Technical Communication

University of the Northern Territory
Darwin

5th to 7th September 94

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Student's Notes

Contents

Introduction to Technical Communication

What do you expect from this course?

How would you assess your present writing skills?

How can your writing be improved?

What is the most important aspect of good writing?

How do you recognise good writing?

What is Technical Communication?

. . . the accurate presentation of technical information to a particular audience to achieve an intended outcome.

It must be accurate

Technical communication involves the presentation of facts. It is not concerned with impressions or opinions, and is not primarily written for the satisfaction of the writer.

Accuracy requires that the writing be:

- clear
- concise
- complete
- correct
- consistent

It has a technical content

The Concise Oxford Dictionary defines *technical* as:

> **technical** *a.* Of or in a particular art, science, handicraft etc. [f. Gk *tekhne* art]

The technical content may relate to almost any subject, including:

- computer systems
- banking procedures
- surgical techniques
- power generation
- accountancy
- household appliances
- aircraft

It has a defined audience

Novels and newspapers are sent out into the world to whomever happens to read them. Although the writer and publisher may carry out some market research, the audience is generally very broad and probably very mixed. However, technical manuals are targeted towards a particular audience.

The audience affects the writing.

It has an intended outcome

Technical documents are not written for the thrill of writing, nor for the joy of reading, nor for satisfaction of collecting a full set. They are written to help the reader achieve a particular outcome, for example:

- operate a VCR
- overhaul an aircraft engine
- process an insurance claim
- fill out a Tax Return.

Don't confuse the *output* of the writing process (a manual, a quick reference card, a set of on-line help screens) with the intended *outcome* (successfully programming the VCR, overhauling the engine with no bits left over).

Why bother?

There are at least two reasons why it is worth putting effort into good technical communication.

- Good writing works. A well written document is more likely to be read and to achieve its intended outcome than a poorly researched, badly written and carelessly presented document. In the real world of work, this matters. Your job, your promotional prospects, the success of your department, company or product may all depend on effective communication.
- Good writing makes the writer feel good. There is satisfaction in a job well done. In a real-life environment there is also the prospect of rewards and added kudos for the writer.

Does it matter? If it is worth writing at all, then yes it does matter. If you really don't think that good writing is worth the effort, then question why you are writing at all.

Some things don't need to be written.

Different Types of Technical Communication

Technical communication comes in many varied forms. Each has particular requirements. Some of the most common are listed below.

User guides

These mostly contain instructions that help a customer to use a piece of equipment, software system or whatever. Generally, these are intended to be read in a systematic order to lead the user through a number of operations. Important features for User Guides are clear, unambiguous instructions and an easy to use, attractive layout.

Reference manuals

Reference manuals are used occasionally to extract information. Access tools are particularly important for reference manuals - index, table of contents, page tabs, systematic order etc.

Design descriptions

Design descriptions are often written as a record of a design process to allow the design to be reviewed or audited, and to assist future changes to the design. Here, a clear logical presentation of the information is essential.

Reports

Reports are records of experiments, investigations or activities. The subject matter of reports is frequently chronological (assignment, preparation, activity, analysis, conclusion) but the report need not be presented in chronological order. The most important part of a report is the conclusion, so put it at the front of the report, not at the at the end.

Procedures

The last few years have seen a dramatic growth of Quality Systems based on standards such as AS3900, or ISO9000. These systems seek to build quality into the way that companies and organisations work by systematically regulating the companies' procedures. The effective documentation of complex procedures is a major technical writing task. Procedures need to be clear, thorough and easy to follow. They also need a strong level of ownership by the people who must use them. This requires close involvement by the users in the writing process.

Training material

Training material is the second largest area that technical writers are involved in, behind computer systems. Training material may be paper-based documentation, audio-visual aids, reference cards, multimedia systems, computer-based-training or more likely a combination of more than one form.

Resumé or curriculum vitae

When your university course is all over you will probably want, and almost certainly need, to find a job. Writing a resumé or CV is a technical writing task, in which you are concerned with the accurate presentation of more-or-less factual information (your experience and qualifications) to a specific audience (your prospective employer) with a desired outcome (you are employed at a handsome salary).

Different Types of Media

As well as the different types of technical communication, there are different types of media that can be used to deliver the information. The choice of which medium to use depends on many factors, including: the way that the information will be used; the expectations of the end user; and the budget available to develop and distribute the material.

Hard-copy

Despite the growth of other delivery media, printed hard-copy documentation is still the most common way to deliver technical information. Amongst its advantages are that it is relatively cheap to develop and produce, and is convenient to use, needing no special display equipment.

Hard-copy documentation is not restricted to A4 manuals. It can also include quick-reference cards, wall charts, and keyboard overlays.

This course is based on preparing paper-based documentation, but the principles are applicable to other types of media.

On-line

All computer systems have some form of on-line information system. There are three major types of on-line documentation:

- The user interface itself. This is often a neglected area of on-line information, but is an important part of the user documentation. Screen prompts and user messages need to be integrated with the presentation of information in the manuals. A well designed interface needs the minimum of supporting documentation, but a poorly-designed interface can be a nightmare for the technical writer as well as the user. (A customer once angrily called Dell Computer Corporation because his computer had told him he was "bad" and an "invalid".)
- Context-sensitive help, which provides specific information to help the user perform a particular task. This is detailed and focussed in content.
- On-line manuals, which are often an electronic form of paper-based reference manuals, though possibly with hypertext features built in.

A word of caution about on-line documentation: think carefully about whether the user or operator can actually access the on-line information when it is most needed. An operator needing assistance with a detailed step in a procedure needs to have the information at hand without having to quit the procedure. And what happens if the on-line delivery system is unavailable? Is there a paper-based alternative, or are the instructions for rebooting the system in the on-line manual?

Video

Video is a useful medium for communicating information in a non-verbal form. It can be used very effectively to overcome language barriers and to show information that is difficult to show by words and static illustrations. However, it is difficult to browse conventional video.

Multimedia

Multimedia is the integration of multiple forms of communication medium in one presentation. Typically this involves the integration of video, audio, text and graphics. It is a powerful technique for certain forms of communication, but is very expensive to produce and is restricted in its application.

The Writing Process

Writing is not an isolated activity. In reality it is a process which needs to be managed and controlled. Forget about notions of sitting down and letting the stream of consciousness flow through your fingers to the keyboard or pen. It might have been true for a few isolated individuals in history, but hen's teeth are more numerous.

Imagine that you are on an aeroplane about to take off, and you are lucky enough to be sitting next to the plane's designer. You ask how long it took him to design the plane "Oh, not too long" he says "I just sort of sketched it out as it came to me." But how did he calculate the lift factor for the wings, or the fuel loading? "Inspiration, sheer inspiration." Has he tested the design, has he performed experiments to check that the plane will take off, cruise and land successfully? "No, I don't use techniques like that. It interferes with the creative process."

Will you take off in confidence or rush past the flight attendant to the nearest land-based transport?

Appropriate techniques provide a framework within which creativity can operate successfully.

Writing is work, but it need not be hard work.

Build Quality into the Process

By treating writing as a process, it is possible to build quality into the writing task as part of the process. Quality is more than just checking the final print out for typos. It is a matter of ensuring that the finished product meets the needs of the user.

The Six Stage Process

The writing process can be seen as a number of distinct stages. These can be defined in a number of different ways, but I have chosen to use six stages: Plan, Design, Write, Review and Edit, Publish, Evaluate.

Plan

In this stage you analyse the task and decide how you are going to tackle it. You assess the audience for whom you are writing, define the scope of the task and select the appropriate media for delivering the information.

Planning is the most difficult stage, the easiest to overlook, but the most important for the eventual success of the project.

