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On Redesigning an Academic Journal

by
Robert Marks †

Abstract:

The purpose of this paper is to explain the process of redesign that the JOURNAL has recently undergone, and to discuss likely changes in the submission and editing process which may soon affect authors, editors, and reviewers. Written by one of the editors of the JOURNAL in his capacity as designer of its new appearance and overseer of its production editing, the paper argues for the importance of design and layout—elements of the delivery of the theory and results of papers almost entirely overlooked by authors. After outlining pitfalls in moving from typewriter to typesetter, the paper describes the design choices made at the JOURNAL, and its partly automated copy-editing. Using standard protocols, authors and editors will increasingly communicate electronically. The paper includes discussion of mark-up text processors and suggestions for authors who wish to submit their manuscripts on computer disk.

Keywords:

DESKTOP PUBLISHING; LAYOUT; DESIGN; ELECTRONIC MANUSCRIPT; MARK-UP TEXT PROCESSING.

† The Australian Graduate School of Management, University of N.S.W.

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Design is choice
— Edward R. Tufte (1983)

1. Introduction

All prospective authors are aware of at least one of the functions of academic journals: screening for worthwhile articles, and in doing so providing advice on content and presentation. In a wider context, journals provide an essential avenue for academic debate in a form which records the progress of this discussion. The main goal of the academic author in writing his paper is to present the results and conclusions of his research in a convincing manner. The main goals of the reviewer (AJM, n.d.) are to examine the manuscript for the importance of its theoretical contribution or its data and results, or for its competence in critically summarising or replicating or building on existing work. The editors and staff of academic journals, after establishing the areas of interest of the journal, should facilitate the processes described above, ironically as invisibly as possible. To do this, however, they find themselves concerned with three broad and not mutually exclusive issues:

- readability,
- æsthetics of presentation, and
- the mechanics of production and presentation.

This paper is written to discuss these issues briefly, from the point of view both of an academic journal and of an individual author, and to outline one possible solution to them, that chosen by the AUSTRALIAN JOURNAL OF MANAGEMENT.

To judge from a copy of the papers and proceedings of a recent international conference (Wood 1987) in which the authors prepared their own papers to the camera-ready stage, academics spend little time on the visual appearance of their research reports. I suspect the same is true for managers. In both cases until recently, longhand was translated into typeface by a secretary, and, if the document had a further incarnation, it was typeset by professionals. The revolution associated with computerised typesetting and word-processing, together with the arrival of affordable laser printers with their page description languages, has meant not only that the academic, the manager, and the secretary have very much greater control over the appearance of their document, but also that many more decisions must be made about its appearance; some would argue that the flexibility in the appearance of the output from laser printers has resulted in open slather, with a drastic decline in typesetting standards. I hope that long-time readers of this JOURNAL have seen the opposite.

2. From Typewriter to Typesetter

For good readability and æsthetic appearance, it is necessary—but unfortunately not sufficient—to spend time and effort over the mechanics of production. Moreover, if the printer is of high quality, then the attainable standards are higher;

but again a higher-quality printer is not sufficient for their attainment. A common feature of much material produced on the new printers is that its typewriter origins are still apparent. Examples of this include the use of capital letters when larger lower-case letters would be not only more æsthetically pleasing, but also more legible; attempts to underline for emphasis, to the extreme of underlining text already in Italic fonts; and, in technical reports, using upright instead of oblique or Italic fonts for mathematical expressions, including symbols in the text. These were traps we had to learn to avoid.

Beginning with Volume 11, Number 1, June 1986, we moved from the constant-pitch typeface of Prestige Élite in which the JOURNAL had appeared since its birth in 1976 to the proportional-pitch typeface of Times Roman and the others in this family (Italic and Bold), with matching Greek/mathematics symbols, produced at 300 dots per inch on an Apple LaserWriter. The JOURNAL had little choice in abandoning the old typeface: the twin-track, daisy-wheel printer on which it had been prepared was becoming less and less reliable, and the Australian Graduate School of Management (AGSM) had installed the LaserWriter as a replacement. A common occurrence in organisations in recent times. But, because of an accident of history, the JOURNAL was able to move swiftly to take advantage of the new printer.

