
UNIT 5 TECHNICAL ARTICLES

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5.1 INTRODUCTION

A good Technical Article addresses a problem or issue important to its audience and presents its **argument** clearly and **coherently**. However, it differs somewhat **from** the other types of technical communication because it is **written** for a very different audience. The **other** types are written for a wide spectrum of readers with varied backgrounds, attention, interest, and time – audience including non technical people, technical non specialists, and specialists. Thus, the other types have to provide features appropriate to this diversity of audience. In contrast, the journal **article** is written for a narrow audience: specialists in a field, who share assumptions, **knowledge**, and backgrounds and who have the need and interest to read carefully. **This** means that the journal article can eliminate some of **the** features provided primarily for non-experts, in particular, **the** Foreword and **Summary**. However, the article should maintain the features providing clarity and ease of reading for experts, in particular, the movement from generalizations and claims to data and support. **Unfortunately**, this movement is sometimes **reduced** by writers relying perhaps too strongly on the expert reader's interest and **determination** to understand.

Articles in **different** fields and journals vary somewhat in style. If you are **writing** an article for a particular journal, you should read that **journal's** instructions on

organization and format **and** then look at sample articles in several issues to become familiar with the journalists style. (Here, style includes such things as format for footnoting, ways of setting up headings and visual aids, length of paragraphs, and **other** special features.)

Although they may differ in style most articles share a remarkably uniform purpose and structure. The purpose of an article in any field is to advance an argument of fact or policy : (1) an **argument** of fact that the results reported are valid, that previously reported **results** are supported (or not), that a given theory is supported (or not), that other observations are necessary to resolve some debate in the field : or (2) an argument of policy that previous results should be questioned or reinterpreted, that a given theory should be abandoned, recast, or extended.

Technical articles are written by specialists – for other **specialists** – and that appear in professional journals. Technical articles are written principally to inform their readers, and **most** of the readers of these articles read them for the information they convey.

Objectives

After studying this Unit you will be familiar with

- the different types of Technical Articles,
- the formal elements of a Technical Article,
- the formalities of preparing and mailing the **manuscript**,
- using the Computer for Technical Writing,
- using E-mail in Technical Writing, **and**
- documentation of Sources.

5.2 TYPES OF TECHNICAL ARTICLES

Technical articles fall into three categories :

- (1) research articles
- (2) review articles
- (3) conference papers.

A research article reports on a **research** project. In most cases, the research is carried out by the writer in the laboratory or the field. A typical research article might describe the effect of a new chemical on a strain of bacterium, or the rate of contamination of a freshwater aquifer. A review article, on the other hand, is an analysis of the published research on a particular topic. It might be, for example, a study of the advances in **chemotherapy research** over the last two years. The purpose of a review article is not merely to provide a bibliography of the important research, but also to classify and **evaluate** the work and perhaps to suggest fruitful directions for future research. The **third** type of technical article – the conference paper – is the text of an oral presentation that the author gave at a professional conference. Because **conferences** prove a useful forum for communicating tentative or partially completed research findings, a paper printed in the "proceedings" – the published collection of the papers given at the meeting – is generally less authoritative and prestigious than an article published in a scholarly journal. However, proceedings do give the reader a good idea of the research currently being done in the field.

5.3 REASONS FOR WRITING TECHNICAL ARTICLES

Technical articles are written by the people who actually perform the research or, in the case of review articles, by specialist,; who can evaluate the research of others. Often, the **only** characteristic these authors share is that they **themselves** generated or

gathered the information they communicate : a physicist at a research organization writes up her experiment in laser technology, just as a hospital administrator writes up his research on the impact of health maintenance organizations on the private hospital industry.

Technical articles are the basic means by which professionals communicate with each other. Conferences occur infrequently, and not all interest parties can attend; therefore, they are not the principal means by which professionals stay **current** with the day-to-day changes in their fields. Only technical journals can fulfill that function, for they provide a convenient and inexpensive way to transmit recent, authoritative information. A technical article can be in a reader's hand less than two months after the writer sent it off to the journal; most books, which deal with broader subjects and contain more information than articles can, require at least two years and therefore are not useful for communicating new findings. **And** because it has been accepted for publication by a group of referees – an editorial board of specialists who evaluate its quality – a technical article is likely to be authoritative.

Because technical articles are a vital communications tool, their authors are highly **valued** and frequently rewarded by employers and professional organizations. In some professions – notably university teaching and research – regular and substantial publication is virtually a job requirement. In many other professions, occasional articles enhance the reputations and hasten **the** promotion and advancement of their authors.

5.4 CHOOSING JOURNALS

Having determined the topic of a possible article and perhaps having written a rough outline, a writer must think of a journal to which to submit the article.

Most professional journals are run by volunteers. The work usually is done by eminent researchers and scholars whose **principal** goal is to strengthen the work in their fields. Consequently, these editors and their **assistants** are extremely serious about their work; they draw **up** and publish careful and comprehensive statements of purpose and editorial policies. They see themselves as **addressing** a particular way, for a particular reason.

Editors expect a prospective author to take the journals they publish seriously and to follow their editorial policies. If, the journal uses **one** style of documentation and an article conforms to a different one, the author should not be surprised if the article is rejected without comment or explanation.

Sheer numbers **contribute** to this situation. Publication is so highly valued these days that few **editors** of reputable **journals** ever have a shortage of good articles from which to choose. Understandably, editors are unwilling to take the time or **use** their tiny staffs to make an article conform to their preferred style when they already **have** a dozen equally good articles that don't need stylistic revisions.

