B.Ed 2.5/4 Years

BASICS OF TECHNICAL ENGLISH

Course Code 6465

**Department of Early Childhood Education and
Elementary Teacher Education
ALLAMA IQBAL OPEN UNIVERSITY ISLAMABAD**

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Course Code: 6465   **Unit: 1-9**

Department of Early Childhood Education and
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COURSE TEAM

ACKNOWLEDGEMENT

INTRODUCTION

Technical writing in English is a specific writing for a a specific audience. It fulfills the specific needs of the students in their practical life in future. It is to convey technical information through speech, minting and other mediums. It is audience's centered and practical in nature.

In today's fast moving world, the importance of technical writing has become many folds. Every profession has its own specialized form of writing. Technical writers have the crucial job to plan, design, organize, write and edit many kinds of professional documents. The contents of this course have therefore been exclusively designed to cater to most of these job assignments.

OBJECTIVES

After completion of the course, you will be able to:

1. Define Technical Writing and explain its key elements.
2. Define and specify tasks of technical writers.
3. Identify the characteristics/qualities of good technical writing.
4. Produce good samples of technical writing.
5. Exhibit an understanding of effective technical research
6. Write bibliography and reference materials according to the format.
7. Demonstrate an awareness of ethical issues involved in technical writing.
8. Review and revise documents to evaluate them for grammatical accuracy, conciseness, coherence, sentence fluency, technical accuracy and correct format.

CONTENTS

Unit-01

INTRODUCTION TO TECHNICAL WRITING

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1

CONTENTS

INTRODUCTION

Technical writing is for specific and accurate information to a defined audience for a specific purpose. The information is technical in nature, so this writing is different from other types of writing. The audience of technical writing includes technical readers, managerial reader and, at times, general readers. The purpose is to inform, instruct, describe, explain, or otherwise, as per demand of the situation.

OBJECTIVES

After going through this unit, students will be able to:
1. Explain technical writing and its purposes.
2. Differentiate among different types of technical documents.
3. Describe technical readers.
4. Discuss technical writing approaches.

1.1   THE PURPOSE OF TECHNICAL WRITING

Technical writing conveys accurate, concise and objective based message. It transmits to the reader factual information that is crystal clear. Technical writing always concentrates on content, rather than style. A technical writer must sacrifice the ego of personal writing style for the sake of clear technical content.

There may be some overlap between technical writing and business writing. However, the two have many distinct differences in terms of subject matter and document format. The primary documents of technical writing are technical reports, manuals, and instructions. Business and technical writing share the same principles of good writing. Both are concerned with delivering factual information in a clear, concise, and objective way.

For many centuries the writings of great thinkers were confined to the intellectual elite at great universities. As literacy and the use of more complex tools and machinery spread during the Industrial Revolution, the need for explanation of mechanical processes grew rapidly.

The discipline of modern technical writing was introduced during World War II. Communications developments during this period increased the demand of technical documents more than ever before. The next great change came with the computer revolution. Since this development, instruction, description, and documentation have become vital to every aspect of work at office and home. Now, technical information are everywhere to guide us in everyday life.

It is the age of specialization so there are professional technical writers who do nothing but write. They work within industry to develop different manuals and material for industrial equipment. Some have individual projects within their areas of technical expertise. There are professionals like engineers, scientists, and technicians who do various types of technical writing for their everyday work. They write journal or articles to contribute to the collective knowledge of their disciplines. Most technical writings are done by the technical professionals. The success of students depends on clear, concise, correct writing.

The question arises why there is greater need for clear and concise technical writing. The answer is simple the more scientifically complex our world becomes, the greater the need for direct, simple, and clear communication. World knowledge doubles with every passing year. Most of the data are documented in one form or another. Manuals, texts, field reports, instructions, and progress

reports consist of a large amount of information. Scientists, engineers, and technicians need clear communication to understand one another's work. The rapid changes taking place in different fields require well defined written documents. Managers and marketers in technology-driven industries need clear and concise information to help them communicate successfully beyond their own technical areas. Systems engineers need clear writing to design local area networks to link personal computers and software that runs on them. In all of these cases, the ability to communicate clearly and concisely is key to success. Technical writing is to help, not hinder, the communication of complex ideas.

There is a danger of unclear technical message. A mechanic who misinterprets instructions for repairing brakes can be a cause of tragedy. Line engineers in an assembly plant likewise depend on clear technical writing to manufacture dependable, high-quality products. Hospital patients rely on medical technicians' ability to comprehend support documentation for diagnostic equipment.

1.2 AUDIENCE AND COMMUNICATION

In technical writing, the readers are always given preference. Although the content, approach, and style are considered first but do not at the expense of clarity. The main purpose is to inform and making the writing is at the readers' level of understanding. Readers ensure the success of any piece of writing. It does not matter how well the piece of writing is, the standard is how well the reader understands the subject matter. If readers miss the message then writing is not technical one. If they do not understand well, the writing has failed. Audiences are the most important and they should be think before attempting writing of any type. Their ability and need to understand technical content should be kept in mind.

Technical documents have following three broad categories:
- Technical Readers
- Managerial Readers
- General Readers.

Let us discuss them in detail:

- **Technical Readers**
  Technical readers are different from the remaining two types i.e managerial and general readers. They have enough knowledge about the content of

particular written material. This knowledge is diverse from general to detailed knowledge of the subject. As the case may be, readers must technically know the subject. They are allowed to get directly to the idea without fighting with writing.

Superficial verbosity is to impress the readers but the technical knowledge will fail. Never ever assume that the readers have advanced technical knowledge and understanding. They prefer writing loaded with long sentences and unnecessary words. Technical readers prefer a direct and simplified written approach. This allows them to deal with difficult concepts instead of difficult writing.
Technical readers further fall into two groups:
Theorists

- **Technician**
  The two groups overlap, but they have basic differences in their approach to technical subjects.

- **Theorists**
  The technical persons involve in pure research. They have highly theoretical concern and translate such areas as scientific research and design theory. The astronomer who strives to validate the existence of black holes and to explain its nature is a technical theorist. The chemist who works to synthesize a new and stronger plastic and the doctor on a research team looking for new ways to open partially blocked coronary arteries are both theorists.
  Writing directed to this group is generally the most difficult to read. Somehow the belief prevails that easily understood writing is somehow insulting to theorists. This notion may have evolved from a preoccupation with academic writing, which can sometimes be difficult to read and understand. This notion carries over to real-world research papers and articles on new discoveries. In fact, theorists do not want to read difficult writing. Highly theoretical writing need not be difficult and boring. The theory may be complex and difficult, but the writing can be clear and concise.

- **Technicians**
  Technicians are primarily concerned with the practical aspects of technology. They repair, maintain, and operate mechanisms and control processes. Electricians, nurses, and hydraulics mechanics are all technicians.

Forms of writing commonly directed to this group are technical manuals, mechanical descriptions, and various types of documentation required in a technical workplace. Because technicians solve the day-to-day problems of science and industry, they must understand what they read as quickly and easily as possible.

- **Managerial Readers**

  Managerial readers need to be informed, yet they often do not need the technical detail and depth that theorists and technicians need. The title of manage indicates job responsibility rather than technical knowledge. The managerial reader might not have the technical understanding of the purely technical reader. This is why the "Executive Summary" has become a common and valuable tool in technical report writing. The executive summary reduces an entire technical document to the plain facts that a manager needs to make decisions. The report itself will contain technical details a managerial reader may not fully comprehend. Therefore, the executive summary must accurately describe the key points of information in nontechnical language.

  Managerial readers come from various technical backgrounds. The Director Institute of Research and Development is most likely both manager and expert. The Engineering Manager is also probably both expert and manager. The Director of Admissions at a teaching and research hospital may be primarily a manager. The Maintenance Manager of a large spread of construction equipment is more than likely a manager and a technician.

  To succeed with this group, one must get straight to the point. Managers generally are flooded with written information and do not have time to read rambling, unclear prose. Concise writing is key with a managerial audience.

- **General Readers**

  General readers usually have the least technical knowledge and understanding of particular subject. Consequently, writers must write clearly and concisely for this group while addressing their level of technical understanding. This does not mean the writers should write down to them. This type of reader will have enough understanding of concepts without struggling with writing. General readers are essential audience for technical business and industry.

  Generally readers do not necessarily lack technical knowledge and understanding. A surgeon who just bought a personal computer may be a beginner where the product is concerned, yet a technical reader in the field

of medicine. The issue, once again, is the need for simplified, direct, understandable language.

1.3 EXPRESSIN VERSUS IMPRESSING

Many professionals write about technical subjects to impress readers or to convey information. It may seem obvious that expressing ideas and conveying information is the right way to approach technical writing. The urge to impress readers is all too prevalent. Consider this classic example of writing that struggles with expressing rather than impressing. A plumber had used hydrochloric acid to clear some clogged pipes. The process worked quickly and cleared the drain. The plumber then wrote to a government research organization into tell them of the expedient method and ask for their appraisal. The agency wrote back as follows:
The efficacy of hydrochloric acid is indisputable, but the highly corrosive residue is incompatible with metallic permanence.

Highly encouraged, the plumber wrote back that he was glad they agreed with this use of the acid. Concerned about the apparent failure in communication, a different member of the agency wrote back as follows:

We cannot assume direct or indirect responsibility for the possible production of toxic and highly noxious residue obtained from the hydrochloric acid and ascertain that you should examine alternative procedures.

Encouraged by the second letter and the apparent enthusiasm of the agency, the plumber wrote back that the acid was working great and that they should recommend its universal use in freeing clogged plumbing. Disturbed over this turn of events, a third member of the agency wrote back this time saying:

Don't use hydrochloric acid. It eats the hell out of pipes.

The problem here was not with the plumber. The problem was with the first two writers, whose words took on the attitude and image of the scientific agency where they were employed. They needed to "look" and "sound" professional. The result was writing that was needlessly obscured, pompous, and self-important. The primary motive in the first two answers the plumber received was to impress. The third answer was written to express at the most expedient level.

It is quite natural for professionals to want a professional image. When it comes to writing, clear, concise, and simple messages have the greatest impact on image. Long, wordy, pompous writing neither expresses nor impresses.

1.4   THE TECHNICAL WRITTING APPROACH

A major contributing factor to vague and difficult technical writing is the nature of academic writing. Usually students do not know the material they are writing about. The prime mission of an academic paper often is to impress the instructor with what the student has learned. A good instructor does not and should not take for granted that the student knows the subject area. Because of the nature of the academic experience, everything becomes an exercise to demonstrate learning.

In the professional world the entire writing emphasis changes from academic to technical writing. Now, professional knowledge is taken for granted after all in a professional capacity. The writing now focuses on the transfer of information and ideas. This transfer of information is not an exercise in impressing readers but rather an action that expresses thoughts in clear, concise language. It is ensured that the written messages are as clear and understandable as possible. There are two major elements in achieving clarity in writing: a preference for shorter sentences and the use of active language. These elements assure clear and understandable technical writing.

1.5   SHORTER SENTENCES

In technical writing, there is probably no greater problem than needlessly long sentences. The more words there are to read in a sentence, the more reader must keep track of and understand. A compound, complex, or compound-complex sentence is always harder to read and understand than a simple declarative sentence. If a technical report, manual, or set of instructions is loaded with the long and complex sentences, the difficulty increases. Never allow sentences to become more complicated than is absolutely necessary. Sentences are like baggage. Only carry what you need and not a bit more.

A common misconception is that highly educated people prefer longer and more complicated writing. It would be mistaken to believe that because the readers have a highly technical background, they will prefer longer sentences. Long sentences make reader try to keep track of more information than is easily managed. It is not that the mind cannot do it but rather that the reader tires of

constantly doing it. A single long sentence at intervals throughout the writing does not pose the reader a problem. It is when every sentence is long and difficult that the reader tires and begins to lose interest and drive. As sentences approach 20 to 30 words, it becomes difficult to keep straight all the information in them. When a sentence goes beyond 30 words, it becomes all but impossible to read without going back and studying it for meaning. The following sentence is too long and needs revision:

It certainly appears that once the tests have been finalized on the new polymer for the motor housings, we can gain a firm and clear consensus on what actions concerning the replacement or the continuance of present housing materials should be, because the next run on housing is due on the 15th of next month. [55 words]

After being revised, it consists of two sentences of 21 words and 20 words:
After testing the new polymer for motor housings, we must make a final decision on whether to use it or not. We must decide on which polymer to use before the next production run, scheduled for the 15th of next month.

1.6   ACTIVE LANGUAGE

Action coupled with a direct statement is at the heart of effective technical writing. Strong, active verbs give the writing energy and power that add interest and understanding to the message. Weak, passive verbs deprive the writing of power and interest. Proper use of verbs in technical writing controls meaning and understanding.

Verbs express either action or state of being. Action verbs convey movement and energy. They promote a vigorous style of prose that shows readers the message rather than just telling them about it. State-of-being verbs are all forms of the verb to be. Such words as is, are, am, was, were, been, and being are some forms of this verb.

Action verbs can describe events in either an active voice or a passive voice. In the active voice, the subject of the sentence names the entity that performed the action. In the passive voice, the subject names the entity that was acted upon. Sentences in the active voice have a direct subject-verb-object structure. Sentences in the passive voice have an indirect structure: the object, a helping form of the verb to be, and the past participle of the action verb. The subject of a passive sentence is either implied or introduced indirectly with a prepositional phrase. The way in which you use these two voices is crucial to how clearly and directly the meaning will come across to your reader.

Both the active voice and the passive voice have their distinct advantages. The problem of active versus passive lies in the frequent abuse of the passive voice in technical writing. Unfortunately, many persons in the technical, scientific, and industrial communities suppress forceful and active writing because of an unwarranted demand for impersonal language. Consider the following sentences written in the passive voice:

All Engineering Change Notices must be approved by the engineering manager. Antiseptic content was not properly analyzed by our satellite lab.

Excessive engine wear is also characterized by low compression readings.

The faulty valve was quickly found by the emergency maintenance crew.

The voltage across the circuit was measured by assembly personnel at three different points.

In each sentence, the passive voice places the receiver of the action as the subject. The doer of the action is in a subordinate position at the end of the sentence. Now consider each of the previous sentences rewritten in the active voice:

The engineering manager must approve all Engineering Change Notices.

Our satellite lab improperly analyzed antiseptic content.

Low compression readings also characterize excessive engine wear.

The emergency maintenance crew quickly found the faulty valve.

Assembly personnel measured the voltage across the circuit at three different points.

Each sentence now has the doer of the action as its subject. In each case, the doer is at least as important as the receiver of the action.

Changing verb constructions to the active voice helps each sentence in two ways. First, each thought becomes a logical route from cause to effect (doer to receiver). Second, the writer uses fewer words when using the active voice. There is no need of helping verbs with past participles, and also no need of prepositional phrases to introduce the doer of the action. Remember that economy of words is the essence

of concise and direct writing. However, summarily the passive voice cannot be dismissed from the English language. On the contrary, the passive voice does have a place in good technical prose. The passive voice is an effective tool of communication when the doer of the action is not important to the reader. In such cases the passive voice is preferred. Consider the following two sentences:

Active Voice: In May, Acme Heating Company will install new electronic air cleaners in both clean rooms.

