

Mastering T_EX with Templates

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ABSTRACT

Large scientific laboratories and government research sites, with from 1,000 to 5,000 employees, are the natural domain of T_EX. However, the degree of secretarial (i.e., keyboarding) motivation for learning T_EX in such an environment, is far below what is generally found in business, commerce, and industry. One such national laboratory, NCAR, has avoided near mutiny by the support staff and decreased learning reluctance by providing on-line templates for all frequently used types of correspondence. Statistics of the learning curve, comparisons of teaching techniques, and examples of templates illustrate a hard-earned victory for T_EX, at long last the preferred scientific word processing software of NCAR scientists as well as support staff.

1. Introduction

The National Center for Atmospheric Research (NCAR)¹ is located in Boulder, Colorado. Its origins, some twenty-five years ago, involved a small group of scientists — physicists, mathematicians, engineers — whose common interest was the natural phenomena of the atmosphere and oceans. It was their hope that, by collaborating and combining efforts and expertise, they could work toward a better understanding of those aspects of weather that endangered lives and destroyed property. Inherent in this mutual goal was the critical need to improve weather prediction, for the benefit of mankind. This national atmospheric research center was, and is, sponsored by the National Science Foundation in Washington.

Today, NCAR has close to 1,000 employees. Its most outstanding product takes the form of scientific papers, carefully refereed by colleagues throughout the world, and published in some twenty monthly American and international journals. These papers and articles must be produced, frequently in camera-ready form, by secretaries and clerical personnel, most of whose word processing knowledge began with the IBM electric typewriter.

2. T_EX Arrives

Four years ago, T_EX came to the attention of several NCAR scientists. Admired for its typeset appearance and praised for its ability to produce any and every type of mathematical equation needed for technical research reports, T_EX was acquired and installed on the VAXes of several scientific groups. A few scientists with programming background began to use it. None of the support staff, i.e., secretaries, had seen or heard of T_EX.

One of the more creative scientists placed a copy of *The T_EXbook* on my desk with the comment “See how you like this word processing program!” I scanned through the book, made a mental note to try to make some sense of it if and when I had the time, and returned to our state-of-the-art stand-alone workstations, Micoms and NBIs.² Returning a week later, the scientist inquired if I had started using T_EX in our office production. I stammered: “No, not yet.” I had been too embarrassed to follow up

¹ The National Center for Atmospheric Research is sponsored by the National Science Foundation.

² Two years earlier, the IBM Selectric had reigned supreme; and many long-term secretaries still resisted the upgrade to the large and cumbersome stand-alones.

with “Why should I? I can’t understand the book. There’s no one to help me. I’m not a programmer or a computer scientist.” But the episode remained in my mind as a challenge. I decided to see our VAX system manager. He gave me brief instructions, taught me a few VAX DCL commands, showed me the location of the new laser printer, and promised to bring a terminal to my office.

The struggle began! I managed at last to hammer out a letter that resembled, lamely, the crisp NBI format we had all become accustomed to. I had no experience with which to equate my knowledge of typewriters and NBIs to the commands and output of T_EX. Margins? Double spacing? Tabs? Indented paragraphs? *Equations*? And I had no one to ask.

I saved that first letter and stapled it to the input page of T_EX commands. Grimly, I twisted and tweaked T_EX into giving me a two-page memo. An abstract containing several equations finally appeared, to my amazement. My collection of samples increased. But it was painfully slow. At the slightest hint of a one-hour deadline, I returned to my simple and predictable NBI.

A breakthrough occurred about six months later. I met a secretary, Eileen Boettner, from another NCAR site seven miles away. We discovered that we had reacted to the T_EX challenge in the same way. My new friend had also saved her samples, and we began to discuss our T_EX problems. Each of us, in her own location, had become a resource to other secretaries. Our samples were hopelessly chained to typewriter terms and NBI keyboard procedures. Glue? Boxes? Modes? Those concepts were obviously meant for programmers and hackers. We would have to manage without them.

Management soon began to make it clear that T_EX was highly desirable, if not absolutely necessary, for all scientific output.

