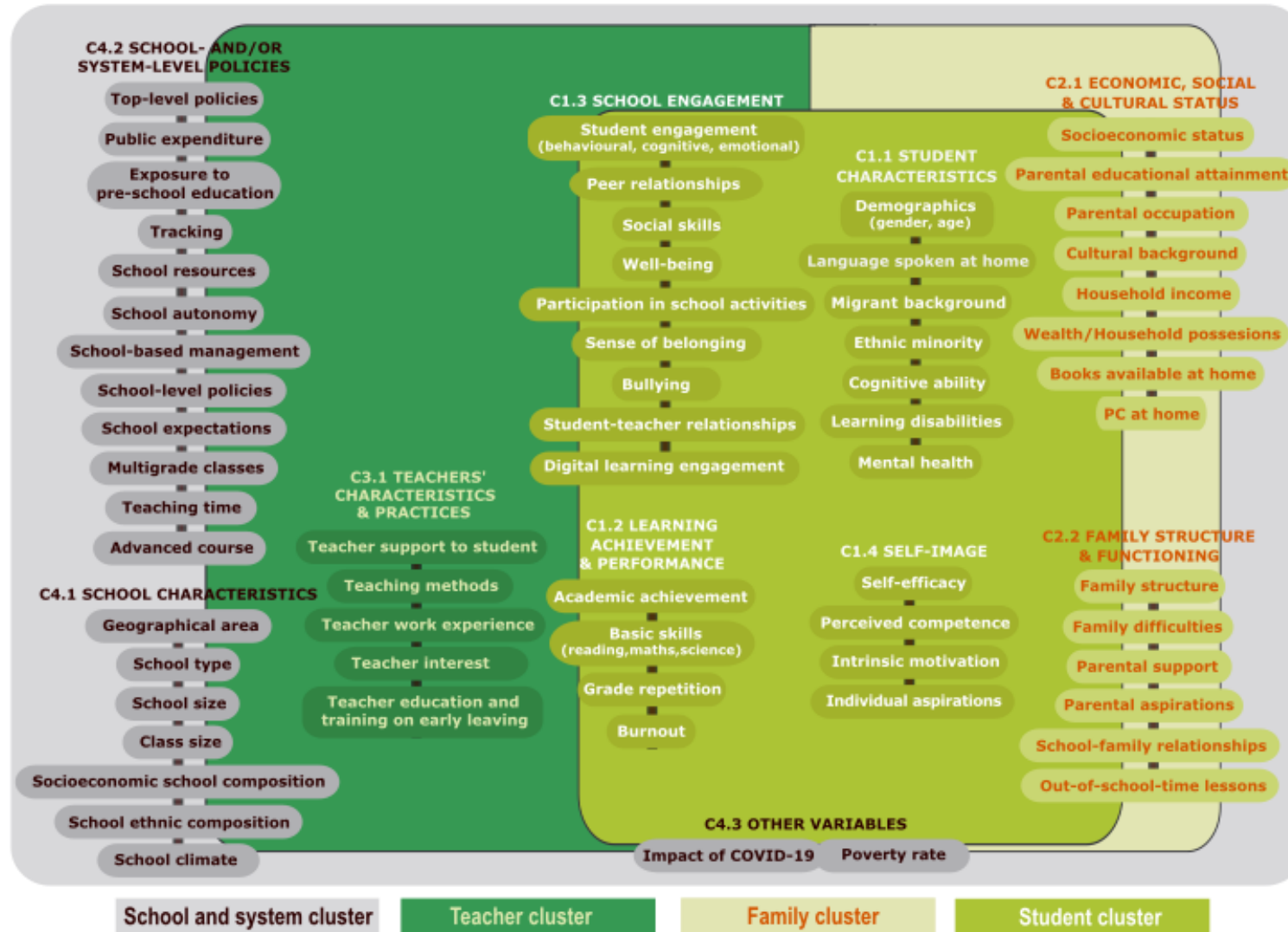
Implications for policy research and practice