In 1976 the AGSM had adopted the robust if daunting UNIX operating system for its supermini computer, and so had bought two text-formatting programs: `troff` for typesetting machines, and a simpler version for impact printers and video display terminals. At the same time it bought a single-track daisy-wheel printer. Although the programmers at the AT&T's Bell Laboratories (where UNIX was developed) had envisaged the simpler version only as a `troff` previewer, the AGSM was not willing to commit the resources necessary to run a properly equipped and manned phototypesetter driven by `troff`. Until its June 1986 issue, the JOURNAL was produced using the simpler version and various daisy-wheel impact printers. The LaserWriter enabled—in fact, demanded—the use of `troff`[1], with the attendant decisions over fonts (typefaces and point sizes), but this change was evolutionary rather than revolutionary.

3. Mark-Up Systems are not Wysiwyg

Other organisations have faced the same decisions, without, perhaps, the same history of operating systems and computers as the AGSM's. Indeed, it is unlikely that the JOURNAL would now be produced with `troff`, had the AGSM not been using UNIX as its operating system. Many organisations have started using the word processors which were first written for the 8-bit CP/M home computer operating system, and were then adapted to the 16-bit MS-DOS system, originally for the IBM PC. Novice users find these simple, "what-you-see-is-what-you-get" (or *wysiwyg*) systems easier to learn. But this simplicity is also a limitation: what is ideal for a short memorandum may well be quite outclassed in the production of a complex document which merges several files and calculates the setting of tables and generates and plots graphs.

Although the availability of cheap personal computers has meant that wysiwyg word processors have become popular, `troff` is not wysiwyg. It can be characterised as a text-formatting language, in which the imbedded formatting instructions are coded or "marked up" between lines of text. This means that the text on the screen does not appear as it will when formatted on the page, but that tables, equations, simple line diagrams ("pictures"), and graphs can be coded for along with text.[2] Mark-up text-formatting languages such as `troff` may be more difficult to learn well than are wysiwyg systems, but they are much more powerful, and so better suited to the production of large documents of many parts, such as the JOURNAL with its articles.

Because the `troff` text formatting system was for several years implemented only on UNIX systems, it was long seen as a specialised, "hacker's" option. Recently, it has become available under MS-DOS. This, together with the advent of laser printers, has led to its recent emergence from obscurity.[3] Because `troff` is UNIX-compatible, it works well in UNIX "pipeline" processes. This has resulted in an abundance of `troff` pre-processors, that is, programs which translate higher-level mark-up codes into lower-level input codes for `troff`. It is by use of such pre-processors that the JOURNAL is able to use the `troff` system to produce tables, equations, line diagrams, and graphs.

Another feature of mark-up languages such as `troff` has been the development of "macros" packages: templates for taking advantage of the power of the language without intimate knowledge of the primitive commands. These are useful precisely because of the power of the mark-up language, and enable documents of a consistent format to be produced by several people independently. At the JOURNAL, we use the `mm` macros package, especially for numbered lists, paragraphs, headings, headers, footers, and changes of point size.

Even with the use of such macros packages, there is a bewildering number of alternatives facing the typist and production manager. Simpler text formatters are not the answer, but rather use of a user-specified macros file which reduces the number of decisions necessary each time a document is formatted. We use two such files: one to specify the dimensions of the page, and another to generate a "synthetic", oblique font for lower-case Greek letters used in equations.

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1. In fact, the JOURNAL is produced with `ditroff`, device-dependent `troff`, a later version written to drive generic output devices, not just the original Wang phototypesetter. `ditroff` is part of the Documenter's Workbench, available from AT&T and third-party suppliers separately from UNIX.
2. With no hidden formatting characters, the files created by mark-up formatters are very portable.
3. There is a close competitor: Donald Knuth's TEX, written in response to the demands associated with typesetting formulas in mathematical and scientific documents. TEX, however, does not conform to UNIX programming conventions, prompting instead for filenames and putting its output into "magic" filenames. Hence, it cannot readily coexist with pre- or post-processors for graph or table generation.

4. Readability and Æsthetics

If the mechanics of production are relatively clear-cut, the same cannot be said for decisions to improve the readability and the æsthetic level of text. We believe that these are important, both for the JOURNAL and for its authors. Articles unread are of little influence, and the appearance of the journal in which they appear plays its part in the likelihood of their being read, since the appearance and readability of a journal affect not only the attractiveness to potential subscribers, but also the amount of time and energy readers will spend in their browsing. Of course, the ultimate determinant of an article's readership is its content, but at the margin appearance, æsthetics, and readability do matter.