For these reasons, an author greatly enhances his or her chances of success by choosing a **journal** *before* **starting** to **write**. Only by **doing** so can an author tailor an article to **its** first audience – the editorial board of a particular **journal**.

5.5 RESEARCH

If you **plan** to **write** a professional **article**, start in the library. You already know the leading journals in your field. Get a **few** recent issues of each journal and **find** a quiet place to study **them**.

First, check the masthead to each journal. The masthead, which is generally located on one of the first few pages, is the **statement** of ownership and editorial policy. The editorial board is often listed on the masthead as well. The **editor** is likely to have a column – also **near** the front of the issue – **that** sometimes discusses **the** kinds of

articles the journal is (or isn't) looking for. Study the editor's comments and the journal's editorial policy carefully; these sources are likely to provide crucial information that will save you considerable time, and expense. For instance, every once in a while a journal stops accepting submissions for a specified period (sometimes up to a year or two), because of a backlog of good articles. Of course, you would not write your article for that journal. Or you might learn that a particular journal does not accept unsolicited manuscripts: that is, that it commissions all its articles from well-known authorities or that it publishes only staff-written articles. Again, this is not the journal for you. Or maybe a journal is planning a special issue devoted entirely to one subject. Some journals print only special issues, and they announce the subjects in advance. If you choose one of these journals, make sure your idea fits the subject before you write the article.

Not all the information in the editorial policy or the editor's column is negative, of course. Most journals do accept unsolicited articles and are happy to explain their requirements: the explanation saves everyone a lot of frustration. Often, they will provide guidelines for sending in manuscripts (how to mail them, how many copies to send, etc.). Perhaps the most pertinent piece of information journals convey is the name of their preferred style. If the journal specifies a style manual, find it and follow it.

After you have studied a journal's editorial policies, turn to what it actually publishes: the article themselves. Read a number of articles and try to determine as much as you can about the following matters :

- 1) *Article length*: Sometimes, journals only print articles that fall within a certain range, such as 4,000 to 6,000 words. Even if a range is not stated explicitly in the journal, the editors might have one in mind as they read your article. If your article is going to be either much shorter or longer than the average length of articles the journal publishes, you might not want to write it for that journal.
- 2) *Level of technicality*: Are the articles moderately technical or extremely technical? Do they include formulas, equations, figures?
- 3) *Prose style*: How long are the paragraphs? Do the authors use the passive voice ("The mixture was added ...") or active voice ("I added the mixture ...")? Is the writing formal or somewhat informal?
- 4) *Formal requirements*: Are the titles purely informative or are they "catchy"? Are subtitles included? Abstracts? Biographical sketches? Are the articles written with American or British spelling and punctuation?

5.6 THE QUERY LETTER

Once you are fairly certain of the journal you want to shape your article for, it's a good idea to find out what the editor thinks. Some editors will talk to you on the phone, but most prefer that you write a query letter.

A query letter is brief—usually less than a page. Your purpose is to provide in brief the following information :

- 1) What is the subject of the article?
- 2) Why is the subject important?
- 3) What is your approach to the subject (that is, will the article be the report of a laboratory procedure, a rebuttal of another article, etc.)?
- 4) How long will the article be?
- 5) What are your credentials?
- 6) What are your phone, fax and e-mail numbers?

5.7 THE STRUCTURE OF THE ARTICLE

Technical articles are intended for a national or international audience, therefore a uniform structure has been developed to assist both writers and readers.

This structure is essentially the same as that of the body of the average report, except that an abstract generally precedes the article itself, with no other material intervening. The components of this structure are as follows :

- 1) Title of article and name of author
- 2) Abstract
- 3) Introduction
- 4) Materials and methods
- 5) Results
- 6) Discussions
- 7) References

5.7.1 Title and Author

Technical articles tend to have long (and clumsy) titles, because of the need for specificity. Abstracting and indexing journals classify articles according to the key words in the title; therefore, you should be sure to **include** in your title those terms that will enable the readers to find your article.

Following the titles comes your name (and the name of any co-authors). In addition, you should include your institutional affiliation.

5.7.2 Abstract

Technical articles contain abstracts for the same reasons that reports do: to **enable** readers to decide whether to read the whole discussion. Most journals today prefer informative abstracts to descriptive ones.

5.7.3 Introduction

The purpose of an introduction to a technical article is to define the problem that led to the investigation. To do so, the introduction generally must (1) fill in the background, (2) isolate the particular deficiencies that currently exist. Often, the introduction requires a brief review of the literature, **that** is, an annotated **summary** of the major research, either on the background of the problem or on the problem itself. This literature review provides a context for the discussion that is to follow. Perhaps more important, the literature review gives credence to the article by demonstrating that the author is thoroughly familiar **with** the pertinent research.

Some writers like to end **the introduction** with a brief summary – usually just one sentence – of their main conclusion. This summary serves two functions: to enable some readers to skip parts of the discussion **they don't** need and to help other readers understand the discussion that follows.

The introduction is an especially tricky part of the article since it must present a great **deal** of information and orientation in a short space.

- i) It **should present first**, with all possible clarity, **the nature** and scope of the problem investigated,
- ii) To orient the reader, the pertinent literature should be followed,
- iii) The method of the investigation should be stated. If deemed necessary, the reasons for the choice of a particular method should be stated,
- iv) **The principal results** of the investigation should be stated. Do not keep the reader in suspense; let him follow the development of the **evidence**.