3. T_EX Templates Arrive

My friend and I, remembering how hard it had been for us to produce the most primitive correspondence in T_EX, combined our samples into an NCAR technical report. By sharing copies, we could make it easier to guide others through those early months of discouraging trial and error.³ We organized our material along the lines of NCAR’s needs and uses. We created a table of contents; we color-coded the examples and their hard-copy input pages. Every example or template was given a number. Each template appeared in its final output form, attached to which was the corresponding page of T_EX commands that produced it. Our “Index,” as we titled it, quickly became an in-house best seller! Lines formed outside of our offices; numerous phone calls and mail requests interfered with our regular work. To date, our 350-page effort — primitive through it is — has undergone three printings totalling about 5,000 copies. Many users have reported that they, in turn, have made countless photocopies for their friends, staff, and colleagues. Requests have been filled from users as far away as Denmark, Australia, China, Japan, Germany, and Brazil.

We asked our VAX system personnel to make the Index available electronically. For example, if Item 15, “References”, was needed by a user, he or she “copied” the corresponding template into his directory from the system. This eliminated the much dreaded keyboarding of a series of confusing — and impossible to debug — T_EX commands, with the obvious certainty of typos and mistakes. It was simple to delete the words on the example and enter the current words. Users were much too mystified by the ubiquitous commands to touch anything preceded by a backslash. Our VAX system manager began to make tapes of the Index and mail them to users in universities and institutions upon request. To date, at least 6,000 T_EX users have been able to start using T_EX without computing or programming knowledge but, unfortunately, without understanding some of T_EX’s unique and basic concepts.

As Management gave T_EX the executive nod of approval, rumors of discontent from the tenured, senior secretaries were rampant. At several sites of our organization, groups of secretaries met; they aired and drafted their complaints. The core of this discontent centered around the fact that there had been no mention of re-classifications or salary increases for the staff who felt “pushed” into learning this difficult new word processing software. T_EX obviously required skill and capabilities that had not been requisites in the traditional secretary’s job description. T_EX was different, better, and only programmers were able to master it. In short, the gauntlet thrown down was “We’ll learn T_EX if Management makes it worth our while.”

³ A T_EX preview device was not available at our research site during this time.

NCAR's budget at that time did not include mass salary raises for the support staff. Management's hope may have been that T_EX's efficiency and speed would reduce the number of support staff needed. To complicate the issue, more scientists could now T_EX their own lengthy, equation-filled papers. The secretaries' complaints and petitions were fended adroitly, and T_EX began to appear on job descriptions as a Required Skill instead of an Optional Skill. Motivation to learn the new software, however, was visibly lagging.

Meanwhile, news of the Index began to spread by word of mouth: a typist's tutorial for T_EX—no formal training nor programming experience necessary. The scientists had enthusiastic praise for anything produced in T_EX by the staff. T_EX's superior output resulted in an elitist competition between scientists and supervisors. "My research paper is being produced in T_EX." "My office is now using T_EX for all output." "Our secretary is leaving to get married. We need to replace her with *someone who knows T_EX*."

At this point, many doubts and questions began to give me increasing concern. Was the Index a satisfactory vehicle for teaching T_EX? Did the Index succeed in motivating nonscientific personnel to learn T_EX? Could this Index be used as effective documentation for learning T_EX? My answer, as would be the answer of any experienced teacher, was "If it works, use it."

The title of this paper is "Mastering T_EX with Templates." I have three years of experience that back up my claim that anyone without computer or programming experience can learn T_EX by using a system of on-line templates. An important provision states that the examples, or templates, be of high-frequency use within an organization. Either Preview software or a nearby printer, preferably both, are highly desirable. The Index has the advantage of not being unnecessarily verbose, such as the conversational style and running format we find in traditional software documentation. Folksy and lengthy explanations of commands and exceptions serve only to frustrate the beginner. The oft-seen documentation breach of avoiding any representation of what appears on the user's screen is side-stepped by the input/output pages of the Index. Another critical factor for the learner is his environment of stress or pressure; if an impatient supervisor is anxiously awaiting the output, no learner can be receptive to new T_EX concepts and detailed explanations.