Passive Voice: In May, new electronic air cleaners will be installed in both clean rooms.

Acme Heating, the installer of the electronic air cleaners, is not important to the message. The reader does not really care who installs the electronic air cleaners. The emphasis is on the new air cleaners and their date of installation. Consequently, the use of the passive voice in this case emphasizes the electronic air cleaners (receivers of the action) and does not even mention Acme Heating (the doers of the action).

Remember, however, that preference for the active voice is the keystone to direct and forcible writing. A lifeless and boring passage can often be revived simply by using the active voice.

1.7 SUPPRESSED VERBS

Turning a verb into a noun suppresses the verb's ability to act. Frequently, active verbs are turned into nouns and used with state-of-being verb forms. These verbs become an event rather than an action. Take notice of noun endings such as -tion, -ance, -ment, ing, -al, and -ancy. These will often signal a suppressed verb. Suppressed verb constructions are underlined in the examples below. Each is an action expressed as an event. Notice how these constructions add hollow wordiness to the sentences. When suppressed verbs are rewritten into activated verbs, sentences gain action and force.

1.8 EXAMPLE OF SUPPRESSED VERBS

1.   Performance of the new stabilizer was far better than past designs.
2.   Stabilization of the compound took place early in the experiment.

3. The milling of the three steel bases was done in the new computerized machining center.
4. Performance of the turbines was not acceptable by industry standards.
5. Evaporation of the fuel will take place in a matter of seconds.

1.9 SUPPRESSED VERBS REWRITTEN AS ACTIVATED VERBS

1. The new stabilizer performed far better than past designs.
2. The compound stabilized early in the experiment.
3. The three steel bases were milled in the new computerized machining center.
4. The turbines performed unacceptably by industry standards.
5. The fuel will evaporate in a matter of seconds.

Once again, a small change in verb structure brought about a large improvement toward direct, active writing.

1.10 NEEDLESS VERBS

Technical writers often add needless verb to a sentence. These add to the sentence's complexity and difficulty without adding meaning. These are to impress rather than express. In the following sentences, the underlined verbs are needless.
1. Alignment of the cutting tool on the arbor must be accomplished by using spacers.
2. Caloric oxidation is dependent on regular exercise for burning.
3. The analysis of the anti-trust coating shows a large variation from earlier tests.
4. Rubber is strengthened by using sculpture and other additives.
5. You must examine the earlier test results that were involved.

1.11 ACTIVATE THESE SENTENCES BY ELIMINATING EACH NEEDLESS VERB

1. Use spacers to align the cutting tool on the arbor.
2. Regular Exercise Burns Calories.
3. Analysis of the anti-trust coating varies greatly from earlier tests.
4. Sculpture and other additives strengthen rubber.
5. You must examine the earlier test results.

1.12 PERSONAL VERSUS IMPESONAL CONSTRUCTIONS

There is much debate about whether technical writing must be strictly impersonal or whether it should use personal references. The trend is unmistakably moving toward the use of active personal references. This trend promotes the use of the active voice. Professional journals have used the first- and second-person pronouns for a number of years now.

Nevertheless, many organizations forbid the use of personal direct reference in their publications. In its place, writers continue to twist and turn technical writing with twisted and passive constructions. It has discovered long ago that people don't read boring, impersonal abstractions. The answer is found in the changes that have begun to take place among organizations that are striving to retrain their staffs in the art and craft of clear and active technical writing. Modern technical writing respects a reader's need to know the doer of the action. Consider the following sentences:
1. It has been requested that the samples taken at five different points on the river to be retested.
2. Limitations must be imposed on the scope of this project.
3. It is necessary that a water-base coolant be used.

The first sentence contains the "It ... that" construction, probably one of the most overworked constructions in technical writing. In almost every such case, you can strengthen and shorten the sentence by employing the active voice.
1. Management has asked us to retest the samples we had taken at five different points on the river.
2. You must limit the scope of this project.
3. Use a water-base coolant.

1.13 MAKING VERBS FROM ADJECTIVES AND NOUNS

Language is a dynamic process. With the onslaught of the high-tech industries and their particular demand, use of adjectives and nouns as verbs has become quite common. When abused, this approach to language becomes elitist. This approach can be a useful tool for direct and meaningful communication. Consider the following nouns and adjectives used as verbs:

Nouns
Position   service   immunity

Adjectives

Final   Formal   Local

Verbs

... to position the stylus.
... to service the compressor.
... to immunize only the primary grades.
... to finalize the stress tests.
... to formalize the procedures.
... to localize the anesthetic.

1.14 WHEN TO USE THE PAST AND PRESENT TENSE

Debate sometimes arises over whether to use the present or past tense in a technical report. The general approach is to describe completed action in the past tense. Describe principles, instructions, and conclusions in the present tense. Consider the following sentences:

Five of the tests showed weak patterns. [Completed action]

These high-compression readings show negligible ring wear. [Conclusion]

Set the timer for 15 seconds. [Instructions]

The Doppler Effect shows a red color shift for stars moving away from our position in the galaxy. [Principle]

1.15 CONCIENESS

Concise writing provides exactly what the reader needs. Bloated writing with superfluous information serves to confuse and obscure. Concise writing gets to the point and does not ramble. There is nothing that will kill a reader's interest faster than rambling, affected writing that takes five pages to say what could be said in one paragraph.

1.16 BREVITY

Brevity is at the heart of getting to the point. You must use an economy of words that allows the reader to get the message immediately.

There is the story of a person who when asked the time of day gave a short history of Swiss watch making before telling what time it was. Don't do this to your reader. Get to the point in the shortest route that still allows the reader to understand. In the following sentence, what should be a direct and concise statement rambles:

A decision on this matter must be made in a prompt manner before the deadline comes and goes.

This sentence can be fixed simply by stating only what is needed in the active voice:

We must decide on this before the deadline.

1.17 REDUNDACY AND CLICHES

To be concise demands one-time statements that is clear and need no repetition. Redundancy occurs when statements are repeated needlessly. This needless repetition comes in the form of affected writing and clichés. In technical writing, make precise statements that speak to the reader only once. In the following examples, note the redundancy and how it has been eliminated:

A decision was made to stop the project.

When you or someone "makes a decision," you or someone "decides." A better sentence without the wordiness might be:

We decided to stop the project.

Clichés can also cause redundancy in technical writing:

At this point in time, the motor housings will remain square in shape.

All references to time refer to some "point in time." Anything that is square is "square in shape." These clichés create redundancy. A better sentence would be as follows:

At this time, the motor housing will remain square.

1.18 SOME CLICHES TO AVOID ARE AS FOLLOWS

At this point in time   at this time
During the course of   during
In the vast majority of cases   in most cases
On a weekly basis   weekly
Until such time as   until
Due to the fact that   due to
Very necessary   necessary
Few in number   few
Square in shape   square

1.19 AFFECTED AND VAGUE WORDS

A technical vocabulary is absolutely necessary for accurate technical communication. Words in a technical vocabulary are necessary even though they may be long and hard to read. There is no other way to refer to an isotope or an oscilloscope other than to use those terms. The challenge lies in keeping the rest of your word usage simple. One should use common words where possible and use difficult technical terms only where they are needed.

For example, the following words are some fairly common technical terms used in the field of hydraulics:
Fittings
Solenoid valve
Tandem-center spool
Fixed-displacement double-vane pump
Venting

All of these words are needed within the context of a technical piece of writing in the field of industrial hydraulics. They are precise terms with precise technical meanings. You must use these terms within the context of hydraulics because there are no easier or commonly known substitutes. Pronouns will not substitute either, because pronouns must first have an antecedent the term itself.

1.20 THE CONCRETE USE OF LANGUAGE

In technical writing (as opposed to literature), adverbs and adjectives do not describe their verbs and nouns exactly and concretely. How heavy is very heavy? How acute is quite acute? In technical writing, you must write with exact and concrete terms and concepts. In the following example, vague and abstract use of language has been converted to concrete and exact use of language:

17

The roadbed must be made with added strength and durability. [Vague]

The roadbed must be paved over reinforcement-bar (rebar) for added strength and durability. [Exact and concrete]

The roadbed in the first sentence is "made," as opposed to the specific "paved over with reinforcement-bar (rebar)" in the second sentence. The words "strength" and "durability" are vague in the context of the first sentence because they have no specific and concrete reference. In the second sentence, they are defined and made specific with reference to reinforcement-bar.

1.21 GOBBLEDYGOOK

Gobbledygook is a particular fondness for buzzwords, redundancy, and overstatement. It is pure affectation. Many people mistakenly think that this overstatement and affected usage make the writing sound official and scientific. They also think that it is indicative of an educated and adept writer. In actuality, gobbledygook signals poor writing and an inability to express yourself. The example that follows is typical gobbledygook. Notice how it has been simplified and made concise for the reader.

In the event of life-threatening conflagration, expeditiously transport your person through the indicated egress of closest proximity to your location.

Translation: In case of fire, quickly leave through the nearest door marked "EXIT."

The challenge of technical writing is to present complicated ideas with the goal of expressing, not impressing. When the technical writer abandons consideration of personal style and concentrates on delivering factual information clearly, concisely, and objectively, the technical audience benefits. Technical writers achieve this goal by understanding their audience. They strive for short, active sentences and eliminate redundancy, clichés, and gobbledygook. They prefer personal constructions and concrete language.

1.22 ACTIVITY

1. Examine a recent technical document from your field of expertise. It can be either something you have written or something a colleague has written. Compare the style of the writing with:
    - a popular novel;
    - a movie or gossip magazine;
    - a piece of poetry;

- a newspaper editorial page;
- copy from a magazine ad.

How does each of the above compare with the style of the technical writing document? What are the major differences? Similarities?

2. You are writing about the inherent problems of converting from gasoline-powered cars to electrical-powered cars.

   How would your writing differ, if it was targeted to the following types of readers?
   - technical readers;
   - managerial readers;
   - general readers.

   How are the styles different and in what specific ways? How are they similar and in what ways?

3. List the various characteristics that signal writing meant to impress rather than express. If possible, show examples of writing you have that can demonstrate these points.

4. Study a recent technical document in your field of expertise and consider the following:
   - the variation in sentence length, throughout;
   - the number of active versus passive sentence constructions;
   - Personal versus impersonal tone.

   Rewrite the document using shorter sentences, more active-voice constructions, and a more personal tone.

5. Without referring to the lists in the text, prepare your own list of:
   - clichés;
   - affected words;
   - Most needed technical terms you use in your field of expertise.

ACTIVITY

Identify True/False statements from the following:
1. Technical writing is meant to be understood only by highly educated scientists, engineers, and technicians.
2. Concise writing gives only needed information to the reader.
3. Clear writing avoids intricate detail because of its tendency to confuse or be misunderstood.
4. Highly complex subjects call for a highly complex approach to writing.

5. Scientists and technicians do not require the definitions of terms and concepts that a non-technical reader requires.
6. Managerial readers may or may not be technical readers also.
7. General readers are the easiest audience for whom to write.
8. Personal tone in technical writing promotes the active voice and adds clarity to the message.
9. The active voice is preferred over the passive voice.
10. In highly technical documents, longer sentences are preferred to shorter sentences.

1.23 ANSWER KEY

1F 2T 3F 4F 5T 6T 7F 8T 9T 10F

1.24 EXERCISE

Q.No.1   Explain Technical Writing and its purpose in details?
Q.No.2   What are different types of technical readers?
Q.No.3   What is technical writing approach explain in detail?

1.25 BIBLIOGRAPHY

Bailey. S. (2018). Academic writing: A Handbook for International Students. New York, NY: Routledge.

Guba & Lincolin (1989). Fourth Generation Evaluation. London: SAGE Publications.

Schriver, K. (1997). Dynamics in Document Design: Creating Texts for Readers, New York: Wiley.

Swales. J. M, & Feak, C.B. (2017). Academic Writing for Graduate Students: Essential Tasks and Skills. Ann Arbor: The University of Michigan Press.

Vincler. J. E, & N. H. Vincler. (1996). Engineering your Writing Success, Professional Publications, Inc. Belmont, CA.

Unit-02

AUDIENCE PROFILE

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CONTENTS

INTRODUCTIONS

Unit 1 showed how audience is a major concern in technical communication. Every piece of writing has an intended audience-the intended reader or the reader of the document. Because your goal is to enable those readers to act, you must analyze the intended readers in order to discover the facts and characteristics that will enable you to make effective decisions as you write. The facts and characteristics that you discover will affect planning, organizing, and designing all aspects of the document, from word choice to overall strategy and structure.

OBJECTIVES

After going through this unit, you will be able to:
1.   Define audience and their demographic characteristics
2.   Explain the role of audience in technical writing
3.   Describe the reader's feelings about subject and sender.
4.   Prepare an audience profile.
5.   Discuss audience's knowledge level.

2.1 PROFILING AUDIENCES

This unit explains the factors that writers investigate in order to analyze audiences. The chapter begins with some basic questions regarding the audience profile and then presents sections that help you answer these questions:
Who is the audience?
What are their demographic characteristics?
What is the audience's role?
How does the reader feel about the subject?
How does the reader feel about the sender?
What form does the reader expect?
What is the audience's task?
What is the audience's knowledge level?
What factors influence the situation?
How do I create an audience profile?

2.2 WHO IS THE AUDIENCES?

The audience is either someone you know or a generalized group, such as your collage fellows or office colleague. The audience could be a single person (your supervisor, a coworker), a small group (member of a committee), or a large group (the reader of a set of instructions). Sometimes the audience is multiple, that is, a primary audience who will act on the contents of your document and a secondary audience who read the document for information-to keep them in the loop-but who will not act on the information.

In order to communicate effectively with your audience, you have to engage them, that is, write in a way that makes it clear to them that their knowledge and values are understood, respected, and not taken for granted. To create that engagement you must answer these questions:
➢   What are the audience's demographic characteristics?
➢   What is the audience's role?
➢   How does the reader feel about the subject?
➢   How does the reader feel about the sender?
➢   What form does the reader expect?

2.3 WHAT ARE THE AUDIENCES'S DEMOGRAPHI CHARACTERISTICS?

A SAMPLE PERFORMA

Name:

Gender:
- Male
- Female

Age Group:
- 20-34 Years
- 35-54 Years
- 55-74 Years
- 75 Years

Education:
- High School , diploma or the equivalent
- Bachelor's Degree
- Master's Degree
- Professional Degree
- Doctorate Degree
- None of the Above

Employer Type:
- For-profit company or business.
- Not-for-profit, tax-exempt, or charitable organization
- Local government employee (city, county, etc.)
- State government employee
- Self-employed-own not-incorporated business or farm
- Self-employed-own incorporated business or farm
- Working without pay in family business or farm
- Other

Gross Individual Income:
- Less than Rs 1,00,000/-
- Rs 50,000/-
- Rs 40,000/-
- Rs 30,000/-
- Rs 20,000/-

25

2.4 WHAT IS THE AUDIENCE'S ROLE?

In any writing situation, your audience has a role. Like actors in a drama, audience members play a part, using the document as a "script". In this script, you "write a part" for department managers or tricycle assemblers or parents or students. The reader assumes that role as he or she reads. If the role in the document reflects the role the reader has in the real-life situation, the documents will the engage the reader and thus make effective communication more likely. Their willingness to assume the role in the document often depends upon the way the role depicted in the writing is similar to the role they play in a real-life situation.

