TIER Dynamic Template

Roadmap for Developing a Dynamic and Reproducible Research Article

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Abstract

This is a template to create a project article using the Quarto book and TIER protocol 4.0 structures. Quarto is a document authoring and publishing tool that allows you to create books, reports, and other documents that are rich in content and fully reproducible. It is integrated with RStudio and is built on markdown and works with R language, Python, Julia, and Observable. The TIER protocol 4.0 specifies the contents and organization of reproduction documentation for a project involving computations with statistical data analysis. The project is already configured for versioning with Git/GitHub, environment control with `renv` and/or Docker, and publication on GitHub Pages.

Key-words: Open Science, Reproducibility, Quarto, TIER Protocol 4.0, R language, RStudio, Git, GitHub, renv, GitHub Pages.

How cite this template?

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1 Introduction

The text below is intended to be an instructive example…

Gain some additional knowledge regarding Open Science and reproducible research (Kathawalla et al., 2021; Klein et al., 2018)

This is an example of how to integrate an external document into your article (Figure 1).

For more details about **TIER Protocol 4.0** visit the page: https://www.projecttier.org/ and/or read the Domingos & Batista (2021) article.

Read the README files for the project root and this repository to learn more about how this protocol works with this template.

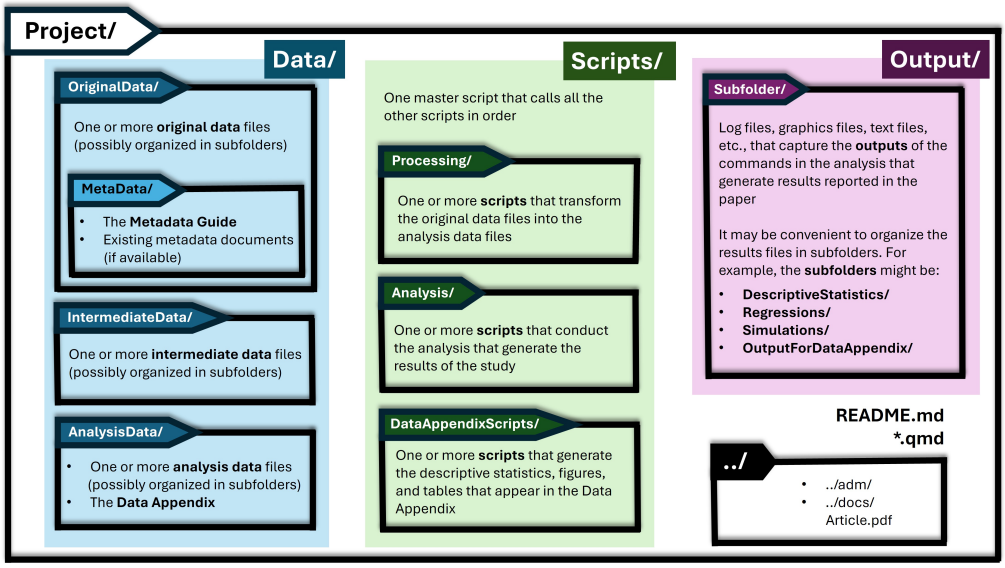

Figure 1: TIER Protocol 4.0: Quarto Reproducible Dynamic Template. Illustration available at: https://doi.org/10.5281/zenodo.13119617

2 Background

The text below is intended to be an instructive example...

Make sure to look into the thought of reproducible research practice (Dogucu & Çetinkaya-Rundel, 2022; Gilroy & Kaplan, 2019; Sullivan et al., 2019; Vuorre & Curley, 2018; Wiebels & Moreau, 2021; Wilson et al., 2017).

3 Methods

The text below is intended to be an instructive example...

If you need to learn a little more about Reproducible Research with R/RStudio there are excellent free e-books:

- R for Data Science
- Building reproducible analytical pipelines with R
- The Open Science Manual: Make Your Scientific Research Accessible and Reproducible

4 Results

The text below is intended to be an instructive example...

- Remember that the dynamic document's sole purpose is to provide analytical findings. This approach allows each analysis step to be defined and controlled separately from the dynamic document. In this sense, the scripts are the source

of the results, and the dynamic document is the published article. There could be a few more analyses in the scripts that haven't been released yet, but anyone who wants to go deeper into the work that went into the article can audit them.