Articles aimed at specialists may begin with an **introduction** based on either a **long-form** or a **short-form** problem statement. (Since **specialists** share **assumptions**, methods, and knowledge of their field, a writer can often **assume** this shared experience and not state it.) In contrast to other types of introductions, article Introductions aimed at specialists include technical details and a short **review** of previous work on the topic. These establish a context against which the author contrasts an observation or an inadequacy in theory or method.

5.7.4 Materials and Methods

"Materials and methods" is a standard phrase used to describe the actual procedure that a researcher followed. Basically, this section of the article has the same **structure** as a common recipe: these are the things you will need, and this is what you **will** do. Often, the materials and methods section is clearly divided into its two halves, and the steps of the procedure are numbered and expressed in **the** imperative mood (for example, "Mix the ...")

The materials and methods section of any report you write is a critical part of the report's argument since it establishes the validity of **your results** and allows them to be taken seriously. It **demonstrates** that you have done everything "the right way": that you have been scrupulously careful and **thorough**, that you have used an accepted method, that you have made no technical mistakes.

This section also provides the mechanism by which the scientific **community** can repeat **and** verify your work. It must contain sufficient detail to allow any relatively experienced researcher in your field to reproduce your results exactly. This means that you must

- 1) Identify exactly **what** materials you used to conduct your research – reactants, enzymes, catalysts, **organisms**, experimental subjects (human or animal) etc. You should also identify your materials specifically enough so that **another** researcher could use exactly what you specify to reproduce your results.
- 2) Identify any special conditions under which you conduct your research – special temperatures, irradiation with ultraviolet light, testing with unusually high current or voltage loads.
- 3) Identify any special criteria you used to select materials, subjects, test apparatus, or test method. (If you chose one gluing material or catalyst over another, why?)
- 4) Identify **the** specific method you used to conduct the research. If you **followed** a standard procedure, you may simply **reference** it. If you followed an **unorthodox** or **new** procedure, you **need** to **describe** it fully.
- 5) **Justify**, where **necessary**, any of your choice of criteria, **materials**, **method**, or **conditions**.

5.7.5 Results

The results of the procedure are **what** happened. Keep in mind **that** the word results refers only to **the** observable or **measurable** effects of **the methods**; it does not attempt to explain or **interpret** those effects. The **results** section of an **article** presents (1) the major generalisations you are **making** about your data, and (2) in a **compact** form the data **supporting** the **generalisations**.

5.7.6 Discussion

The discussion section **answers** two basic questions: (1) Why did the results happen? (2) **What** are the implications of the results? The two **halves** of the typical **discussion** section of an article are **thus** similar to the conclusion **and** **recommendation** sections of a report.

The discussion explains the **implications** of your **results**. It fits the results into the context of the field by relating **your results** of other work, both theoretical and experimental. Along with **the introduction**, it explains why **your work** is **important**, how it contributes to the advancement of the field. It is **critical** that this be done carefully and **thoroughly**. Many papers are rejected by journal editors because of a faulty **discussion**, even though the **data** of the paper **might** be both valid and interesting. Even more likely, the true meaning of the data may be completely obscured by the interpretation **presented** in the **discussion**, again resulting in rejection.

If you want to show how your work **contributes** to the advancement of your field, you might consider what circumstances create advancement.

5.8 PREPARING AND MAILING THE MANUSCRIPT

Preparing and mailing the manuscript in a professional manner will not guarantee that an article is accepted for a publication, of course. However, an unprofessional approach will almost certainly ensure that an article is not accepted.

5.8.1 Typing the Article

The article must be typed **double-spaced**. Whether or not you type it, keep in mind that editors are like any other readers: they **don't** like sloppy manuscripts. And they particularly don't like articles that **violate** the preferred stylistic guidelines. **One** reason is that it costs the journal money to revise a **manuscript** to make it **conform** stylistically. Perhaps a more important reason is that it is rude.

One new area of concern is word processing. Most journals address the question of whether they accept word-processed manuscripts at all and, if they do, **what kind** of printing they require.

The reason that some journals don't accept a word-processed article is that they want to discourage **simultaneous submissions**. That is, they don't want the writer to **submit** the same article to more than one journal at a time. Because most reviewers work for free, they understandably feel victimized when they spend long hours reviewing a manuscript only to have the author withdraw it and **publish** it in another journal. However, now that the letter quality printers are **commonplace**, it is almost impossible to distinguish typed copy from word-processed copy.

Many journals will not accept dot-matrix **printing** because it is more difficult to read than letter-quality printing. Mathematical symbols can be especially difficult to decipher.

Increasingly common, however, are journals that accept soft copies if the authors can create the **manuscript using** the same system that the journal uses. **This** saves money for both the author and the journal. The author saves postage and the journal saves retyping expenses. Most important, however, no errors are introduced into the article during retyping.

If the journal has provided no typing guidelines, double-space everything and type on only one side of 8 1/2 - by 11-inch **non-erasable** bond paper. Use a word processor with a printer the journal accepts. Send a photocopy **with** the original, and make **sure** you **keep a photocopy**.

5.8.2 Writing a Cover Letter

An article should not arrive alone in an envelope. Enclose a cover **letter**. This letter should be brief, for your purpose is not to "sell" the article: any boasting would probably work **against** you. The abstract will tell your readers **everything** they **want** to **know**.

If the editor has responded to a query letter, you should work **this** fact into the first paragraph. If you didn't **inquire** first, simply state **that** you are **enclosing an** article that you would like the editor to consider. In the next paragraph, you might wish to define

briefly the subject or approach of your article and give its title if you haven't done so already. Then conclude the letter politely,

5.8.3 Mailing the Article

Follow the journal's mailing guidelines – about the number of copies to include, for example. Some journals request that you **enclose** a self-addressed, stamped envelope (SASE); others ask for loose postage. You might wish to state, in your cover letter, **that** you are enclosing an SASE or postage.