The output of this stage is a document plan which outlines the document, or documents, that you are going to write, and the contents of each. If possible, your customer should review and approve your plan.

Design

In the Design stage, you develop the outline plan into a detailed design framework for the document. This includes a draft table of contents, an estimate of the number of pages, and a sample page layout.

Write

This is the core stage when you gather the detailed information and write the first draft, following the plan and design framework that you developed in the first two stages.

The output of this stage is a complete first draft.

Review and Edit

In this stage you take the draft, and refine it. Editing has two aspects: right-brain editing is qualitative and looks at meaning, structure, ease of reading and clarity; left-brain editing is quantitative and looks at technical accuracy, grammar, punctuation, spelling and consistency.

At the end of this stage you have a finished masterpiece ready to be presented to the world.

Publish

This is the stage at which you let your document go into the cruel world. If all goes well, you only have to do this once.

Evaluate

Your work is not finished once your document has been published. This is the point at which you evaluate the previous stages in your process and seek to learn from them. Did the finished product conform to your initial plan? If not, what changed and why? What would you do differently next time?

The output of this stage is captured experience which will prepare you for your next project.

The Real Process

In reality, these stages are not totally distinct. Writing is a recursive process, with multiple feedback loops. As you get further into the writing process, you develop a greater understanding of the subject matter and the audience, and so you are able to refine your planning and design. If the parameters for your writing task change part way through, you may have to stop writing and do more planning. If you identify significant omissions at the edit stage, you may need to do more writing, or go right back to planning.

The amount of iteration that you have to go through depends partly on how thoroughly you complete each stage before starting the next. Remember that the effect of mistakes multiplies through the process. Omitting an important group of readers is easy to put right if you discover it in the planning stage; it is a lot more work if you discover it while writing; and it may be disastrous if you discover it when evaluating the finished product.

In reality the different activities such as planning, writing and editing, happen in parallel rather than in series. However, there are times in the process when certain activities predominate. It helps to think of the process in separate stages so that you can focus on the different types of activity that are involved.

Planning the Document

In the Planning stage, you define the boundaries and essential requirements for your writing task. Like all planning activities, it can be frustrating because it takes a significant amount of time and there is relatively little to show for your effort. However, it is an essential stage if you are to avoid wasting time writing the wrong document.

Identify the Purpose and Scope of the Document

Before you start to write, before you put pen to paper, finger to keyboard or mouth to dictaphone, think . . . why am I doing this?

What is the purpose of the document?

Define the purpose of the document in terms of the readers or tasks, rather than the subject matter. Suppose you are documenting a new library database program. Are you writing for a lay user who only wants to find a title, for a librarian who wants to enter titles into the system, and set up search macros for the system administrator who wants to know how to integrate it with other computer systems?

What is the scope of the document?

Here you are asking about the extent of information that you need to cover in the manual. Do you need to cover operation of the computer system on which the library database program runs? Do you need to describe the classification system?

Write the title with care

The purpose and scope of the document should be enshrined in its title. Take time when writing the title to make sure that it is accurate and concise, and that it adequately describes the content.

Consider your Audience

Who are your readers?

Our readers are not empty vessels, void of all knowledge, simply waiting for us to fill up their mental tanks like a car at a filling station. Rather, every reader approaches a document or any other information source, with a mental structure of prior experience, or *schema*. The readers' schema affects how they will interpret what they read. Effective communication acknowledges the reader's schema, and provides connection points for the reader to be able to relate to the new information.

For each document, describe your readers in terms of their:

educational background
- affects the level of language used (a tertiary educated audience will be more willing to read than a high school level audience)

professional background
- affects depth of treatment of subject (an operator may need detailed step by step instructions, a supervisor or manager may need only an overview of the system)

assume knowledge and skills
- affects the level of information

capability in the target language
- affects complexity of language and use of non-verbal techniques such as icons, graphics, charts.

What information do the readers require?

Not all readers need the same information. A novice user of a computer program may need simple step-by-step instructions to get started; an advanced user may need much more detailed information to be able to take short cuts or perform advanced work; a system administrator may need totally different information.

Consider the hidden audience

Most documents have one or two primary audiences, but they also have hidden audiences. For example, a manual describing a new medical device for a doctor may also be used by a cardiac technician, nurse, sales rep and by regulatory bodies. What are their needs? Can they be addressed in this document? If so how? If not, what other documents of forms of communication may be needed?

Write a Document Plan

An important part of any significant document project is to write a document plan and to have the plan reviewed by the person to whom you must eventually answer - the customer.

The document plan should capture the information that you have gathered and assembled in this stage of the project, and should include the following information:

- A definition of the audience for whom you are writing.
- A statement of the purpose and scope of the document.
- The title of the document.
- A timetable for completing the document.

Designing the Document

When you have completed the document plan it is time to start the detailed design phase. There are four aspects to the design of the document:

- logical design - what contents the document will have
- organisational design - how the document will be structured
- visual design - how the document will look
- physical design - what form the finished document will take

The analysis of your readers and the scope of the project are important factors in the design of the document.

Outline the Contents

Use your assessment of the audience and their needs, and your knowledge of the information that you have to present, to prepare an outline for your document. This will become a draft Table of Contents.

Use mind maps to develop your ideas

Mind maps are great tools to help structure and develop our thinking. Mind maps

- are visual
- can be created quickly
- are easy to review
- use non-linear, right-brain logic
- show interrelationships between ideas
- show hierarchies in the subject

A map is dynamic. It allows you to explore ideas and develop shadowy, vague ideas into solid constructive thinking. Be prepared to revise your map as your thinking develops.

Developing your map

Start your map by writing a simple question or statement about your subject in the centre of the page. Draw a box around this statement and then add associated ideas in the space around the main theme. Circle each idea and link it to the main idea with an arrow. The circles and arrows help to give the map visual structure.

Now continue to develop these ideas, and add new thoughts and linkages. Each time you add a new thought, circle it and link it to other ideas on the map.

Use labels that capture the essential idea of the subject or connection. Don't worry about writing complete sentences, but do use verbs to focus your thinking. Nouns and adjectives can be very imprecise in isolation.

Revising your map

If your map gets too cluttered, or you run out of space, revise it. Drawing it again will give you opportunity to rearrange ideas, and put related thoughts together. You might want to break off a whole topic to explore on a separate map.

Plan the Organisation

A good technical document is not just a collection of individual sentences, paragraphs and instructions, no matter how well they are written. It must have a consistent and rational organisation if it is to be truly useful to its readers. The type of document that you are writing has a strong influence on the organisation that you choose.

Some possible ways to organise documents include task-oriented, chronological, alphabetical order, or by increasing detail.

Choose an organisation that meets the needs of the reader, rather than one which is convenient for you as the writer. This means that you have to understand your reader's requirements.

Some documents will have more than one level of organisation

Task-oriented organisation

Task-oriented organisation is appropriate when the reader will use the information to perform tasks, for example installation instructions for a computer program, operating instructions for a video camera. This type of organisation requires you to organise the information into tasks and order those tasks in a logical sequence.

The audience and task analysis that you did as part of the planning stage will form the basis for a more detailed analysis of tasks in this stage.

There are a number of ways to put tasks in order, depending on the nature of the tasks.

- General to detailed.

- Simple to complex.
- Chronological order.
- From most to least frequent.

Alphabetic order

Alphabetic order is useful for reference documents, such as a directory of computer system commands, or parameters. However, always ensure that the entries are alphabetised using the names that the user will see on the screen or other interface. Remember that these may be abbreviated, or reworded from the theoretical names.

Chronological order

Chronological organisation is appropriate when time is the dominant factor in the presentation of information. For example, a guide to inoculating children might present information in chronological order from birth to 12 years. A historic account of the development of scientific thought might also take time as the dominant organising principle.

