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Learning loss during the COVID-19 pandemic: a living systematic review and meta-analysis

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Review question

This paper aims to systematically identify, appraise and synthesize the existing evidence on the effect of the Covid-19 Pandemic on learning progress amongst school-age children. To this end, it addresses the following two main questions: (1) What is the effect of the Covid-19 Pandemic on learning progress amongst school-age children? (2) If sufficient evidence is available, we will also examine whether the effect of the Covid-19 Pandemic on learning differs across (a) different social background groups, (b) age groups, (c) boys and girls, (d) learning areas or subjects, (e) national contexts.

Searches

We will search the following scholarly sources: Coronavirus Research Database, Education Database, ERIC, International Bibliography of the Social Sciences (IBSS), Politics Collection (PAIS index, policy file index, political science database, and worldwide political science abstracts), Social Science Database, Sociology Collection (applied social science index (ASSIA) and abstracts, sociological abstracts, and sociology database), CINAHL, and Web of Science. We will also search the following preprint and working paper repositories: SSRN, MPRA, IZA, NBER, OSF Preprints, PsyArXiv, SocArXiv, and EdArXiv. To identify relevant government and policy documents, we will hand search relevant policy websites, including, but not limited to, the OECD, the UN, the World Bank, and the Education Endowment Foundation. Additionally, we will publicize this protocol via Twitter in order to crowdsource additional relevant studies not captured by the search. We will update our search periodically to ensure that our review captures all recent and relevant research.

Types of study to be included

We will consider all observational research including, but not limited to, studies using quantitative data that is longitudinal or cross-sectional, individual or aggregate (e.g., at the level of schools) on the effect of the Covid-19 Pandemic on learning loss amongst school-age children. The outcome measure must be a valid measure of learning progress, as defined below. We will consider all types of primary research, including peer-reviewed publications, preprints, working papers, and reports. Secondary research such as systematic reviews will be excluded, but may be used to identify further relevant studies. Given the focus on the Covid-19 Pandemic, we will restrict our search to papers published in 2020 or later. Papers must be in English, German, Dutch, Danish, Norwegian, Spanish or Swedish.

Condition or domain being studied

We focus on learning loss amongst school-age children across key learning areas, including math, reading and spelling. The measurement of learning loss amongst school-age children is discussed in further detail below.

Emerging evidence suggests that the pandemic has led to substantial learning losses amongst school-age children (see, e.g., Engzell, Frey and Verhagen 2021; Kuhfeld et al. 2020). Some (but not all) studies find that the negative effects of the Covid-19 Pandemic on learning is particularly severe for students from disadvantaged backgrounds (ibid.). This is likely related to these poor families both being most severely affected by the economic fallout of the pandemic and lacking resources to compensate the absence of face-to-face teaching in schools. Moreover, this pattern may be related to school in poorer neighborhoods being more likely to close or offer fewer opportunities for remote learning (Parolin and Lee 2021).

Participants/population

All school-age children, defined as children between the age of 5 and 18.

Intervention(s), exposure(s)

The review focuses on the exposure to the Covid-19 Pandemic.

Comparator(s)/control

Learning progress amongst school-age children in years preceding the Covid-19 Pandemic.

Context

The Covid-19 Pandemic has arguably led to the largest disruption to learning in history (United Nations 2020). To a large extent this is due to the suspension of face-to-face teaching in schools, which is estimated to affect about 95 percent of the world's student population (ibid). But the effect of school closures on learning is likely to be intensified by the toll of the pandemic on mental and physical health (Golberstein, Wen and Miller 2020). The latter is likely to affect students' ability to learn and parents' ability to support their children's learning.

Understanding the effect of the Covid-19 Pandemic on learning loss and whether it has disproportionately affected students from disadvantaged backgrounds is crucial in order to devise evidence-based policy measures in order to limit further learning loss during the pandemic, to weigh the public health benefits and the costs of school closures, and to compensate learning loss through education policy and interventions in the future. To this end, our systematic review and meta-analysis will identify, appraise and synthesize the existing evidence on the effect of the Covid-19 Pandemic on learning progress amongst school-age children. It will further aim to assess to what extent the effect of the Covid-19 Pandemic on learning progress differs across relevant groups, particularly children from different socio-economic backgrounds, and whether and how it differs across countries that differed in the severity of the Covid-19 Pandemic and the disruption to education and every-day life through policy measures to contain the pandemic.