To keep the article from getting mangled: it's a good idea to enclose it between pieces of cardboard. Be especially careful if you are enclosing photographs or other artwork. If you are sending a total of about 100 pages or more, use a padded envelope. This can be obtained from the post office.

Some journals state that they acknowledge received manuscripts. If the journal you are writing to doesn't, enclose a self-addressed postcard and ask the editor to **mail** it when he or she receives your article.

SAQ 1

- a) What are the three types of Technical Articles?
- b) Name the formal elements of a Technical Report.

5.9 USING THE COMPUTER AND E-MAIL

Whether you write your rough draft by hand or on computer, you will find it helpful to use computer the rest of the way. A computerized word processor allows you to do a variety of things that you cannot do with any other technology. You can write faster you can make more changes faster; you can use outliners, spelling checkers and other tools; you can print out hard copy in variety of fonts and sizes; you can integrate visual aids and special formatting features; and you can send the result electronically to distant recipients. Whether you use a personal computer or a mainframe, you can find a word-processing program that will suit your taste and your bank account.

Research has shown that not everyone benefits equally from using a computer. For example, many students apparently lack **an** understanding of the computer as a writer's machine. If you are careful **about** your planning, and if **you can** type well, you will **probably** get maximal benefit out of **writing** on a computer. If not you probably won't. The rest of this unit, discusses **some** of the pros and cons of using a word processor.

5.9.1 Minimising Distractions from Typing or Running the Computer

The first set of **problems** to confront a computer-based writer are the many things to learn and control when first using a new word processor or computer system. Many people find that when they start with a new system, **they** seem to focus all their attention on their typing skills or on the commands needed to run the computer. In such cases, they may have little or no attention "left over" to devote to the cognitive acts of composition, to developing an appropriate point and structure and focus for the audience for which they are writing. **Thus** if you are a **new** or moderately new user of a computer system, you may want to minimize the attention you need to spend on running the computer by trying the following strategies.

Define a Minimal Instruction Set

Instead of trying to learn everything about your new system right away, make a list of **the** smallest number of tasks you need to **learn** to get started. Then make a reference

sheet of the commands for these tasks **and** tape it to your computer or set it up close by while you work. The list will probably include :

- Turning on your computer
- Starting up your text-processing system
- Opening a new document
- Entering a new material
- Deleting material
- Adding new **material** to existing material
- Saving your **document**
- Printing your **document**
- Turning off your text-processing system and computer

Once you have these **actions** under control, you might add the following to your list :

- Changing left margins
- Setting up lists
- Copying a moving text

If you can master **this** subset of text processing tasks, you will be able to get started **on** your writing with a minimum of things to remember and thus a minimum of distractions to your writing activity. Once you are comfortable with these tasks, you can do other things as you need to use them.

Get Formal Training

Take a course on your text processing system or teach yourself to use it by going through all the tasks listed in **the documentation** and then practising on 'junk' documents. This approach has the advantage of letting you know **how** to **run** the computer, before you start to do the real work, but **the** serious disadvantage is forcing you to spend a lot of time practising instead of doing real work while you learn.

Improve your typing

If you are a poor typist, try to improve your typing by taking a typing course or practising with a '**typing-tutor**' on your computer. While you are learning, try not to worry about your typing as you write. **One** great advantage of using a computer is that it is very easy to correct mistakes when you are editing. If you can shift your attention from your typing to your thinking and writing you will be way ahead.

Special Highlighting Features

Many computers give writers the capability of using different fonts - this is, different sizes, shapes, thickness, and size of letters. Since these are interesting and **new**, writers often get carried away and use most of them in the same document, giving **their** work a hotchpotch look. If your system has different fonts, try to design a use of fonts **which** is **functional**. Choose one major font as **the** base for the text and then use its different sizes and styles to highlight important things. For instance you might use bold and large sizes for headings, and use bold or italics alone for a particular kind of emphasis. If you use too many fonts in a text, you'll detract from **its** ultimate readability.

Computer Failures

One of the easiest ways to save your time is to save your documents frequently **when** writing on a computer and to make at least one back up copy of the document. You should update the backup copy of the text frequently and keep it in a separate, safe place so that if your computer has a failure you won't lose hours of work. Although you may find it annoying to save your text and make backup copies so frequently, you won't find it nearly as annoying as losing **all** you have written in a power **failure**.

5.9.2 Problems in Planning when Writing on a Computer

Planning involves the writers selecting and organizing material and considering how the audience and purpose effect what is being said. It is essential to good writing, and therefore it should be done not just before **writing** but throughout the writing process, even during **final editing** and **formatting**. Although planning presents problems for writers working by hand, there is **some** evidence that planning is even more of a challenge for writers working on a computer. When writers use a computer, they tend to do less planning overall, less planning before writing, **and less** conceptual or high level planning than when they write by hand. Though the evidence could be stronger, it suggests certain 'downside' effects of the computer that correspond to many people's observations comments :

- 1) The **empty**, blinking computer screen "pressures" some people to start writing before they are really ready, make them feel that 'I just can't sit and **think** with my fingers on the keyboard - I feel I have to start typing'.
- 2) The small screen **limits** the amount of text the writer can see and thus focuses attention on local issues rather than on larger issues of overall organization, audience and purpose.
- 3) The end of making small editing **changes** biases the reader towards stylistic editing rather than basic organizational changes.