4. T_EX by Osmosis

Inevitably there are calmer, quieter hours in the secretary's day. Aware that **h** represents horizontal and **v** vertical, the learner's perception of the meaning of all commands beginning with **h** and **v** can result in cautious explorations:

"Change `\vskip1truein` to `\vskip2truein` if twice the space is needed. An `\hfill` can shift the location of the date in a line, depending on its placement."

A sense of control rewards the keyboarder who timidly experiments with variations in the `lineskip`. Commands such as `\hsize/\vsize`, `\hfill/\vfill`, `\eject`, `\centerline`, `\indent`, `\hskip/\vskip`, `\nopagenumbers`, `\raggedright`, and `\hoffset/\voffset` are not difficult to understand. Greek letters and mathematical symbols are as close as Appendix F in *The T_EXbook*. `\obeylines` and `\obeyspaces` are a boon to those who still wistfully hold out for WYSIWYG. `\settabs` are a welcome discovery when problems arise with the `cc:` after the closing of a letter. Font changes may require a visit (but only once) to the system manager, and aligned columns in tables may possibly be the last frontier in T_EX mastery.

With the Index in hand, beginners can start T_EXing without delay, and this early success is the most motivating factor of all. There is a maxim that all teachers heed: No one can learn until he or she is ready to learn. And as far as learning T_EX is concerned, a learner is not ready until he wants to learn.

In my experience, the language itself used in T_EX commands encourages the learner to experiment with altering the templates to serve his needs. This kind of learning is self-rewarding. An encouraged learner can evolve into a curious, audacious learner who may even decide to defer his doubts to the heretofore neglected *T_EXbook*. The occasional familiarity of commands found within its pages continues the cycle of curiosity and reward. In a matter of weeks, the learner is ready to consider the more discrete concepts. It occurs to him that a formal T_EX class might be helpful. He has unconsciously begun to shed the old typewriter habits; he realizes that the flexibility and power of T_EX can elevate him to

levels and standards of production that will be recognized and praised by peers and supervisors.

5. Conclusion

If you have yet to succeed in motivating reluctant personnel to break away from out-moded word processing methods and begin experimenting with \TeX , I suggest that you consider this approach. Tenured administrative staff, because of a lack either of self-confidence or of technical education, can surprise us by their enthusiastic support of \TeX . Extend such a opportunity to them. Meet them half-way with a collection of templates based on familiar output. There may be costly consequences, however. It may be necessary later to budget for their advanced \TeX classes. In time, there may also be a need to cover all of their expenses to annual TUG meetings.

Bibliography

Boettner, Eileen, and Hope Hamilton. *Definitive NCAR Index for \TeX for NCAR Scientists*. Boulder: National Center for Atmospheric Research, NCAR Technical Note, NCAR/TN-266+1A, 1986.

Knuth, Donald E. *The \TeX book*. Reading, Mass.: Addison-Wesley, 1984.

Appendix A: Customized TeX Templates

The following table of contents reflects my organization's word processing activities:

Abstracts (See Manuscripts)	Top, centered
Contents, Table of (See Tables)	Begin with Introduction
1. Equations	Roman and arabic
Within text (see also Manuscripts)	Discretionary
Centered/displayed	Corner
2. Figure Captions	Book/chapter headings
Examples	15. References
Fonts (see Typefaces)	Examples
3. Footnotes	Résumés (see Vitae)
Examples	16. Reviews
Forms (see Reviews, Spacing, Tables)	Manuscript/article
4. Format/Default	NSF
TeX's built-in settings/no commands necessary	SCD
(See also Spacing, Letters)	17. Seminars
Hyphens (see Spacing)	Examples
5. Indenting	18. Spacing
Paragraphs	Horizontal
Quotations/narrower margins	Centering
Numbered items	Flush left/right
Outline	Between words/letters
Columns (see also Lists, Tables)	Word break/hyphen
6. Letterheads	Vertical
7. Letters	Single/double
Business (letterhead included)	Between paragraphs
Business (letterhead, address, cc.,	Line skipping/page break
2nd page heading)	Examples
Business (multiple addresses)	19. Tables (see also Tabs)
Business (use with letterhead)	Budget
Personal	Manuscript
cc: (see Tabs)	Ruled
8. Lines/underlines/overlines	Typeset
9. Lists (see also Tabs)	Forms
10. Manuscripts	Flow Charts
Journal publication	Routines
Conference, camera-ready	Contents
Journal, camera-ready	20. Tabs (see also Tables)
AGU abstract	21. Title Pages
Book, typeset,	Examples
11. Margins (see also Format)	Transparencies (see View-graphs)
Examples	22. Typefaces (Fonts) and Sizes
12. Memos	Typefaces (Fonts)
Examples	Sizes
13. Minutes	23. View-graphs
Notices (see Seminars)	Examples
14. Page Numbers	24. Vitae, Curriculum
Bottom, centered	Examples
No page numbers	APPENDICES
Roman and arabic	A. Greek/symbols
Discretionary	B. Error Messages
Corner	C. Quick Command Shortcuts

