Computer-based reading interventions have become a widely used tool to address reading deficits in schools. They are cost-effective compared to employing additional teachers, offer unique engagement opportunities, and require minimal training. Many modern programs market themselves as "adaptive," aiming to tailor instruction to the specific needs of students. However, the question remains: Are they as effective as traditional teachers?
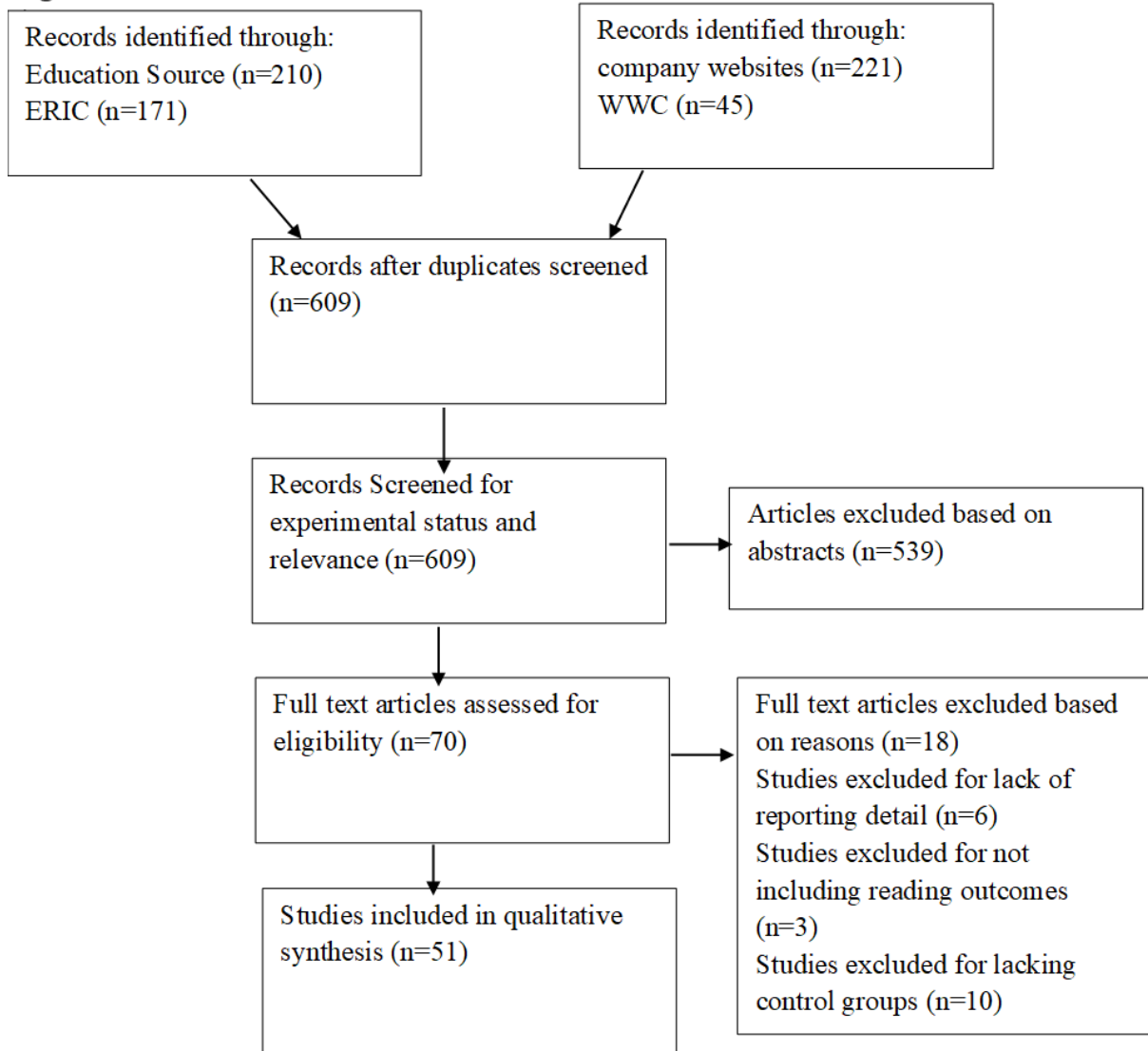
Over the past six months, Nathaniel Hansford, Elizabeth Reenstra, Pamela Aitchison, and Sky McGlynn reviewed 609 studies and conducted a large-scale meta-analysis on computer-based reading interventions. The results of this meta-analysis indicate that computer-based reading instruction is, in fact, ineffective. The mean raw effect size was 0.17, with 95% confidence intervals of [0.08, 0.25], and a weighted mean effect size of 0.11. Interestingly, results did not show improvement with more modern programs or those utilizing adaptive technology. Studies with larger sample sizes or those not peer-reviewed, on average, yielded worse results.

The manuscript detailing these findings has been submitted for peer review. While this article provides a summary of our process and results, it's important to note that these findings have not yet undergone successful peer review and may be subject to change as the paper progresses through the review process. If you wish to read the full manuscript or if you have questions, please contact us at outreach@pedagogynongrata.com.

Systematic Search:
Studies were included in the analysis if they focused on technology-based reading interventions, had sample sizes above 20, utilized an experimental or quasi-experimental design, and provided sufficient information for calculating effect sizes.

