

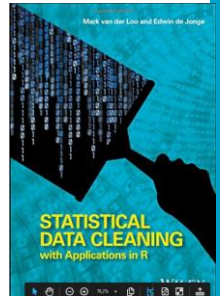
# Programming and teaching Statistics

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# About me

- Sr. Researcher at Statistics Netherlands (15 years)
- 10+ years teaching R, Python, data science, statistics, data cleaning methods, data management **to professionals**, and students, in Government, University, and Private Sector.
- (co) author of several R packages (tinytest, stringdist, validate,...), and a book.



# Question 1



Is it **possible** to teach and learn Statistics **quickly** and **efficiently** using programming?



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Only if you already are **computer literate**, understand **basic programming concepts**, and are **relatively fluent** in the language used.

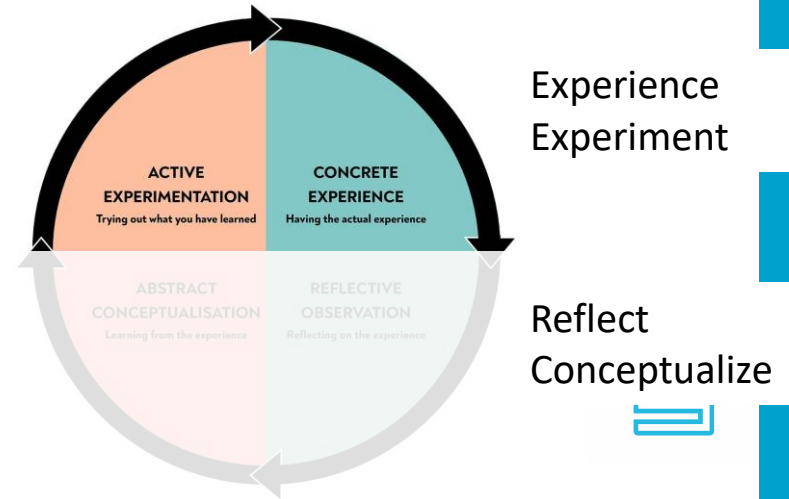


# Question 1



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Programming in itself only touches half of Kolb's learning cycle.



# Interlude: my programming exercises

1. Few technical exercises to learn new functions & interpret output.
2. Give dataset and walk exercise by exercise through an analysis.
3. Give dataset (or bring own!) and ask open questions, e.g.
  1. Does the treatment have a significant effect?
  2. How many people in Amsterdam voted for the liberal party?
  3. What are the most important variables explaining income?
  4. Create an EDA report for this dataset. Report the most important features.
4. Always ask for explanations, let people demonstrate their work and criticize each other's work. Give feedback as a teacher. Compare solutions.



# Question 1



Is it **possible** to teach and learn Statistics **quickly** and **efficiently** using programming?

Ability to apply statistical concepts immediately to real data (especially from own practice!) is *extremely* motivating\*.



\*For many students/professionals, but not all!



## Question 2

At what age should we start teaching statistics using programming?

We should teach **basic computer literacy**, and concepts from **structural (imperative) programming** from around the time you learn about X's and Y's in math. (in NL ~12 years old).



## Question 3

In professional life, as a data scientist/official statistician, is programming a necessary skill?

- The core **craft** of anyone analyzing data is to **automate processing and analyzing data**.
- The core **competence** is to **ask the right questions** and to **interpret the results**.





**Facts that matter**