

Reproducible Documents with `{ rmarkdown }`

Day 2

Instructor: **Selina Baldauf**

Freie Universität Berlin - Theoretical Ecology



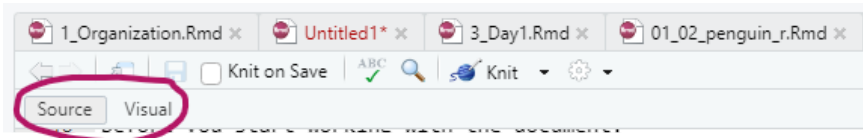
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Topics today

- 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 metadata 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
- Problem: RStudio does not auto-fill citations
 - You have to know the name of the citation in order to cite it

Adding citations - Visual editor

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

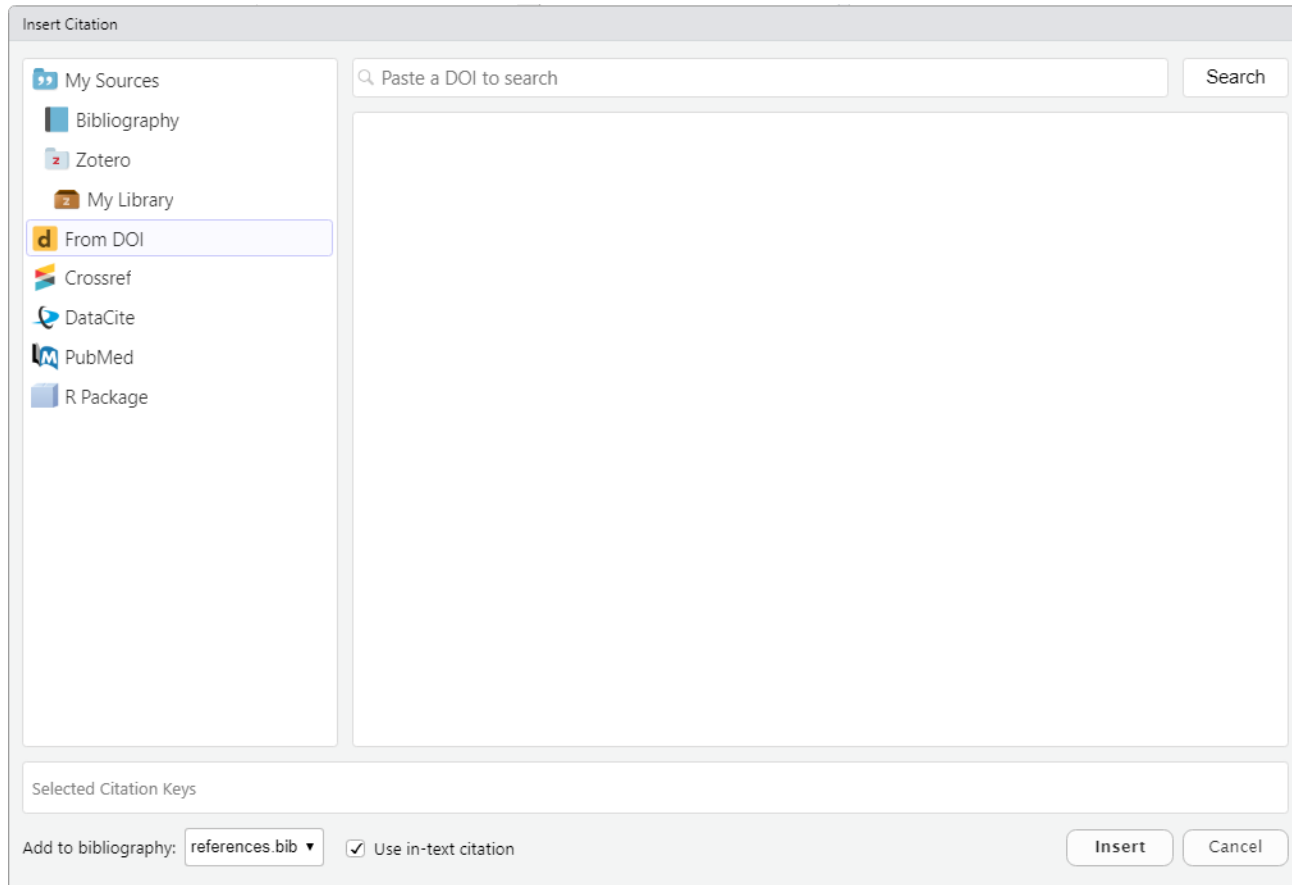
- Visual editor creates and updates `.bib` file automatically
- Search and add citations from
 - The bibliography file
 - Zotero
 - DOI
 - ...

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`



The screenshot shows a dialog box titled "Insert Citation". On the left side, there is a list of sources: "My Sources", "Bibliography", "Zotero", "My Library", "From DOI" (which is highlighted with a blue border), "Crossref", "DataCite", "PubMed", and "R Package". To the right of this list is a search bar with the placeholder text "Paste a DOI to search" and a "Search" button. Below the search bar is a large empty rectangular area for displaying search results. At the bottom of the dialog, there is a section labeled "Selected Citation Keys" with an empty text field. Below this, there is a label "Add to bibliography:" followed by a dropdown menu showing "references.bib" and a checked checkbox labeled "Use in-text citation". At the bottom right, there are two buttons: "Insert" and "Cancel".

Adding citations - Visual editor

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

and published by @gor . You can find the original paper

d environmental v
PLoS ONE¹

R package [@horst

ving measurement



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 × 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")  
  )
```

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

- `booktabs = TRUE` will use the `booktabs` LaTeX package to create nice horizontal lines and removes vertical lines

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 {kableExtra} package

Packing rows and columns

```
iris_sum %>%  
  kable() %>%  
  kable_styling(font_size = 15) %>%  
  add_header_above(c("", "Sepals" = 2, "Petals" = 2)) %>%  
  pack_rows("Group 1", 1, 1) %>%  
  pack_rows("Group 2", 2, 3)
```

	Sepals		Petals	
Species	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
Group 1				
setosa	5.006	3.428	1.462	0.246
Group 2				
versicolor	5.936	2.770	4.260	1.326
virginica	6.588	2.974	5.552	2.026

The {kableExtra} package

Some predefined html themes

- `kableExtra` offers some themes for HTML tables
 - `kable_paper`, `kable_classic`, `kable_classic_2`, `kable_minimal`, `kable_material` and `kable_material_dark`
 - Use them alternative to `kable_styling()`

```
iris_sum %>%  
  kable() %>%  
  kable_classic(  
    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

- This only works with HTML output! It will give you an error for PDF output.

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](#)