

L^AT_EX for academics and researchers who (think they) don't need it

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Abstract

This paper is written for academics and researchers who don't use L^AT_EX and wonder why anyone does. People who *do* use L^AT_EX (probably all of the readers of the article in this journal) may wish to share the article with their colleagues.

1 Introduction

Why should you learn L^AT_EX? To the uninitiated, L^AT_EX code looks bizarre. Like this:

```
\item Order each distribution. Let
 $x_{(1)} \dots x_{(n)}$  be the ordered x
values, and  $y_{(1)} \dots y_{(m)}$  be the
ordered y values; and let  $m \leq n$ .
\item If  $m=n$  then  $x_i$  and  $y_i$  are both
 $(i-0.5)/m$  quantiles of their distributions;
in this case, simply graph  $x_i$  against
 $y_i$  (if  $m$  is very large, say, more than
500, then fewer quantiles are needed).
```

Why would anyone bother with all that arcane stuff to prepare documents? Why not just use Word or some other word processor?

Well, there are lots of good reasons. For people in some disciplines, L^AT_EX is virtually indispensable. You've managed to get along without it. But if you give it a try, you may wonder *how* you got along without it. It takes some getting used to, and you'll probably have some problems at first, but it's not really that hard; simple things can be done very quickly, and there are lots of resources to help. Once you are used to it, L^AT_EX is *easier* to use than word processors; in particular, it makes certain parts of writing scholarly articles much easier. Most of these articles include bibliographies and L^AT_EX has tools to manage bibliographies. Different publishers require different formats, L^AT_EX has tools to manage these, and some publishers may even provide their own L^AT_EX formatting templates, so that everything is set up automatically. Papers may include figures and tables, and, when they do, they will require cross-referencing, and, yes, you guessed it, L^AT_EX has tools to handle this as well. And many papers require revisions, both before and after they are submitted. L^AT_EX will renumber everything automatically — references, cross-references, section numbers — everything.

When you want to make presentations, L^AT_EX has add-on packages which can help create presentations that look good, and can include many options for overlays and navigating through a presentation. Finally, if you decide to write a book, L^AT_EX can handle books of any length, and can produce books of real beauty (for one example, take a look at [3]).

This article is organized as follows: in section 2, I cover some of the basics of using L^AT_EX. In section 3, I give more detail on the helpful things L^AT_EX can do that I listed above. In section 4, I show why some of the bad things you may have heard about L^AT_EX aren't true. Finally, in section 5, I give some resources for those who want to learn more.

2 The very basics

L^AT_EX is not a word processor. It's a document preparation system. Rather than type words and then format them using drop-down menus, in L^AT_EX the formatting is part of the text, all of which is written in ASCII characters. At first, this seems bizarre, but after a while (not too long a while) you begin to appreciate it.

L^AT_EX does *exactly* what you tell it. You can *see* what you are telling it; if something goes wrong (and it will) you can try to find the problem yourself, and, if you can't, you can show it to others. You can even e-mail it. Try doing that with something you did in a word processor; "Well, I was using version 9 and I clicked on this, and then on that, then the pull-down menu appeared and I clicked on the default ... then I entered 2". Sheesh. With L^AT_EX, you can e-mail your actual code to an expert, or to one of the help groups listed below. The L^AT_EX community is friendly, there are places to go to get help, probably right on your campus. In my experience, L^AT_EX experts welcome L^AT_EX novices. (Some suggestions of where to get help are in section 5.)

3 The good stuff

3.1 Sectioning

So, you're writing a long article. It has sections. How to create them? An example:

```
\section*{Introduction}
In this article I prove that the key dependent
variable in my field is related to the
particular independent variables I have
available to me, and in just the ways I
thought it would be.
\section{Methods}
  \subsection{Subjects}
    A bunch of students who happened to be
    in my class the day I had a bad cold
    and couldn't give a lecture.
  \subsection{Analysis}
    I think I tried ANOVA.
\section{Results}
All my null hypotheses were rejected.
Now they feel bad.
\section{Discussion}
If this doesn't get me a big grant, I'm
history in this department. Maybe I can
find work as a \LaTeX{} compositor?
```

(Note that you can indent your source however you like). L^AT_EX will handle the numbering, the formatting, the spacing, and all that, leaving you free to do the writing and the thinking. And L^AT_EX won't try to guess what you're thinking, or start numbering sections whenever you type a number, or start indenting like crazy.

3.2 Cross-referencing

At some points in your article you want to refer to other parts, or to figures, or tables. No problem. At the part you want to refer to you need a `\label` command, and at the point where you make your reference, you need a corresponding `\ref` command. Like this:

```
In subsection \ref{SS:section} I showed you how
to create sections and subsections.
```

This produces the following:

```
In subsection 3.1 I showed you how to create
sections and subsections.
```

3.3 A simple table

OK, I admit it. It can be hard to create complicated tables in L^AT_EX.¹ It's hard to create good complicated tables in *any* program. But simple tables aren't so bad. Here's an example:

¹ Some L^AT_EX systems automatically put the basics of an environment in place for you, such as XEmacs, LyX, T_EXmacs, and others.

```
\begin{table}
\centering
\begin{tabular}{lrr}
Quantile & Male & Female\\\hline
0\%      & 59  & 44\\
50\%     & 69  & 64\\
100\%    & 77  & 71\\
\end{tabular}
\caption{Quantiles of male and female heights}
\label{tab:malefemale}
\end{table}
```

which produces Table 1:

Quantile	Male	Female
0%	59	44
50%	69	64
100%	77	71

Table 1: Quantiles of male and female heights

What does all this do? Well, there isn't space here to go into everything even for this table (see Section 5). But for a start:

- The `\begin{table}` and `\end{table}` define a *table* which can be placed anywhere in a document, and given a caption and a label. Every `\begin` must have an `\end`.
- The `\centering` command horizontally centers everything following until the `\end{table}`.
- The `\begin{tabular}` sets up a table, and the `{lrr}` makes it three columns with the first left aligned and the others right aligned.
- The ampersands (the `&` character) separate columns.
- A double backslash (`\\`) ends each row.
- The `\hline` adds the printed horizontal line.

3.4 Graphics

L^AT_EX also provides extensive methods to deal with graphics. For social scientists, perhaps the most useful are ways to directly import `.pdf` and `.eps` files that are created by other programs, such as statistical packages. Although the full use of imported graphics can be complex (see Section 5) a basic example takes the following steps:

1. Create your graphics file (e.g., `diagram1.pdf`) and store it in the same directory with your L^AT_EX file for the article you are writing.
2. In the preamble include the following command: `\usepackage{graphicx}`.
3. At the spot where you want your diagram, put `\includegraphics{diagram1}`.

If you want L^AT_EX to move the figure to the closest position where it will fit in your document, give it a label and cross-reference inside a `figure`, similar to the previous `table` example. For instance:

```
\begin{figure}
  \centering
  \includegraphics{diagram1}
  \caption{This is an example of a figure.}
  \label{fig:example}
\end{figure}
```

3.5 BibT_EX

Although space here does not permit a full discussion of bibliography creation in L^AT_EX, you should know that there is a package called BIBT_EX which allows you to create extensive bibliographies, enter the information for each citation in a natural way, and then never have to reenter the information again. There are methods for formatting the citations to match a wide variety of styles.

4 The (supposedly) bad stuff

4.1 L^AT_EX is hard to learn

OK, this is *partially* true, in that, if you want to or need to, there is a *lot* you can do with L^AT_EX. You can create complicated diagrams, write long books with complex and beautiful formatting, create multiple indexes, and multiple lists, and on and on. But the *basics* of L^AT_EX are *not* so hard; in fact, you're well on your way with what you've seen here.

4.2 L^AT_EX can't be annotated

This one is simply incorrect. There are several ways to insert editorial comments into L^AT_EX files. One is to use the `\textcolor` command to insert comments in a different color. Another is to use `\marginpar` to insert comments in the margin.

4.3 You can't share L^AT_EX files with people who use Word

There are some free programs which attempt to convert L^AT_EX to Word, for example, `latex2rtf` (<http://tug.org/utilities/texconv/latex2rtf.html>). I haven't tried these extensively. For Windows, I have found the commercial program TeX2Word to be quite useful; see <http://www.chikrii.com/> and Dave Walden's articles [4] for more information on this software.

4.4 You can't see the output while you type

While technically true, typesetting a file and previewing the result is typically a matter of a sin-

gle keystroke or mouse click, and typesetting is extremely fast.

5 Where to go from here

There is a huge variety of materials to help you learn more about L^AT_EX:

- CTAN (The Comprehensive T_EX Archive Network) is a repository of T_EX macros, packages, formats, utilities, and other goodies, and has lots of material, some of it for beginners. Two that I found useful are
 - For more on graphics, see <http://www.ctan.org/tex-archive/info/epslatex>.
 - For a thorough introduction to L^AT_EX, see <http://www.ctan.org/tex-archive/info/beginlatex>.

There are numerous other introductory materials there, as well—the above are just my own preferences.

- Books, including:
 1. *Guide to L^AT_EX* [2] which is an excellent introduction to L^AT_EX.
 2. *Math into L^AT_EX* [1], which is particularly useful if you have to type a lot of math.
 3. *The L^AT_EX Companion* [3]. This is a great reference, but not for beginners; it's also good for impressing people with the power of L^AT_EX. If you start using L^AT_EX a lot you will probably wind up wanting this one.
- The mailing list for general questions and discussion is <http://lists.tug.org/texhax>.
- The T_EX newsgroup, `comp.text.tex`, is also for general questions and discussion.
- There are a number of FAQs and lists of tips and tricks; two I've used are
 1. <http://www.tex.ac.uk/faq>
 2. <http://www.texnik.de/>

References

- [1] George Grätzer. *Math into L^AT_EX*. Birkhäuser, New York, 3rd edition, 2000.
- [2] Helmut Kopka and Patrick W. Daly. *Guide to L^AT_EX*. Addison Wesley, Boston, 4th edition, 2004.
- [3] Frank Mittelbach, Michel Goossens, et al. *The L^AT_EX Companion*. Addison Wesley, Boston, 2nd edition, 2004.
- [4] David Walden. Travels in T_EX Land. *The PracT_EX Journal*, 2005 (issues 3 and 4). <http://tug.org/pracjourn/2005-3/walden-travels> and <http://tug.org/pracjourn/2005-4/walden-travels>.