Appendix B: Samples of a Title Page and a Memo

The examples that follow illustrate early steps in the transfer from typewriting or stand-alone word processor usage to simple T_EX output.

Example 1: Title Page

Output:

AIRBORNE LASER AND DOPPLER RADAR SYSTEMS

PART II: DESIGN CRITERIA

by

K. L. Rolff

Arles National Laboratory, Denmark

and

D. L. Adrian

National Center for Atmospheric Research*
P. O. Box 3000, Boulder, CO 80307

Input:

```
\vskip.3truein
\centerline{\bf AIRBORNE LASER AND DOPPLER RADAR SYSTEMS}
\vskip .2truein
\centerline{\bf PART II: DESIGN CRITERIA}
\vskip .4truein
\centerline {by}
\vskip .26truein
\centerline {K. L. Rolff}
\vskip .17truein
\centerline {Arles National Laboratory, Denmark}
\vskip .3truein
\centerline {and}
\vskip .3truein
\centerline {D. L. Adrian}
\vskip .17truein
\centerline {National Center for Atmospheric Research\footnote*{The National
Center for Atmospheric Research is sponsored by the National Science
Foundation.}}
\centerline {P. O. Box 3000, Boulder, CO 80307}
```

* The National Center for Atmospheric Research is sponsored by the National Science Foundation.

Example 2: Memo

Output:

1 October 1987

MEMO TO: Algernon P. Esworthy
FROM: Mary R. Stuart
SUBJECT: Definitive NCAR Index for T_EX

This *Index* does not pretend to be an extension of Donald Knuth's comprehensive *T_EXbook*. It contains, instead, a condensation of the text-formatting output most frequently used by the scientific community of NCAR. Also, as a special *lagniappe*, each example includes its own NCAR computer location; scientists can access and thus copy our "templates" to their directories where they can be used and altered to accommodate their needs.

The authors thank our many T_EX-using friends who have shared their discoveries — serendipitous or otherwise. Their generosity has contributed greatly to the wide range of examples included in the Index.

End of Memo

cc: W.C. White
University of Illinois

Input:

```
\parskip=4pt
\parindent=30pt
\nopagenumbers
\raggedright
\hsize=5truein
\vsize=6truein
\hfill {1 October 1987}
\vskip .2truein
\settabs\+\noindent&MEMO TO: \qqquad&\cr

\+&MEMO TO:      &Algernon P. Esworthy \cr
\medskip
\+&FROM:         &Mary R. Stuart \cr
\medskip
\+&SUBJECT:      &Definitive NCAR Index for \TeX \cr
\bigskip
```

This {\it Index} does not pretend to be an extension of Donald Knuth's comprehensive {\it T_EX book}. It contains, instead, a condensation of the text-formatting output most frequently used by the scientific community of NCAR. Also, as a special {\it lagniappe}, each example includes its own NCAR computer location; scientists can access and thus copy our "templates" to their directories where they can be used and altered to accommodate their needs.

The authors thank our many \TeX -using friends who have shared their discoveries --- serendipitous or otherwise. Their gener\~osity has contributed greatly to the wide range of examples included in the Index.

\bigskip

\centerline {End of Memo}

\vskip .3truein

\settabs\+\noindent &cc: \quad & \cr

\+&cc: &W.C. White \cr

\+&& University of Illinois \cr