To create an effective role in the script, you have to understand the audience's role in real life. Because of their role, they have specific tasks that are specific responsibilities and actions. For instance, Saima is department manager. She evaluates data in relation to other aspects of the company. Her decisions have consequences because the corporation chooses to fund different actions based on her evaluations. She is professionally concerned that her clients be satisfied, that the company sells quality products. Personally, she is concerned that her work be judged as effective both be the clients and by her supervisors. This matrix of characteristics defines her role. A writer must understand those characteristics in order to design an effective memo or any other document for her.

Role and task, in turn, are connected to need, those items necessary to fulfill the role. In order to fulfill her role in the organization, Saima must be assured that the mats serve the purpose for which they were sold. She must know of possible problems so that she can keep the customer happy with the product and with the company's service. She must be able to explain to her supervisor how her department is functioning. She has to decide whether she should talk to people in manufacturing about the fabrication of the part. In short, she needs the information to help her carry out her job responsibilities.

You can easily see the different effects of need by considering two audience operators of a machine and their department's managers. Both groups need information but of different kinds. Operators need to know the sequence of steps that makes the machine run: how to turn it on and off, how to set it to perform its intended actions, and how to troubleshoot if anything goes wrong. Managers need to know whether the machine would be a useful addition to the workstation and thus to purchase it. They need to know whether the machine's capabilities will benefit staff and budget. They need to know that the machine has a variable

output that can be changed to meet the changing flow of orders in the plant; that the personnel on the floor can easily perform routine maintenance on the machine without outside help; and that problems such as jamming can be easily corrected.

Because the audiences' need differ, the documents directed at each are different. For the operator, the document would be a manual, with lots of numbered how-to-do-it-steps, photos, or drawings of important parts, and an index to help the operator find the relevant information quickly. For the manger, the document would contain explanatory paragraphs rather than numbered how-to-do-it-steps. Instead of photos, you might use a line graph that shows the effect of the variable rate of production or a table that illustrates budget, cost, or savings.

2.5   HOW DOES THE READER FEEL ABOUT THE SUBJECT?

The reader's feelings can be described as positively inclined, neutral, or negatively inclined toward the topic or the writer. If the audience is positively inclined, a kind of shared community can be set up rather easily. In such a situation, many of the small details won't make as much difference; the form that is chosen is not so important, and the document can be brief and informal. Words that have some emotional bias can be used without causing an adverse reaction. Saima is positively inclined toward the subject. Knowing about mats is part of her job; she is responsible for seeing that clients are satisfied with the product they purchased.

Much the same is true of an audience that is neutral. A writer who has to send a neutral audience a message about a meeting or the results of a meeting might choose a variety of forms, perhaps a memo or just a brief note. As long as the essential facts are present, the message will be communicated.

However, if the audience is negatively inclined, the writer cannot assume a shared community. The small details must be attended to carefully. Spelling, format, and work choice become even more important than usual because negatively inclined readers may seize upon anything that lets them vent their frustration or anger. Even such seemingly trivial documents as the announcements of a meeting can become a source of friction to an audience that is negatively inclined.

There are some questions to help you discover the audience's attitudes toward the subject. Although these questions are phrased for the audience of a manual, they are easily generalized to any situation:

27

Do you users hold any biases against the technology that will prevent them from using the product or reading documentation? Are they experts in other technologies who are reluctant to develop new specialization?

Are they forced to use the product to accomplish their jobs? Would they opt to use it if given a choice?

How long have your users been in their current jobs? What kind of position did they have previously?

2.6 HOW DOES THE READER FEEL ABOUT THE SENDER?

A writer must establish a relationship with the reader. Readers feel positively about a message if they feel that is organized around their needs and if the writer has taken the time to speak clearly, knowledgeably, and honestly to them. To create this positive sense, writers must create the belief that they are credible and authoritative and they must create documents that are inviting and seductive. These documents tend to motivate the reader both to read and act a key requirement for effective communication.

Credibility means that you are a person who can be listened to. Credibility arises because of your role or your actions.

If the readers know that you are a quality control engineer, they will believe what you write on a quality issue. If readers know that you have followed a standard or at least a clear method of investigating a topic, they will believe you.

Authority means that you have the power to present messages that readers will take seriously (Lay). Basically, you have the right to speak because you have expertise, gained by either your roles or your actions. Naturally, this authority is limited. Your report is authoritative enough to be the basis for company policy, even though you might not be the one who actually sets the policy.

Inviting documents cast the writer in a helpful role towards the reader. For instance, the writer could assume the role of a guide who shows the visitors the paths through the forest of instructions in assembling a tricycle, a librarian, who leads users through the information to find what they need. Often how inviting the document is depends on the wording. The seductive phrase "e-mail us" is much more seductive than a link to an unnamed webmaster in this usage, means "to attract our reader's attention and win their sympathy". To create a seductive document is partly a matter of your attitude. The key attitude is to present yourself as a person who will "guide and protect the reader" in order to stimulate them into action.

In an example, Zahid is positively inclined toward Javed. Javed knows that Zahid likes and trusts him because they two have worked together for a while. His past actions have generated a sense of authority. He is the person who has the right to speak because he has acted well in the past. Naeem knows that Zahid is the supervisor and expects clear information without much comment.

Naeem however, creates a credible, inviting document. He establishes credibility in the first paragraph by explaining his methodology-he inspected the site. He clearly feels that he has the authority to make evaluation comments that suggests future actions. His tone is informal, using "I" and "You"; notice, too, that he is comfortable enough to structure his communication as a short, no-nonsense list. In short, Naeem presents himself as a person who will guide and protect the reader. He has created an easy-to-follow document that invites further actions, should it be necessary. He is a person whom the reader can trust.

2.7 WHAT FORM DOES THE READER EXPECT?

Many audiences expect certain types of messages to take certain forms. To be effective, you must provide the audience with a document in the form they expect. For instance, a manager who wants a brief note to keep for handy reference may be irritated if he gets a long, detailed business letter. An electronics expert who wants information on a certain circuit doesn't want a prose discussion because it is customary to convey that information through schematics and specifications. If an office manager has set up a form for reporting accidents, she expects report in that form. If she gets exactly the form that she specified, her attitude may easily turn from neutral to positively inclined. If she gets a different form, her attitude may change from neutral to negatively inclined.

Saima expects an informal memo that she can skim over easily, getting all the main points. She expects that this memo, like all that she receives reporting on site visits, will have the usual lines (Date, To, From, Subject) at the top and head to break up the text.

2.8 WHAT IS THE AUDIENCES'S TASK?

What will the reader do after reading the document? Although fulfilling a need is why the audience is involved in a situation, the task is the action they must accomplish. Tasks vary greatly and can be nearly anything-to assemble a tricycle or a workstation, to say no to drugs, to agree to build a retail outlet at a site, to

evaluate the sanitary conditions of a restaurant. The document must enable the reader to perform that task.

Saima task is to act to protect the interests of the company. As a result, she will alert her superiors to the problem with the pillars.

2.9 WHAT IS THE AUDIENCES'S KNOWLEDGE LEVEL?

Every audience has a knowledge level, the amount they know about the subject matter of the document. This level ranges from expert to layperson (or no expert). An expert audience understands the terminology, facts, concepts, and implications associated with the topic. A lay audience is intelligent but not well informed about the topic. Knowing how much the audience knows helps you choose which information to present and in what depth to explain it.

2.10 ADAPTING TO YOUR AUDIENCES'S KNOWLEDGE LEVEL

You adapt to your audience knowledge level by building a schemata--that is, on concepts they have formed from prior experiences. The basic principles are add to what the audience knows, and do not belabor what they already know. If the audience knows a term of concept (has a schema for it), simply present it. But if the audience does not know the term or concept (because they have no schema), you must help them grasp it and add it to their schemata.

Suppose you have to discuss a specific characteristic of a digitalized sound. If the reader has a "digitalized sound schema," you can use just the appropriate terminology to covey a word of meaning. But if the reader does not have this schema, you must find a way to help him or her develop it.

The following two examples illustrate how writers react to knowledge level.

2.11 FOR A MORE KNOWLEDGEABLE AUDIENCE

For a more knowledgeable audience, a writer may use this sentence:
That format allows only 8-bit-sampling.
The knowledgeable reader knows the definitions of the terms "format" and "8-bit." He or she also understands the implications of the wording, which is that the sound will not reproduce as accurately if it sampled as 8-bit, but that the file will take up less disk space than, say, 16-bit sampling.

2.12 FOR A LESS KNOWLEDGEABLE AUDIENCE

A less knowledgeable audience, however, grasps neither the definition not the implications. To develop a schema for such readers, the writer must build on the familiar by explaining concepts, formatting the page to emphasize information, making comparison to the familiar, and pointing out implications. You might convey the same information about sampling to less knowledgeable audience in the following manner.

2.13 FINDING OUT WHAT YOUR AUDIENCE KNOWS

Discovering what the audience knows is a key activity for any writer. It complements and is as important as discovering the audience's role. To estimate an audience's knowledge level, you can employ several strategies.

2.14 ASK THEM BEFORE YOU WRITE

If you personally know the members of the audience, ask them in a phone call or brief conversation how much they know about the topic.

2.15 ASK THEM AFTER YOU WRITE

Ask the audience to indicate on your draft where the concepts are unfamiliar or the presentation is unclear.

2.16 ASK SOMEONE ELSE

If you cannot ask the audience directly, ask someone who knows or has worked with the audience.

2.17 CONSIDER THE AUDIENCE'S POSITION

If you know what the duties and responsibilities the audience members have, you can often estimate which concepts they will be familiar with.

2.18 CONSIDER PRIOR CONTACTS

If you have had dealings with the audience before, recall the extent of their knowledge about the topic.

2.19 WHAT FACTORS INFLUENCE THE SITUATION?

In addition to the personal factors mentioned above in relation to role, business or bureaucratic situations have factors external to both the reader and writer that will

affect the design of a document. These factors can powerfully affect the way readers read. Common questions (based on Odell et al.) to answer are
What consequences will occur from this idea?
What is the history of this idea?
How much power does the reader have?
How formal is the situation?
Is there more than one audience?

2.20 HOW FORMAL IS THE SITUATION?

Formality is the degree of impersonality in the document. In many situations, you are expected to act in an official capacity rather than as a personality. For an oral presentation to a board meeting concerning a multimillion-dollar planning decision, you would simply act as the person who knows about widgets. You would try to submerge personal idiosyncrasies, such as joking or sarcasm. Generally, the more formal the situation, the more impersonal the document.

2.21 IS THERE MORE THAN ONE AUDIENCE?

Sometimes a document has more than one audience. In these situations, you must decide whether to write for the primary or secondary audience. The primary audience is the person actually addressed in the document. A secondary audience is someone other than the intended receiver who will also read the document. Often you must write with such a reader in mind. The secondary reader is not often immediately involved with the writer, so the document must be formal.

Suppose you have to write a memo to your supervisor requesting money to travel to a convention so that you can give a speech. This memo is just for your supervisor's reference; all he needs is a brief notice for his records.

If this brief notice is what all your supervisor needs, neither a long, formal proposal with a title page and table of contents nor a formal business letter would be appropriate. The needs of the primary audience dictate the form and content of this memo.

Suppose, however, that your supervisor has to show the memo to his manager for her approval. In that case, a brief, informal memo would be inappropriate. His manager might not understand the significance of the trip or might need to know that your work activities will be covered.

2.22 CREATING AUDIENCE PROFILES

Before you begin to write, you need to use the concerns outlined in this chapter to create an audience profile, a description of the characteristics of your audience.

The profile is an image of a person who lives in a situation. You use that description as the basis for decisions you make as you create your document.

In order to create a profile, you need to ask specific questions and use an information-gathering strategy.

2.23 QUESTIONS FOR AN AUDIENCE PROFILE

To create the profile, ask the questions discussed in this chapter:
Who is the audience?
What are their demographics-characteristics?
What is the audience role?
How does the reader feel about the subject?
How does the reader feel about the sender?
What form does the reader expect?
What is the audience's task?
What is the audience's knowledge level?
What factors influence the situation?

2.24 INFORMATION GATHERING STRATIGES

To create these answers, use one of two methods-create a typical user or involve the actual audience at some point in your planning.

2.25 CREATE A TYPICAL USER

Creating a typical user means to imagine an actual person about whom you answer all the profile questions. Suppose that you have to write a set of instructions for uploading document to a web server. You should create a typical user whom you follow in your mind as she enacts the instructions.
Here is such a creation: Saima, a sophomore (demographic) arrives in the lab (situation) with the assignment to place several files on the Web (task). She is taking her first course that deals completely with computers and need to get the files on the Web so that she receives credit (role). She intensely dislikes computers (attitude towards the subject), has never really liked using manuals (expectation about sender and form). She has never done this before by herself (knowledge level). She is stressed because she has only 20 minutes in the lab to do this before she has to go to work, and she still has no baby sitter lined up for her child (other factors).
To write the manual, you try to accommodate all the "realities" that you feel will affect "Saima's" or any user's ability to carry out the instructions. Your goal is to

write an inviting, seductive manual, one that entices her to read and to act. If you can write a manual that can help "Saima," it is a good guess that it will help other people also. Using "Saima" you can make decisions that will help create a document that enables any reader to accomplish his/her task and enhance his/her relationships with teachers, co-workers, and children.

2.26 INVOLVE THE ACTUAL AUDIENCE

You could interview actual members of the target audience. Instead of creating "Saima," you interview several people who have to upload file but have no experience. You ask them the profile questions and, in the best practice, later ask them to review the manual before the final draft is published. When you interview them, you ask the same profile questions as you would if you were creating a typical user, but of course you get their answers rather than your imagined ones. While this method is slower than creating an imaginary user, it is often more accurate in gauging real users' needs because it clarifies what the attitudes and experiences really are.

2.27 EXERCISE

Q.No.1   Who is audience and what are their demographic characteristics?
Q.No.2   What is the role of audience in technical writing?
Q.No.3   Discuss reader's feelings about sender and subject?
Q.No.4   What is audience profile?
Q.No.5   How can audience knowledge level affect your technical writing?

2.28 BIBLIOGRAPHY

Blake. G. and Bly, R. (1991) The Elements of Business Writing. Macmillan, New York.

Blake. G. and Bly, R. (1993). The Elements of Technical Writing, Macmillan, New York.

Guba & Lincolin (1989). Fourth Generation Evaluation. London: SAGE Publications.

Swales. J. M, & Feak, C.B. (2017). Academic Writing for Graduate Students: Essential Tasks and Skills. Ann Arbor: The University of Michigan Press.