Increasing detail

For reports it is often useful to present the higher level information first and to proceed to the more detailed information. This allows readers to stop when they have reached their level of interest or need. This is particularly useful for documents which will be read by managers or others who only need to know the conclusions without having to wade through the detail to get there.

For example, a structure for the report of an investigation might be:

Purpose of the investigation

Conclusion

Procedure

Summary of results

Discussion of findings

Results

Non-linear organisation

Some topics just don't have a clear, linear pattern that you can use to order information. If this is the case, tell the reader clearly how you have chosen to present the information. In this case, it is particularly important to use effective signposts to guide the reader through the document.

Signposts ☞

Whatever organisational structure you adopt, it is important to help the reader by the appropriate use of signposts. You cannot assume that your readers will read the manual the way that you want them to. They are free-thinking individuals who are as likely to start at the back, or the middle, as they are at the front. As the writer, you have to plan for their perversity.

Some signposts that you might want to use include:

- headers or footers that indicate which part of the manual the reader has turned to
- tabs on the outside edge of the margin
- use of graphic symbols to identify particular types of information such as warnings, notes, or mere trivia
- cross-references to other parts of the text
- a useful table of contents
- an index

Balance the structure

As far as possible, balance the presentation of information so that similar chunks of information, such as chapters or sections, are of similar size. This helps maintain a degree of consistency throughout the document.

Draft the Table of Contents

When you feel that you have adequately explored the technical content of your subject, and have planned the organisation of your document, bring them together in a draft Table of Contents.

Use the topics in your map to draft the major headings for your document, and add subordinate headings as you go on. Use your organisational plan to arrange the headings and sub-headings in a logical sequence.

The outlining feature in word processing packages is useful at this stage. This allows you to see the outline of the whole document in just a few pages. You can move chunks around and rearrange them at will.

How detailed should the outline be?

The simple answer to that, is that it should be as detailed as it needs to be useful to you. Start with the top level headings - the major chapter or sections in the document. Then add the second level under each of these.

Use verbs to give meaning and rigour to the headings, just as you did on the map. If you want to capture more information on the outline add an explanatory sentence or two under each heading. This is especially useful if you have to present the draft Table of Contents for approval before you can start on the text.

Is it complete?

Check that all the topics you have explored in your map are included in the Table of Contents. You may have to go back to your map, or revise your organisational plan when you see the first draft of your Table of Contents.

Visual Design

The font of all knowledge?

A font is particular typeface (e.g. Times), in a particular size (e.g. 12 pt) and style (e.g. bold). The selection of fonts can enhance or seriously hinder the impact of a document.

The introduction of electronic publishing has made a vast array of typefaces available on the desktop. One of the dangers of this abundance is the temptation to use an excessive number of typefaces, and to mix typefaces that should never be seen together. Typography is more of an art than a science, but a few guidelines are worth noting about typefaces, size and styles.

Serif or sans-serif?

A serif face has small decorative strokes on the tips of the letters. The serifs help to give distinction to the characters. This paragraph is set in a serif face (Palatino).

Sans-serif faces, such as this one, lack serifs.

A serif face, such as Times, New Century Schoolbook, or Palatino, is generally better for a large body of text than a sans-serif face, such as Helvetica, or Avant Garde. Sans-serif faces can be used effectively to distinguish text, such as headings or figure captions, or to give emphasis to notes, caution or warnings.

Type size

Type is measured in points, an old measure used by conventional typesetters. There are 72 points to the inch, or about 3 points to the millimetre. It is worth noting that two type faces in the same size may not look the same size. For example:

This is Times 12pt. Times is a very popular typeface, used extensively in newspapers and magazines because it is a compact face – you can get a lot of text on a page.

This is Palatino 12pt. It is a much more open face with more space in the characters. This makes it easier to read, although you get less text on a page.

Type style

Besides providing a multitude of type faces, desktop publishing has also provided a variety of styles. As with type faces, use styles carefully, don't mix too many, and don't overdo it. Use different styles to give emphasis to a particular word, phrase or sentence.

The main styles are:

bold
: Bold type stands out from normal type because of its heavier darker appearance. Use bold type for headings or for warning and caution notices.

italic
: Italic type also gives emphasis, though not to the same degree as bold type. It is useful for contrasting text such as a note, or quotation, or the caption to a figure.

underline
: I can't think of any useful purpose for the underline. It is the typographic equivalent of shouting at someone from point-blank range. It's use is a hangover from the days of handwriting and typewriters, when underlines or capitals were the only effective means of giving emphasis to a document. Bold and italic variants are much more elegant ways of giving emphasis, so use them wherever possible.

CAPITALS
: LIKE UNDERLINING, CAPITALISING WAS VALUABLE IN THE DAYS OF THE TYPEWRITER. CAPITALS SLOW READING CONSIDERABLY BECAUSE THERE IS SO LITTLE VARIATION BETWEEN THE CHARACTERS. THIS CAN BE USED TO YOUR ADVANTAGE, FOR EXAMPLE IF YOU WANT THE READER TO PAY PARTICULAR ATTENTION TO A WARNING NOTICE. CAPITALS ALSO HAVE THE ADVANTAGE OF BEING VISIBLE AT GREATER DISTANCE; THIS MAKES THEM USEFUL FOR HEADINGS AND NOTICES.

Other styles such as outline, shadow or hybrid creations such as ***bold-italic-underlined-shadow*** are best left for the sign writers and no-frills ad agencies.

Using typographic styles for emphasis depends on the difference between the normal text and the emphasised text. It is particularly effective where no more than one word in every 200 is emphasised. If this ratio gets up to one word in 30, readers start to ignore the difference in the type styles; when this happens, you have lost the value of the different style, and you have also probably alienated the reader.

Colour

A fair amount of research has been done into the use of colour and its effects on readability. Not surprisingly, black text on a white background is one of the most effective combinations. This is almost certainly due to the sharp contrast between black and white. Other combinations that rate highly for legibility include black text on yellow, and blue text on white.

However, there are reasons to use colour other than readability. Coloured papers or inks are likely to get noticed more than plain black on white. It is also sometimes necessary to differentiate between different documents such as multi-part forms.

However, if you do go for coloured paper or ink, make sure that there is adequate contrast between the paper and the print, and keep in mind how the document will be used. If you expect, and want, your user to photocopy the document, avoid dark paper.

Get Physical

What medium is best for the document?

We are mainly concerned here with paper-based documents, but is that the best choice? Consider alternatives such as on-line documentation. And if a printed document is best, what sort of document? Will it be a detailed manual, a quick-reference card, a pocket book or a poster?

Size isn't everything - but it is important

In Australia, indeed in most of the world outside North America, we use international paper sizes. These are all based on an A0 sheet which has an area of $1m^2$ with sides in the proportion 1:1.414. This means that each time you halve the sheet along the long edge, the resulting halves have the same proportions. Half an A0 sheet is A1, half of that is A2 and so on.

The standard paper size is A4 (297 x 210 mm). This is the normal paper size used in photocopiers and laser printers. It is, therefore, easy to obtain and use. However, A4 is just too large for many purposes, and A5 is often a better choice. For a booklet that the user needs to carry about in a pocket, it may be better to go down to A6.

By the way . . . just because A4 is twice the size of A5, don't assume that you can get twice as much text on an A4 page as an A5 page. Because of the limitation on line length for adequate readability, an A4 page may only contain between 1.2 and 1.5 times as much text as an A5 page.

If you are writing for an American audience, or if the manual is to be printed in America, design the manual on US Letter size (11 x 8.5 inches, 279.4 x 203.2 mm). US letter is shorter and wider than A4; half US letter is taller and narrower than A5.