If you have trouble with planning or feel specially pressed to write in front of a computer screen, there are several strategies you can use to increase the amount and effect of your planning activities.

Plan Before Writing

Do as much of explicit planning before writing as you can. Make sure you have identified the problem, your audience, your purposes, your main **point(s)**, and your arguments. Keep a hard-copy (printed) outline handy so that you can keep a sense of the whole document in **mind** as you write.

Use the computer in your **idea** generation stage - that is, to take and organize notes **for** writing. (You might want to try one of the "idea generating" programs which ask a series of questions about a topic to help you think of relevant things to say.) This approach allows you to plan **and** also to relieve the sense of "pressure" from the blank screen by doing some **typing**. It **also** saves you from having to write notes by **hand** on note cards or on paper and then to retype needed **parts** into the computer. **Use** the computer to set up your bibliography and footnotes.

Plan during Organizationand Writing

Use an outlining program. A good outliner allows you (1) to create **and** view an outline of a document, (2) to write text under each entry in the outline, and (3) to use the entries as headings and subheadings for the actual **document** and thus as **writing** guides to topic structure. Such programs typically allow you to view the outline alone, even if there is a large amount of text under some or all of the entries, and to easily add to or rearrange the outline and associated text as reorganization is needed. **Outlining** program thus enables you to gain high-level views of the organization of the document, even within the limitations of the small computer screen.

If you don't have access to an outlining program with the capabilities described, **make** an outline and keep it handy to guide you writing and to remind you of the overall **structure** of the document as you work on its parts.

Scroll back and forth in the document frequently. Scrolling allows you to review what comes before and after in the document and to better connect the text being written to its context. There is some evidence that writers who do less planning when they write on the computer make up some of their planning time in rereading the text after it is written.

Print out copies of the document or part of the document at critical stages in the writing process, and use these copies for serious editing and revision. A hard (printed) copy eliminates the viewing limitations imposed by a small computer screen, allows you to see the overall structure and relationships among parts, and – if it is a good copy – may be easier and faster to read.

Re-evaluate the document after any changes. It is very easy to move a paragraph from one place to another without any typographic indication that a move has occurred, **though** there may be a conceptual "hole" where the paragraph came from and a lack of integration in its new location. Be particularly careful to check the organizational implications of a move. Also, make sure you still have good transition from one paragraph to another.

5.9.3 Computer-Aided Editing

Once you start editing, proceed in stages to make the editing easier and more effective. Do one pass for organizational issues, another for paragraphs structure, another for grammatical or stylistic issues, another for spelling, punctuation etc. Make a list of your special problems and add a pass for each problem.

Feel free to use **the** copying and moving capabilities of your computer. They allow you to reorganize your text **and** create multiple versions of it so you can compare two or more different ways of doing something. Use the search and replace capability to find multiple forms of reference for the same **item** and to pinpoint your typically wordy expressions and words that **may** need to be defined for your various audiences.

Use the spelling checker and other **editing** tools available on your system. If you don't have a **spelling** checker, try to get one, **and add** your special "problem" words to it if they're already not there. **Other computer-based** editing tools which **might** be useful including a thesaurus program for finding synonyms and style programs for isolating stylistic **problems such** as overly long sentences and overly abstract or "fancy" **words**.

If you do use a spelling checker or style program, be **sure** to critically evaluate **the** advice it gives you, since **much** of the advice will be inappropriate for given situations. For **instance**, the spelling checker can tell if there or there is misspelled as **theer**, but not if one is used **incorrectly** for the other. Thus, it will not catch **their** used for there as a **misspelling**. Also, some style programs **single** out passive verbs as weak writing, but they **cannot** identify **particular** sentences in which a passive verb may be better than an active one.

Finally, set up your **writing** area with the tools you will need so that you can work without the interruptions of finding a dictionary and **other** missing items.

5.9.4 Using Electronic Mail

One form of writing which is becoming **increasingly** popular is electronic mail **and** its variants of interactive electronic **messages** and electronic conferences. In each case, the computer is used to send notes, **comments**, questions, or **full** documents to a variety of readers through a computer network. As many of you know, **an** electronic **mail** system **puts** a piece of communication in the "mailbox" owned by the **recipient** of the **communication** and then allows **the** recipient to read it whenever he or she wants **to**. **Interactive messages** are messages exchanged **between** two computer users who have signed on at the same time, **and** conferences (or forums) are electronic meeting places where people interested **in** a particular topic can exchange **information**. If you're not using electronic mail now, you most probably soon will be.

Although electronic mail is becoming very **popular**, certain conventions still need to **be** worked out so that the audiences **who** receive it will **feel** that it is appropriate in a variety of ways. Today, **many** electronic mail systems **allow** junior employees to send messages directly to the highest-ranking **officers** in the institution. In this sense, electronic mail seems to be a **somewhat "democratizing"** influence on a hierarchical organization and a way of providing access to the **highest** officers.

However, the style of much electronic mail is not that of formal communication aimed at busy and preoccupied audiences. It is more like that of conversation but without all the politeness conventions you normally find in conversation. For instance, electronic mail is often used to dash off short notes or responses to readers. These pieces of communication are often "shot from the hip," in that they are not very carefully reasoned or composed or edited for style and image. They may assume the context instead of defining it to the audience, or they may talk in what seems to be a conversational mode to the writer but a curt or even impolite mode to the reader.

In dealing with this computerized form of communication, a writer must shift out of the conversational mode of writing, treat the messages as other written documents, and evaluate them in terms of the criteria for good written communication.

