Does Home Computer Use Improve or Harm Children's Reading Skills?

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Currently, there is much discussion about the effects of "screen time" and computer use on children's learning and development. Opinions are divided, not only between children and their parents, but also between researchers who report contradictory findings. While some[1] report positive effects on children's development of knowledge and skills, others[2] find computer use to harm achievement, and to increase social inequity.

Correlation does not imply causation

Fuchs and Wößmann[3] found a positive relation between computer access at home and student performance in analyses of PISA data. However, the relationship disappeared when they took student home background into account. When they also took school resources into account, the effect of computer access at home on student performance turned strongly negative. The Fuchs and Wößmann study showed that students who had access to computers at home tended to have a higher social background and attend more resourceful schools than students who did not have access to computers at home. Unless such differences are controlled for, conclusions about effects of computer use at home will be incorrect.

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[1] https://journals.sagepub.com/doi/abs/10.1177/1069397105277602

[2] https://onlinelibrary.wiley.com/doi/pdf/10.1111/ecin.12089

[3] https://www.econstor.eu/bitstream/10419/18686/1/cesifo1_wp1321.pdf

Longitudinal analyses provide more robust evidence

In order to ensure that groups with and without access to computers at home are comparable, we could conduct an experiment where we randomly assigned a computer to half the group, and withdrew any existing home computers from all students. Of course, such an experiment can never be conducted in practice. A question is then if existing non-experimental data can be analysed in such a way that they allow equally strong conclusions about causal effects as the hypothetical experiment?

One way to do that is to use a longitudinal approach and investigate change over time. The international studies are repeated at fixed intervals and many countries participate regularly. Thus, at the country level the international studies have a longitudinal design. If changes in different factors, such as home computer use, relate to changes in achievement levels, this suggests a causal relationship, because the countries are their own controls.

In our study[4] we used data from two IEA trend studies of reading in grade four; the Reading Literacy Study 1991 which was repeated in 2001 with nine countries, and the IEA PIRLS studies from 2001and 2006 with sixteen OECD countries.

More screen time decreases reading performance

The results from both studies showed negative effects of home computer use on reading literacy, the negative effect being stronger in the Reading Literacy data than in the PIRLS data. The negative effect also was stronger for reading continuous text, than for finding factual information in non-continuous texts.

In previous research a displacement theory has been proposed to account for negative effects of home computer use. This theory argues that home computer use leads to a diminishing amount of time and interest being spent on reading. The theory also implies that the strongest negative effects would be found on reading of continuous text, which involves skills that are developed during extensive practice of reading. Our results are well in line with the displacement theory. One practical implication of our findings is that measures should be taken to prevent home computer use from reducing the amount of time and effort students spend on reading.

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[4] https://link.springer.com/article/10.1186/s40536-016-0020-8

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