# A Meta-Analysis on the Effect of Remote Compared to F2F Instruction on Student Outcomes During the COVID-19 Pandemic

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## Background

94% of world student population (1.5 billion students) impacted by school closures due to the COVID-19 pandemic.

United Nations Educational, Scientific, and Cultural Organization (UNESCO)

Daily global monitoring by region and country

Variance in disruption by location and region

## Literature Review

Abrupt shift to online learning created surge in educational research

Early studies – Projected learning loss

Later studies – Empirical data on attitudes, achievement, and motivation

One systematic review examined empirical data

Variance in learning loss

Subject, location, grade level

Without consideration for learning modality

This study aims to expand previous research to assess impact of instruction modality on student outcomes during the COVID-19 pandemic.

## Research Question

Is there a difference between face-to-face and online instruction on student outcomes during the COVID-19 pandemic?

## Methodology

**Coding categories**

- Location: country; Grade level: K-12 or higher education; Subject: Instructional subject area; Outcome: academic achievement or student motivation/engagement; Research design; Sample size; Mean and standard deviation; Effect size: reported or computed
- Effect size computation
  
  All reported or computed as Cohen's *d*

Campbell Collaboration effect size calculator

**Outcome variables**

- Student academic achievement; Student motivation/engagement

**Moderators**

- Location (country); Grade level (K-12 or higher education); Subject area (e.g., mathematics, reading/language arts, science, education, and business)

**Analysis**

- Metafor package in R

## Study Selection

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>TERMS</th>
<th>Studies identified in search and screened (<em>n</em>= 2,761)</th>
<th>Studies excluded during initial screening (<em>n</em>= 2,522)</th>
<th>Studies excluded during group review (<em>n</em>= 217)</th>
<th>Studies retained for analysis (<em>n</em>= 25)</th>
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</thead>
<tbody>
<tr>
<td>Population</td>
<td>Student, K-12, higher education</td>
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<tr>
<td>Intervention</td>
<td>Online learning, virtual</td>
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<td>Comparison Group</td>
<td>Face-to-face, in-person learning</td>
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<tr>
<td>Outcomes</td>
<td>Academic achievement</td>
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<td>Study Design</td>
<td>Experimental, Quantitative</td>
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## Results

### Academic Achievement

Estimated effect sizes ranged from -2.91 to 3.08, represents a trivial negative effect.

The test for heterogeneity was significant.

Publication bias against studies with small sample sizes.

The moderators did not account for any of the total variability.

### Motivation/Engagement

Estimated effect sizes ranged from -4.83 to 2.33, represents a small to moderate negative effect.

The test for heterogeneity was significant.

Publication bias against studies including a range of sample sizes from small to large, this study may benefit from the inclusion of additional unpublished studies.

No additional studies were added to the simulation.

The moderator (country) was significant.

## References