Main outcome(s)

We will include all valid measures that capture learning loss amongst school-age children. These include measures using scores from school-based tests or from assessments administered by researchers or international assessment programs, such as the Programme for International Student Assessment (PISA). Learning can be measured with respect to specific learning areas (such as math, reading and spelling) or through composite measures, which will be differentiated in the review if the available evidence allows. Measures of learning loss should be readily quantifiable on a standardized, continuous scale to serve aggregation across different studies.

Measures of effect

Our measure of learning loss due to the Covid-19 Pandemic is operationalized as the difference in learning progress measured by standardized test scores before and after the onset of the Covid-19 Pandemic.

Additional outcome(s)

Additional outcomes we will consider include the following: (1) Hours spent studying. Depending on the available evidence, we will differentiate between different subcategories, such as remote instruction or self-stud. (2) The percentage of students who meet relevant educational thresholds, such as succeeding in qualifying exams for the academic secondary education or higher education.

Data extraction (selection and coding)

The screening of studies, the selection of studies according to selection criteria and the data extraction will be performed by Bastian A. Betthäuser and independently validated by Anders Bach-Mortensen. Discrepancies in individual judgements will be resolved through discussion and, where necessary, by conferring with Per Engzell. We will collect study details such as author name(s), key characteristics of country or countries studied, sample size, information on the age of students in sample, measures of social background recorded, outcomes measured, follow-up period(s), and the standardized effect sizes. Additionally, we will retrieve factors relevant to the risk of bias assessment such as survey attrition, funding source, or sample restrictions. Data will be recorded using an excel spreadsheet.

Risk of bias (quality) assessment

We will assess the methodological rigor and transparency of each study and subsequently rate the robustness of the overall body of evidence across all outcomes. More specifically, we will follow the ROBINS-I approach to assessing the risk of bias, and we will consider elements of the study design and execution that may contribute to selection bias, performance bias, detection bias, attrition bias, reporting bias and other sources of bias. The the quality assessment will be completed by Bastian A. Betthäuser and independently validated by Anders Bach-Mortensen.

Strategy for data synthesis

For studies that contain data for individual learning loss, we will aggregate these into a composite measure of learning for the most common specific learning areas examined in all relevant studies (such as math, reading and spelling). If sufficient evidence is available, we will also aggregate estimates for learning loss in specific learning areas. If outcomes are measured at multiple follow-up times, we will collect effect sizes for each follow up and, if possible, note the time since the advent of the Covid-19 pandemic and the implementation of institutional responses (particularly school-closures), in order to estimate adaptation effects. If there are multiple model specifications including controls, we will extract the relevant coefficient from the models that allow for comparison of effect sizes across studies. We plan to implement our meta-analysis using a random effects model to account for between study heterogeneity.

Analysis of subgroups or subsets

If the evidence permits, we will perform subgroup analysis across groups for which differences in the effect of the Covid-19 Pandemic on learning can be expected. Subgroup analysis will be based on relevant observable individual-level characteristics, such as children's social background, age range, and sex. If possible, we also plan to perform subgroup analysis to examine cross-national differences, particularly in relation to the severity of the pandemic (as measured by excess deaths per capita, change in unemployment, or change GDP), and the level of disruption to education and every-day life by measures to contain the pandemic, particularly school closures.

Contact details for further information

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Type and method of review

Meta-analysis, Systematic review

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Anticipated completion date

31 December 2021

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Conflicts of interest

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England

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Review Ongoing

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Subject indexing assigned by CRD

Subject index terms

COVID-19; Humans; Learning; Pandemics; SARS-CoV-2

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19 April 2021

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Stage of review at time of this submission

The review has not started

Stage	Started	Completed

Preliminary searches	No	No
Piloting of the study selection process	No	No
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.

The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.

Versions

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