However, there is no doubt that electronic mail has revolutionized business communications.

The main advantage of this computer-based system, which requires both sender and receiver to have VDU (visual display unit) for reading the message (and storing, etc.) and be linked up to the 'network' are as follows:

- Employees can communicate short or long messages from their office keyboard (with modem) to anywhere in the world.
- Messages are transmitted immediately; therefore there is no reliance on the relatively slow postal systems or other methods of communication.

The cost is absolutely minimal, relative to using other systems of communications; it also saves a considerable amount of time which is required when preparing letters and other documentation to make them suitable for posting.

- A signal is sent to the recipient on her screen to indicate that a message has arrived. Messages can also be stored easily and efficiently for future reference.

SAQ 2

What is the role of planning while using a computer for Technical Writing ?

SAQ 3

What is the advantage of using E-mail ?

5.10 DOCUMENTING YOUR SOURCES

Most research draws on the information and ideas of others. Credit each source of direct quotations, paraphrases, and visuals. Proper documentation satisfies the professional requirements for ethics, efficiency, and authority.

Documentation is a matter of ethics in that the originator of an idea always deserves the credit. All published material is protected by copyright law. Failure to credit your source could make you liable to a charge of plagiarism, even if your omission was unintentional.

Documentation is also a matter of efficiency. It provides a network for locating the world's printed knowledge. If you cite a particular article, your reference will enable readers to locate that source easily.

Finally documentation is a matter of authority. In making any claim (" A Daewoo **Matiz** is a better car than the **Indica** ") you invite challenge : "Say's who ? Data on road tests, frequency of repairs, resale value, workmanship and owner comments can help validate your claim by showing its basis in fact. Your credibility increases in relation to the expert references supporting your claim. For a controversial subject, you may need to cite several authorities.

Document any source from which you have quoted words or borrowed facts and ideas that cannot be regarded as common knowledge (or general information) in that field. **Common** knowledge about a field can be found in any number of sources. In medicine it is common knowledge that foods high in fat can cause **some** types of cancer. Thus, in a research report on fatty diets and cancer, you probably wont need to document that fact. But you would document the results of tests on folic acids and vitamin E as possible cancer preservatives.

If your information can be found in only one specific source, and not in various general reference sources, it should be documented. **When in** doubt document the source.

Choosing a System of Citations

Documentation practices vary widely. Many disciplines, institutions and organisations publish their own documentation manuals.

In this section we discuss three systems of documentation : in-text citations, author year designation, and numerical designation.

In-Text Citations

The Modern Language Association (MLA) has replaced footnotes and endnotes with in-text **citations** (or parenthetical references). Instead of **placing** footnote numbers in the text and listing the sources at the bottom of the page or as endnotes, list your abbreviated references within the text, **then** give full documentation on a " Works Cited" page at the end of the reports. (The 'Works Cited' page usually replaces the traditional "Bibliography" page.)

An in-text or parenthetical citation usually includes the author's last name and the page cited, as in (Barrett 69). Here is how the **citation** would appear in **the** report;

"The benefits of automation outweigh its costs (Barrett 69)"

Readers needing the full citation for Barrett can turn to ("Works Cited") listed alphabetically by **author**, to get complete publishing information.

Keep parenthetical **reference** brief. If you mention the author's name in your discussion, **don't** repeat it **in** the citation; merely provide the page reference.

"**Barret** claims that the benefits of **automation outweigh** its costs (69)"

If the work is by a corporate author or is unsigned (**i.e.** author unknown), use a shortened version of title or corporate **name** in your citation, as in ("Information **System**"), but be sure that shortened titles **correspond** with the entries in "**Work Cited**" (e.g., "**Information Systems for Tomorrow's Office**", **Fortune** 18 Oct. 1982 : 18 - **56**).

Unless your **readers** request otherwise, use **the following** format for references on your "**Work Cited**" page.

Work Cited From - Books. A reference for a book should **contain the** following **information** (as applicable) : author, title, editor or translator, edition, volume number, facts about publication (city, publisher, date). (**This information** is found on a book's title and copyright pages.)-Abbreviate publishers' names in your list of works cited, as in "Little" for Little, Brown and Company; "**Knopf**" for Alfred A. Knopf, **Inc.**; "**GPO**" for **Government** Printing Office; or "Yale UP" for Yale University Press.

Type the first line of the entry flush with a 1-inch margin. indent the second **and** all subsequent lines five spaces, Double space within each entry as well as between entries. Skip two **horizontal after** every period in an **entry**, and one **space** after any comma or colon. Here are examples:

Single Author

Katzan, Harry - *Office Automation : A Managers Guide*, New York : American Management Association, 1982.

Two Authors

Adam, Everest E., Jr. and Ronald J Ebert. *Production and Operations Management*], Englewood Cliffs, Prentice, 1978.

Three or More Authors

Levin, Richard I., et al. *Quantitative Approach to Management*. 5th ed. New York : McGraw 1982.

Author(s) Not Named

Computer Documentation. Meredith : Little, 1983.

Two Books with the same author

Lamont. John W. *Biophysics*. Boston : Little, 1984.

Diagnostic Techniques. Boston; Little, 1983.

When citing more than one work by an author, do not repeat the author's name; simply type **three** hyphens followed by a period.

An Editor

Meadows , A.J. ed. *The Random House Dictionary of New Information Technology*. New York : Vintage 1983.

A Quotation of a Quotation

Kline, Thomas. *Automated Office Systems*, New York, Random, 1983, p 97, as cited in John To Increase White-Collar Productivity Little 1983.