Figure 1. *Prisma Flow Chart.*

Records identified through:
Education Source (n=210)
ERIC (n=171)

Records identified through:
company websites (n=221)
WWC (n=45)

Records after duplicates screened
(n=609)

Records Screened for
experimental status and
relevance (n=609)

Articles excluded based on
abstracts (n=539)

Full text articles assessed for
eligibility (n=70)

Full text articles excluded based
on reasons (n=18)
Studies excluded for lack of
reporting detail (n=6)
Studies excluded for not
including reading outcomes
(n=3)
Studies excluded for lacking
control groups (n=10)

Studies included in qualitative
synthesis (n=51)

Effect Size Calculations:

Effect sizes for interventions were calculated using Cohen's d. Cohen's d was calculated as follows: d = (Post-test treatment mean – Post-test control mean) / Pooled standard deviation (SD). The standard deviations were pooled using the formula $\sqrt{(SD1^2 + SD2^2) / 2}$. When experimental effect sizes were calculated by the original authors or by What Works ClearingHouse, but there was insufficient data to re-check the calculations, effect sizes were accepted as is. 95% confidence intervals were used to calculate the range of possible results. To account for sample size variations, effect sizes were weighted based on the inverse variance method. Results were interpreted using Cohen's guide, where effect sizes below .20 were considered negligible, .20 to .39 as low, .40 to .79 as moderate, and above .79 as large.

Results:

Fifty-one experimental/quasi-experimental studies investigating computer-based reading instruction were subjected to analysis. A mean raw effect size of 0.17 was found, with 95% confidence intervals of [0.08, 0.25], and a weighted mean effect size of 0.11. Notably, these

results are significantly lower than those reported in the meta-analysis conducted by the National Reading Panel (NRP, 2000) for language programs, encompassing both systematic phonics and whole language instruction. In summary, the findings indicate that computer-based reading interventions tend to yield a statistically negligible benefit for students.

Furthermore, a specific re-analysis was performed for interventions associated with companies claiming to employ adaptive technology for instructional purposes. This analysis yielded a mean raw effect size of 0.20, with 95% confidence intervals of [0.11, 0.29], and a mean weighted effect size of 0.11. These results suggest that current implementations of adaptive technology are not effective in improving reading outcomes.

Results:

Are Computer Based Reading Interventions Effective
Pedagogy Non Grata 2023
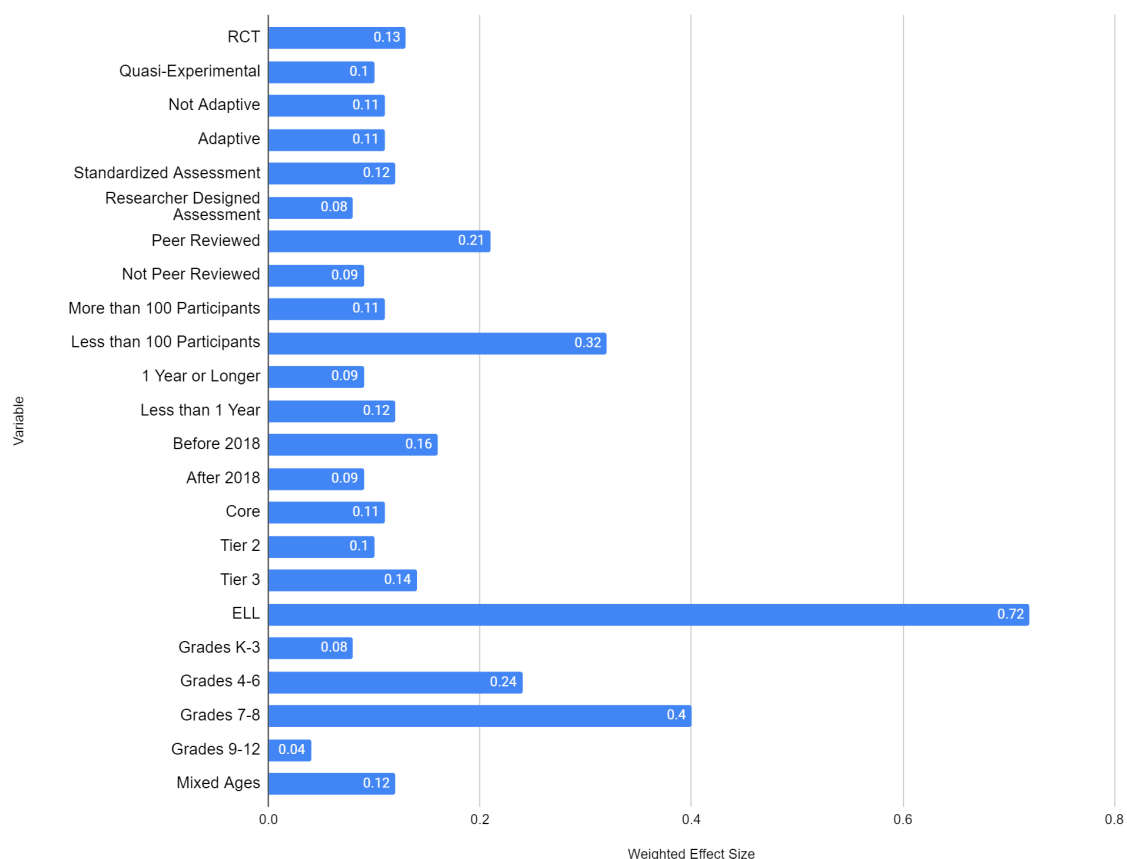
Discussion:
Our analysis findings indicate that computer-based reading programs consistently exhibit lower effectiveness compared to in-person instruction. Furthermore, the results suggest that programs designed to be more adaptive currently provide no discernible benefits. The ambiguity arises from whether adaptive technology is inherently ineffective, if

individualization itself lacks efficacy, or if these programs face limitations in truly personalizing instruction.

Written by Nathaniel Hansford

Last Updated 2023/10/08

References:

For a full copy of the references, please contact Nate at outreach@pedagogynongrata.com

This summary has been left as brief as possible, to avoid automated rejections, during the peer-review process.