Who Clicks On Advertisements During an Online Reading Assessment? An Analysis of ePIRLS 2016 Process Data

# Introduction

Students around the world have increased access to and consumption of online information both in and out of school. While online reading provides new opportunities that offline reading does not, it also presents challenges for readers, including the potential for distractions (Goldstein et al., 2014). This is an important point, because it is believed that students working on a school assignment or research project will finish sooner if they focus on finding critical information and are not distracted (Mullis et al., 2017).

Given the increased prevalence and importance of online reading, the ePIRLS international assessment was first administered in 2016 to measure how well fourth-grade students read, interpret, and critique information online. As a digitally based assessment, ePIRLS collects data on the test-taking process, which can be used to provide insight into the relationship between students’ performance and their testing behavior. However, research on this relationship is limited to using data either from international large-scale assessments in general or from ePIRLS specifically. This study aims to contribute to the literature by exploring the process data in ePIRLS to understand how students read and behave when presented with the distraction of online advertisements.

# Data and Methods

This study analyzes data from 16 education systems whose fourth-grade students participated in ePIRLS 2016, an innovative assessment of online reading. The ePIRLS assessment consists of five modules of science and social studies topics (“Mars,” “Rainforests,” “Dr. Elizabeth Blackwell,” “Zebra and Wildebeest Migration,” and “The Legend of Troy”), with each module lasting up to 40 minutes. Each student was randomly assigned to complete two of the modules. Each module contained advertisements that resemble those in real-life web-browsing experiences.

ePIRLS records information on how many times students click on the advertisements in each module; this information was used for the cross-tabulation and significance tests conducted in this study. All analyses account for the complex survey design of ePIRLS and use all five plausible values of achievement.

# Results Synopsis

**RQ1: What are students’ advertisement-clicking patterns in each of the five modules?**

In each module, students clicked on advertisements as few as zero times and as many as 604 times. The percentage of students who clicked on advertisements in each module ranged from 2.5 percent in Sweden in the “Zebra and Wildebeest Migration” module to 20.0 percent in Abu Dhabi in the “Mars” module.

In 13 of the 16 participating education systems, a higher percentage of students clicked on the advertisements in the “Mars” module than in the other modules. Differential advertisement-clicking patterns across modules may be attributed to how relevant the advertisements are to the reading theme of each module. As a comparison of the two released modules shows, the “Mars” module advertisements are about "trips to the stars” or “having a star named after you or your friend,” which are highly relevant to the space theme of the module, while the advertisements in the “Dr. Elizabeth Blackwell” module are about “unlimited free calls” or “low interest loans,” which are less relevant to the biographical theme of the module.

**RQ2: What percentage of students clicked on advertisements at least once in the assessment?**

The percentage of students who clicked on advertisements at least once in the assessment ranged from 6.7 percent in Sweden to 27.7 percent in Chinese Taipei. In the United States, 13.1 percent of students clicked on advertisements at least once.

~~Among students who clicked on advertisements, boys make up from 57.0 percent (Slovenia) to 67.8 percent (Abu Dhabi) in each education system, which are all statistically significantly higher than the percentage of girls in the corresponding education system. Among students who did not click on any advertisements, however, there are no measurable percentage differences between gender in most education systems, except for 4 education systems where lower percentages of boys (from 46.2 percent to 47.7 percent) than girls did not click on advertisements.~~

Among students who clicked on advertisements, the percentage of boys ranged from 57.0 percent (Slovenia) to 67.8 percent (Abu Dhabi); in each of these education systems, the percentage of boys who clicked on advertisements was higher than the percentage of girls. However, among students who did not click on advertisements, there were measurable gender differences in only four education systems; in these education systems, the percentage of boys who did not click on advertisements ranged from 46.2 percent to 47.7 percent and was lower than the percentage of girls.

**RQ3: How are students’ advertisement-clicking** **patterns associated with their online reading achievement?**

Across all participating education systems, on average, students who clicked on advertisements scored 502.1 points on the ePIRLS assessment while students who did not click on advertisements scored 537.5 points. As a point of reference, the centerpoint of the ePIRLS scale is 500 points.

In all participating education systems, students who clicked on advertisements scored significantly lower than their peers who did not click on advertisements, except in Singapore, where the gap was not statistically significantly different from zero. The gap favoring students who did not click on advertisements ranged from 11.4 points in Norway to 89.7 points in Abu Dhabi. In the United States, the achievement gap was 20.5 points in favor of students who did not click on advertisements.

**RQ4: How are students’ advertisement-clicking patterns associated with time spent completing the assessment?**

In 13 of the 16 participating education systems, there was no measurable difference in time spent on the ePIRLS assessment (from start to log-out) between students who clicked on advertisements and those who did not. However, in Italy, students who clicked on advertisements spent, on average, 2.8 more minutes on the assessment than their peers who did not click on advertisements. Conversely, in the United Arab Emirates and Abu Dhabi, students who clicked on advertisements spent, on average, 3.1 and 4.5 fewer minutes, respectively, than their peers who clicked on advertisements. This finding does not lend support to the hypothesis that students who are distracted tend to take more time to complete the assessment.

# Conclusions

Using process data from ePIRLS 2016, this study reveals that in most education systems, students who clicked on advertisements spent the same amount of time completing the assessment but tended to score lower than their peers who did not click on advertisements. Also, the results indicate that higher proportions of boys than girls clicked on advertisements during the assessment time. Using process data, future studies could attempt to gain more insight into students’ online reading and testing behaviors, including their advertisement-clicking patterns.

# References

Goldstein, D. G., Suri, S., McAfee, R. P., Ekstrand-Abueg, M., & Diaz, F. (2014). The Economic and Cognitive Costs of Annoying Display Advertisements. *Journal of Marketing Research*, *51*(6), 742–752. <https://doi.org/10.1509/jmr.13.0439>

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2017). ePIRLS 2016 International Results in Online Informational Reading. Retrieved from Boston College, TIMSS & PIRLS International Study Center website: <http://timssandpirls.bc.edu/pirls2016/international-results/>