Edward Tufte, in a book which exemplifies its message (Tufte 1983), would go further in some aspects. He argues that poor presentation of quantitative material may mislead the reader, inadvertently or intentionally. He argues for authors and editors to consider the issues of presentation long and hard, and, in the late Robert Graves' memorable phrase, to consider *The Reader Over Your Shoulder* (Graves and Hodge 1947).

The new laser printers' use of professionally designed typefaces has been the foundation of desktop publishing. The first decision which faced us in our new-found freedom of the LaserWriter was that of the typeface family—the visible difference between typewritten and typeset documents. Our LaserWriter had two families of typefaces: the sans-serif Helvetica and the serif Times. Some find the clean verticals of Helvetica more appealing than the higher-frequency Times typeface, but the JOURNAL opted for Times family partly on the grounds of the traditional appearance of academic journals, and partly on æsthetics: the PostScript Greek/maths typeface in the LaserWriter has been tuned to match Times rather than Helvetica.

At the same time as the JOURNAL has been moving from typewriter typefaces to the standard typesetting typeface of Times Roman, other publications have been moving away from Times Roman. In recent months *The Economist* has moved to Goudy, and *Scientific American* has moved to Lucida Bright, one of a typeface family especially designed for laser printing (Bigelow and Holmes 1986). The newest version of the Apple LaserWriter contains many more typefaces in its PostScript library, and choice of the typeface family will soon present the future designer with as many possibilities and decisions as the physical page layout does today. Here at the AUSTRALIAN JOURNAL OF MANAGEMENT, we are content, however, to fine-tune the new design, and to consider taking advantage of commercial typesetting machines with PostScript capabilities to obtain photo-typesetter quality at 1,250 dots per inch or above. The higher resolution of these machines makes a visible improvement in the clarity of the appearance of the text on the page.

After the decision in favour of the Times family of typefaces, design of the JOURNAL turned on the appearance and legibility of the text, the headings, the titles and tables and figures, the references, and the appendices, if any. Production of the JOURNAL has so far remained a procedure whereby the printer reduces the

dimensions of the camera-ready pages by 20% while creating the "bromides" for off-set printing. Previously, the size of the type was determined by the size of the daisy-wheel fonts used, but, with the arrival of the LaserWriter, there was much more freedom (although continuous point sizes are not available). After some experimentation, I decided that the basic text would be printed in a 13-point font, with an extra leading of three points instead of the standard two. With a line length of 153mm, this is described in typesetting terms as 13/16 point type on a 36.3 pica[4] measure. (The relationship of line length and leading size is important for legibility, specifically, the eye's ability to easily move from the end of one line to the beginning of the next without skipping.) After the 20% photo-reduction at the printer's, this becomes what you are reading now: 10.4/12.8 point type on a 29 pica measure; the proportions, of course, are unchanged.

Tables and block quotations are one points smaller than text (12/14 point type), and footnotes, references, and appendices are two points smaller (11/13 point type). First- and second-level headings are in Times Bold, but at the same (13-point) size as the text. Tables have been designed without boxes, to present a centred, open appearance, and, as the JOURNAL produces more of these figures itself, this appearance will be matched.[5]

Article title pages had been designed distinctively since the JOURNAL was founded, and the redesign continues the tradition: the entire page, including the 171-point number in the upper right-hand corner, is now produced on the LaserWriter. From Volume 11, Number 2, December 1986, the entire cover, inside and out, has also been produced on the LaserWriter. The JOURNAL's name is more prominently and legibly displayed (in 66-point Times Bold lower-case), and the contents, too, are easier to read.

As mentioned above, the `troff` system can plot graphs and line diagrams as well as setting tables and equations. Downstream of the `troff` processor lies the LaserWriter, which is driven by a page-description language (PDL), into which the `troff` output is translated before downloading to the laser printer. For the final appearance of the copy, the page description language is vital, since it directly controls the printer's imaging mechanism. The best known PDL is Adobe System's PostScript, which has become the de facto standard, and is device-independent, driving both 300-dots-per-inch laser printers and 2,200-dpi photo-typesetting machines.

4. A pica is about 4.2mm or 1/6 of an inch; a point is 1/12 of a pica—about 1/72 of an inch.
5. At final acceptance of their papers, JOURNAL authors have recently been asked to provide the numbers underlying their figures, preferably in machine-readable form, for replotting using `troff` on the LaserWriter.