Vincler. J. E, & N. H. Vincler. (1996). Engineering your Writing Success, Professional Publications, Inc. Belmont, CA.

Unit-03

ETHICS IN TECHNICAL WRITING

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CONTENTS

INTRODUCTION

This unit discusses the role of ethics in technical writing. We all have an image of our better selves-of how we are when we act ethically. We probably also have an image of what an ethical community, an ethical business, an ethical government, or an ethical society should be. Ethics really has to do with all these levels-acting ethically as individuals, creating ethical organizations and governments, and making our society as a whole ethical in the way it treats everyone. While interacting with others we follow some ethical standards. The communication may be oral or written but should be within the ethics. Briefly, ethics refers to standards of behavior that tell us how human beings ought to act in the many situations in which they find themselves-as friends, parents, children, citizens, businesspeople, teachers, professionals, and so on.

OBJECTIVES

After going through this unit, students will be able to:
1. Explain ethics and its sources
2. Know ethics in style
3. Know ethics in letter writing, resumes, and proposal.
4. Discuss ethical situation.
5. Communicate ethically.

3.1 DEFINITION OF ETHICS

Ethics deals with question, what is the right thing to do? Philosophers since Plato have written extensively on topic. It is concern in daily life, in political life, in corporate life. Instances of its importance appear daily in our decisions about how to act. Ethics is a matter of judging both private and communal actions. Individuals are expected to do the right thing, for their own personal integrity and for the well-being of their communities.

The issue, of course, is that the answer to the question, what is the right thing to do? Is problematic? It is not always clear what to do or what value to base the decision on. Philosophers' answers to that dilemma have not always been consistent. But in relation to communication several common threads have emerged.

One major dimension is that the communicator must be a good person who cares for audience. Communicators must tell the full truth as convincingly as possible, because truth will lead to the good for the audience. Another dimension is that the communicator must do what is right, regardless of possible outcomes. A third dimension is that the communicator must act for the greatest good for the greatest number of people. Of course, there are many ethical standards and writers on ethics, but it is commonly held that one must act not for self-gain but for the good of community, or for the stakeholders in the situation.

3.2 WHAT ETHICS IS NOT?

3.2.1 Ethics is not the same as feelings

Feelings provide important information for our ethical choices. Some people have highly developed habits that make them feel bad when they do something wrong, but many people feel good even though they are doing something wrong. And often our feelings will tell us it is uncomfortable to do the right thing if it is hard.

3.2.2 Ethics is not religion

Many people are not religious, but ethics applies to everyone. Most religions do advocate high ethical standards but sometimes do not address all the types of problems we face.

3.2.3 Ethics is not following the law

A good system of law does incorporate many ethical standards, but law can deviate from what is ethical. Law can become ethically corrupt, as some totalitarian regimes have made it. Law can be a function of power alone and

designed to serve the interests of narrow groups. Law may have a difficult time designing or enforcing standards in some important areas, and may be slow to address new problems.

3.2.4 Ethics is not following culturally accepted norms

Some cultures are quite ethical, but others become corrupt -or blind to certain ethical concerns (as the United States was to slavery before the Civil War). "When in Rome, do as the Romans do" is not a satisfactory ethical standard.

3.2.5 Ethics is not science
Social and natural science can provide important data to help us make better ethical choices. But science alone does not tell us what we ought to do. Science may provide an explanation for what humans are like. But ethics provides reasons for how humans ought to act. And just because something is scientifically or technologically possible, it may not be ethical to do it.

3.3 FIVE SOURCES OF ETHICAL STANDERDS

3.3.1 The Utilitarian Approach

Some ethicists emphasize that the ethical action is the one that provides the most good or does the least harm, or, to put it another way, produces the greatest balance of good over harm. The ethical corporate action, then, is the one that produces the greatest good and does the least harm for all who are affected-customers, employees, shareholders, the community, and the environment. Ethical warfare balances the good achieved in ending terrorism with the harm done to all parties through death, injuries, and destruction. The utilitarian approach deals with consequences; it tries both to increase the good done and to reduce the harm done.

3.3.2 The Rights Approach

The philosophers and ethicists suggest that the ethical action is the one that best protects and respects the moral rights of those affected. This approach starts from the belief that humans have a dignity based on their human nature per se or on their ability to choose freely what they do with their lives. On the basis of such dignity, they have a right to be treated as ends and not merely as means to other ends. The list of moral rights -including the rights to make one's own choices about what kind of life to lead, to be told the truth, not to be injured, to a degree of privacy, and so on-is widely debated; people now even argue that non-humans

have rights, too. Also, it is often said that rights imply duties-in particular, the duty to respect others' rights.

3.3.3 The Fairness or Justice Approach

All great people have contributed the idea that all equals should be treated equally. Today we use this idea to say that ethical actions treat all human beings equally, if unequally, then fairly based on some standard that is defensible. We pay people more based on their harder work or the greater amount that they contribute to an organization, and say that is fair. But there is a debate over CEO salaries that are hundreds of times larger than the pay of others. It may be asked whether the huge disparity is based on a defensible standard or whether it is the result of an imbalance of power and hence is unfair.

3.3.4 The Common Good Approach

It is a fact that life in community is a good in itself and our actions should contribute to that life. This approach suggests that the interlocking relationships of society are the basis of ethical reasoning. We should respect and compassionate for all others-especially the vulnerable. This approach also calls attention to the common conditions that are important to the welfare of everyone. This may be a system of laws, effective police and fire departments, health care, a public educational system, public recreational areas, or even communication approach.

3.3.5 The Virtue Approach

A very ancient approach to ethics is that ethical actions ought to be consistent with certain ideal virtues that provide for the full development of our humanity. These virtues are dispositions and habits that enable us to act according to the highest potential of our character and on behalf of values like truth and beauty. Honesty, courage, compassion, generosity, tolerance, love, fidelity, integrity, fairness, self-control, and prudence are all examples of virtues. Virtue ethics asks of any action, "What kind of person will I become if I do this?" or "Is this action consistent with my acting at my best?"

3.3.6 Putting the Approaches Together

 Each of the approaches helps us determine what standards of behavior can be considered ethical. There are still problems to be solved, however. The first problem is that we may not agree on the content of some of these specific

41

approaches. We may not all agree to the same set of human and civil rights. We may not agree on what constitutes the common good. We may not even agree on what is a good and what is harm.

The second problem is that the different approaches may not all answer the question "What is ethical?" in the same way. Nonetheless, each approach gives us important information with which to determine what is ethical in a particular circumstance. And much more often than not, the different approaches do lead to similar answers.

Producing a good technical writing within ethical standard requires a trained sensitivity to ethical issues and a practiced method for exploring the ethical aspects. Having a method for ethically good technical writing absolutely essential. When practiced regularly, the method becomes so familiar that we work through it automatically without consulting the specific steps.

The more novel and difficult the ethical choice we face, the more we need to rely on discussion and dialogue with others about the dilemma. Only by careful exploration of the problem, aided by the insights and different perspectives of others, can we make good ethics covered technical writing.

We have found the following framework for ethics based technical writing, making a useful method for exploring ethical dilemmas and identifying ethical courses of action.

3.4 RECOGNIZE AN ETHICAL ISSUE

Could this writing or situation be damaging to someone or to some group? Does it involve a choice between a good and bad alternative, or perhaps between two "goods" or between two "bads"?
Is this issue about more than what is legal or what is most efficient? If so, how?

3.4.1 Get the Facts
What are the relevant facts of the case? What facts are not known? Can I learn more about the situation? Do I know enough to write about it?

What individuals and groups have an important stake in the outcome? Are some concerns more important? Why?
What are the options for acting? Have all the relevant persons and groups been consulted? Have I identified creative options?

6.4.2 Evaluate Alternative Actions

Evaluate the options by asking the following questions:
Which option will produce the most good and do the least harm? (The Utilitarian Approach)

Which option best respects the rights of all who have a stake? (The Rights Approach)
Which option treats people equally or proportionately? (The Justice Approach)
Which option best serves the community as whole, not just some members? (The Common Good Approach)
Which option leads me to act as the sort of person I want to be? (The Virtue Approach)

3.4.3 Make a Decision and Test It

Considering all these approaches, which option best, addresses the situation?
If I told someone I respect-or told a television audience-which option I have chosen, what would they say?

3.4.4 Act and Reflect on the Outcome

How can my writing be implemented with the greatest care and attention to the concerns of all stakeholders?
How did my writing turn out and what have I learned from this specific situation?

3.5   ETHICAL CONSIDERATIONS IN DIFFERENT TECHNICAL WRITING

3.5.1 Ethics and Letters

Letters are written to communicate something in a more formal way than is an e-mail or a memo. Understanding the letter's format and audience is essential if the writer is to establish his or her ethos (the character that the reader perceives). Business letters are written for a specific purpose and therefore are to the point. Sometimes this terseness can be misconstrued, so the letter's structure directly affects show the information it contains is interpreted. Letters containing good news are, not surprisingly, easier to write than letters with bad news and structuring it is simple: Start with the good news. However, relaying bad news makes considering the audience reaction much more important, communicating bad the letter also creates a positive ethos (perception of the character of the writer) for the sender. The letter writer must take ethical responsibility for his or her epistolary communication.

3.5.2 Ethics and Resumes

In writing a resume, you want to engender confidence in your abilities, and avoid either underselling or overselling your experience. Recruiters are often looking through scores of resumes in search of measurable accomplishments that sound relevant for the position being filled. Using creative words to enhance the sound

of an otherwise mundane job may result in your resume being passed over, as the manager spends extra seconds trying to decipher the hidden meanings. What you say about your experience should be defensible and logical, and can be creative, but not outlandish. The resume that honestly and straightforwardly presents the candidate's experience with a positive spin has the best chance of being read and landing you an interview (Truesdell). For example, stretching dates of employment to cover a jobless period is lying, and can cost you the offer or get you fired later on. Saying that you "specialized in retail sales and assisted in a 10 percent increase in sales at the store level," when you worked at the local video store and the store saw a 10 percent increase in sales is embellishing, but is not a lie. Claiming that you were store manager when you were not is lying (Trunk).

Resume padding, telling lies on resumes, is becoming more and more common. Lying about experience or accomplishments on a resume is risky. Resume padding may get you a job for the short term if the employer hiring you does not check your resume carefully, but resume padding can come back to haunt you later. Inventing experiences, educational degrees, and accomplishments shouldn't be done due to the damage it can cause the writer down the road, even if the writer does not have a moral problem with lying. False information on your resume sits like a land mine waiting to explode. Being a candidate without a master's degree or with a gap in employment is not out of the ordinary. Being a candidate who got caught stretching dates of employment to cover gaps or inventing a degree that never existed is inexcusable, ruinous, and unethical.

3.5.3 Ethics and Proposals

Proposals are an attempt to persuade an audience to approve whatever it is that is being proposed. Whether the proposal is internal or external, solicited or unsolicited, it is a kind of contract between the technical writer (or company) and the audience. Because proposals often deal with time and money, your trustworthiness and accountability are at stake. Consider your audience's needs and write sympathetically and knowledgeably for them. The ethical writer considers the audience's requirements, not what he or she can get out of the situation.

3.5.4 Ethics and style

Clarity is the gold standard for all communication. Jargon, shop talk, or techno babble that marginalizes or excludes the reader or audience is not only confusing. It is unethical. It is both reasonable and desirable to create prose, be it technical or otherwise, that is written for its intended audience. Unfortunately, sometimes it is

all too easy to slide into a vernacular that is common among those in-house. To use terms that are unique to a particular discursive community can create a boundary between the document and its intended audience. If you must use jargonistic terms, include a glossary, or define the term the first time you use it in the text. If your language can be misconstrued, it can cause problems. A good general rule is to guard against any use of terms that are common in-house when the audience for the document is "out of house." This is not only good practice; it is the ethical thing to do.

3.5.5 Ethical Situations

The situations in which a person would have to make ethical decisions and consequences from those decisions. For instance, there are "this could cost me a job" situations, or whistle-blowing, a practice protected by federal law. In these situations, the employee becomes aware that the company is doing something illegal or that could cause great harm, perhaps standards are not being followed. For instance, before the terrible Challenger disaster, one employee had written a very clear memo outlining serious problems concerning the O-rings. This memo was subsequently used legally as the "smoking gun" to prove negligence on the part of those in charge. The writer subsequently lost his job, fought back and was reinstated under the law, only to leave the company because of the challenges posed remaining employed.
This kind of decision-and action-is incredibly intense, requiring more than just a sense of what is the right thing to do. It requires courage to accept the negative consequences on self, and family, that losing employment entails.

Each person must ask him or herself how to respond in a situation like this, but the ethical advice is clear you should blow the whistle.

Much more common, however, are the everyday issues of communication. People rely on documents to act. These actions influence their well-being at all levels of their lives, from personal health, to large financial indebtedness, to accepting arguments for public policy. As a result, each document must be designed ethically.

Two examples from an ethics survey will give you a sense of the kind of daily decision that can be judged unethical.

You have asked to design materials that will be used to recruit new employees. You decided to include photographs of company's employees and its facilities. Your company has no disabled employees. You asked one of the employees to sit in a wheelchair for one of the photographs. Is it ethical?
You are preparing materials for potential investors, including a 5-year profile of your company's sales figure. Your sales have steadily decreased every year for

five years. You design a line graph to display your sales figure. You clearly label each year and the corresponding annual sales. In order to de-emphasize the decreasing sales, you reverse the chronology on the horizontal axis, from 1989, 1990, 1991, 1992, 1993 to 1993, 1992, 1991, 1990, 1989. This way the year with the lowest sales (1993) occurs first and the year with the highest sales (1989) occurs last. Thus, the date line rises from left to right and gives the viewer a positive initial impression of your company. Is it ethical?

Of the respondents, 85.6 percent found the first case and 71.8 percent found the second case "mostly" or "completely" unethical (260). The basic principle that the practitioner used was "The greater the likelihood of deception, the more unethical is the design of document".

Ethical considerations are integral parts of every project. In order to be a responsible member of the community, every communicator must investigate and find the principles-and courage-upon which to act ethically.
Strategies for Communicating Ethically
Commitment to professional excellence and ethical behavior means:
- Use language and visual with precision.
- Prefer simple direct expression of ideas.
- Satisfy the audience's need for information, not one's own need for self-expression.
- Hold responsible for how well audience understands message.
- Respect the work of colleagues, knowing that a communication problem may have more than one solution.

In applying high standards in the choice of words and images, communicators are unambiguous language; use design honestly; use visuals with precision; use simple, direct expression of ideas; and credit the ideas or work of others.

3.6 USE UNABIGUOUS LANGUAGE

Suppose, for instance, that you are writing a manual for a machine that has a sharp, whirling part under a protective cover. This dangerous part could slice off a user's fingers. When you explain how to clean the part, you inform the reader of the danger in a manner that prompts him or her to act cautiously. It would be unethical to write, "A hazard exists if a contact is made with this part while it is whirling." That sentence is not urgent or specific enough to help a user prevent injury. Instead write, "Warning! Turn off all power before you remove the cover. The blade underneath could slice off your fingers!"