- Because of this, you have to demonstrate in the scripts how you got to where you are, even if you should only include information that you think is essential in the article's body. See https://quarto.org/docs/authoring/notebook-embed.html for information on how to embed the output of another Quarto document to prevent code duplication. Below is an example of how you can proceed.

Include tables, graphs, figures, and other visual aids from your scripts in the `AnalysisScripts` folder as you write up your narrative. To learn how to complete this integration, look to Quarto's documentation embedding.

I've included two examples of how to include results from your analytic scripts into your story below: Figure 2 and Table 1.

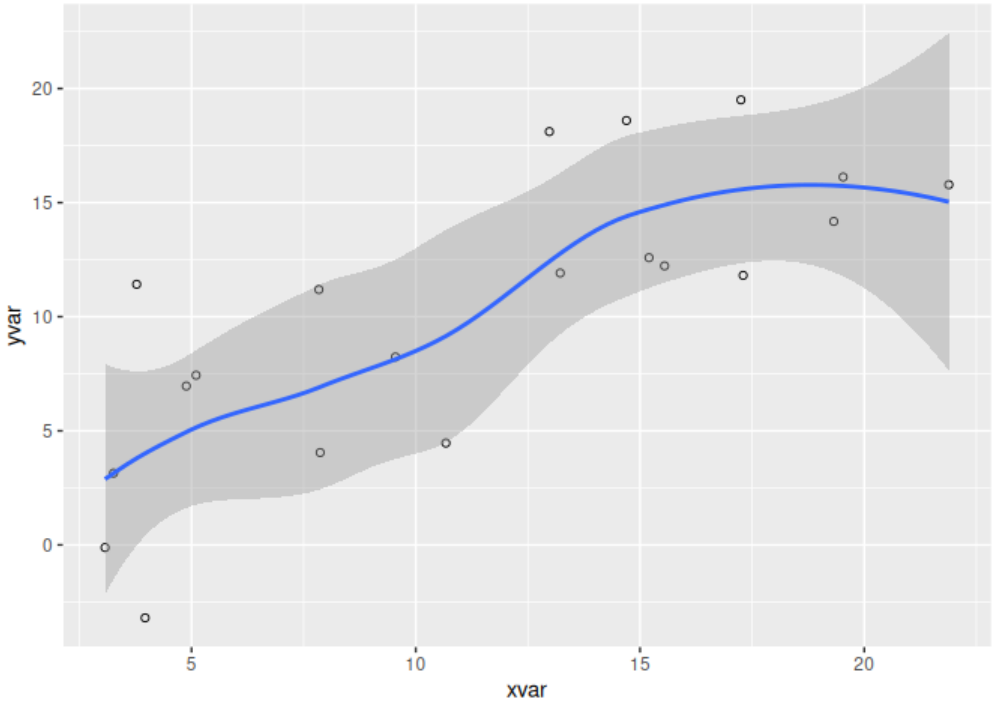

Figure 2: Pressure

Table 1: Diamonds characteristics

carat	cut	color	clarity	depth	table	price	x	y	z
0.23	Ideal	E	SI2	61.5	55	326	3.95	3.98	2.43
0.21	Premium	E	SI1	59.8	61	326	3.89	3.84	2.31
0.23	Good	E	VS1	56.9	65	327	4.05	4.07	2.31
0.29	Premium	I	VS2	62.4	58	334	4.20	4.23	2.63
0.31	Good	J	SI2	63.3	58	335	4.34	4.35	2.75

Table 1: Diamonds characteristics

carat	cut	color	clarity	depth	table	price	x	y	z
0.24	Very Good	J	VVS2	62.8	57	336	3.94	3.96	2.48

To learn how it was done, follow the code! Please take note that I was only referring to the output that was suggested in the `data_visualization.qmd` script located in the `Scripts/AnalysisScripts` folder. You can refer to the script for more information.

5 Conclusion

The text below is intended to be an instructive example…

Although your story must be auditable and replicable by your scripts, keep in mind that not everything in your scripts needs to be in your narrative. For example, you may want to include a summary of your results in your narrative, but you don't need to include all the code that generated those results. You can include the code in a separate script file that you reference in your table summary. In this approach, you can provide the context you need to audit your results within your repository, all the while keeping your narrative focused on the story you are trying to tell.

References

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