

Online tools for the teaching of the R programming language

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The Current Situation

- Statistical software is used in many industries.
- An important skill for employability.
- Use of statistical software in teaching fosters deeper learning.
- Use R in a range of courses.
- Initial teaching occurs in first year.
- Utilized in a number of courses in later years, for example:
 - 1 Stochastic Processes (level 9)
 - 2 Probability and Statistics (level 8)
 - 3 Time series (level 10)

The Need for Change and Innovation

- Currently teaching of R is ad-hoc.
 - Different styles of worksheets.
 - Some lectures provide videos on VISION.
 - No coherent student experience.
- Courses to be taught over multiple campus.
 - Current methods need over hauling to deal with this change.
- Aim:
 - 1 Explore use of novel technologies to improve teaching of R.
 - 2 Provide students with a uniform learning experience across campuses and courses.
 - 3 Enable students to learn at their own pace.

Solution?

The image shows two browser windows side-by-side. The left window is a Codecademy Python lesson titled 'Strings & Console Output'. The right window is a Try R challenge page titled 'CHAPTER 1 Try R'.

Codecademy Python Lesson:

- Strings**
- Another useful data type is the **string**. A **string** can contain letters, numbers, and symbols.

```
name = "Ryan"
age = "19"
food = "cheese"
```

- 01.** In the above example, we create a variable `name` and set it to the string value `"Ryan"`.
- 02.** We also set `age` to `"19"` and `food` to `"cheese"`.
- Strings need to be within quotes.
- Instructions**
- Create a new variable `brian` and assign it the string `"Hello li fe!"`.
- Stuck?** Get a hint!
- Q&A Forum | Glossary
- Save & Submit Code | Reset Code

Try R Challenge Page:

- CHAPTER 1**
- Try R**
- In this first chapter, we'll cover basic R expressions. We'll start simple, with numbers, strings, and true/false values. Then we'll show you how to store those values in variables, and how to pass them to functions. We'll show you how to get help on functions when you're stuck. Finally we'll load an R script in from a file.
- Try R is Sponsored By: **O'REILLY®**
- Complete to Unlock
- Let's get started!
- Continue

Back-end Development

- Project focused on the development of a back end for online teaching of R.
- Implemented by a summer intern (Ross Brunton).
- On-line interactive worksheets tied with a R back end to allow code to be run.
- Enables student to run code and auto-checking of code.
- Provides a flexible framework for writing course material.
- Enables lecturers to prepare and update course specific material.
- Inbuilt tracking of student progress.

Engaging the Rest of the Department

- Engaged lecturers of first two years courses to understand needs.
- Collected current teaching material and explored current good practice.
- Arranged a demonstration afternoon including presentation and hand on sessions.
- Positive feedback from lecturers and students.
- With the help of various lecturers currently implementing current teaching material.

Current State and Future Steps

- Initial back end is complete but ...
- does not have a permanent server to run from.
- Aim to set this up this semester with support from MACS.
- This will enable wider uptake.
- Future plans:
 - 1 Continue the transfer of material.
 - 2 Explore possibilities for future funding to continue development.
 - 3 The implementation of auto-generation of questions and auto-checking.
 - 4 The implementation of assessments.