Reproducible Documents with `{rmarkdown}`

Day 2

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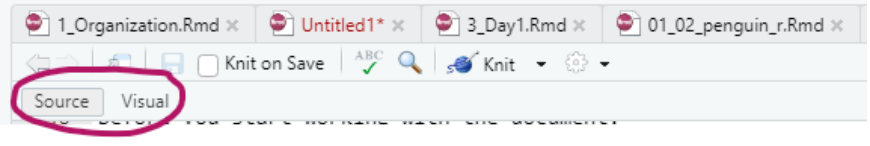
Topics today

- Visual editor in RStudio
- Citations
- Make tables look nice
- Some more tips and good practice

The visual editor in RStudio

- WYSIWYG editor (*What you see is what you get*)
    - More similar to Word etc. but with less functionality
- Click on the button on the top left



- Very helpful in the beginning until you remember how everything works in markdown
- Especially helpful for markdown tables and citations
- But careful: Can reformat the `.Rmd` file a bit, so sometimes if you switch back it can look different than before.
    - Best to choose the editor you like most and stick with it

Adding citations - The classic way

Bibliographies can be included via a BibTeX data base.

- Create a `.bib` file that consists of bibliography entries

```
@Book{cookbook,
  title = {R Markdown Cookbook},
  author = {Yihui Xie and Christophe Dervieux and Emily Riederer},
  publisher = {Chapman and Hall/CRC},
  address = {Boca Raton, Florida},
  year = {2020},
  note = {ISBN 9780367563837},
  url = {https://bookdown.org/yihui/rmarkdown-cookbook},
  }
```

Adding citations - The classic way

Bibliographies can be included via a BibTeX data base.

- Create a `.bib` file that consists of bibliography entries
- Add name and location of your `.bib` file as a medatada field in YAML header

```
---
output: html_document
bibliography: references.bib
---
```

- Cite an article from the database with `@bib_item_name` for in text citations or `[@bib_item_name]` for citation in brackets
  - Here, I cite `@cookbook` because it's a good book `[@cookbook]`
  - Here, I cite Xie, Dervieux, and Riederer (2020) because it’s a good book (Xie, Dervieux, and Riederer 2020)
- List of references used will be added to the end of the document
  - Just add a heading `# References` to end of the doc

Adding citations - The classic way

- Add a custom citation style file with:

```
---
output: html_document
bibliography: references.bib
csl: myrefstyle.csl
---
```

- Most (all?) reference managers can export your citations as a `.bib` file

Adding citations - Visual editor

Citations can also be added using the **visual editor** in RStudio.

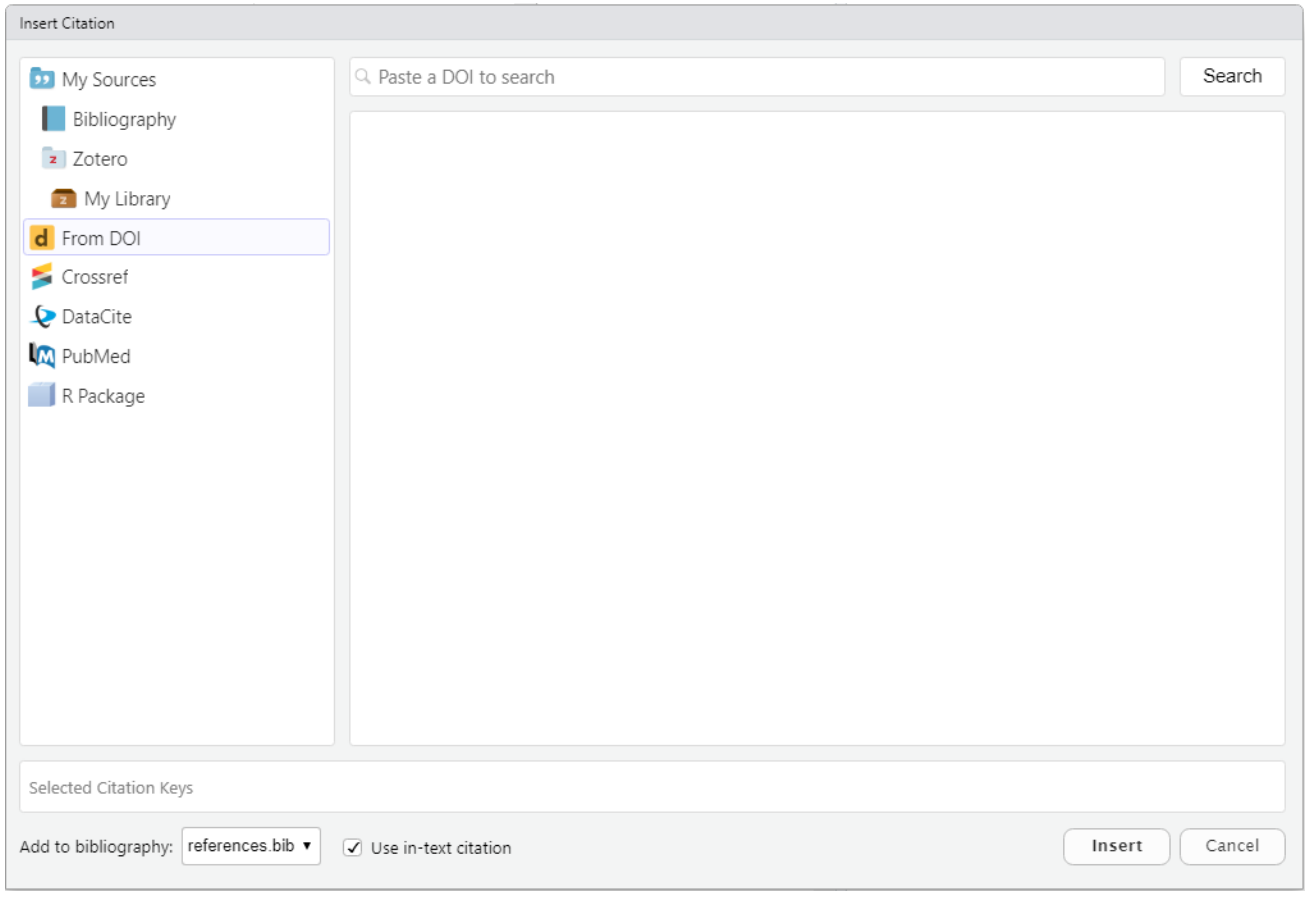
- Visual editor creates and updates `.bib` file automatically
- Search and add citations from
  - The bibliography file
  - Zotero
  - DOI
  - ...

