The title of your amazing work!

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Keywords: stuff, major good stuff, really good stuff, crap

Running title: Reproducibility!

Author contributions: XYZ

Abstract

The greatest study ever!

Introduction

This document serves as an example of how to make a reproducible workflow–from R to manuscript. For this example, you must link your Overleaf project to a git repo, then link your R project to the same repo. For more on how to do this see Jessi Rick's tutorial (click here).

The figure and one of the tables in this manuscript are R script outputs. We run Make to update these and our manuscript. See the document "How to use Make" that is in this repo for more.

Why use LaTeX?

As you will see, LaTeX helps with reproducibility, saves you time inputting results into your manuscript, keeps you from screwing up stuff like adding data to tables or misnumbering figures, makes it easy to format a manuscript however you want, avoid having figures move around like they do in Word, avoid the damnable compression algorithm that Word uses that makes your figures look like crap, keep you from writing or formatting citations, allow you to format your manuscript as required for your journal with minimal effort using style templates, write waaay better math (this alone could be a selling point, if you do the math), built in version control with Overleaf, the ability to build document classes for templates that you commonly use, like reference/cover letters....probably more stuff that I am not remembering.

However, LaTeX has a bit of a learning curve that can be frustrating at first. Persevere, get comfortable Googling stuff that you can't figure out, and soon under no circumstances would you go back to using Word.

As mentioned, a benefit of LaTeX is easy, streamlined citation incorporation. You can source a bib file and make use of any of the citations therein with the citep, citet, citalt, and other cite commands. For more click (here)

RECOMMENDED: You can also link your citation manager to your Overleaf project. See how to do that by clicking (here). This is very handy since you can simply refresh as needed to quickly bring new citations into your manuscript. Note where we define the bibliography after the acknowledgements. At that point we specify style. You can download citation styles for many journals, so never reformat citations by hand!

TIP: To add R code to your document one has to first change the .tex ending to .Rtex (at least with Overleaf). See actual Tex file for example of how to add a code chunk.

Use $\Sexpr{X = 2:10;length(X)}$ to add R code output straight inline. See more here at this knitr tutorial: `https://www.overleaf.com/learn/latex/Knitr`

Methods

Results

Here are is our scatter plot (Fig. 1). Note that the number of the figure is automatically updated based on its order in the figure section. This is another handy thing about LaTeX. One does not have to worry about accidentally misnumbering a figure in the text after moving figures around (particularly nice for those pesky supplemental figures that often get misnumbered).

Here are some made up results (Table. 1) and also check out results from our linear regression (Table. 2). The cool thing here is that for the latter table we output the results straight from R via the xtable package. This package takes a matrix object and converts it into the appropriate format for LaTeX (see the associated R script linearModel.R in the Supplemental Material).

Discussion

Acknowledgments

Funding was provided by XXXX. Computing was performed in the Teton Computing Environment at the Advanced Research Computing Center, University of Wyoming, Laramie (https://doi.org/10.15786/M2FY47).

Data availability

All scripts and processed data are available at:

Figure 1: A scatterplot of some random data

Table 1: Example table.

Treatment 1	Treatment 2	Sample size
Yes	Yes	62
Yes	No	68
No	Yes	54
No	No	54
Controls		
Yes	Yes	13
Yes	No	13
No	Yes	18
No	No	18

Table 2: Results from a regression of a simulated vector of deviates from a normal distribution centered at 100 against deviates from a normal distribution centered at 10. xtable is awesome!

Estimate	Std. Error	t value	Pr(>|t|)
100.23	1.10	91.44	0.00
-0.03	0.11	-0.26	0.80

Supplementary Material

R scripts used follow. Note that much cleaner output can be generated using R Markdown. Please see Jessi Rick's tutorial (linked above) for information on how to do that.

```
#linearModel.R
#J. G. Harrison

library(xtable)

dat <- read.csv("./data/testdata.csv")


reg <- lm(dat$rnorm.100..100. ~ dat$rnorm.100..10.)

#NOTE that it is very helpful to label your tables and figures so that you can
#reference them from anywhere in a document when in Latex and it will always
#reference them by the proper order. No more checking through to make sure figure number
#are correct after reording them!

print(xtable(summary(reg)$coefficients,
        type = "latex",
        caption = "Results from a regression of a simulated vector of deviates from a no
        label = "table:lm_results",
        digits = 2, #round to the correct number of digits automatically
        align = rep("c", dim(summary(reg)$coefficients)[2] + 1) #align cell contents, ha
        #You can add horizontal lines, etc. too. Basically, all the easy formatting stuf
        #If you have to build a really crazy table then you may need to copy the output
        #build a function to paste content into the output of xtable prior to printing.
        ),
      caption.placement = "top",
      file = "./results/lm_results.tex",
      floating.environment='table', #Can change to sideways table if landscape format de
      include.rownames = FALSE)
```

```
dat <- read.csv("./data/testdata.csv")

pdf(width = 8,
    height = 8,
    file = "./results/scatterplot.pdf")
plot(dat$rnorm.100..100.,
     dat$rnorm.100..10.,
     main = "",
```

```
     xlab = "fake data",
     ylab = "more fake data")
dev.off()
```