

# Communicate Data Findings: PISA 2012

## What is PISA?

According to their Web site, PISA is the Organisation for Economic Co-operation and Development (OECD)'s Programme for International Student Assessment. PISA measures 15-year-olds' ability to use their reading, mathematics and science knowledge and skills to meet real-life challenges.

## Mindsets, Resources, Outcomes

The dataset for 2012 is available for download, although quite large. For the purposes of this project, I focused on mindsets, resources, and mathematics outcomes, measured with a scoring system of plausible values. Further narrowing the field of interest, I selected a handful of countries from around the globe to compare student results.

Upon cleaning the data up, exploring the dataset one mindset variable at a time, the raw counts seemed to align with assumptions about teenagers. The only notable variable was the lack of absences for our assessed students. The distribution of plausible values was also normal among the selected countries.

Moving onto bivariate exploration, I immediately found Brazil to stand out for having a much lower distribution of plausible values. *NOTE FROM PISA TECHNICAL GUIDE: It cannot be emphasised too strongly that the plausible values are not a substitute for test scores for individuals. Plausible values incorporate responses to test items and information about the background of responses; therefore, they cannot be used to compare individuals.*

Viewing the dataset as whole, the key insights to the relationship between resources and plausible values became clear. Desk ownership, internet access, and the number of books at home all positively impacted the plausible values. Interestingly, the value of the number of baths/showers in the home maxed out at two: Those with three or more weren't much more likely to do better than those with fewer than two.

Additional insights between mindset and plausible values were uncovered. While most assessed students had 100% attendance, plausible values visibly worsened with more absences. Students also fared slightly better the more they perceived their parents to believe math is important. Students more anxious about the difficulty of math appeared to score worse. Unintuitively, turning work in on time, paying attention in class, school-belonging, and learning from mistakes didn't seem to meaningfully impact the plausible values. Beliefs about best effort being important, success being attainable with enough effort, and identification with perseverance did all impact the distribution of plausible values.

When we look at these factors that have impact by country, the ultimate question became: Why is the distribution of math plausible values so much lower for Brazil when students in Vietnam appear to be similarly under-resourced?

Comparing the countries side-by-side, ownership of desks are the only area measured by PISA that showed greater access by the Vietnamese students. Vietnamese students showed proportionally less access to internet and computers. Another baffling finding, Vietnamese students seemed to answer the mindset questions more negatively. While removing Brazilians without desks from the dataset does bring the distribution higher, their plausible values still vastly underperform compared to the Vietnamese.

The answer to my final question was not something easily attributed to a factor, or simple combination of factors, recorded in this dataset.