A Work in an Anthology (a collection of works by various authors)

Anderson, Paul V. "What Survey Research Tells Us About Writing At Work"

Writing in Non-academic Settings.

Ed. Lee Odell and Dixie Goswami. New York. Guilford, 1985, 3-83.

The page numbers are for the one **work** cited from the **anthology**.

Works Cited From - Periodicals. A reference for an article should give this information (as applicable) : author, article title, volume or number (or both) date (in day, month, year order), and page numbers for the entire article - not for pages cited. Here are examples :

A Magazine Article

Main, Jeremy. "The Executive Yearning to Learn." *Fortune*, May 3 1982: 234-48

No **punctuation** separates the magazine title from the date. Notice also that the abbreviation p. or pp. is not used to designate pages.

If no author is **given** list all other information :

"Information Systems for Tomorrow's Office". *Fortune*, 18 Oct. 1982 : 234 -48.

Thakman, John. "Computer Assisted Research." *American Librarian*, 51.1 (1981): 3-9.

Because each issue for that year will have pages beginning with one, readers have to know the number of this issue. The "51" is the volume number, and the "1" is the issue number.

Omit "The" or any other introductory article from a journal or magazine title.

All Article in a Journal with Continuous Pagination

Barnstead, Marison H. "The Writing Crisis." *Writing Theory*, 12 (1986) : 4-15-33.

When page numbers continue from one issue to another for the whole year, readers do not need to know the issue number because no other issue in that year will repeat the same page numbers.

A Newspaper Article

Barret, Marianne. "The Decline in White-Collar Productivity" *Boston News* 15 Jan. 1987. Evening ed., sec. 2:3.

When a daily newspaper has more than one edition, cite the edition after the date. Omit any introductory article from the newspaper title (e.g., New York Times).

Citing Miscellaneous Items

An Encyclopedia, Dictionary, or Other Alphabetic Reference Work

"Communication." *The Business Reference Book*. 1977 ed.

If the entry is single begin with the author's name.

A Personally Conducted Interview

Jones, Al. President, Al's TV shop. Personal Interview. Swansea, Mass., 2 Apr. 1987.

A Published Interview

Lescault, James. "The Future of Computer Graphics," *Executive Views of Automation*, Ed. Karl P. Prell, Boston: Haber 1986. 216-31.

The name of the interviewee is placed in the entry's author slot.

An Unpublished Letter

Rogers, Leonard. Letter to the author. 15 May 1987.

A Questionnaire

Taylor, Lynne. Questionnaire sent to 612 Southeastern Massachusetts Business Presidents. 14 Feb. 1988.

A Pamphlet or Brochure

Waters, John L. *Investment Strategies for Tax Savings* San Francisco : Blount Economics Division, 1987.

A Lecture

Thompson, Edwin. "Bureaucratic Follies and Blunders."

Lecture presented at Southeastern Massachusetts University. North Dartmouth, 17 Sept. 1988.

A Database Source

Keyes, Langley Carton. "Profits in Prose." *Harvard Business Review* 39 (1961):

105-12; Latham, New York: Bibliographic Retrieval Service, 1984.

Software

Levy, Michael C., et al. Statmaster : *Exploring and Computing Statistics*. Computer Software Boston : Little, 1982. IBM PC, 48KB, disk.

When documenting software, name the appropriate computer, the kilobytes (48KB), **and** the software format (disc).

Corporate author or Government Publication

The presidential Task Force on Acid Rain. *Acid Rain and Corporate Profits*. Washington : GPO, 1984.

Other Items

Cite other **items** (reports, dissertations, and other unpublished works) thus :

Author (if **known**), title (in quotes), sponsoring organization, date, page number (s).

If the author is unknown, use the name of the organization or agency in place of the author's name.

In the list of the works cited, arrange the **entries** alphabetically by **the** author's last name (as the first item of the entry). When the author's name is **unknown**, list the title alphabetically according to its first word (excluding a, an, and **the**). A title that begins with a number should be alphabetized as if the number were spelled out.

Author-year Documentation System

One alternative to the works-cited is the author-year system, in which the author's last **name** and the publication date appear in the textual citation:

Seventy-five percent of technicians interviewed expressed a desire for further **training** (Albey, 1986).

With this **system**, you can also include page numbers in the text:

Seventy-five percent of technicians interviewed expressed a desire for further training (Albey, 1986, p. 114).

When you mention the writer's name in the text of your discussion, do not repeat it **within** the parentheses:

Crasbaw and co-workers (1987, pp.93-94) claim that medical technologists "feel challenged by their work."

If you are citing two works published by **the** same **author(s)** in the same year, insert an "a" and a "b" **after** the dates, in both your reference list and textual citation: (J. Jones 1975a).

Because it emphasizes the date, author-year documentation is preferred in the sciences and social sciences, where information quickly becomes dated.

Every reference **cited** in the text appears alphabetically, by author's last name, in a list of references at the end of **the** document.

References

Albey, J. (1986). *Modern Career Choices*. San Francisco: Hamilton.

Crashaw, H., et al. (1987). *Technology and Careers*. Boston; Little Brown.

(1983). *Careers in the natural sciences*. Dallas: Bovy.

Donne, M. (1984). Job prospects for college graduates.

Education Digest, 28(2), 86-89.

Marsh, A., and C. Smith eds. (1979). *Advice for the job seeker* Boston: Arngold.

Peters, Claire (1982). Wage scales for women in civil engineering. Master's thesis, Barandan University.

