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**The impact of technology on students of different age groups: meta-analysis of WWC's reading interventions**

**Presenting Authors**

Dr. Andrei Streke, and Dr. Tsze Chan

**Affiliation**

Campbell Collaboration

**Country of residence**

United States of America

**Objectives/aims**

This study uses meta-analysis to determine if the impact of digital technologies on literacy skills differs by students’ age. Dataset is drawn from the What Works Clearinghouse publicly available database, and consists of 172 studies and 933 effect sizes that cover 3 topic areas: Early Childhood Education (ECE), Beginning Reading (BR), and Adolescent Literacy (AL).

The study asks two research questions:

Does the evidence indicate that computer-assisted interventions (CAIs) improve literacy outcomes for pre-schoolers (ages 3-5), beginning readers (grades K-3), and adolescents (grades 4-12)?

What is the relative impact of CAIs when compared to non-CAIs on literacy skills within each age group?

**Methods**

We first conducted meta-analyses that synthesized the effect sizes of CAIs using a random effects model within each of the WWC topic areas: ECE, BR, and AL. To address the second question, we applied the meta-regression analysis technique to assess the relative impact of CAIs vs. non-CAIs separately for each topic area.

Because multiple effect sizes can be nested within a study, the standard errors should be adjusted to account for dependencies among effect sizes. Our study used the robust variance estimation (RVE) proposed by Hedges et al. (2010) and the synthetic effect size approach that summarizes independent study-average effect sizes across studies. Results from the two approaches are compared.

**Main findings**

The study finds that CAIs produce substantive learning gains for ECE interventions (ES=0.42), larger than those from their non-CAI counterparts, although the difference is not statistically significant. For the AL topic area, the CAIs impact is less pronounced (0.11), and does not differ significantly from the impact of non-CAIs. The RVE results from the BR comparison (grades K-3), indicate that although improvements from CAIs are promising (0.23), they are smaller than the effect for traditional reading programs when controlling for other study characteristics (evaluation design, control group, & sample size). Both the RVE and the synthetic ES approach provide similar results for the BR area.