University of Glasgow | School of Psychology

Teaching Reproducible Data Analysis in R: Practicalities

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LEARNING FROM OUR STORY

- Introducing R has been part of other developments.
- Curriculum developments and wider school development in statistics.
- Closer links between teaching and research streams
- Started about 3 years before the introduction of R

What do you need to plan for when changing to R

- Pedagogical Approach
- Assessment
- Teacher skills not related to R
- Classroom set-up
- Open minds

Pedagogical Approach in Practice

- Slowing down the pace of teaching
  - Focussing on understanding data, visualisation and probability before moving to statistics
  - Re-orient to focus on the goal
- Student generated content
  - When students solve problems things happen that you are not prepared for
  - We are increasingly finding that we have to do away with “the right answer”
- Using content not generated by us
  - Facilitators rather than dictators

Pedagogical Approach

- Bottom-up vs top-down teaching
- Open educational practices
- Problem-based learning
- Blended learning

Support materials

- What had worked well
  - R-videos we made and found on the web
  - Exercises and classes we authored
  - Data available on the web
- What has worked less well
  - Non tidyverse materials can only take us so far
  - Passive exercises – active works best
  - Most materials are not currently geared to teaching beginners
  - Most introductory materials are focussed on stats with less focus on data skills

Assessment

Formative & peer marked

Regular exercises

Opportunities to practice skills

Reports

Assessment what we have tried

- Formative
  - submissions for peer review on Slack
  - web exercises with webex
  - different levels of formative tasks (beginner, intermediate, advanced)
  - R-analysis plans for reports for peer review
- Summative
  - Weekly exercises marked with assesser (UG)
    - Problems to solve, practice with skills
  - Exercises not marked with assesser (PG)
    - Problem – based approaches: generate and analyse a hypotheses for a previously unseen dataset/dataset generated by students
    - In-class exams – similar to weekly exercises, but under exam conditions

Patience

IT support

Communication

Reports

Teacher Skills not Related to R

The most challenging things for students to learn

- Challenges:
  - Using computers
  - Downloading and saving files on their own computers
  - Finding files on their own computers
  - Setting the working directory
  - Uploading the correct file for an assessment
  - Spotting typing errors
- Solutions
  - Patience and lots of it
  - Sharing data/markdown/scripts as zipped (though leads to the unzipping challenge)
  - R-server (but that has its own challenges)
  - Getting R on our student desktop, but encouraging students to use their own devices

Group-based Learning

Add some non-R stuff

Small Groups-teaching?

Flipped classes

Classroom set-up

Integration in an RM Curriculum

- Teaching about reproducibility and open science
- Encouraging discussion about research design and the nature of data
- Improving inference
- Using simulation
- Power, effect size, probability

Other things R has done for us

The amazing results for our students

Aha!

Eureka!

Made us a team – staff and students

Open minds