Single or double sided?

Do you use single or double-sided printing? The choice depends on your constraints and the way in which the manual will be used. Here are some of the benefits of each.

Single-sided	Double-sided
Easier to prepare	Gives more flexibility in layout
Makes small manuals look larger (may impress your boss)	Makes large manuals look smaller (better for the reader)
Provides blank pages for the user to make notes (useful for training courses)	Allows you to have diagrams and supporting text on facing pages
Easier to photocopy and fax	Saves space, costs, paper and trees

How will it be bound?

Choose a binding method that is appropriate to the use and future life of the manual.

- Plastic spiral binding - inexpensive binding method which can be opened flat, requires a stiff cover, maximum capacity around 200 sheets of paper (20mm).
- Metal spiral binding - slightly more expensive than plastic spiral binding, can be folded back, requires a stiff cover, maximum capacity around 200 sheets of paper (20mm).

- 3- or 4-ring binder - allows for replacement of individual pages or sections, has robust covers.
- Centre-stapled - suitable for booklets up to 64 pages, cannot be updated.
- Heat-sealed 'perfect' binding - gives a neat finish; also cannot be updated.

Key questions:

- how will the manual be printed?
- under what conditions will it be used?
- will it need to be updated?
- will it be subjected to harsh handling?
- does it need to have a particular image?

Writing Skills

Getting Started

For many writers, one of the most difficult parts of any writing task is getting started. You know what you have to write about. You know who you have to write for. But how do you actually get started and overcome the paralysing tyranny of that blank page?

Probably the first thing that you need to do is to collect as much information as you can about your topic. Research it thoroughly; talk with experts, customers, reviewers, anyone that has any related information; record your own ideas, no matter how incomplete and rough they are.

Having done all of this, you still have to get started. A journey of a thousand miles starts with a single step, and a 5000 word report starts with a single word (probably spelt wrongly but never mind). Here are some suggestions that have been put forward for generating leads into your subject. I don't use all of these, and nor will you, but you might find one that works for you.

- Start with the draft table of contents that you drafted earlier, put each major heading on a new page and write down as much as you know about that topic.
- If you used a conceptual map to draft the table of contents, expand the map. Add new concepts and new linkages as they occur to you. Take major chunks and develop them into new maps.
- Ask questions. Start with the standard journalists questions – who, what, when, where, why, how? Add questions of your own that relate more specifically to the subject you are writing about. What are the requirements? How does this relate to other processes? What takes precedence? What if the user does this? Why does this happen, why not that?
- Try cubing. Cubing is a development of the questioning technique, in which you imagine a cube. Each face of the cube has a specific instruction written on it: Describe It, Compare It, Associate It, Analyse It, Apply It and Argue For or Against It. Write as much as you can for each instruction for a period of 5 to 10 minutes.

- Write!
  Write anything that comes into your head. Don't stop, just write and write until your writing starts to make sense. The English writer W Somerset Maugham advocated this method to meet a daily quota of words:

  > *Each morning you write down the first word that occurs to you, then the next and the next, and so on. Don't worry if the words appear to have no connection: this is simply an exercise to limber up the mind. What you write will gradually take on meaning, and before you know it you're in the middle of the job.*

Whichever method you use to prompt you to write, the important thing is to get started and to get your ideas down as quickly as possible without seeking to edit them at this stage. Don't worry about writing carefully crafted sentences, just write to capture the idea; you will revise it later. The important thing is to get the information down out of your short term memory.

You can also look at other similar documents to give you ideas about how you can tackle your subject. Even if you don't agree with the way that another writer has handled a subject, the process of evaluating another document can be catalyst to developing your own ideas.

However, if you do this be careful not to plagiarise (it's illegal), and not to copy weaknesses in the other document (it's foolish).

Use Plain English

What is "Plain English"?

Plain English is a common term these days. Almost everyone has heard of it, but what is it. Is it just a matter of using good grammar and correct spelling?

Consider this paragraph:

> *Behind every grate man is a purple imagination. Underneath the profile the excellent owls fly in convention without a careless dream. Porridge is a fatter conclusion. Better still, if not more so, are the albatrosses in the forth grade. They always pursue my ancient address. They never undermine a football match in spades. They speak red and loud buses. In between the consciousness and the balloon, all best are off.*

This is all correctly spelt, and good grammar according to the Microsoft Word Grammar and Spelling tools. The Grammar checker tells me that there are no passive sentences, 8 sentences to the paragraph and an average of 8 words in each sentence. Based on a statistical analysis of the numbers of syllables, words and sentences, this paragraph rates a Flesch Reading Ease of 67.4 and a Flesch Grade level of 8.2. These are both in the Standard range for comprehensibility.

But, it is nonsense.

Plain English must be more than a matter of spelling, grammar and short sentences.

So, what *is* Plain English?

In his book *Writing in Plain English*, Robert Eagleson writes:

> *Plain English is clear, straightforward expression, using only as many words as are necessary. It is language that avoids obscurity, inflated vocabulary and convoluted sentence construction. It is not baby talk, nor is it a simplified version of the English language.*

Or, as William Strunk wrote in *The Elements of Style*:

> *Vigorous writing is concise. A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts. This requires not that the writer make all his sentences short, or that he avoid all detail and treat his subjects only in outline, but that every word tell.*

Quick Tips for Better Writing

Here are some guidelines for using clear language.

Use a vocabulary that your reader will understand

As far as possible use simple, clear English. Don't dress your ideas up in fancy words when simple words will convey your meaning with equal or greater force and less ambiguity.

Handle jargon with care

Jargon is simply "*the technical terminology of a special activity or group*" (Websters Dictionary). Jargon is not only unavoidable, it is often essential in technical writing.

If you didn't use jargon, you would have to explain every technical concept in everyday language every time that you referred to it. A floppy disk would become a removable data storage medium, and even that might be too technical. However, jargon does have to be handled with care.

Jargon can exist on a number of different levels. Some jargon is so commonplace that it has become part of the common language (for example, *laser*). Some jargon is widely known throughout a particular area of activity or scientific discipline (for example, *megabyte*, or *icon*). Other jargon is specific to a particular product or subject (for example, *Nubus*).

Jargon is the language of a *special activity or group*. But is your reader part of that activity or group? Does your reader know the jargon, and more importantly, does your reader understand the jargon in the same way that you are using it? There are a number of different scenarios, each of which require you to treat jargon quite differently.

The reader's position	*Your response*
The reader knows the jargon, understands it well, and is comfortable with it.	Use the jargon.
The reader knows and understands the jargon, but does not like it.	Avoid the jargon altogether, or risk alienating your audience.
The reader knows the jargon, but thinks it means something else. For example, 'abort' or 'invalid' mean something quite different to a nurse than they do to a programmer.	If possible avoid the confusing jargon altogether. If you must use it, define it very clearly.
The reader doesn't know the jargon, but understands the concept.	Either use the readers existing jargon or define the jargon.
The reader doesn't know the jargon, and doesn't understand the concept.	This is a challenge. You have to explain the concept very clearly for this user. Think carefully about whether you need to use jargon at all. Do you have to introduce the reader into this "special group" or can you use existing generic terminology?

Jargon should be used to make it easier for the reader to understand and handle concepts, not as a cover for the writer's laziness. If in doubt, always defer to your reader's usage.

Vary your sentence constructions

English has 4 types of sentence: Simple, Compound, Complex and Compound-Complex.