However, the need for unambiguous appears in other much less dramatic situations. Take, for instance, the phrase "When I click on the hyperlink, nothing happens." Anyone familiar with hypertext knows that this message is not accurate. Something always happens-a message window appears, the cursor moves to a point on the screen that you did not expect it to, or the original screen

reforms itself. The phrasing "nothing happens" is so imprecise that it does not allow another person to act in a helpful way. How can someone fix it if he does not know what is wrong? But that phrasing also indicates a moral stance- "I am not responsible. It is your job. I will not take the time and effort to right this, whatever inconvenience it may cause." This kind of ambiguous use of language certainly is not dangerous, the way the previous example was, but it is a refusal to take responsibility in the situation. As such, the language does not help other people achieve their goals. It is wrong, not just because it is imprecise, but because it does not help stakeholders.

3.7 DESIGN HONESTLY

Suppose that in a progress report you must discuss whether your department has met its production goal. The page-formatting techniques you use could either aid or hinder the reader's perceptions of the truth. For instance, you might use a boldfaced head to call attention to the department's success:

3.8 WIDGET LINE EXCEEDS GOALS

One again this month, our widget line has exceeded production goals, this time by 18%. Conversely, to downplay poor performance, you might use a more subdued format, one without boldface and a head with a vague phrase:

3.9 FINAL COMMENTS

Great strides have been made in resolving previous difficulties in meeting monthly production goals. This month's achievement is nearly equal to expectations.

If reader misunderstanding could have significant consequences, however, your use of "Final Comments" is actually a refusal to take responsibility for telling the stakeholder what he or she needs.

3.10 CREATE HELPFUL VISUALS

Suppose readers had to know the exact location of the emergency stop button in order to operate a machine safely. To help them find the button quickly, you decide to include a visual aid.

3.11 USE DIRECT, SIMPLE EXPRESSION

Say what you mean in a way that your reader will easily understand. Suppose you have to tell an operator how to deal with a problem with the flow of toxic liquid in a manufacturing plant. A complex, indirect expression of a key instruction would look like this:

If there is confirmation of the tank level rising, a determination of the source should be made.

A simple, direct expression of the same idea looks like this:

Determine if the tank level is rising. Visually check to see if liquid is coming out of the first-floor trench.

Credit Others
Suppose a new coworker has found a way to modify a procedure and save the company money. You are assigned to write the internal proposal that suggests the change. Your obligation is to present the facts so that your manager understands who convinced the idea-and who gets the credit. To do otherwise would be to deny your coworker proper credit to for the idea.

There are many strategies for the clear presentation of language, format, and visual aids. Use these communications devices responsibly to ensure that your writing tells the audience everything it has a right to know. The audience trusts you because you are an expert. Be worthy of that trust.

3.12 EXERCISE

Q.No.1   Define ethics in detail and what are not ethics.
Q.No.2   What are five sources of ethics standards?
Q.No.3   What are ethical consideration in style, letter writing resume and proposal?
Q.No.4   Describe the ethical situations.
Q.No.5   What are different strategies to communicate ethically?

3.13 BIBLIOGRAPHY

Blake. G. and Bly, R. (1991) The Elements of Business Writing. Macmillan, New York.
Blake. G. and Bly, R. (1993). The Elements of Technical Writing, Macmillan, New York.
Guba & Lincolin (1989). Fourth Generation Evaluation. London: SAGE Publications.
Swales. J. M, & Feak, C.B. (2017). Academic Writing for Graduate Students: Essential Tasks and Skills. Ann Arbor: The University of Michigan Press.
Vincler. J. E, & N. H. Vincler. (1996). Engineering your Writing Success, Professional Publications, Inc. Belmont, CA.

Unit-04

MECHANICS OF TECHNICAL WRITING

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CONTENTS

INTRODUCTION

This unit is about the basic rules of grammar and punctuation. It constrains different sections covering sentence construction problems; agreement of subject and verbs, agreement of pronouns with their antecedents, punctuation, abbreviation and capitalization.

OBJECTIVES

After going through this unit, you will be able to:
1.   Use grammar rules
2.   Punctuate the sentence properly
3.   Use capital words

4.1 THE PARTS OF SPEECH

Whether you are writing or speaking, you will be using certain basic tools to communicate the message. These basic communication tools are called the parts of speech. They are the primary "bricks and mortar" of the English language. There are eight parts of speech, and each of the eight helps to convey a certain type of expressed thought. The eight parts of speech are the following:
1.   Nouns
2.   Pronoun
3.   Verbs
4.   Adverbs
5.   Adjectives
6.   Prepositions
7.   Conjunctions
8.   Interjections

4.1.1 Nouns

Words that mean persons, places, objects, events, or concepts are called nouns. The following words are examples of nouns:

Persons:	Technician	Scientist
Places:	Factory	Laboratory
Objects:	Pin	Terminal
Events:	Explosion	Experiment
Concepts:	Formula	Equation

Common, Proper, and Collective Nouns
Nouns are divided into three major classes. Nouns that are common or general people, places, or things are called common nouns. Nouns that refer to people, places, or things that are special or particular are called proper nouns. (Note: Always capitalize proper nouns.) Nouns that refer to a single group made up of a number of people, places, or things are called collective nouns.

Common Nouns	Clinic	Company
Proper Nouns:,	Mayo Clinic	Motorola Inc.
Collective Nouns:	Fleet	Staff

How Nouns Function
Within speech or writing, nouns have certain functions. Nouns can be subjects or objects, and in some cases they can function as adverbs or adjectives. Nouns also

have the ability to show possession. The following examples show the basic functions of nouns:

Subject: The shipment arrived late that afternoon. [Tells who or what is or does something]

Direct object: The receiving inspection department rejected the cold roll steel. [Tells what was rejected]

Indirect object: Engineering sent him the specifications. [Tells to whom the specifications were sent]

Object of a preposition: He typed the department code number under the signature. [Completes the preposition under]

Adverb: The tests will be finished tomorrow. [Tells when the finishing will occur]

Adjective: She is our small engines inspector. [Tells which one or what kind]

Possession: The HVAC system starts automatically in Patricia's area. [Shows possession]

Plural Nouns

Most nouns are made plural by simply adding an "s" to the singular form. In some cases, depending on the spelling rule, the noun is pluralized by adding "es" or by changing "y" to "ies." Consider the following examples:

File   files
Group   groups
Gas   gases
Company   companies

Remember that a collective noun can be singular or plural depending on how it is used.
Singular: The engineering staff meets this morning.
Plural: The engineering staff is still divided about the number of needed tests.

Possessive Nouns

A possessive noun owns or possesses something. You form the possessive by adding "'s" or simply an apostrophe (') to the end of the noun. The possessive

noun comes in two forms. They are the singular possessive and the plural possessive.

- To form the singular possessive, add "'s" to the noun.
- The company's trucks are all under warranty.
- To form the plural possessive of nouns that end in "s" or "es," simply add an apostrophe to the end of the word.
- All the engineers' activity reports are due each week.
- All of the secretaries' wages are above union level.
- If the final "s" is a "z" sound, such as in houses, add only the apostrophe.
- It is necessary to weatherproof the houses' roofs. [the roofs of more than one house]
- To form joint ownership or possession, simply make the final noun possessive.
- Jack and Pat's project report is due tomorrow.
- To form individual ownership or possession of two or more nouns, make each noun possessive.
- Jack's and Pat's trip reports are due on Monday.

4.1.2 Pronouns

Pronouns take the place of nouns. Pronouns do virtually everything that nouns do. They create a convenience for the writer by helping to eliminate monotonous repetition of the same noun. The noun that the pronoun replaces is called its antecedent. In most cases, replacement of a noun with a pronoun serves to further clarify the noun that is replaced. Pronouns can be divided into seven basic types:
- Personal Pronouns
- Intensive/reflexive pronouns
- Indefinite pronouns
- Possessive pronouns
- Relative pronouns
- Interrogative pronouns
- Demonstrative Pronouns Personal Pronouns

Personal Pronouns

Personal pronouns take the place of a noun that represents a person. They can be and do all the things that a personal noun can do in a sentence.
Subject: She is qualified to manage R&D.

Direct object: Show him how to set the automatic timers.
Object of preposition: The second shift was managed by him for two years.
Possessive: We want to have your findings by Thursday morning.
Intensive: The manager herself rejected the shipment.
Reflexive: I basically taught myself the order-entry system.

The following table shows all the forms or cases for personal pronouns in the first, second, and third person.

Person	Case	Singular	Plural
First:,	Nominative,	I	We
Possessive,	My/Mine	Our/Ours	
Objective	Me	Us	
Intensive/Reflexive	Myself	Ourselves	
Second:	Nominative,	You	You
Possessive	Your/Yours	Your/Yours	
Objective	You	You	
Intensive/Reflexive	Yourself	Yourselves	
Third:	Nominative,	She/he/It,	They
Possessive	His/her,	Hers/It's	Their/Theirs
Objective	Him/her/	It	Them
Intensive/Reflexive	Himself/ Herself/ Itself,		Themselves

Indefinite Pronouns

Indefinite pronouns show unspecified people or things. Many of the indefinite pronouns will show quantity, such as all, several, none, few. The most common indefinite pronouns are the following:

All	each	most	other
Another	either	neither	several
Any	everybody	nobody	some
Anybody	everyone	none	somebody
Anyone	few	no one	someone
Both	many	one	such

Consider the following examples of indefinite pronouns:

The plastics department appointed a new group leader for the day shift. They appointed someone from outside of the section. [Someone replaces group leader from the preceding sentence.]

Do you have the newest edition of the operations manuals? We have none in our section. [None replaces manuals.] Possessive Pronouns

Possessive pronouns do all the things that possessive nouns do. The major difference is that possessive pronouns never take an apostrophe. Consider the following examples:
Whose caliper was left on the bench? [Who is never possessive, but whose is possessive.]I thought my tools were lost. Mine were found the next day.

Our test project starts on Monday. Those parking spaces on the north end of the lot are ours.

How did your figures come out? Are these figures yours?

His/her timing on this matter was perfect. Hers was the best.

Do these tools belong in our department or theirs? Their department is also in the pool.

A problem frequently occurs with the contraction it's and the possessive its. Remember the common rule: possessive pronouns do not take an apostrophe.
It's crucial to run the machine according to its operations manual.

Relative Pronouns

Relative pronouns are primarily used to keep from repeating the same noun within one or several closely linked sentences. The relative pronouns that, whom, whose, and that typically refer to people. The pronouns which, that, and of which refer to things.

The new hardness tester, which she purchased recently, is a valuable tool.

The employee who discarded the scrap brass has been reprimanded.

Interrogative Pronouns

Interrogative pronouns always ask a question. The pronouns who, whose, and whom all refer to people. The pronouns what and which refer to objects or concepts.

- Who shut down the line?
- What is your highest estimate of damage?
- Which vehicle should we take?

Demonstrative Pronouns

Demonstrative pronouns do two things. They first indicate a specific item or group of items as antecedent. The second thing they do is show distance from the speaker or writer.

This is our work area, and that is lunchroom. [The work area is closer to the speaker than is the lunchroom.]

I don't envy those involved in the layoff this fall. [Those has no specific antecedent; it refers to a specific group that was involved in a layoff.]

Pronoun-Antecedent Agreement

Antecedents are the nouns to which pronouns refer. Pronouns must agree with their antecedent. This means that the number, case, and person of the pronoun must be the same as the noun to which it refers.

Software engineers must have a working knowledge of FORTRAN. Otherwise, they will have problems devising routines. [The antecedent is engineers. It agrees with its pronoun, they, in number.]

Who and whom seem to present problems to many writers. The difficulty is a matter of when to use either of the forms. Simply use who as a subject and use whom as an object.

4.1.3 Verbs

Verbs express three primary things to the reader. They show a sense of being, a sense of action, and a sense of time. Because of these three elements, verbs form the core of expressive writing.

The State of Being Verb
Verbs that express being or condition are also called linking verbs. This is because they link or connect the subject of the sentence with a noun, pronoun, or adjective that describes the subject.

- That element is inert.
- She is the leading chemist in the field.
- We are not an engineering group.

The most common state of being verb is the verb to be. Other common linking verbs are the following:

Appear	grow	seem
Become	look	sound
Feel	hear	remain

State of being verbs also function as auxiliary verbs or "helping verbs." These verbs "help" certain verb constructions to express themselves as a complete verb form. They can signal a change in tense or a change in voice. Consider the following:
- The lab has tested for carbon.
- R&D is testing for carbon content.
- She can operate the CNC lathe.

Active and Passive Voice

Verbs can show only one other state besides being, and that state is action. They show that something is happening. To show action in a sentence, you can express it either actively or passively. The active or passive way of expressing that action in the sentence is called voice. The active voice expresses action in an active manner, while the passive voice expresses the action passively.

Active voice: Everyone in the engineering department must write a weekly activity report. [The subject of the sentence (everyone) acts directly (must write) on a direct object (report).]

Passive voice: An activity report must be written by everyone in the engineering department. [The subject of the sentence is what is acted on (report).]

The passive verb form is made up of the auxiliary verb to be "helping" the past participle written. The actor in this sentence (everyone) has been made the object of the preposition by. As a technical writer, you should prefer the active voice, because it is more direct and lively for your reader.

Verbals

Verbals are derived from verbs. They are verb forms that act as other grammatical elements, such as nouns, adverbs, and adjectives, within a sentence. There are three types of verbals:
- Infinitives
- Participles
- Gerunds

Infinitives

An infinitive is a verbal. It is the root form of a verb without the restriction imposed through number, tense, and person. Infinitives are generally preceded by the word to. Infinitives can be used within a sentence as nouns, adverbs, and adjectives.

- He likes to experiment. [Noun]
- It is the last partition to build. [Adjective]
- The solenoid acts to stop the flow of liquid. [Adverb]

Participles

A verb that is used as an adjective is called a participle. There are both past participles and present participles. Most present participles end in "ing," and most past participles end in "ed," "en," "ed," or "t."

The finished version of the report was not handed out.

Past participles are used with a linking form of the verb to be in order to form the passive voice verb form.

The specifications were written by the new engineer.

Gerunds

The gerund is a verbal that is used as a noun. Gerunds always end in "ing" and signal the use of an action verb to be used as a noun.

Testing is a major activity in the R&D lab.

Verb Tenses

Verb tenses deal with time. In any sentence, the time element will always be expressed by the verb. That state of time expressed by the verb is called tense.
In English, verbs have six regular tenses and two special function tenses.
Regular tenses:
- Present
- Past
- Future
- Present perfect
- Past perfect
- Future perfect

Special Functions:

- Progressive
- Conditional

Present Tense

The present tense expresses an action or a state of being that is occurring at the present time. The present tense also indicates habitual action or something that is true at all times. The present tense is best used with technical definitions, descriptions, and instructions.
I write technical specifications.

Past Tense

The past tense expresses action or being that occurred in the past and is not continuing into the present.
I wrote the specifications yesterday.

Future Tense:

The future tense expresses an action or state of being that will occur in the future.
I will write the specifications tomorrow.

