Dynamic Report Generation in R: LaTeX vs. Markdown

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What is knitr?

- "Elegant, flexible and fast dynamic report generation with R"
- An R package which allows R code and a document template to be combined
- Changes to the R code filter through to the document when the report is re-run

Why use knitr?

Fewer mistakes - when updating your R code it is easy to forget to update your report at the last minute

Reproducibility - the code used to perform the analysis is linked to the report, so can be easily reproduced

No copy/paste - no need to copy your results and graphics into a word or powerpoint document

Custom report styles - can create templates for custom styles and layouts

Why not?

Learning curve - you need to learn a mark-up language first

How does it work?

- Start with your report template (more on this later!)
- Put your R code in a "chunk" in the document:

In latex a chunk looks like:

```
<< my chunk name, ... >>=

my R code

@
```

In markdown a chunk looks like:

```
```{ my chunk name, ... }

my R code

```
```

How does it work?

- Load the `knitr` package
- Use the knit function to knit the document into the required format:

Latex:

```
library(knitr)
knit("myReport.Rnw")
```

Markdown:

```
library(knitr)
knit("myReport.Rmd")
```

Fun fact: Rnw stands for R Noweb

What do I get?

Latex	Markdown
R Noweb file (.Rnw)	R Markdown file (.Rmd)
↓	↓
Latex file (.tex)	Markdown file (.md)
↓	↓
PDF	HTML

"Hello World!" example

Latex

```
\documentclass{article}
\begin{document}

Hello World!

\end{document}
```

Markdown

```
Hello World!
```

How to make a title

Latex

```
\section{My Title}
\subsection{My Subtitle}
```

Markdown

```
%My Title
%%My Subtitle
```

How to make a list

Latex

```
\begin{itemize}
\item Item 1
\item Item 2
\end{itemize}
```

Markdown

```
- Item 1
- Item 2
```

How to make a table

Latex

```
\begin{tabular}{|c|c|}
 \hline
   Column 1 & Column 2 \\
 \hline
   Value 1a & Value 2a \\
   Value 1b & Value 2b \\
 \hline
\end{tabular}
```

Markdown

```
Column 1 | Column 2
      ---|---
Value 1a | Value 2a
Value 1b | Value 2b
```

Latex vs Markdown

Feature	Latex	Markdown
Bullet points / numbered lists	Yes	Yes
Auto-contents and page numbering	Yes	No
Dynamic figure referencing	Yes	No
Customised styling	Yes	Yes
Simple tables	Yes	Yes
Complex tables	Yes	No

NB - you can use any HTML as part of a markdown document

- you can customise layout, create complex tables for markdown using CSS

Latex

Why?

- Flexible
- Can do almost anything you need to do in-house
- Mathematical typesetting is excellent
- Auto-generates a contents page and page/figure numbers
- Lots of packages available, and many help forums and guides

Why not?

- Quite verbose
- Sometimes it can take ages to do something that seems very simple
- Learning curve

Markdown

Why?

- Very simple syntax
- Quick to learn and write

Why not?

- Cannot create complex tables or dynamic references
- Need to know CSS to add styling to a document
- Need to know HTML to create anything complex
- Creates HTML document

Which should I use?

It depends on your situation, but as a general rule:

- If you know latex, use latex
- If you want to do simple, quick documents without styling (or if you know CSS and HTML well), use markdown
- If you want to create complex documents with page numbers, contents, figure referencing and labelling, use latex

Thank you for listening!

Any questions?