LaTeX for Beginners Workshop

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NUTRITION INFORMATION

The use of LaTeX has expanded outside of STEM fields as more disciplines become involved with large statistical analyses and big data. Due to this, many researchers have become interested in utilizing LaTeX to produce clean, professional documents for many journals and graduate theses. Unfortunately, learning LaTeX can be a hurdle since in practice this software is a cross between coding and writing. Workshops can help bridge this gap to teach beginners how LaTeX works, get them started on their first journal article, and provide resources for help as they learn.

This recipe describes how to teach an introductory LaTeX workshop for a tech-savvy librarian. In addition, ideas for additional workshops are presented for chefs to follow as they expand their workshop offerings.

LEARNING OUTCOMES

- Workshop attendees will understand the basics of LaTeX, including how to use it in an online editor and/or a distribution installed on a computer.
- Attendees will also be introduced to the basics of reference management for their publications in LaTeX.
- Attendees will know where to find information when they need help, including free online resources.

NUMBER SERVED

This recipe can be done with a single lead instructor, but additional chefs are necessary if serving more than 25–30 attendees. An ideal number served is generally closer to 15–20 for one chef, allowing the chef to answer specific questions from attendees and help find coding errors during the workshop.

COOKING TIME

- Prep time will vary by the chef's familiarity with LaTeX. For a current LaTeX user teaching their first beginners workshop, expect 3–4 hours to develop an example article in LaTeX.
- 60-minute workshops are recommended with 30 minutes allowed after for follow-up questions by participants.

DIETARY GUIDELINES

This recipe is primarily focused on preparation for scholarly communications in STEM fields, reducing the barriers to writing that may occur when required to use LaTeX for theses, dissertations, journal articles, and more. Academic librarians may also find their knowledge grow rapidly regarding citations in LaTeX and be better equipped to answer patron questions. Finally, this recipe also supports the ACRL *Framework* under Information Has Value via generation of their own publications with citations.

INGREDIENTS & EQUIPMENT

- 1 lead instructor
- 1 or more projected screens
- 1 instructor computer with access to
  - LaTeX desktop distribution
  - Overleaf
- 30 laptops with access to LaTeX
- 1 instruction/seminar room with tables and chairs for up to 30 attendees

Increase numbers for a larger number served as needed.

PREPARATION

- Develop sample LaTeX article templates to use in instruction for Overleaf and/or a desktop distribution (TeXShop, MiKTeX, TeX Live, etc.). Template suggestions include
  - A few sentences to a few paragraphs in at least two different sections
  - Figure(s) and table(s), each with caption and label
  - Equations in text and in their own environment
  - A few references in a common style (APA, IEEE, etc) included as in-text citations and a bibliography
- Plan hands-on activities that can be done by someone with no prior knowledge of LaTeX. Have workshop attendees start with a built-in template for the software used and then working through adding

- Basic text, such as a sentence or two ("This is my first sentence in \LaTeX.")
- A figure from an image already on their computer or found online
- A citation found via a Google Scholar or other database search

Note: Citations can be problematic in LaTeX due to the ease at which errors can be induced in cross-referencing, so be sure to allow for extra time to test different citation styles. (See Chef's Notes for information about citation managers and LaTeX.)

- Develop or locate relevant handouts (physical or electronic) for workshop attendees. Some suggestions for handout contents include
  - Tips for getting started
  - Free resources and/or library resources related to LaTeX (examples can be found in the Additional Resources section)
  - Contact information of the chef teaching the workshop
  - Keyboard shortcuts

Note: Although Overleaf has handouts, their online interface/software changes periodically, so be sure to check for the latest versions.

COOKING METHOD
Begin the workshop by introducing LaTeX, then explain how it works, followed by demonstrations and hands-on activities, finishing with additional resources and tips. The chef is encouraged to develop a lesson plan that is appropriate for those served by this recipe based on their expected audience.

A sample instructional outline is provided here with suggested times for each portion assuming attendees are primarily graduate students with very little (if any) LaTeX experience:

1. **Introduction/welcome.** Introduce your library branch/part and make attendees feel welcomed. (1 minute)
2. **Poll audience** (show of hands or similar) to help get a sense of their needs/background. (1 minute)
   - How many of you have used LaTeX before?
   - How many of you are planning to use it for an upcoming writing project?
3. **Outline workshop for attendees.** (1 minute)
   - What is LaTeX?
   - How LaTeX works.
   - Creating your first article.
   - Final tips and information.
4. **What is LaTeX?** (5 minutes)
   - Typesetting system/document preparation system
   - Combination of coding and writing that works by environments

- Advantages: clear and professional documents, great for tables, etc.
- Disadvantages: learning curve, debugging, etc.
5. **How LaTeX works.** Code a command and the system reads it based on the environment specified. (5 minutes)
   - Example: Live coding of a sentence with equation ($E = mc^2$) noting math environment specified and then more complex version (see figure 1).
6. **Hands-on: Creating an article.** (30 minutes)
   - Get attendees started in their editor of choice (online or distribution):
     - Overleaf/online editor: help attendees sign-in/create accounts.
     - Distribution: have attendees open the one on their computer.
   - Open article template: direct attendees on how to start a template they can edit.
     - Overleaf: new example project
     - Distribution: new from stationary (or similar depending on their software)

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\begin{equation}
KE = \left[\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}\right]mc^2
\end{equation}
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$$(1) \qquad KE = \left[\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}\right] mc^2$$

Figure 1. LaTeX example equation notation and result

– Once all have an article template open, walk them through adding and recompiling after each addition (and answering debugging questions as needed):

  ■ Basic text, such as a sentence or two. ("This is my first sentence in \ LaTeX.") Typing this directly in the text file, and allowing them to see how the document changes.