5. Towards An Automated Copy Editor

If readability is the prime goal of layout and design, it is also the main concern of the copy editor's. Better punctuation alone—with no other changes—can eliminate ambiguity and reduce readers' surprise. In an attempt to automate part of the copy editor's task, I have written a program to make a line-by-line check for stylistic inconsistencies and mistakes; it also reduces the number of keystrokes necessary to type manuscripts into the computer. For example, the program puts thousands commas into strings of digits, correctly adds the accents to such words and phrases as vis-à-vis, correctly changes hyphens to minuses or em dashes, adds a leading zero to decimals less than one, and searches for over 500 other corrections. The program uses the standard UNIX stream editor, and reduces the time necessary for the preparation and final polishing of a paper by over half. Such a procedure would be difficult, if not impossible, with an interactive wysiwyg word-processing system, since its files contain the hidden page-formatting instructions which were calculated as the text was typed in. Ultimately, however, the JOURNAL must depend not on the computer but on its referees and authors for good, clear writing: those monkeys are still trying to write *Hamlet* at random.

6. Changes for Authors

The inside back cover of the JOURNAL contains the Notes to Authors. These have been amended from time to time. Increasingly, however, the interaction between editor and author is going beyond the simple exchange of referees' comments for the original manuscript and further comments for revised drafts of the paper. The JOURNAL is not alone in finding that it can reduce the time to publication as well as the possibility of typographical errors by "capturing the keystrokes"—obtaining a "machine-readable" copy of the final, accepted manuscript from the author, either on floppy disk or via electronic mail. The Association of American Publishers' Electronic Manuscript Project (1986) is an attempt to establish protocols for electronic editing and revisions through formal adoption of the AAP Standard for Electronic Manuscript Preparation and Markup.[6]

The *Chicago Guide* (1987) summarises the progress towards this goal, and provides further guidance for authors and editors. The *Guide* suggests generic codes—"the labelling of chapter titles, subheads, block quotations, italicised words, special characters, and so on, with identifying tags, so that the typesetter need not conduct a word-by-word search through the manuscript to locate and identify such components". The *Guide* cautions, however, that the coding of tables and mathematical equations is so complex and exacting that it should be handled in

6. The AAP Standard is the first industry-wide application of the draft international ISO standard, SGML, the Standard Generalised Markup Language. Other potential standards are ODA/ODIF (see Horak 1985) and IBM's DCA.

the conventional manner, with the publisher's typesetter doing all inputting.

At the JOURNAL, we have not yet formulated clear guidelines, but increasingly we shall ask whether authors can supply electronic, ASCII versions of the text of their accepted papers, without the equations and tables, so that the keystrokes underlying the verbal text can be used without duplication. The JOURNAL typesetter will mark the manuscript up for processing, including any tables and equations. Tufte (1983) has coined the word "chartjunk" to describe the interior decoration of graphics that does not tell the viewer anything new; moreover, he warns against the unintentional optical art of the moiré patterns produced by some computer graphics packages. To avoid these pitfalls, the JOURNAL will sometimes request figures underlying a graph, so that we can improve its appearance by replotting with `troff`'s `grap` pre-processor.

Since the JOURNAL is produced virtually entirely on computer, a future development may be electronic publication, with subscribers printing off their own copies, but that revolution is for tomorrow. In the meantime, it is up to you, our readers and future contributors, to enable us to continue to improve the *content* of the JOURNAL.

7. Annotated Bibliography

For a simple and clear exposition of many of the issues discussed above, see Felici and Nace (1987), which, however, does not mention `troff`. The best instruction book for `troff` I have found is Dougherty and O'Reilly (1987), which also includes a good overview of useful UNIX shell and editor commands. The reference works Elan (1987) and Gehani (1986) cover the `mm` macros package and the `tbl`, `eqn`, `pic`, and `grap` preprocessors for tables, equations, line diagrams, and graphs, respectively. Emerson and Paulsell (1987) is an excellent guide to `troff` alone. The *Chicago Guide* (1987) provides instructions to authors, notes to publishers, and a discussion of generic coding of electronic manuscripts in light of the experience of the University of Chicago Press, and will, I predict, become the de facto standard for the publishing of electronic manuscripts. Knuth (1986) is the definitive book on his TEX text processing language.

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