

**TOWARDS A MORE  
STATISTICALLY  
LITERATE FUTURE**

The “statistical spirit” in the statistics curriculum

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# My background



- Mathematician, with a PhD in statistics
- Professor of statistics at the Mathematics Department at ULiège with teaching duties ranging throughout my career from
  - basic statistics courses to students of different bachelors (economics, biology, mathematics, computer sciences...)
  - Advanced statistics courses to students of different masters (mathematics, engineering, biology, data science...)
- President of the Royal Statistical Society of Belgium

# My experience in statistical literacy



- Several times member of the regional and national juries of the Statistics Olympiades, with the opportunity to analyse the school curriculum (check of the questions) and to provide some feedbacks to professors.
- Active participation in the activity "A professor of ULiège in your classroom" organized by the science diffusion unit of ULiège (e.g. analysis of the distribution of colors of m&m's: experimentation, sampling distribution and "testing")
- Frequently invited for providing statistics training to high-school teachers (e.g. discussion of statistics results published in the media)
- VP of the RSSB when the "training for journalists" was constructed.

# My opinion about the learning of statistical literacy



- At school !
- Starting early with basic ideas
- Covering the **key concepts** by the end of secondary school
- Higher-education may then focus on specialized topics or more advanced techniques depending on the field.
- The importance of statistical literacy is visible in our everyday life and plenty of examples are readily available (e.g. in the news) -> that should help get some interest from the students (“why do we need to study that?”)



# The statistics curriculum in the Wallonia-Brussels Federation

- Since 1980: several changes in the mathematics curriculum with more and more emphasis on statistics and probability (-> less focus on other mathematics topics, like geometry)
- At the beginning, there was a huge gap between the formal (theoretical) mathematical training of the professors and the skills needed to teach more practical statistics topics
- However, university training evolved over time (at least on average).

# Content of the statistics curriculum in the Wallonia-Brussels Federation



Nowadays, the content is quite extensive (but not complete)

- Descriptive statistics (graphics, summary statistics)
- Bivariate statistics (correlation, regression)
- Combinatorics and probability (random variables, distributions)
- ...

[missing: sampling variability]

The learning of these topics, combined with a correct approach, should allow the student to reach some key competencies.

# Key competencies

- Correct computation and interpretation of percentages
- Appropriate computation and interpretation of graphics and summary statistics
- Interpretation of statistics results, with critical sense (e.g. confounding factors, comparison of numbers, ...)
- Difference between correlation/causality
- Some understanding of randomness and probability (margin or error, false/true positives, measure of a risk/confidence)



[list inspired by the training for journalists of the Royal Statistical Society of Belgium]



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# Statistical learning at school lacks statistical spirit



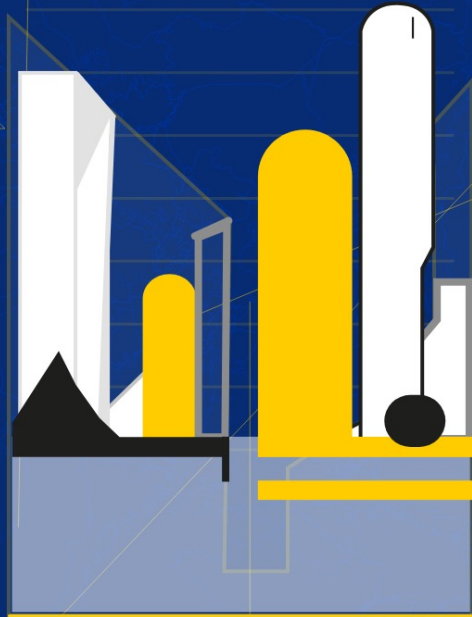
Statistics learning at school remains too “scholar” and/or too “mathematical”:

- Calculus and graphics are ok
- Probability (and combinatorics) are well taught (and liked) by teachers

But

- Examples are mostly “artificial” (no real data, no real context)
- Interpretation and critical thinking are often left out





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## Group Discussion Questions:

1. Wouldn't statistical literacy benefit from an interdisciplinary learning approach?
2. How can teachers be supported in implementing effective pedagogical strategies for teaching statistical literacy within their classrooms?
3. How could "statistical agencies" contribute to provide "real life data and contexts"?