Perfect Tenses

The perfect tenses express actions and states of being that happen at one time but are understood in relation to another time. They signify totally completed actions. The perfect tenses are found in the present, past, and future tense verb constructions.
- I have written the report. [present perfect]
- I had written the report. [past perfect]
- I will have written the report. [future perfect]

The Progressive Verb Form

The progressive verb form indicates action and being that are continuous relative to the tense.
- I am writing the report. [present progressive]
- I was writing the report. [past progressive]
- I will be writing the report. [future progressive]

The Conditional Verb Form

The conditional verb form expresses the intent or possibility to do or be something. I can write the report. [Present conditional]
I could have written the report. [past conditional]
Consider the following full conjugation of the verb to write:

Present:

I write   you write   he/she/it writes   we write   You write   they write
am/is/are writing [progressive]   can/could write [conditional]

Past:

I wrote   you wrote   he/she/it wrote   we wrote   you wrote   they wrote
was/were writing [past progressive]
could write/could have written/ could have been writing [past conditional]

Future:

I will/shall write   you will/shall write   he/she/it will/shall write
we will/shall write   you will/shall write   they will/shall write
will/shall be writing   [future progressive]

Present Perfect:

I have written   you have written
he/she/it has written   we have written
you have written   they have written   have been/has been writing

Past perfect:
I had written   you had written   he/she/it had written   we had written
You had written   they had written   had been writing   Future perfect:
I will have written   you will have written   he/she/it will have written
we will have written   You will have written   they will have written
will have been writing

Mood

Verbs express differences in the speaker's or writer's intention. The sense of intention is called mood. There are three moods in English:
- The indicative mood makes a direct statement or asks a question.
- The train is ten minutes late.
- Is the train running late?
- The imperative mood commands, directs, or requests. Call the warehouse and cancel the shipment.
- The subjunctive mood makes a statement of urgency, formality, possibility, or speculation. She demanded that they check it immediately.
- They recommended that the testing procedure be adopted.
- If she were to sign the release, she would have no legal recourse later.
- If he were the director, policies would change.

Subject-Verb Agreement
Verbs are like pronouns in that verbs must agree with their subjects in person and number.
Agreement in person:
I am   You are   It is

Agreement in number:
She writes They write

4.1.4 Adjectives

Adjectives modify, describe, and explain nouns, pronouns, and other adjectives. Adjectives answer the questions of what kind? how many? which one? and how much?

- The feasibility report was due yesterday. [What kind]
- There are more than forty failures per year. [How many]
- She tested those o-rings this morning. [Which one]
- We tested the larger sample. [How much]

Adjectives can be divided into five general types
- Demonstrative
- Limiting
- Comparative
- Compound
- Predicate

Demonstrative Adjectives
Demonstrative adjectives show or demonstrate particular items and their distance from the speaker. Typical demonstrative adjectives are this, that, which, what, these, those.
This sampling shows a definite skew toward that sampling. [This is closer to the speaker than that.]

Limiting Adjectives
Limiting adjectives identify and number the nouns they modify. In most cases, the limiting adjective comes before the noun it modifies. Typical limiting adjectives are:
a/an, both, several, few, some, many, any, every, most, each, one, every
Few engines will pass those tests.

Comparative Adjectives
Many adjectives make comparisons of people, places, and things. The positive, comparative, and superlative adjectives show different degrees of the quality or characteristic. The following examples are some typical comparative adjectives:

Positive	Comparative	Superlative:
Hard	Hard,	Hardest
Careful	More Careful	Most Careful
Large	Larger	Largest
Small	Smaller	Smallest

Compound Adjectives

Compound adjectives are hyphenated forms when they precede the noun they modify. If they follow the noun they modify, they are two separate words.
This is a past-due report.
This report is past due.

Predicate Adjectives

Adjectives following linking verbs are called predicate adjectives. They refer to and modify the condition of the subject and its relation to the verb.
The lubricant has become hot.

4.1.5 Adverbs

Adverbs describe and explain verbs. They clarify questions about verbs, such as when? where? how much? and how? Adverbs explain an action verb or state of being verb in expanded detail and provide a more vivid picture of that verb.
Most adverbs end in "ly" and come from nouns and adjectives. In some cases both the adjective and adverb will end in "ly."

Noun	Adjective	Adverb:
Care	Careful	Carefully
Hour	Hourly	Hourly

Adverbs Showing When:

Now	Forever	Frequently
Before	Seldom	Often
Once	Friday	Eventually
Never	Occasionally	Always

Adverbs Showing Where:

In	Through	Across
Over	Under	Sideways
Upstairs	Here	Backwards
Out	There	Around

Adverbs Showing How Much:

Entirely	Thoroughly	Excessively
Mostly	Nearly	Mildly

Adverbs Showing How:

Nicely	Quickly	Tirelessly
Carefully	Equally	Accurately

4.1.6 Prepositions

Prepositions are the words that connect informational phrases to the rest of a sentence. A prepositional phrase always expands and adds meaningful information. Prepositions have objects, which together form the prepositional phrase. Prepositional phrases can serve as adjectives and adverbs.

Signal strength is still within range of the original cell site. [Within range modifies the verb is. The phrase of the original cell site modifies the noun strength.]

The following is a list of some commonly used prepositions:

Above, below, of, Across, between, off, After, beyond, on, Against, by, over, Along, down, through
Around, for, to, At, from, under, Before, in, up, Behind, like, with

4.1.7 Conjunctions

Conjunctions connect major elements within sentences and show their relationships. There are four basic types of conjunction:
- Coordinating conjunction
- Correlative conjunction
- Subordinating conjunction
- Linking adverb

Coordinating Conjunctions

Coordinating conjunctions join two or more elements in a sentence. The elements joined together can be nouns, verbs, adjectives, adverbs, pronouns, or phrases and clauses. The coordinating conjunctions are and, but, or, and nor.
The pen and papers were on the table.

Correlative Conjunctions
Correlative conjunctions are used in pairs to emphasize the elements they join. The elements that they join are of equal importance. The following are some typical correlative conjunctions:

either or, neither nor, not only, but also,
The chemical analysis performed on the last batch was neither complete nor accurate.

Subordinating Conjunctions
Subordinating conjunctions also emphasize the elements they join, but, unlike correlative conjunctions, subordinating conjunctions join elements of unequal importance or rank. These elements are generally subordinate clauses and independent clauses. The following are some common subordinating conjunctions:

After	provided	what
Although	since	when
As	than	where
Because	that	which
Before	though	while
How	unless	who

Subordinating conjunctions introduce sentences as well as join elements within them. Subordinating conjunctions at the beginning of subordinating clauses at the beginning of sentences are always followed by a comma. No comma is needed when the subordinate clause comes at the end of the sentence.

We should keep these data in the current data bank until new tests are completed.
Until new tests are completed, we must keep these data in the current data bank.
Many clauses give additional information about a person, place, or thing. When that clause is essential to the meaning of the sentence, it is known as a restrictive clause. When the clause is descriptive but not essential, it is called a nonrestrictive clause.

The lab where the fire started was a total loss. [Restrictive clause]
The other compressor, which was never used, was not damaged in the move. [Nonrestrictive clause]

Linking Adverbs

Linking adverbs join two independent clauses. They indicate the relationship between two ideas expressed in independent clauses. As a general rule, linking adverbs show results, contrast, or continuation.

Linking adverbs can follow a semicolon at the beginning of the second clause they are joining. They can also be within the second clause, set off with commas. Further tests delayed shipment; therefore, the project was put on temporary hold. Further tests delayed shipment; the project, therefore, was put on hold.

4.1.8 Interjections

Interjections express emotion or get the reader's immediate attention. In technical writing, you should not use interjections to express emotion this is primarily used as a literary device. You can, however, use interjections effectively as attention getters where your reader should pay special attention, such as when safety is an issue.

Beware! Poisonous fumes are released in this chemical reaction.
Warning! High voltage.

4.2   PUNCTUATION

Punctuation is unique to written language. You don't use punctuation when you speak. What you do use is a series of meaningful pauses and tonal changes in the sound of your voice. Because there is no sound in written language, a great deal of meaning is lost unless some kind of substitute for these vocal pauses and intonations is used.

4.2.1 What Is Punctuation?

Punctuation is systems of symbols that help readers understand the structural relationships within a sentence. Marks of punctuation link, separate, enclose, indicate omissions, terminate, and classify the sentence. Most punctuation marks can perform more than one function.

Understanding punctuation is essential for writers because it enables them to communicate with clarity and precision. The use of punctuation is determined by grammatical conventions and the writer's intention. Punctuation marks may serve as substitute for the writer's facial expressions and vocal inflexions

The use of punctuation can completely change the meaning of a sentence. Here is an example that reflects that how punctuation changes the meanings of a sentence:

The rivers not the dams are dry.
The rivers not, the dams, are dry.
You can see that in the above example the use of comma can totally alter the meaning of sentence. So, learning the use of punctuation is very important.
The following 11 marks of punctuation are often seen being used in writing.

Period Or Full Stop	.
Apostrophe	'
Colon	:
Semi Colon	;
Comma	,
Exclamation Mark	!
Dash	---
Hyphen	-
Parenthesis	( )
Question Mark	?
Quotation Mark	" "

4.2.2 Period or Full Stop

A period usually indicates the end of a declarative or imperative sentence. It is the greatest pause and separation. Periods also link when used as leaders (for example, in a table of contents) and indicate omissions when used as ellipses. Periods may also end questions that are really polite requests and questions to which an affirmative response is assumed.
Please open your books at unit 9.
Will you please send me the financial statement?

Periods in Quotations

Use a comma, not a period, after a declarative sentence that is quoted in the context of another sentence.

"There is very chance of success," she stated.
A period is conventionally placed inside quotation marks.
Hamlet said, "Frailty, thy name is women."
He stated clearly, "My vote is yes."

Periods with Parentheses

If a sentence ends with parentheses, the period should follow the parenthesis.
The institute was established by Quad-e-Azam (1900-1930).
If a whole sentence (beginning with an initial capital letter) is enclosed in parentheses, the period (or other end mark) should be placed inside the final parenthesis.
The project director listed the problems his staff faced. (This was the third time he had complained to the board.)

Other Uses of Periods

Use periods after initials in names.
John T., J.P. Morgan
Use periods as decimal points with numbers.
109.2 degrees; $540.26; 6.9 percent

Use periods to indicate abbreviations.
Ms. Dr. Inc.
When a sentence ends with an abbreviation that ends with a period, do not add another period.
Please meet me at 3:30 p.m.

4.2.3 Period Faults

The incorrect use of a period is sometimes referred to as a period fault. When a period is inserted prematurely, the result is a sentence fragment.

FRAGMENT: After a long day at the center during which we finished the quarterly report. We left hurriedly for home. (In this sentence period has been inserted prematurely after report. It has resulted in fragment and not a complete sentence.)

SENTENCE: After a long day at the center, during which we finished the quarterly report, we left hurriedly for home.

When two independent clauses are joined without any punctuation, the result is a run- on sentence. Adding a period between the clauses is one way to correct a run-on sentence.

4.2.4 Apostrophe (')

An apostrophe (') is used to show possession, to indicate the omission of letters, and sometimes to form the plural. Do not confuse the apostrophe used to show the plural with the apostrophe used to show possession.

4.2.5 To Show Possession

Use an apostrophe + S ('s) to show that one person/thing owns or is a member of something
The power plant's output reduced this year.
This is my brother's house.
Singular nouns of more than one syllable that end in s may form the possessive either with an apostrophe alone or with an 's. whichever way you do it be consistent.
The hostess' warm welcome
The hostess's warm welcome
With coordinate nouns, the last noun takes the possessive form to show joint possession.
The man and woman's car was badly damaged.
To show individual possession with coordinate nouns, each noun should take the possessive form.
The difference between Tahir's and Maria's test results is insignificant.
Use only an apostrophe with plural nouns ending in s.
The managers' meeting was canceled.
If a plural noun doesn't end in "s," add an "'s" to create the possessive form.
The children's room is at the top floor.
Do not use the apostrophe with possessive pronouns.
Yours, its, his, ours, whose, theirs

4.3   CONTRACTION

When you combine two words to make a contraction, you will always take out some letters. In their place, use an apostrophe.
they + have = they've; are + not = aren't; they + will = they'll

4.3.1 Plurals

Apostrophe is also used to form plurals of numbers and letters when they are indicated in the sentence.

All the L's in you writing look like an I.
Add two 8's and a 4.

4.3.2 Commas

Like all punctuation, the comma (,) helps readers understand the writer's meaning and prevents ambiguity. It is most widely used mark of punctuation and is used to indicate shortest pause in the sentence. Notice how the comma helps make the meaning clear in the following example:

AMBIGUOUS: To be successful managers with MBAs must continue to learn. [At first glance, this sentence seems to be about "successful managers with MBAs."]

CLEAR: To be successful, managers with MBAs must continue to learn. [The comma makes clear where the main part of the sentence begins.]

Look at some of the following sentences to see how you might use a comma when writing a sentence.

Introductory word: Personally, I think the practice is helpful.

Lists: The barn, the tool shed, and the back porch were destroyed by the wind.

Coordinating adjectives: He was tired, hungry and late.

Conjunctions in compound sentences: The bedroom door was closed, so the children knew their mother was asleep.

Interrupting words: I knew where it was hidden, of course, but I wanted them to find it themselves.

Dates, addresses, greetings and letters: The letter was postmarked December 8, 1945.

4.3.3 Commas after an Introductory Word or Phrase

You may notice a comma that appears near the beginning of the sentence, usually after a word or phrase. This comma lets the reader know where the introductory word or phrase ends and the main sentence begins.

Without spoiling the surprise, we need to tell her about her result.

In this sentence, without spoiling the surprise is an introductory phrase, while we need to tell her to save the date is the main sentence. Notice how they are separated by a comma. When only an introductory word appears in the sentence, a comma also follows the introductory word.

Ironically, she already had plans for that day.

4.4 ACTIVITY

Look for the introductory word or phrase and add a comma to correct the sentence.

- Suddenly the dog ran into the house.
- In the blink of an eye the kids were ready to go to the movies.
- Confused he tried opening the box from the other end.
- Every year we go camping in the woods.
- Without a doubt green is my favorite colour.

Commas in a List of Items
When you want to list several nouns in a sentence, you separate each word with a comma. This allows the reader to pause after each item and identify which words are included in the grouping. When you list items in a sentence, put a comma after each noun, then add the word and before the last item. However, you do not need to include a comma after the last item.

We'll need to get flour, tomatoes and cheese at the store.
The pizza will be topped with olives, peppers and pineapple chunks.

Commas and Coordinating Adjectives
You can use commas to list both adjectives and nouns. A string of adjectives that describe a noun are called coordinating adjectives. These adjectives come before the noun they modify and are separated by commas. One important thing to note, however, is that unlike listing nouns, the word and does not always need to be before the last adjective.

It was a bright, windy, clear day.
Our kite glowed red, yellow, and blue in the morning sunlight.