Adding citations - Visual editor

- Just click on the `Insert -> citation`

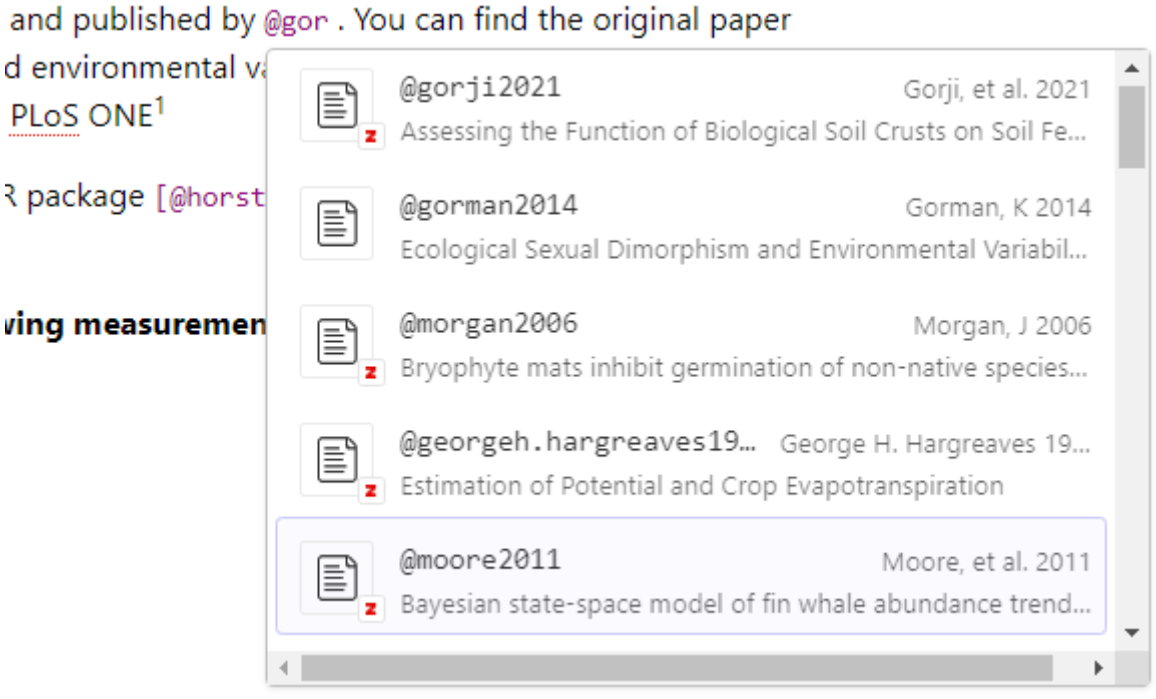
Adding citations - Visual editor

- Select source of citation on the left (e.g. DOI, Zotero, ...)
- Click `Insert` to add citation to `bibliography.bib`



Adding citations - Visual editor

- You can also start typing `@` and the editor will suggest you a list of citations that fit



Adding citations - Visual editor

Using Zotero

- If you use Zotero on your machine, RStudio should automatically detect the installation
- If not, go to `Tools->Global Options->R Markdown -> Citations` and enter the location of your Zotero data directory and the library that you would like to use
    - In General this should be recognized automatically