The dates in the references are again prominently displayed, Notice that only the initial letter in the first word book and article titles is capitalized, but that each important word in a journal title is capitalized.

Numerical Documentation System

Another alternative to the work-cited system is the numerical-reference system, in which each work is assigned a number upon first citation. And this same number is used for any subsequent reference to that work. Adding page numbers helps clarify the reference:

Seventy-five percent of technicians expressed a desire for further training (2:83)
Crashaw, H. (1982).

In the list of references at report's end, works are numbered in alphabetical order or in the order in which first cited in the text. (Use one arrangement or the other, consistently.) Otherwise, the format resembles the author-year system. Here are entries for a reference list in order of first citation in the text. (These, of course, are not alphabetized.)

References
1) Donne, M. Job prospects for college graduates. Education Digest 28.2 (1984) : 86-80
2) Albey, J. Modern career choices. San Francisco: Hamilton, 1984.
3) Crashaw, H., et al. Careers in the natural sciences: Dallas : Bovary, 1983.
4) Marsh, A., and C. Smith, eds. Advice for the job seeker. Boston: Arngold, 1979.
5) Crashaw, H., et al. Technology and Careers. Boston: Little Brown, 1982,.

The numerical system is generally used in the physical sciences (astronomy, chemistry, geology, physics) and the applied sciences (mathematics, medicine, computer science).

American Institute of Physics, Style Manual

American Medical Association, Style Book

A Manual for Authors of Mathematical Papers

Whichever documentation system you choose, be consistent throughout your report.

SAQ 4

Why is proper Documentation of Sources important ?

5.11 EXAMPLE: TECHNICAL ARTICLE

As an example of technical article a research paper is given in Appendix-I. This paper was presented in an International Conference. Go through it and notice the various characteristics of a technical article.

5.12 SUMMARY

- The Technical Article is a basic communication tool for professionals.
- Articles should be written keeping the requirements of the Journal for which it is meant in mind
- A Technical article has the following elements
 - a) Title of the Article and name of the Author
 - b) Abstract
 - c) Introduction
 - d) Materials and Methods
 - e) Results
 - fj Discussion
 - g) References
- It is useful to follow a professional approach while preparing and mailing the Manuscript
- A Computer/word-processor makes the task of writing easier
- E-mail reduces cost and time of communication
- Proper documentation is an evidence of your ethics efficiency and authoritativeness.

5.12 ANSWERS TO SAQs

The answers will be found in the relevant sections of the Unit.

MURTAZA, G.¹, BHARDWAJ, M.K.² and TABASSUMNAQVI³

SUMMARY

Often in typical situations the choice is left only for pile foundation. The off-shore areas and many other sites consist of clay deposits. The pile foundation installed in soft clays poses multi-problems and the most relevant aspect is to evaluate the appropriate design load to meet out the requirement of time-dependent settlement of the soil-pile system.

In present studies, the time-dependent deformation behaviour of vertically loaded piles has been studied in the light of consolidation and creep in soils. Stress controlled triaxial tests and model pile tests have been conducted to observe the time-dependent deformation behaviour of soil-pile system respectively. A rheological model representing the visco-elastic response of loaded soil mass has been used to explain the deformation behaviour of the two systems. Assuming isothermal behaviour, the system is simulated by a rheological model consisting of strain softening spring and a time thickening dash-pot coupled in parallel. The rheological constants of the model for the two system are evaluated from the test data. Equations giving the relationship between the rheological constants of the two systems are worked out. With the help of these relations rheological constants for the soil-pile system are computed incorporating the pile properties and the rheological behaviour of the soil mass. Using these relations, time-dependent deformations of piles have been predicted and are compared to the observed one. A close conformity is observed between the two.

Thus, for the design load, the present analysis may be used with advantage to predict the time-dependent settlement of vertically loaded piles in soft clays using experimental technique to evaluate the rheological constants of the soil mass and incorporating the pile properties.

INTRODUCTION

So many phenomena occurring in loaded soil mass have been explained by proposing suitable rheological models (Murayama-1956, Komamura-1974, Aziz-1976), but little attention is paid to describe the time dependent deformation of vertically loaded piles. The present work is based on the study of time-dependent deformation behaviour of vertically loaded piles embedded in cohesive soil. A non-linear Kelvin model, representing the visco-elastic response of soil-pile system is used to describe the time-dependent deformations of vertically loaded piles. Rheological constants of the model are evaluated with the help of test data obtained from tests on model piles. Three piles of same diameter with different L/D ratio (i.e. L/D, 5, 0, 7.5, 10) embedded in cohesive soil are tested under incremental vertical static loads. Aluminium pipes of 12 mm diameter are used as model piles which were embedded in soft clay classified as CL with LL = 39 and PI = 20. The deposited clay has 28% moisture, 1.5 g/cc dry unit weight and 0.14 kg/cm³ unit cohesion.

In an attempt to replace the prototype tests on piles by a simple laboratory test, stress controlled triaxial tests were performed on the same soil. Time-dependent deformation behaviour of this system is also described by the same rheological model. Rheological constants of the model for soil system are evaluated with the help of test data. Relations between the rheological constants of the two systems are worked out. With the help of these relations, rheological constants of soil pile system are calculated and time-dependent deformation behaviour of the system has been predicted and compared with the observed behaviour.

RHEOLOGICAL MODEL & COMPUTATION OF RHEOLOGICAL CONSTANTS

Figure 1 shows a non-linear Kelvin model which represents the visco-elastic response of loaded soil mass. It was first proposed by Murtaza (1978) to analyse the laterally

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