A simple sentence has one independent clause, for example:

> *The cat sat on the mat.*

Adding additional phrases still leaves it as a simple sentence:

> *The fat ginger cat with the sickly grin sat motionless on the threadbare mat beside the goldfish bowl.*

A compound sentence consists of one or more independent clauses joined by a coordinating conjunction (*and, but, or, nor, for, yet, so*) or by a colon (:) or semicolon (;). For example,

> *The cat sat on the mat and licked his lips.*
>
> *The cat sat on the mat; the goldfish swam nervously in her tank.*

A complex sentence consist of one independent clause with one or more dependent clauses. It is often effective in showing relationships between ideas. For example:

> *While the goldfish watched from the safety of the plastic Spanish galleon, the cat crept towards the bowl.*

Compound-complex sentences are, not surprisingly, combinations of compound and complex sentences. They include two or more independent clauses, with at least one dependent clause. For example:

> *As the cat leapt towards the goldfish bowl, his owner threw the chair at the unsuspecting creature, and sent it flying through the open window.*

The compound-complex sentence is the most complicated type of sentence, and the one that requires most work from the reader. Use it with care.

Try to use different sentence types to avoid the monotony of constant repetition, but avoid using too many compound/complex sentences.

Keep your sentences in order

The basic sentence construction is English is subject-verb-object. This doesn't mean that all sentences have to follow this pattern, but this should be the predominant sentence construction. Don't dress your writing up with convoluted constructions in an attempt to impress your reader. Technical communication should not aim to impress; it's purpose is to communicate.

Of tenses, moods and voices . . .

Verbs are the most powerful words in the language because they convey action. Verbs, like people, come in a variety of shapes and sizes. Verbs have five main characteristics to consider:

- voice - active or passive
- tense - past, present or future
- mood - interrogative, indicative or imperative
- person - I, you, he, she, it, we or them
- number - singular or plural

Prefer the active voice to the passive

Active constructions are more dynamic and have more impact than passive ones. They also have the advantage that they demand a subject, or operator. With passive constructions it is very easy to omit the subject.

For example,

> *the bacon was burnt*

is a complete clause in itself. It tells us what happened to the bacon, but it doesn't tell us *who* burnt the bacon. If we turn it around and make it active rather than passive, the culprit becomes clear, *Phil burnt the bacon*.

However, at times the passive voice is better than the active. This is true where you want to place the emphasis on the object rather than the subject. Sometimes the subject is irrelevant, or a distraction, or is obvious from the subject matter. For example:

> *The data is compressed and then stored on magnetic tape.*

It would be quite unnecessary to say:

> *The computer compresses the data and stores it on magnetic tape.*

An occasional passive construction can also be a light relief from a monotonous string of similarly constructed active sentences. However, never use the passive voice in instructions.

For example,

the power switch must be on

is not really an instruction at all. It is a statement. But does the operator interpret it as a precondition, implying that someone else should have turned the switch on already, or as an instruction to turn the switch on? This sort of ambiguity can cause serious problems for the reader, and can be dangerous.

Get the tense right, and stick with it

There are two pitfalls that await the unwary writer when handling tenses:

- using the wrong tense
- changing between tenses

Where possible, use the present tense, particularly when describing the results of actions. The future tense tends to imply that the result is conditional on some other factor, or may be divorced from the action. For example,

If the footpedal is pressed the drawbridge will rise.

is less direct than

The drawbridge rises when you press the footpedal.

Always remember that although the reader's actions are in the future as far as you are concerned, they are in the present for the reader.

Choose the right mood

Verbs have three moods: interrogative, imperative or indicative (or declarative).

The interrogative mood is the one we use when we ask a question:

Why are you doing that with your pencil?

The imperative mood is the mood of instruction:

Put your pencil in the other ear.

The indicative, or declarative, mood is the mood of description:

She put her pencil in his left ear.

Technical writing demands the use of all three moods, though not in equal proportion. A design description will use the indicative mood more than the other two; an instruction manual will mostly use the imperative mood.

The interrogative and imperative moods both demand a response from the reader. If you ask a question you demand an answer. If you give an instruction, you demand action. Using these moods can make writing more active, and give the reader a greater sense of involvement with the writing. They are particularly useful as 'talking headings'

For example,

How do you enrol a new patient?

is more interesting and attention-grabbing than

Enrolling new patients

and much better than

New patients

Be consistent in person and number

Verbs can be in one of three persons and be either singular or plural.

	Singular	Plural
1st Person	I write	We write
2nd Person	you write	you write
3rd Person	he, she, it writes	they write

For most verbs, the third person singular is the only form to have a different ending to the other forms. The person of a verb (I, you, he, she or it) and the number (I or we, he or they) need to be kept consistent throughout a document. If you start off by addressing the reader directly, for example

This manual shows you how to fly a hang glider.

don't switch to third person later,

Purchasers of Acme hang gliders should renew their life insurance policy before attempting flight.

This example comes from a book on technical writing:

If a document's author is not the primary researcher or product developer, obtain information from other people.

The second person style engages the reader more than an impersonal third person style of writing. Unfortunately, too many people think that it is "unprofessional" to address the reader directly in that way. There are also cultural issues to bear in mind. Some cultures will not readily accept instructions and writing that are so direct. Know your readers.

Make instructions clear

The kiss of death for any instruction manual is the combination of the passive and indicative styles. For example, in this 'instruction'

> *a layer of silastic adhesive is to be applied to the terminal assembly*

it is not clear whether the operator must do this, or whether some other, unidentified, person is responsible. Be explicit. Use the imperative mood to make the instruction clear and active, for example

> *Apply a layer of adhesive to the terminal assembly.*

Never verb a noun . . .

One feature of English is that you can verb any word. Try it. Take any noun and turn it into a verb. It may sound strange at first, but soon you will be using verbs such as *action* in preference to the boring old *act*, and sounding mighty impressive too. You can also do it with adjectives, but sometimes you have to add *-ise* on the end to make it work. For example, a few years ago a Macintosh magazine announced that

> *Apple has divisionalised.*

In Telectronics, one document stated that

> *The implant is implanted at the implant procedure.*

Here, the word *implant* was being used as a noun (the medical device), a verb (the act of putting the device in someone's body) and an adjective (a type of clinical operation).

As wonderful as this freedom may seem, it is a source of much confusion, particularly when compounded by other writing mistakes. By using the same word as both a noun and a verb, we create a special class of homonyms which can be very difficult to interpret correctly. This is a particular problem for readers who do not speak English as their first language. It also a major problem for translators.

. . . and never turn a verb into a noun

Turning verbs into nouns weakens vigorous writing and forces the reader to undo your work and extract the verb from the noun. These nouns can be recognised by endings like -ion, -ence, -ance and -ment. Because the verb has been destroyed, another, weaker verb has to be employed, often the verb *to be* or *to have*.

So we end up with sentences like:

Compliance is required.

instead of

You must comply.

or

Give consideration to

instead of

Consider

Always be on the look out for weak verbs, and replace them with strong verbs that convey meaning more clearly.

Multiple modifier string interpretation difficulties

This is a particularly insidious habit of lazy writing. If you have a lot of things to say about a subject, put all of them together into the same sentence, as modifiers to the same noun or verb, and leave the reader to sort out the mess. With practice you can end up with terms such as:

Top company management stability concerns

Now, are they concerns of the top company management about stability (and if so, of what?). Or are they concerns about the stability of top company management, or the stability of the management of top companies, or the top concerns about the stability of company management?

In all probability, the writer of this phrase didn't know either!

This may seem excessive, but confusion can abound with just two modifiers, for example:

periodic progress reviews

What is periodic? The reviews or the progress?

No matter how hard you try, you will probably be hard pressed to match the following example which was nominated as the champion modifier string for the year 1970:

The Commission was impressed by the Test Project command module reaction control system engine oxidizer vapor inhalation damage recovery results.

Spelling

Does spelling matter?

Suppose you receive a note directing you to go to another university and ask for the Centrol Building? Where do you go? Do you look for the Central Building, or the Control Building?

