

The PISA scoring guidelines and their prescriptions for interpreting a problem situation

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PISA's

Real World Situations

PISA places most value on tasks that are set in a variety of **real world situations** in which the use of mathematics to solve the problem would be authentic. Problems with **extra-mathematical**

contexts that influence the solution and its

are preferred as a vehicle for assessing mathematical proficiency. These problems are most like those used in real life (OECD, 2009a, p. 93).

Extra-mathematical contexts influences solution

Research Questions

(1) What extra-mathematical knowledge do students integrate while dealing with a **PISA problem**?

(2) To what extent do students' interpretations align with the **scoring guidelines**?

Bourdieu's concept of 'field'

A field is:

a setting for practices with relatively autonomous rules which define social relations.

A person participating in a field is expected to consider a field's unwritten rules. (Bourdieu & Wacquant, 1992)

Examples of fields:

- a situation in a problem (e.g. a shop situation)
- a teacher-centered classroom situation
- a test environment in which students are assessed

Pizzas problem

A pizzeria serves two round pizzas of the same thickness in different sizes. The small one has a diameter of 30 cm and costs **300 ALL**. The larger one has a diameter of 40 cm and costs **400 ALL**. Which pizza is better value for money? Show your reasoning.

(OECD, 2009a, 2009b, 2013)

Data collection

We analyzed the fields of the solution to the Pizzas problem, as prescribed by the PISA scoring guidelines.

We interviewed twelve Albanian grade 9 students while working in pairs on the Pizzas problem.

Analysis of the PISA

Full credit: Gives general reasoning that the surface price of pizza to conclude that the larger pizza is

- The diameter of the pizzas is the same, so the pizza you get is found using diameter of the larger one

Calculates the area and amount per

smaller pizza is 0

$\pi \times 30 \times 30 = 225\pi$; amount per
 $\pi \times 40 \times 40 = 400\pi$; amount per zero

Full credit: reasoning about surface increasing more rapidly than price.

Partial credit: calculating the area per price.

(OECD, 2009b, p.173)

The field of: *traditional school mathematics & economy*

Analysing the interviews

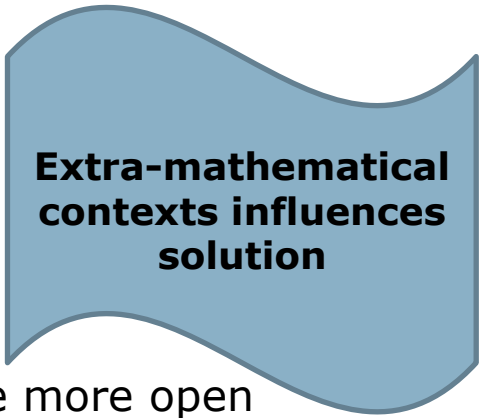
- Abby: It depend because they can be a group of people who wish to share it [the pizza] then if they are many they would order the big one [pizza] but if they are few they would order the small one [pizza]
- Ava: Moreover both pizzas have a nice price, they are not too expensive
- Abby: But it can also depend from the ingredients, for example one [pizza] can be vegetarian while the other [pizza] can be with sausage
- Ava: ...It all depends on what people like...

Fields:

- *a social community*
- *micro-finances*
- *gastronomics*
- *health*

Conclusion

The task but not the scoring guidelines of the Pizzas problem do align with PISA's aims



**Extra-mathematical
contexts influences
solution**

We recommend that PISA's scoring guidelines can be more open to a variety of interpretations that will make it align well with PISA's aims.

References

Bourdieu, P., & Wacquant, L.J.D. (1992). *An Invitation to Reflexive Sociology*. Chicago: University of Chicago Press.

OECD (2009a). *PISA 2009 Assessment Framework*. Paris: OECD.

OECD (2009b). *Take the Test - Sample Questions from OECD's PISA Assessments*. Paris: OECD.

OECD (2013). *PISA 2012 Assessment and analytical framework: Mathematics, Reading, Science, Problem solving and Financial literacy*. Paris: OECD.

Thank you!