Now you

Task 1: Add some citations (20 mins)

Find the task description here

Nice looking tables in R Markdown

Nice looking tables with R Markdown

- The default for printing tables looks the same as printing it in the console:

```
iris_sum
```

```
## # A tibble: 3 x 5
##   Species    Sepal.Length Sepal.Width Petal.Length Petal.Width
##   <fct>             <dbl>       <dbl>        <dbl>       <dbl>
## 1 setosa             5.01        3.43         1.46       0.246
## 2 versicolor         5.94        2.77         4.26       1.33
## 3 virginica          6.59        2.97         5.55       2.03
```

- This is not really nice for documents

`knitr::kable()`

Simple to use table generator from the `knitr` package.

```
knitr::kable(iris_sum) # or iris_sum %>% knitr::kable()
```

Species	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
setosa	5.006	3.428	1.462	0.246
versicolor	5.936	2.770	4.260	1.326
virginica	6.588	2.974	5.552	2.026

- Chose `kable` as default table printing in YAML header:

```
df_print: "kable"
```

- `kable` works for PDF, HTML and Word output

knitr::kable()

Add arguments for additional formatting:

```
kable(x,
  format,
  digits = getOption("digits"),
  row.names = NA,
  col.names = NA,
  align, caption = NULL,
  label = NULL,
  format.args = list(),
  escape = TRUE, ...
)
```

- See here for many examples many different use cases

knitr::kable()

Example:

```
knitr::kable(
  iris_sum,
  digits = 1,
  col.names = c("Species", "Sepal Length", "Sepal Width", "Petal Length", "Petal Width"),
  caption = "Summary of the Iris data",
  align = "l"
)
```

Summary of the Iris data

Species	Sepal Length	Sepal Width	Petal Length	Petal Width
setosa	5.0	3.4	1.5	0.2
versicolor	5.9	2.8	4.3	1.3
virginica	6.6	3.0	5.6	2.0

The `{kableExtra}` package

- Provides options for table styling for HTML and PDF tables
- Most of the features work for both HTML and PDF tables
- Find the full documentation here
    - If you use tables a lot, I recommend looking through the documentation to see all possibilities
- Load the packages in the setup chunk before using them

```
library(knitr)
library(kableExtra)
```

- **Careful**: Don't load `kableExtra` for `word_document` output. This will break the tables made with `kable`

The {kableExtra} package

`kable_styling()` is the basic styling function

- Use the pipe operator (`%>%`) to pipe `kable()` output to styling function `kable_styling()`
  - Use the keyboard shortcut `Ctrl/Cmd + Shift + M` to insert `%>%`

```
iris_sum %>%
  kable() %>%
  kable_styling(
  full_width = FALSE, # display table on full page width?
  position = "center",  # if not full width -> where to put table
  font_size = 15
)
```

Species	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
setosa	5.006	3.428	1.462	0.246
versicolor	5.936	2.770	4.260	1.326
virginica	6.588	2.974	5.552	2.026

The {kableExtra} package

`kable_styling()` provides styling options

- Additional styling options for HTML output are passed via `bootstrap_options`

```
iris_sum %>%
  kable() %>%
  kable_styling(
  full_width = FALSE, # display table on full page width?
  position = "center",  # if not full width -> where
  font_size = 15,
  bootstrap_options = c("striped", "hover")
)
```

Species	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
setosa	5.006	3.428	1.462	0.246
versicolor	5.936	2.770	4.260	1.326
virginica	6.588	2.974	5.552	2.026

The {kableExtra} package

`kable_styling()` provides styling options

- Additional styling options for PDF output are passed via `latex_options`

```
iris_sum %>%
  kable(booktabs = TRUE) %>%
  kable_styling(
    full_width = FALSE,
    position = "center",
    font_size = 15,
    bootstrap_options = c("striped", "hover"),
    latex_options = c("striped", "hold_position", "scale_down")
  )
```

- `booktabs = TRUE` will use the `booktabs` LaTeX package to create nice horizontal lines and removes vertical lines
- `hold_position` places the table where it is created in the document (no floating)
- `scale_down` scales the text down to fit the table width

The {kableExtra} package

`kable_styling()` provides styling options

- Additional styling options for PDF output are passed via `latex_options`

```
iris_sum %>%
  kable(booktabs = TRUE) %>%
  kable_styling(
    full_width = FALSE,
    position = "center",
    font_size = 15,
    bootstrap_options = c("striped", "hover"),
    latex_options = c("striped", "hold_position", "scale_down")
  )
```

- Depending on the output format you chose, `bootstrap_options` or `latex_options` will be ignored

The `{flextable}` package

- Works with PDF, HTML and Word output
  - Can be used as an option to style tables in Word
- Alternative to `kable` and `kableExtra`
- See here for an extensive documentation of the flextable package

Now you

Task 3: Create a nice table (25 mins)

Find the task description here