  ■ A figure from an image already on their computer or found online. Copy and paste from an existing figure template text and allow them to edit the text to use their image instead (can also show scale command here).

  ■ A citation found via a Google Scholar or other database search. Go to database and run a search on a topic of their choice and demonstrate how to find and add the BibTeX formatted citation to the .bib file (or end of the sample document).

7. **Tips.** (2 minutes)
   – Use commenting (% symbol) as you generate your documents.
   – Be careful when copying and pasting from word processors as special characters and stylized fonts may induce errors or be ignored.
   – Consider the multiple options for reviewing/tracking changes when working on larger projects.

8. **When you need help** (demo places to go for information/help): CTAN, StackExchange, books, and more. (5 minutes)
   – Contact with questions

(Post workshop option: Q&A time with attendees as needed for 30 minutes)

CHEF'S NOTES

There are different ways to customize how this workshop is presented, so it is up to the chef to decide on what options work best for their expected attendees. First, the chef can ask attendees to bring their own laptops to participate, and those that do not have one can use a library laptop or partner up with another attendee. Also, although this chef has found that most attendees prefer Overleaf for learning and using LaTeX, some attendees prefer desktop distributions. The chef should be prepared to answer questions about both online and desktop versions and can even demonstrate how both function by making basic edits in both while explaining how LaTeX works. Finally, if the chef finds that more than 30 attendees is preferable for their organization, an additional chef is recommended to accommodate the larger size. This allows for one chef to present while the other is available to wander/answer questions.

The chef should also be aware of some aspects of citations in LaTeX that can cause complications when teaching. For example, different citation styles can require different citation packages as not all will work with the default BibTeX compiler. Additionally, different citation managers export to BibTeX format differently with some translating special characters correctly (such as ä to {\"a}) and others not. This chef has found Zotero to be the most consistent in exporting to BibTeX

compared to EndNote and Mendeley. Zotero also has an add-on called Better BibTeX that can set citation keys/labels based on the user's preference.

Last, there are options to expand from the base workshop given in this recipe to other topics while following a similar hands-on focused workshop. Other reuse and modification options include topics such as citations and references and/or theses and dissertations. These modified recipes have also cooked up well with graduate students at the University of Maryland. For a citations and references workshop, the main focus can be on importing/exporting multiple references from the library's most common databases to each of the major citation managers (EndNote, Mendeley, Zotero) and then into BibTeX format, producing a .bib file. Then, attendees can cite multiple references in the text from their .bib file, producing a bibliography, and/or converting between different common citation styles (APA, IEEE, Chicago, etc.) and citation packages (cite, natbib, biblatex). For a theses and dissertations workshop (or more generally large projects), focus can be on working with the report or book document class in LaTeX. Attendees can work with a basic LaTeX template or the organization's template for theses and/or dissertations to create different elements of larger scholarly outputs, such as an additional chapter and/or multiple reference files (.bib). The workshop can also include having attendees think about file organization in the context of LaTeX even down to the level of how they name their chapters

and figures. These are just some options for the chef to consider and there are many more possible; just make sure to tailor to your organization's needs.

ADDITIONAL RESOURCES

- LaTeX learning resources:
    – The LaTeX Project. Main software information. latex-project.org
    – CTAN. Packages information lookup and download. ctan.org
    – Tex StackExchange. Q&A for LaTeX users. tex.stackexchange.com
    – Overleaf. Overview of many LaTeX topics. overleaf.com/learn
    – Books: check the library's catalog for LaTeX (especially check for books with syntax/command and concept lookup in the index such as "More Math into LaTeX")
    – Links to workshop materials at the University of Maryland Libraries within the Research Commons are included below. An overview of each workshop can also be found at https://www.lib.umd.edu/rc/common-quandaries
    – LaTeX for Beginners Workshop
        ■ Handout: https://www.lib.umd.edu/binaries/content/assets/public/rc/latexgettingstarted.pdf
        ■ Example files: https://www.lib.umd.edu/binaries/content/assets/public/rc/latexworkshopexample2019.zip
    – LaTeX Reference Management and Citations Workshop
        ■ Handout: https://www.lib.umd.edu/binaries/content/assets/public/rc/latexcitetips_2020.pdf
        ■ BibTeX example files: https://www.lib.umd.edu/binaries/content/assets/public/rc/bibtex_example.zip
        ■ BibLaTeX/biber example files: https://www.lib.umd.edu/binaries/content/assets/public/rc/biber_example.zip
    – Theses & Dissertations Workshop
        ■ Handout: https://www.lib.umd.edu/binaries/content/assets/public/rc/latexresources_tips_2020.pdf
        ■ University of Maryland LaTeX template: https://ireap.umd.edu/sites/default/files/documents/theses/LatexThesisFiles_2020.zip