This is a trivial example, but it illustrates the point. Poor spelling can lead to confusion and error, as well as affecting the reader's confidence in the integrity of the document.

Use spelling that is appropriate to your target audience, either American or Australian (British) English.

Thoughts on spell checkers

- If your word-processing package has a built-in spell checker, use it. If it doesn't, throw it out and get one that does.
- Don't trust the spell-checker. It will check each word in glorious isolation, but will not question words that are incorrect in context. For example, *the black witch* and *the black switch* would both pass through the spell checker, but their meanings are quite different.
- Most spell-checkers are limited in their vocabulary, particularly in technical fields. A good general dictionary and a relevant technical dictionary are essential tools.
- Beware the user dictionary. Spell-checkers usually acknowledge their limitations by allowing users to create their own custom dictionaries. This is useful for storing custom words and names. However, if you store an incorrect spelling in your user dictionary, the spell-checker will happily accept it as correct. Review your user dictionary periodically and throw out any errors, or specific terms that related to a project that is long gone.

Punctuation

why do we use punctuation quite simply because if we didnt we would make it very difficult for our readers to follow our chain of thought punctuation is there to help the reader and to show where the natural breaks are in the writing otherwise it all tends to flow together into one unintelligible whole

The *Macquarie Dictionary* and the *Australian Government Style Manual* give extensive advice on correct punctuation, but here are a few tips.

- Don't use too many commas. They tend to break up the flow of information and clutter text if used to excess.
- You **can** put a comma before the word *and*, particularly if the preceding clause also includes the word *and*. For example:

  For dinner we had fish and chips and strawberries and cream.

  This sentence needs a comma:

  For dinner we had fish and chips, and strawberries and cream.
- Use colons to introduce a series, or a list of items, or an example. You can also use a colon to join two contrasting clauses.
- Semi-colons give less of a break than full stops or colons and are useful for joining clauses with closely associated ideas. They are also useful for separating groups of items.

Acronyms and abbreviations

Acronyms can be useful if used carefully; if over used, they tend to create confusion. Use an acronym only if it is already well known (such as *IBM* or *RAM*), or if a term will be used frequently in the text and using the acronym will make the text easier to read. If you are using an acronym which is not in common use within the company, give the term in full the first time you mention it, for example . . ..

the Infra Red (IR) reflow machine

You may also have to redefine the acronym later in the document, particularly if there is a large gap between its use and its definition. Do not assume that the reader will read the document in one sitting in the order that you have written it.

Remember the object of your instruction

Make the relationship between actions and objects clear. For example, in

Remove the polyimide tape from the C Flex and discard.

what is to be discarded - the C Flex or the tape? Presumably the tape, but don't force your readers to interpret your terse text.

Trim the fat

Avoid unnecessary words, especially wordy phrases which have simpler and clearer equivalents. Many wordy phrases are constructions with weak verbs. For example:

Instead of	*Use*
to be in a position to	to
with a view to	to
in order to	to
in the event that	if
due to the fact that	because
in view of the fact that	because
will be of assistance in	will help
make an application	apply

Don't cut too much

When removing unnecessary words, do not cut out articles and prepositions such as *the a* and *of*. Small though they are, these words help to make sentences easy to read, and can be important in distinguishing between nouns and verbs. If you don't put them in as you write, the reader has to attempt to put them in later to make some sense out of the abbreviated text. This makes the reader do more work than is necessary, and also gives plenty of scope for misunderstanding. For example, does the heading

> *Pack contents*

refer to an instruction to *pack the contents*, or a description of *the contents of the pack*? Be explicit.

To quote Robert Eagleson again:

> *The fact that a sentence is short is no reason to believe that it is also plain.*

Distinguish between sequential and non-sequential instructions

Where a series of operations must be performed in a specified order, number the individual steps, for example:

1. Press the clutch pedal.
2. Select 1st gear.
3. Slowly release the clutch pedal.

If the order is not important, for example a list of items to be checked, use a bulleted list:

- Check that there is petrol in the tank.
- Check that the tyres are inflated to the recommended pressure.

Be consistent in your use of words

Be consistent in terminology within each document. If something is a *fixture* on page 5, don't call it a *jig* on page 7. Similarly, be consistent with terminology used in other documents.

Here are some common words which can cause confusion if used incorrectly or inconsistently. This list is certainly not comprehensive.

caution	A caution refers to a situation which may cause damage to equipment or product, or adversely affect a process. See also **warning**.
check	This means to find out whether something does or does not meet particular conditions. It does not imply taking action to make sure that it does. See also **ensure**.
different	*Different than, from, or to? Different to* is mainly British usage, *different than* is common in America, *different from is* generally acceptable. Remember your audience.
ensure	This means to make sure that something *does* meet particular conditions. For example, the instruction "*Ensure that the door is closed"* requires you to close the door if it is not already closed.
etc.	Avoid using "etc."; it requires the reader to guess what other things you may be referring to. Be explicit.
replace	If you use replace in the sense of "*Replace the item with another*", never use it in the sense "*Place the item back*".
warning	A warning refers to a situation which poses a risk to someone's health or life. This may be an operator, a patient, or a bystander.

Indexing

An index is almost essential in any technical document longer than 40 to 50 pages, particularly reference documents. A good index saves the reader time by simplifying the search for information.

What makes a good index?

A good index is

- complete
- accurate
- concise
- consistent

What should I index?

This is one of the hardest questions to answer. Try to put yourself in the reader's position and ask "What would I want to look for in this manual?".

- index every important point in the manual
- index themes and topics as well as keywords
- use primary and secondary entries to arrange the index information in away that is logical and easy to use
- do not index the contents list or glossary
- do not use the main subject of the manual as an index entry

Be accurate

Don't prepare the index until the body of the document is stable. You can insert index entries as you write and review the text, but do not create the index at that stage. An index is useless to the reader if the information is not on the page quoted the index.

If an entry spans a number of pages, quote the range in the index, for example:

design 20–38, 62

This tells the reader that there is an extensive treatment of the topic on pages 20 to 38, with a later reference on page 62.

Be concise

Make each entry clear and logical. An index entry should be long enough to be unambiguous, but short enough to be read at a glance.

For most purposes, two index levels are sufficient to associate subordinate ideas to a main topic. If you need more levels, you are probably indexing in too much detail. For example,

design 20–38
  typographic 30
  visual 26

Be consistent

Consistency in the index, and between the index and the rest of the manual, are very important.

- be consistent in the terms you use in the index (for example *sense lead* or *sensing lead*)
- maintain consistency between the text and the index, particularly in spelling and in capitalisation of acronyms
- use the plural case to define a class of an item (for example, files or commands), otherwise use the singular case (for example, Print command)

Give your reader alternatives

Your reader may not search for a topic in the same way that you would, so make provision for this in the index.

- Repeat entries under different headings, for example:

  design 20–38
    visual 26
  .
  .

  visual design 26

- Use *See* references to refer the reader to the appropriate place in the index, for example:

  design 20–38
    visual 26
  .
  .

  visual design *See* design.

- Use *See also* references to refer the reader to associated entries in the index, for example:

  typography 34 *See also* design

How should I format the index?

Because each index entry is usually only one to four words long, it is wasteful to use a full size column. Use two columns of unjustified left-aligned text. A general rule is to use the same type face as the body text, but in a size 2 points smaller.

The index format can either be indented (nested) or paragraph (run-in).

In an indented index, 2nd level entries are indented below the primary entry. For example:

> design 20–38
>
> logical 21
>
> typographic 30
>
> visual 26

In a paragraph index, 2nd level entries are separated from the primary entry by a semi-colon. For example:

> design 20–38; logical 21; typographic 34;
> visual 21

The paragraph format take up less space, but is more difficult to use than the indented format. Don't use this style unless space is a very severe constraint.