The review findings highlight that longitudinal and repeated cross-sectional data offer valuable insights into educational inequalities. Although the review identified and analysed in depth 157 related publications, it is evident that the available longitudinal or repeated cross-sectional datasets do not cover all European countries and/or all the variables that are predictors of educational inequalities. Therefore, there is a **need for intensifying the collection and analysis of longitudinal and repeated cross-sectional data** to monitor and understand the evolution of educational inequalities, their predictors, and the impact of related policies. The insights derived from the review also indicate that policymakers and school practitioners should monitor academic achievement but also design and implement **strategies to increase students' engagement**. This may involve creating a supportive school environment, inclusive teaching practices and targeted support for students at risk of falling behind, including counselling, mentoring and special education resources.

Report structure

Section 1 presents the research and policy context and this systematic review's objectives and research questions. Section 2 details the review methodology, including the screening strategy, the quality control mechanisms, and the open data approach. Section 3 provides an overview of the studies analysed in-depth through a review matrix and outlines the key findings for each of the three research questions. The synthesis of the results and the implications for policy, research and practice are discussed in Section 4, along with the study's limitations. The conclusions and next steps are presented in Section 5.

Appendix A contains the complete list of the 77 longitudinal or repeated cross-sectional datasets identified through the systematic review. Appendix B includes the complete list of the 54 data analysis methods and techniques. Finally, Appendix C presents the 70 factors and predictors of educational inequalities identified through the 157 studies analysed in depth in this systematic review.

The report is complemented by a Zotero library, which is going to be a living infrastructure, updated and constantly curated during the LINEup project. The library will be hosted by the end of the project in the EU Open Repository for EU-funded Research in Zenodo. Access to the Zotero library can be granted before the end of the project upon request to the project coordinator and/or corresponding author of this this systematic review.

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C4.2 SCHOOL- AND/OR SYSTEM-LEVEL POLICIES
- Top-level policies
- Public expenditure
- Exposure to pre-school education
- Tracking
- School resources
- School autonomy
- School-based management
- School-level policies
- School expectations
- Multigrade classes
- Teaching time
- Advanced course

C4.1 SCHOOL CHARACTERISTICS
- Geographical area
- School type
- School size
- Class size
- Socioeconomic school composition
- School ethnic composition
- School climate

C3.1 TEACHERS' CHARACTERISTICS & PRACTICES
- Teacher support to student
- Teaching methods
- Teacher work experience
- Teacher interest
- Teacher education and training on early leaving

C1.3 SCHOOL ENGAGEMENT
- Student engagement (behavioural, cognitive, emotional)
- Peer relationships
- Social skills
- Well-being
- Participation in school activities
- Sense of belonging
- Bullying
- Student-teacher relationships
- Digital learning engagement

C1.2 LEARNING ACHIEVEMENT & PERFORMANCE
- Academic achievement
- Basic skills (reading, maths, science)
- Grade repetition
- Burnout

C1.1 STUDENT CHARACTERISTICS
- Demographics (gender, age)
- Language spoken at home
- Migrant background
- Ethnic minority
- Cognitive ability
- Learning disabilities
- Mental health

C1.4 SELF-IMAGE
- Self-efficacy
- Perceived competence
- Intrinsic motivation
- Individual aspirations

C2.1 ECONOMIC, SOCIAL & CULTURAL STATUS
- Socioeconomic status
- Parental educational attainment
- Parental occupation
- Cultural background
- Household income
- Wealth/Household possesions
- Books available at home
- PC at home

C2.2 FAMILY STRUCTURE & FUNCTIONING
- Family structure
- Family difficulties
- Parental support
- Parental aspirations
- School-family relationships
- Out-of-school-time lessons

C4.3 OTHER VARIABLES
- Impact of COVID-19
- Poverty rate

School and system cluster | Teacher cluster | Family cluster | Student cluster

LINEup conceptual model: general overview