Activity

- Add commas to the following sentences where you think is necessary.
- Monday Tuesday and Wednesday are all booked with meetings.
- It was a quiet uneventful unproductive day.
- We'll need to prepare statements for the Fahad Tabraiz and Shan before their portfolio reviews next week.
- Majid Najma and Dilawar finished their report last Tuesday.
- With cold wet aching fingers he was able to secure the sails before the storm.
- Commas before Conjunctions in Compound Sentences
- Commas are sometimes used to separate two independent clauses. The comma comes after the first independent clause and is followed by a conjunction, such as for, and, or but.
- He missed class today, and he thinks he will be out tomorrow, too.
- He says his fever is gone, but he is still very tired.
- Commas before and after Interrupting Words
- In conversations, you might interrupt your train of thought by giving more details about what you are talking about. In a sentence, you might interrupt your train of thought with a word or phrase called interrupting words. Interrupting words can come at the beginning or middle of a sentence. When the interrupting words appear at the beginning of the sentence, a comma appears after the word or phrase.
- If you can believe it, people once thought the sun and planets orbited around Earth.
- Luckily, some people questioned that theory.
- When interrupting words come in the middle of a sentence, they are separated from the rest of the sentence by commas. You can determine where the commas should go by looking for the part of the sentence that is not essential for the sentence to make sense.
- An Italian astronomer, Galileo, proved that Earth orbited the sun.
- We have known, for hundreds of years now that the Earth and other planets exist in a solar system.

Activity

Insert commas to separate the interrupting words from the rest of the sentence.
I asked my neighbours the retired couple from Faisalabad to bring in my mail.
Without a doubt his work has improved over the last few weeks.

Our professor Mr. Allama Nazir drilled the lessons into our heads.
The meeting is at noon unfortunately which means I will be late for lunch.
We came in time for the last part of dinner but most importantly we came in time for dessert.

Commas in Dates, Addresses, Greetings and Closings of Letters
You also use commas when you write the date, such as in cover letters and e-mails. Commas are used when you write the date, when you include an address, and when you greet someone.

If you are writing out the full date, add a comma after the day and before the year. You do not need to add a comma when you write the month and day or when you write the month and the year. If you need to continue the sentence after you add a date that includes the day and year, add a comma after the end of the date.

The letter is postmarked May 4, 2001.
Her birthday is May 5.
He visited the country in July 2009.
I registered for the conference on March 7, 2010, so we should get our tickets soon.
You also use commas when you include addresses and locations. When you include an address in a sentence, be sure to place a comma after the street and after the city. Do not place a comma between the state and the zip code. Like a date, if you need to continue the sentence after adding the address, simply add a comma after the address.

We moved to House 684, Lane 3, Gulistan-e-iqbal, and Rawalpindi.

After moving to F-10, Islamabad, Ahmad used public transportation to get to work.

Greetings are also separated by commas. When you write an e-mail or a letter, you add a comma after the greeting word or the person's name. You also need to include a comma after the closing, which is the word or phrase you put before your signature.
Hello,
Dear Mrs. Ahmad,
I would like more information about your job posting.
Thank you,
Anita.

Activity

Use what you have learned about comma usage to edit the following paragraphs.
My brother Naeem is a collector of many rare unusual things. He has collected lunch boxes limited edition books and hatpins at various points of his life. His current collection of unusual bottles has over fifty pieces. Usually he sells one collection before starting another.

Our meeting is scheduled for Thursday March 20. In that time we need to gather all our documents together. Iqra is in charge of the timetables and schedules. Tariq is in charge of updating the guidelines. I am in charge of the presentation. To prepare for this meeting please print out any e-mails faxes or documents you have referred to when writing your sample.

It was a cool crisp autumn day when the group set out. They needed to cover several miles before they made camp so they walked at a brisk pace. The leader of the group Raheel kept checking his watch and their GPS location. Ifra Rauf and Madhia took turns carrying the equipment while Kamran took notes about the wildlife they saw. As a result no one noticed the darkening sky until the first drops of rain splattered on their faces.

Please have your report complete and filed by April 15 2010. In your submission letter please include your contact information the position you are applying for and two people we can contact as references. We will not be available for consultation after April 10 but you may contact the office if you have any questions. Thank you HR Department.

Colons
The colon (:) is a mark of anticipation and introduction that alerts readers to the close connection between the first statement and what follows. A colon is used to connect a list or series to a word, clause, or phrase with which it is in opposition.
Three topics will be discussed: the history of language, the origin of English, and the importance of grammar.

Do not, however, place a colon between a verb and its objects.

Three fluids that clean pipes are: water, acid, and acetone.
(Incorrect use)

One common exception is made when a verb is followed by a stacked list.

Corporations that manufacture computers include:
Apple   Compaq   Micron
IBM   Dell   Gateway

Do not use a colon between a preposition and its object.

I would like to be transferred to: Rawalpindi, Islamabad or Lahore. (Incorrect use)
A colon is used to link one statement to another statement that develops, explains, amplifies or illustrates the first.

Any organization is confronted with two separate, though related, information problems: It must maintain an effective internal communication system, and it must see that an effective external communication system is maintained.

A colon is used to link an appositive phrase to its related statement if more emphasis is needed and if the phrase comes at the end of the sentence.
There is only one thing that will satisfy Mr. Samar: our finished report.
Colons are used to link numbers that signify different nouns.
10: 50 a.m. [10 hours, 50 minutes]
In proportions, colons indicate the ratio of amounts to each other.
The cement is mixed with the water and sand at 7:5:14.
Colons are often used in mathematical ratios.
7:3 =14: x
The initial capital letter of a quotation is retained following a colon if the quoted material began with a capital letter.
The headmaster issued the following statement: "We are not concerned about the present. We are worried about the future."
A colon always goes outside quotation marks.
This was the real meaning of his "suggestion": the division must show a profit by the end of the year.

Activity
Insert colon where you think it is required. If no colon is required than write ok.
The potion contained fruit, biscuits and glue.
You have only one choice leave now while you can.
I can see only one thing the old lighthouse.
Many jobs interest me teaching, writing, editing, and social work.
He was a world class athlete a rowing champion

Semicolons

The Semicolon (;) links independent clauses or other sentence elements of equal weight and grammatical rank, especially phrases in a series that have commas in them. The semicolon indicates a greater pause between clauses than a comma, but not as great as a period.

When the independent clauses of a compound sentence are not joined by a comma and a conjunction, they are linked by a semicolon.

No one applied for the position; the job was too difficult.

Make sure however, that such clauses balance or contrast with each other. The relationship between two statements should be so clear that further explanation is not necessary.

The new Web page was very successful; every division reported increased online sales.

Do not use a semicolon between a dependent clause and its main clause. Remember that elements joined by semicolons must be of equal grammatical rank or weight.

Semicolons with Strong Connectives
In complicated sentences, a semicolon may be used before transitional words or phrases (that is, for example, namely) that introduce examples or further explanation.

The study group was aware of his position on the issue; that is, federal funds should not be used for the research project.

A semicolon should also be used before conjunctive adverbs (such as therefore, moreover, consequently, furthermore, indeed, in fact, however) that connect independent clauses.

I won't finish today; moreover, I doubt that I will finish this week.

The semicolon in the example shows that moreover belongs to the second clause.

Semicolons to Join Two Independent Clauses
Use a semicolon to combine two closely related independent clauses. Relying on a period to separate the related clauses into two shorter sentences could lead to choppy writing. Using a comma would create an awkward run-on sentence.

Correct: Be sure to wear clean, well-pressed clothes to the interview; appearances are important.

Choppy: Be sure to wear clean, well-pressed clothes to the interview. Appearances are important.

Incorrect: Be sure to wear clean, well-pressed clothes to the interview, appearances are important.

In this case, writing the independent clauses as two sentences separated by a period is correct. However, using a semicolon to combine the clauses can make your writing more interesting by creating a variety of sentence lengths and structures while preserving the flow of ideas.

Activity
Correct the following sentences by adding semicolons. If the sentence is correct as it is, write OK.

I did not notice that you were in the office I was behind the front desk all day.
Please close the blinds there is a glare on the screen.

Let's go for a walk the air is so refreshing.

Hopefully, the weather will change soon otherwise, the whole summer will go by without the sun shining.

It is raining outside I will bring my umbrella with me.

Exclamation Marks (!)
The exclamation mark indicates strong feeling. The most common use of an exclamation mark is after a word, phrase, clause, or sentence to indicate urgency, elation, or surprise.
Hurry!
Great!
Wow!

In technical writing, the exclamation mark is often used in cautions and warnings.
Notice!
Stop!
Danger!

An exclamation mark can be used after a whole sentence or an element of a sentence.

The subject of this meeting please note well! is our budget deficit.

Keep in mind that an exclamation mark cannot make an argument more convincing, lend force to a weak statement, or call attention to an intended irony.
An exclamation mark can be used after a title that is an exclamatory word, phrase, or sentence.

"Our International Perspective Must Change!" is an article by Richard Moody.
When used with quotation marks, the exclamation mark goes outside, unless what is quoted is an exclamation.

The manager yelled, "Get in here!" Then Bashir, according to Rashid, "jumped like a kangaroo"!

Dash (—)
A dash (—) is a punctuation mark used to set off information in a sentence for emphasis. You can enclose text between two dashes, or use just one dash. To create a dash in Microsoft Word, type two hyphens together. Do not put a space between dashes and text.

Arrive to the interview early—but not too early.

Any of the suits—except for the purple one—should be fine to wear

Hyphens
The hyphen (-) serves both to link and to separate words. The hyphen's most common linking function is to join compound words.
Able-bodied
Self-contained
Self-esteem

A hyphen is used to form compound numbers from twenty-one through ninety-nine and fractions when they are written out.
Forty-two
Three-quarters
Hyphens Used with Modifiers

Two-and three-word modifiers that express a single thought are hyphenated when they precede a noun.
It was a well-written report.
We need a clear-cut decision.

A hyphen is always used as part of a letter or number modifier.
5-cent
9-inch
A-frame
H-shaped

In a series of unit modifiers that all have the same term following the hyphen, the term following the hyphen need not be repeated throughout the series; for greater smoothness and brevity, use the term only at the end of the series
The third-, fourth-, and fifth-floor rooms were recently painted.

Hyphens Used with Prefixes and Suffixes
A hyphen is used with a prefix when the root word is a proper noun.
Pre-Columbian
Anti-American
Post-Newtonian

A hyphen may be used when the prefix ends and the root word begins with the same vowel.
Re-elect
Re-enter
Anti-inflammatory

A hyphen is used when ex- means "former."
Ex-president
Ex-spouse

A hyphen may be used to emphasize a prefix.
She was anti-everything.

The suffix -elect is hyphenated.
President-elect
Commissioner-elect
Other Uses of Hyphen

A hyphen can stand for to or through between letters and numbers.
pp. 44-46
The Lahore-Peshawar Motorway
A-L and M-Z
Hyphens also are used to divide words at the end of a line.

Parentheses ( )
Parentheses ( ) are most often used to identify material that acts as an aside or that is secondary to the main information (such as this brief comment) or to add incidental information.

Other punctuation marks used alongside parentheses need to take into account their context. If the parentheses enclose a full sentence beginning with a capital letter, then the end punctuation for the sentence falls inside the parentheses. For example:

Typically, suppliers specify air to cloth ratios of 6:1 or higher. (However, ratios of 4:1 should be used for applications involving silica or feldspathic minerals.)

If the parentheses indicate a citation at the end of a sentence, then the sentence's end punctuation comes after the parentheses are closed:
In a study comparing three different building types, repairable dust concentrations were significantly lower in the open-structure building (Hugh et al., 2005).

Finally, if the parentheses appear in the midst of a sentence (as in this example), then any necessary punctuation (such as the comma that appeared just a few words ago) is delayed until the parentheses are closed.

Remember, parentheses always appear in pairs. If you open a parenthesis, you need another to close it.

Activity

Clarify the following sentences by adding parentheses. If the sentence is clear as it is, write ok.

I was able to solve the puzzle after taking a few moments to think about it. Please complete the questionnaire at the end of this letter.'

If the green light does not come on See instruction booklet try the steps again. Has anyone besides me read the assignment?

Please be sure to circle not underline the correct answers.

Question Marks (?)

The question mark has several uses. Use a question mark to end a sentence that is a direct question.

- Where did you put the specifications?
- Never use a mark to end a sentence that is an indirect question.
- He asked me whether I had finished my report this week.
- Use a question mark to end a statement that has an interrogative meaning (a statement that is declarative in form but asks a question).
- The laboratory report is finished?
- When a directive is phrased as a question, a question mark is usually not used. However, a request (to a customer or a superior, for instance) almost always requires a question mark.
- Will you make sure that the machinery is operational by August 15? [Directive]
- Will you email me if your entire shipment does not arrive by June 10? [Request]
- Question marks may follow a series of separate items within an interrogative sentence.
- Do you remember the date of the contract? Its terms? Whether you signed it?
- When used with quotations, the placement of the question mark is important. When the writer is asking a question, the question mark belongs outside the quotation marks.
- Did she say, "I don't think the project should continue"?
- If the quotation itself is a question, the quotation mark goes inside the quotation marks.
- She asked, "When will we go?"

Activity

Are the following sentences declarative or indirect sentences? Which need a question mark at the end?
Jasmine wondered where her keys were
Can you pass the butter?
Is anyone here?
She asked how you were doing
Why won't you admit I'm right?
Quotation marks (" ")
Quotation marks (" ") set off a group of words from the rest of the text. Use quotation marks to indicate direct quotations of another person's words or to indicate a title. Quotation marks always appear in pairs.

Direct Quotations

A direct quotation is an exact account of what someone said or wrote. To include a direct quotation in your writing, enclose the words in quotation marks. An indirect quotation is a restatement of what someone said or wrote. An indirect quotation does not use the person's exact words. You do not need to use quotation marks for indirect quotations.

Direct quotation: Kamran said, "I'm not ever going back there again."
Indirect quotation: Kamran said that she would never go back there.

Punctuating Direct Quotations
Quotation marks show readers another person's exact words. Often, you will want to identify who is speaking. You can do this at the beginning, middle, or end of the quote. Notice the use of commas and capitalized words.

Beginning: Madhia said, "Let's stop at the farmers market to buy some fresh vegetables for dinner."

Middle: "Let's stop at the farmers market," Madhia said, "to buy some fresh vegetables for dinner."

End: "Let's stop at the farmers market to buy some fresh vegetables for dinner," Madhia said.

Speaker not identified: "Let's stop at the farmers market to buy some fresh vegetables for dinner."

Always capitalize the first letter of a quote even if it is not the beginning of the sentence. When using identifying words in the middle of the quote, the beginning of the second part of the quote does not need to be capitalized.

Use commas between identifying words and quotes. Quotation marks must be placed after commas and periods. Place quotation marks after question marks and exclamation points only if the question or exclamation is part of the quoted text.
Question is part of quoted text: The new employee asked, "When is lunch?"

Question is not part of quoted text: Did you hear her say you were "the next Picasso"?

Exclamation is part of quoted text: My supervisor beamed, "Thanks for all of your hard work!"

