

Using Quarto for Parameterized Reports

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Parameterized Reports with Quarto

- [Quarto](#) is an open-source publishing platform for producing websites, PDFs, Word documents, slide presentations (and more!)
- It was developed by Posit (formerly RStudio) to bring benefits of Rmarkdown to more users
- It enables researchers to use different programming languages (currently R, Python, Javascript, and Julia) in the same project
- It is included in the free desktop version of RStudio



More about Quarto

- Quarto uses markdown language, so it will be familiar to R markdown users (.rmd files can be converted to .qmd)
- Templates for journal articles and websites
- Supports parameterized reporting

How did I use Quarto to complete a project?

- Collaborated with PPE and DDOE on project to create district and school reports in response to [SB4](#) and [HB304](#)
- Processed responses from completed Qualtrics surveys that included:
 - Assessment screeners for diagnosing difficulties with reading
 - Reading curriculums at each grade level
 - Percent of students at different benchmarks
- Needed one report per district (and charter) & one per elementary school (ended up being ~160 reports)

How do Word documents look?

- Headers in R become headers in Word
- When making tables with the {gt} package, table captions become table numbers
- Margins are pretty standard (but spacing between tables can be an issue)

Steps for making automating reports with Quarto

- Write your code in a Quarto (.qmd) document
- Create a data frame with two columns
 - One for your output file
 - One with the values of your parameters
- Use code chunks for your programs



Structure of a Quarto document

- YAML header
- Body of report
- Code chunks
- Text in markdown language

YAML Header

- YAML Header includes title, output format, and parameters

```
1  ---
2  title: "Example of Quarto Report"      # Set the title and author
3  author: "SVH"
4  format: juniper-html                  # Select the output format
5  code-fold: true
6  code-summary: "Show the code"
7  params:                               # Choose default parameters in key-value pairs
8    year: 2023
9    district: Cape Henlopen School District
10 ---
```

When you click the **Render** button a document will be generated that includes:

- Content authored with markdown
- Output from executable code



Parameters are referenced in code

```
1 str(params)
```

List of 2

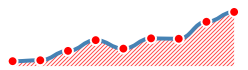
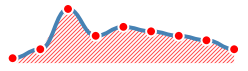
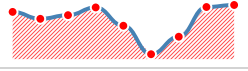
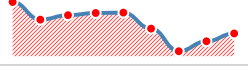
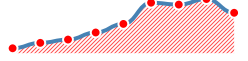
```
$ year      : int 2023  
$ district: chr "Smyrna School District"
```

```
1 district_enrollment <- enrollment |>  
2   filter(schoolcode == 0 & district == params$district & grade=="All Students" &  
3         geography=="All Students" & specialdemo!="All Students" &  
4         gender=="All Students" & race == "All Students")
```



Example Output from Parameters

- At rendering, the value is what is set in header

Trend in Enrollment for Special Demographic Groups in Smyrna School District			
Demographic Group	2015	2023	Trend for 2015-2023
Active EL Students	104	214	
Foster Care	24	26	
Homeless	235	252	
Low-Income	1,771	1,525	
Students with Disabilities	912	1,193	

Percent change in EoY Enrollment from 2015 until 2023			
School District	Demographic Group	% Change in District	% Change in State
Smyrna School District	Active EL Students	105.77%	51.23%
Smyrna School District	Foster Care	8.33%	-9.98%
Smyrna School District	Homeless	7.23%	11.06%
Smyrna School District	Low-Income	-13.89%	-12.73%
Smyrna School District	Students with Disabilities	30.81%	45.46%

How can we automate this?

Write
a single
report
in quarto.

Change
parameters in
quarto
manually to
publish reports.

Map over a
dataframe of
parameters to
automate creation
of many reports.



Create dataframe with parameters

First obtain the combinations of your parameters

```
1 district <- c("Cape Henlopen School District", "Brandywine School District", "Appoquinimink School District")
2 year <- 2023
3 districts <- data.frame(district, year)
4 head(districts)
```

	district	year
1	Cape Henlopen School District	2023
2	Brandywine School District	2023
3	Appoquinimink School District	2023



Make your output and list columns

```

1 reports <- districts |>
2   dplyr::mutate(
3     output_file = paste0(
4       `district`, "_", gsub(" ", "", year), "_Report.html"
5     ),
6     execute_params = purrr::map2(
7       district, year,
8       \(x, y) list(district = x, year = y)
9     )
10  ) |>
11  dplyr::select(output_file, execute_params)
12  head(reports)

```

	output_file
1	Cape Henlopen School District_2023_Report.html
2	Brandywine School District_2023_Report.html
3	Appoquinimink School District_2023_Report.html

	execute_params
1	Cape Henlopen School District, 2023
2	Brandywine School District, 2023
3	Appoquinimink School District, 2023



Publish the documents

```
1 reports|>
2   purrr::pwalk(
3     jph::quarto_render_move,
4     input = here("Code/CRESP_quarto_example.qmd"),
5     output_format = "html",
6     output_dir = here("Code")
7   )
```



Resources

- [Tutorial](#) for making parameterized reports in Quarto
- Another [tutorial](#) for different aspects of using Quarto
- [Guide](#) to using Quarto at Posit