Upper or lower case?

Some style manuals recommend using a capital letter for each primary entry. Others recommend all lower case. Choose one style and stick to it. However, maintain consistency between the index and the main text for capitalisation of equipment names, controls, commands and the like.

How long should an index be?

There is no hard and fast rule for this. As a guide, an index to a technical manual will be between 2 and 5 percent of the main text; 4 to 10 pages for a 200 page manual. Of course, it depends on the layout of the text and the index, on the complexity of the subject matter, and on the nature of the document.

Can I do it automatically?

Yes.

And no.

Most document creation packages, including Microsoft Word and LaTeX have some form of automated indexing mechanism which takes care of the mechanical aspects of gathering and sorting the index entries. However, these systems cannot tell you what to index, and cannot resolve conflicts between inconsistent index entries.

Be prepared to edit and revise your index 2 or 3 times, and possibly more.

What makes a good indexer?

Indexing is a specialised skill in its own right. A good indexer knows the skills of index preparation, has an awareness of the reader's expectations, and is able to assess the technical content of the work. The author may have all of these qualities, but may be too close to the topic to be fully objective.

However, writers often have to index their own work so here are some suggestions.

- If possible. allow some time to elapse between completing the document and starting the index. This distance in time may help develop a degree of objectivity.
- If you cannot afford a delay, allocate a specific block of time to preparing the index after completing your writing, reviewing and editing. Don't try to write, edit, review and index at the same time.
- Prepare the whole index in one go, and keep notes of keywords that you have used.

Writing for Translation

Writing a document with a view to it being translated brings a new set of constraints to your writing. For the most part, problems for translators are also problems for English readers, although native English readers may be able to work their way around bad writing by using the surrounding context.

Here are some of the major issues to consider when writing for translation. Most of these issues also affect readers who speak English as second language.

Distinguish between verbs, nouns and adjectives

The ability to use the same word as a verb, noun and adjective in English causes great difficulty for translators. For example look at these different uses of the word *interrupt*:

You can interrupt the process at any time. [verb]

Press button A in case of power interrupt. [noun]

This device records interrupt time. [adjective]

This is a particular problem where there is little context for the translator, such as in terse headings or captions:

Debug operation

Pack contents

Install instruction

To get around this problem:

- Use words consistently throughout your document.
- Use articles and prepositions to make headings and captions explicit. *Pack the contents*, or *The contents of the pack*.

Some expressions can be singular or plural

In English, the adjectival phrase *the sample case* can mean the same as one of two prepositional phrases: either *the case for the sample* (singular) or *the case for the samples* (plural). Many other languages, including French, Spanish and Italian, do not allow the adjectival phrase, and so must use either a singular or plural prepositional phrase.

To get around this problem:

- Use prepositional phrases where possible. This can be difficult, as English usage generally prefers the adjectival form.

- Indicate in the context of the expression whether it is singular or plural (e.g *the sample case, which holds all the samples*).
- Make the adjectival noun plural. This breaks the general rule of English usage, but there are some precedents such as *parts list* and *accounts file*.

Avoid modifier strings

Are *green plastic brackets and fasteners* all made of green plastic? Or are they all green, with only the brackets made of plastic? Or are the brackets made of green plastic, with the material and colour of the fasteners a mystery?

The translator often has to be able to break up a modifier string to be able to translate it.

To get around this problem re-write the expression to make it clear which nouns are modified by which adjectives. This is not always easy. Sometimes it helps to change the order of the items (*fasteners and green plastic brackets*), sometimes you may have to repeat the adjectives (*green plastic brackets and green fasteners*). Alternatively, you may be able to group the items (*green plastic fittings, including brackets and fasteners)*.

Acronyms and abbreviations

Extensive use of acronyms can be annoying for English readers, but can pose particular problems for translators. In English, there are alternative meanings of the same acronym, even in closely related fields. For example,:

PC printed circuit *or* personal computer,

PCB printed circuit board *or* polychlorinated biphenyl

ATP antitachycardia pacing *or* adenosine triphosphate

ICD implantable cardioverter defibrillator *or* inspection criteria document

Always define acronyms and abbreviations explicitly at least once.

Another feature of acronyms is that they very rarely cross the translation boundary intact. This can be a problem if an English acronym is being used as a key label or screen prompt. In English, the acronym may be a very effective memory jogger. However, in another language that link is lost unless the acronym is also translated.

For example, *Antitachycardia Pacing* becomes *Terapia de Estimulación Antitaquicardia* in Spanish. Unfortunately, different therapies were identified in the software as ATP1 and ATP2. This requires the Spanish reader to make the link between ATP and Terapia de Estimulación Antitaquicardia.

Language growth

English is a very compact language. Few languages have the same capacity for succinct, snappy expression. This means that translated text almost always takes up more space than the original English. The amount of growth depends on the target language, but is typically between 10 and 50%. It may go up to 100%!

- Translated documents will be longer. If you have designed a very compact layout which just fits into a 16-page format, you can be sure it will blow out to 20 or 24 pages when translated. If you want the translated version to have the same pagination as the English, leave plenty of space in the English copy.
- Software screens, messages and prompts must be designed to allow for expansion. It is not enough to allow for the longest English language string; you have to allow for the longest translated string.

Revising and Editing

Revising the Draft

Having completed your first draft, you are now ready to revise it. And it will need revising. Indeed, it must be revised.

Remember that writing is a dynamic process. Not only does your document change and develop, but so do you. Your knowledge of the subject matter, your understanding of your audience, and your experience as a writer all change (hopefully for the better). When you have come to the end of the first draft, it is time to re-evaluate the whole process, and take a fresh look at everything you have done. This is the process of revision.

As a rough guide, the first draft may be around 60% complete, both in terms of quantity and quality. Revision is the process that brings this figure up to around 90% (the final 10% comes in editing).

Revision means taking a fresh look at the document, and has five aspects:

- overall purpose and content
- overall structure
- paragraph structure and content
- sentence level problems
- idiosyncratic errors

These may all happen at the same time, or may be sequential. However, it is important to review your draft from all five points of view.

Overall purpose and content

Does the document meet its objectives in terms of purpose and content? Go back to your original plan for the document, and compare your result with your plan? Are all features of the product covered? Have you addressed the needs of all the users that you are able to identify? Have you given instructions for all procedures or activities?

Add new material if you identify deficiencies, or remove material that doesn't need to be there.

Overall structure

Having established that the document as a whole satisfies its purpose, and is complete, the next step is to look at the internal structure of the document. Why are the sections arranged in that order? Would it be better to swap sections 2 and 4? Is the conclusion in the right place? Are tables and graphics linked to the related text? Do headings relate to the following text, or has the text strayed beyond the scope of the heading? Will a reader, without your overall knowledge and hindsight, find the structure clear and logical?

If necessary, make changes to achieve a clear logical structure. This may involve moving sections of the text, adding more signposts or references, or adding new text to link sections.

An important part of this process is looking at the logical flow from one paragraph to another. Is there a clear progression of thought? Does each paragraph lead into the next, or are there abrupt changes of direction? It may be necessary to add new headings to signal changes of topic. Or to change the order of some paragraphs.

Paragraph structure

This aspects of revision looks at paragraphs as individual units. Does each paragraph have a logical structure? Do the sentences proceed in an orderly sequence, for example from a general statement to specific details.

Every paragraph must contribute to the overall purpose of the document. If it doesn't, it is dead wood and is likely to deflect the reader. Either relegate the paragraph to a footnote (if it's an interesting aside that you want to keep in) or else delete it.

Sentence level problems

Look at each sentence for some of the pitfalls that we discussed in Writing Skills (including passive clauses, modifier strings, weak verbs) as well as for grammatical errors and sentences that never quite got finished.

Look out for sentences that develop a life of their own and which, although they once had a real purpose in life, have become so full of dependent clauses - some of which may be very valuable and may contain useful information not found elsewhere - have become a self-sustaining jungle of tangled ideas, and which, like Frank Sinatra never quite know when it's time to call it a day.

Idiosyncrasies

Idiosyncrasies are those unique features of our own writing that we need to check for carefully. We all have particular faults, and need to be aware of them. The sort of fault to be aware of includes:

- confusing similar words (*effect* and *affect*)
- excessive use of similar sentence structures (sequences of sentences all starting with *The*)
- words that we persistently misspell.

When to revise

Revise when you have something worth revising. Depending on the extent of your project, you may want to wait until you have a complete first draft of the entire document, or else you may want to revise separate sections in stages. The 4th and 5th aspects can be carried out progressively as you write, but don't let revision interrupt your writing. If you do revise in stages, be sure to review the overall structure, purpose and content of the entire document at least once.

To be most effective, revision should be separated from the act of writing. Otherwise you are straining the old view, rather than gaining a new one. There are a few ways that you can get that separation:

- Don't revise material on the same day as writing it. Try to put at least one night's sleep between writing and revising.
- Use a printed copy to revise, particularly if you write directly at the keyboard. A paper copy is easier to flick through when checking the overall structure.
- Revise in a different place than where you write. If you write at a computer terminal, try revising at a desk in the library, or sitting in a comfortable chair.
- Read the text aloud so that you hear it as well as see it (not recommended if you decided to revise in the library). Reading aloud is slower than silent reading, and so enforces a closer attention to the words. You may pick up more problems this way.
- Do it with a friend. Ask someone else, whose opinion you respect, to read your draft and see if it makes sense. If the other person doesn't understand something, change it – don't assume that the reviewer is stupid!

Editing the Draft

Editing is a similar process to revising with two exceptions:

- revising is always done by the author, editing may be done by someone else
- revising often involves adding new material, editing almost never does.

As with revising, editing is best done on a paper copy as a distinct function quite separate from writing. Editing involves both right-brain and left-brain functions.

Right-brain editing

Right-brain editing is qualitative. It is concerned with aspects such as meaning, clarity and order of information. The first stage of editing is to read the entire document to get the feel of it. Do this before you start to mark up suggested changes. Then read through it again, trying to put yourself in the reader's position.

Use the following checklist for right-brain editing:

- are there any unnecessary words, sentences, paragraphs or sections?
- can the order of the words, sentences, paragraphs and sections be improved?
- can individual sentences be rewritten to make them clearer?
- do any sections need examples or graphics to illustrate the text?
- are any examples or graphics superfluous?
- can the layout be improved?
- is it easy to find information?
- does the text make assumptions that are not valid?

Left brain editing

Left brain editing is quantitative. It is concerned with accuracy and factual errors.

A left-brain editing check list includes:

- are all technical details correct?
- are terms used consistently throughout the document?
- do terms in graphics and tables agree with terms in the body of the text?
- does the Table of Contents agree with the headings in the text?

- are numbered sequences complete and in order?
- are all pages numbered correctly and in order?
- have special type faces been used correctly and consistently?
- is capitalisation consistent throughout the document?
- are there any spelling errors?
- is the grammar correct?
- is punctuation used correctly?
- are the page references in the index correct?
- are all page breaks appropriate?

Some Useful References

Technical Writing as a Career

Technical writing is a relatively new profession in Australia, although it is very well established in countries such as America and the United Kingdom. A 1992 survey of the Australian Society for Technical Communication (ASTC) was distributed to 545 members or past-members in NSW/ACT (322), Queensland (45), South Australia (105) and Victoria (73). There is also an active society in New Zealand which shares the same initials, the Association for Science and Technical Communication.

In Australia, over half of all technical communicators produce some form of computer documentation.

Here are the addresses of some technical writing organisations.

- Australian Society for Technical Communication (NSW)
  PO Box R812, Royal Exchange, Sydney 2000
- Australian Society for Technical Communication (Queensland)
  PO Box 118, Spring Hill 4004
- Australian Society for Technical Communication (Victoria)
  PO Box 390, Heidelberg 3084
- Technical Writers Association of South Australia
  PO Box 185, Rundle Mall 5000
- CHISIG (Computer-Human Interaction Special Interest Group)
  c/- Human Factors Research Team, Telecom Research Labs, 770 Blackburn Road, Clayton 3168
- Australian Society of Indexers
  GPO Box 1251L, Melbourne 3001
  PO Box R598, Royal Exchange, Sydney 2000
- Society of Editors
  PO Box 254, Broadway 2007
  PO Box 1524, Toowong 4066
  PO Box 2328, Kent Town 5071
- Society for Technical Communication
  815 Fifteenth Street NW, Washington, DC 20005, USA

Some Recommended Titles

Dictionaries

Macquarie Dictionary; 2nd ed; Macquarie Library, 1991
(The most common dictionary for Australian usage)

Concise Oxford Dictionary; Oxford University Press
(A single volume)

Shorter Oxford English Dictionary; Oxford University Press
(2 volumes, its longer than the Concise)

Websters Third New International Dictionary; Merriam Webster
(Useful if you have to write for an American audience)

Websters Ninth New Collegiate Dictionary Merriam Webster
(A shorter version of the International)

Grammar and Punctuation

Bernard: *A Short Guide to Traditional Grammar*; Sydney University Press, 1975-86

Usage

Hudson: *Modern Australian Usage*; Oxford University Press, 1993
(I haven't seen this, though it has received favourable reviews)

Fowler: *A Dictionary of Modern English Usage*; revised by Gowers, Oxford University Press, 1965
(One of the classic works on English usage; the style is a little old-fashioned now)

Style

Eagleson: *Writing in Plain English*; Australian Government Publishing Service, 1993

Gowers: *The Complete Plain Words*; revised by Greenbaum and Whitcut, Penguin 1987

Strunk and White: *The Elements of Style*; MacMillan, 1975

Williams: *Style: Towards Clarity and Grace*; University of Chicago, 1990

Australian Style; Macquarie University Dictionary Research Centre
(A free 16-page magazine issued periodically.)

Style Manuals

Style Manual for Authors, Editors and Printers, 5th Ed; Australian Government Publishing Service, 1994
(This is a very well respected manual which covers current topics such as non-discriminatory language and the application of new publishing technologies. Highly recommended).

Australian Editing Handbook; Australian Government Publishing Service, 1994
(Recommended as a companion to the *Style Manual*)

Chicago Manual of Style, 14th ed; University of Chicago, 1994
(First published in 1906, this manual is the definitive reference source for American editors and is an excellent reference for American style.)

Acknowledgments

The following publications provided much of the inspiration for this course:

Robert Eagleson: *Writing in Plain English*; Australian Government Publishing Service, 1993

Michael L Keene: *Effective Professional Writing*; D C Heath, 1987.

Philip Rubens, Ed: *Science and Technical Writing – a Manual of Style*; Henry Holt & Co., 1992.

Rob McKilliam: *How to Develop Successful User Documentation*; Rob McKilliam Services, 1992.

Tony Golsby-Smith, Mark Strom, Rob McGregor: *Information with Impact*; Golsby-Smith & Associates, 1990.

Strunk and White: *The Elements of Style*; MacMillan, 1975.

Richard Crum: *Writing English Copy for Better Translation*; Berlitz Translation Services, Los Angeles, 1992.

Colin Wheildon: *Communicating, or Just Making Pretty Shapes?*; Newspaper Advertising Bureau of Australia, 1990.