Exclamation is not part of quoted text: He said I "single-handedly saved the company thousands of dollars"!

Quotations within Quotations
Use single quotation marks (' ') to show a quotation within in a quotation.
Theresa said, "I wanted to take my dog to the festival, but the man at the gate said, 'No dogs allowed.'"
"When you say, 'I can't help it, what exactly does that mean?"
"The instructions say, 'Tighten the screws one at a time.'"

Titles
Use quotation marks around titles of short works of writing, such as essays, songs, poems, short stories, and chapters in books. Usually, titles of longer works, such as books, magazines, albums, newspapers, and novels, are italicized.
"Annabelle Lee" is one of my favorite romantic poems.
The New York Times has been in publication since 1851.

Activity
Correct the following sentenced by adding quotation marks where necessary. If it is not required write ok.
Yasmin said, I don't feel like cooking. Let's go out to eat.
Where should we go to eat? Asked Rashid.

Yasmeen said it didn't matter.

I know, said Rashid, let's go to the ABC restaurant.

He said "I'll never forget you." It was the best moment of my life.

Activity

Each sentence contains a punctuation error. Correct each sentence by adding the correct punctuation. The headings will let you know which type of punctuation mistakes to look for. If the sentence does not need corrections, write OK.

Commas

a. The wedding will be July 13 2012.
b. The date by the way is the anniversary of the day that they met.
c. The groom the bride and their parents are all planning the event.
d. Actually all of their friends and relatives are involved in the planning.
e. The bride is a baker so she will be making the wedding cake herself.
f. The photography the catering and the music will all be friends.

Semicolons

a. Some people spend a lot of money hiring people for wedding services they are lucky to have such talented friends.
b. The flowers will be either roses, daisies, and snapdragons orchids, tulips, and irises or peonies and lilies.

Colons

a. There will be three colors for the wedding: white, black, and gold.
b. They've finally narrowed down the dinner choices salmon, steak, and a vegan stew.
c. Their wedding invitations contained the following quote from the Roman poet Ovid If you want to be loved, be lovable.

Quotes

a. The invitations said that the wedding would be "outdoor casual."
b. "What exactly does 'outdoor casual' mean?" I asked the bride.
c. She told me to dress comfortably and wear shoes that do not sink into the ground.

Apostrophes

a. On the day of the wedding, were going to rent a limo.
b. My brother's wife will make the arrangements.
c. She's a great party organizer.

Parentheses

a. On the day of the wedding, the bride looked more beautiful than ever and I've known her for fifteen years.
b. All the details were perfect in my opinion.

Dashes
a. Everyone danced at the wedding except my mother.
b. It was to be expected she just had hip surgery.

Hyphens
a. The groom danced with his new mother in law.
b. It was a spectacular, fun filled day for everyone.

Activity

Each sentence contains a punctuation error. Correct each sentence by adding commas, semicolons, colons, apostrophes, parentheses, hyphens, and dashes as needed.
a. My mother's garden is full of beautiful flowers.
b. She has carefully planted several species of rose's peonies and irises.
c. She is especially proud of her thirty year old Japanese maple tree.
d. I am especially proud of the sunflowers I planted them!
e. You should see the birds that are attracted to the garden hummingbirds, finches, robins, and sparrows.
f. I like to watch the hummingbirds they are my favorite.
g. We spend a lot of time in the garden planting weeding and just enjoying the view.
h. Each flower has its own personality some seem shy and others seem bold.
i. Aren't gardens wonderful?
j. You should come visit sometime Do you like to garden?

Abbreviations
Use abbreviations only for long words or combinations of words that must be used more than once in a report. For example, if words such as Rahreheit or phrases such as pounds per square inch must be used several times in a report, abbreviate them to save space. Several rules for abbreviating follow (Chicago).
1. If an abbreviation might confuse your reader, use it and the complete phrase the first time.
    This paper will discuss materials planning requirements (MPR)
2. Use all capital letters (no periods, no space between letters or symbols) for acronyms.
    NASA   NAFTA   COBOL   HUD PAC
3. Capitalize just the first letter of abbreviations for titles and companies; the abbreviation follows with a period.
    PRES   CO
4. Form the plural of an abbreviation by adding just s.
    BOMS   VCRS   CRTS
5. Omit the period after abbreviations of units of measurement. Exception use in. for inch.
6. Use periods with Latin abbreviations.
    e.g. (For example)   i.e. (That is)   etc. (and so forth)

7. Use abbreviations (and symbols) when necessary to save space on visuals, but define difficult ones in the legend, a footnote, or the text.
8. Do not capitalize abbreviations of measurements.
   10 Ib   12m   14g   16cm
9. Do not abbreviate units of measurement preceded by approximations.
   Several pounds per square inch 15psi
10. Do not abbreviate short words such as acre or ton. In tables, abbreviate units of length, area, volume, and capacity.

Capitalization
The conventional rules of capitalization apply to technical writing. The trend in industry is away from overcapitalization.
1. Capitalize a title that immediately precedes a name.
   Senior project manager Jones
   But do not capitalize it if it is generic.
   The senior project manager reviewed the report.
2. Capitalize proper nouns and adjectives.
   Asia   American   French
3. Capitalize trade names, but not the product.
   Apple computers   Clean all window cleaner
4. Capitalize titles of courses and departments and the titles of majors that refer to a specific degree program.
   The first statistics course I took was statistics 1.
   I majored in plant Engineering and have applied for several plant engineering positions.
5. Do not capitalize after a colon.
   The chair has four parts: legs, seat, arms, and back.
   I recommend the XYZ lathe: it is the best machine for the price.

Capitalization

The following rules cover most situations, but when in doubt whether to use a numeral or a word, remember that the trend in report writing is toward using numerals.
1. Spell out numbers below 10; use figures for 10 and above.
   Four cycles   1835 members
2. Spell out numbers that begin sentences.
   Thirty employees received safety commendations.
3. If a series contains numbers above and below 10, use numerals for all of them.
   The floor plan has 2 aisles and 14 workstations.
4. Use numerals for numbers that accompany units of measurement and time.
   1 gram   0.452 minute
   7 yards   6 kilometers

5.	In compound-number adjectives, spell out the first one or the shorter one to avoid confusion.
	75 twelve-volt batteries
6.	Use figures to record specific measurements.
	He took readings of 7.0, 7.1, and 7.3
7.	Combine figures and words for extremely large round numbers.
	2 million miles
8.	For decimal fractions of less than 1, place a zero before the decimal oint.
	0.613
9.	Express plurals of figures by adding just s.
	21s 1990s
10.	Place the last two letters of the ordinal after fractions used as nouns:
	1/10th of a second
	But not after fractions that modify nouns:
	1/10th horsepower
11.	Spell our ordinals below 10.
	Fourth part eighth incident
12.	For 10 and above, use the number and the last two letters of the ordinal.
	11th week 52nd Contract

4.5 BIBLIOGRAPHY

Geever. J. C. & Foundation Center. (2012). The Foundation Center's Guide to Proposal Writing. New York: Foundation Center.

Goldstein. N. E. (1993). The Associated Press Stylebook and Libel Manual, The Associated Press, New York.

Guba & Lincolin (1989). Fourth Generation Evaluation. London: SAGE Publications.

Shertzer. M. (1986). The Elements of Grammar, Macmillan, New York.

Swales. J. M, & Feak, C.B. (2017). Academic Writing for Graduate Students: Essential Tasks and Skills. Ann Arbor: The University of Michigan Press.

Vincler. J. E, & N. H. Vincler. (1996). Engineering your Writing Success, Professional Publications, Inc. Belmont, CA.

Unit-05

TECHNICAL WRITING PROCESS

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CONTENTS

INTRODUCTION

Good technical writing takes discipline and strict adherence to a system. Much like technical knowledge and skill, writing follows an orderly sequence of events that lead to clear and concise technical prose. Whether you are designing circuits or writing instructions for a new computer program, technical writing is systematically structuring technical ideas on paper. There is no doubt that: to be a master in this process, keep in mind that it will vary in intricacy, and at times its separate parts will overlap. There is quite a difference between a complete operations manual and a brief technical memo. In the memo, you may only have to list the points that you need to make. On the other hand, the process may become extensive for the manual. In short this process will help you with your technical writing in much the same way that a map helps you get to your destination in the most direct and effective manner.

OBJECTIVES

After going through this unit, you will be able to:
1. Outline the formate
2. write the rough draft
3. revise the draft
4. organize and develop the writing
5. discuss before writing techniques.

5.1 THINK AND PREPARE BEFORE WRITE

This may seem necessary to mention that a technical writer should think and prepare before writing. An average technical writer does just the opposite of this sage advice. You live in an internationally competitive environment that demands action now. Technical reports, memos, and manuals do not escape this commercial pressure. You do not have the luxury of taking all the time you want to form a verbal masterpiece of research and discovery. The fact is that there is never enough time to write in the professional and commercial world without the nagging pressure of deadlines. So what do you do about it? Exactly what is it that you think about before you write? There are basically four areas to consider before you do anything:

- Establish your writing objective.
- Identify your readers.
- Determine the scope of your writing project.
- Perform the necessary research.
- Establish Writing Objective

Technical writing objectives fall into three broad categories: instructive technical procedures, descriptive technical information, and general conveyance of technical information for managerial purposes.

These three categories are not always separate and distinct. An operations manual for a computerized machining center will have a mix of both descriptive and instructive procedures. That same manual may or may not include general managerial information. A report describing a malfunction in an aircraft's instrument panel will certainly contain descriptive information and managerial information. The report will not have instructions on how to fly an aircraft.

Once the general objective is clear, you must develop it into a specific objective. It is all too common for writers to determine a general direction and go no further. This leads to vague writing that is unclear in its intent.

Write the objective out, and don't try to have it in your head and pull it up from your memory when you need to refer to it.

Write it out and examine it, and by doing this, you can see whether the objective fits the writing task. Don't stop with generalities. Make the objective specific.

Written out, this objective tells you in one sentence exactly where you are going with the writing. The following objective is too general:

To describe the effects of using sodium sulfite in film processing.

A better objective would be the following:

To show the effects on high-speed coarse-grained film processing when combining sodium sulfite with the three leading black-and-white film developers (name the three) on the commercial market.

5.2 IDENTIFY READERS

When you identify your readers, don't simply identify whether they are technical, managerial, or general (or a combination of these three). Regardless of what general category your readers fall into, you must specifically determine their levels of understanding.

5.3 READERS NEED

How deeply do you need to go into the subject? Is it an in-depth study or is it a relatively brief and simple memo-report? This determines the scope of the writing. It is not simply a matter of how much to write but what specifically to write about in terms of your readers' needs.

An operational staff studying a user's manual for operating mainframe computer system needs information on how to operate the computer and what it will do for them. They don't need to know how it is programmed or how to service the system.

5.4 READERS KNOWLEDGE

Is this about an ongoing project in which everyone is involved, or is it a new project about which your readers know little or nothing? How much background information can you take for granted that they already know?

In the instance of a user's manual for a mainframe computer, we must assume that the readers know next to nothing about how to operate the system. If, however, the manual is for programmers working on the system, we can take for granted that they understand the computer languages such as COBOL or FORTRAN. By contrast, the user does not need to know programming language to operate the system.

5.5 USE OF JARGON

Engineers who work in cellular communication understand "hand-off" very differently than a football coach understands "hand-off." If the communication is a field report directed to the engineering manager, the jargon will be understood. If, however, the football coach just bought a new earphone and read this term in the instruction manuals, it would not be understood. Jargon is a great shortcut only when it is understood.

Remember that jargon is exclusive language, understood only by a narrow margin of readers. This does not necessarily make jargon bad, but it does make it risky if your reader is not in that narrow margin of understanding. You must know and understand your readers to effectively use jargon. If you cannot discern this about your reader's understanding, replace the jargon with commonly understood and defined statements. For example, consider the following sentence:
As yet, there are still several glitches in the software.

If the underlined jargon is replaced, the sentence reads as follows:
As yet, the software is still giving out several wrong responses.
People involved in the computer software industry would talk in terms of "glitches" and not in lay terms of "wrong responses." Jargon affords a shortcut if understood, but to the general or lay reader more common words will be needed.
Short reports and memos that are directed to a small group of readers within a department of a computer company would most likely have little problem with jargon such as "boot up," "de-bug," "glitch," "I/O," "ports," or "bus." The owner of a new PC (personal computer) is more than likely to struggle with these terms if they are used throughout the user's manual.

5.6 USE OF TERMINOLOGY

Jargon and technical terminology overlap each other. Jargon can be replaced with common language and definition, but technical terminology must be defined. You must, however, be careful to define technical terms based on your readers' level of understanding. General readers will need to have most or all technical terms defined at least once. Graduate engineers, on the other hand, may not need to have any of the terms defined if they are within their area of expertise.

Are Your Primary Readers Technical?

If technical readers are your audience, are they primarily theorists or are they technicians? If they are theorists, are you addressing their needs at the theoretical, scientific level? On the other hand, if your readers are primarily technicians at the practical level, are you addressing their needs from an applied, practical standpoint?

Are Your Primary Readers Managerial?

Managerial readers need a far more general approach that deals with the essence of a project and the managerial circumstances surrounding it. At what level of managerial authority are your readers? Are there a number of different levels of line authority involved as well as technical and nontechnical levels? If so, you must write at the level most common to your readers.

Are Your Readers Primarily General-interest Readers?

General-interest readers are the most difficult to identify specifically, because they can span so many different levels of technical understanding. This is especially true of manuals directed toward customers of technical products. When it comes to customers, you cannot take anything for granted. You must write to the level that is your best estimation of the lowest common denominator of technical understanding and expertise.

5.7 DETERMINE THE SCOPE OF THE WRITING

You must know how deeply to go into your subject before you start writing. This depth or amount of detail is known as the scope of the piece of writing. You must determine this in the early planning stages of the writing.

Your writing objective and mix of readers will determine the depth and detail you must use. The scope varies a great deal depending on your judgment and the specific task at hand. Consequently, it is imperative that you be as exact and specific with your objective and reader profile as possible. By determining the scope of your writing project, you set the stage for research.

Research
Research is the process of gathering factual information. In the academic world, research is primarily done at the campus. In the professional world, it is primarily

a matter of calling upon experience and experimentation. These generally reflect primary research and secondary research.

Primary research is research you do yourself. If you take a trip to troubleshoot a series of manufacturing sites and draw conclusions, you have done primary research. If you put together a questionnaire and send it out and then receive replies, you have done primary research. If you do original scientific experiments and discover some new facts, you have done primary research.
The following are typical examples of primary research:
- Experiments
- Mail questionnaires
- Personal interviews
- Telephone interviews
- Personal observation/experience

Primary research is the most common type of research done in professional scientific and industrial settings.

Secondary research is research someone has done before you. If you go to the library and find information in the resource books, you are doing secondary research. If you refer to something that you read in Scientific American, you are doing secondary research. If you saw it in The Wall Street Journal, you are using secondary research. The following are typical examples of secondary research:
- Books
- Periodicals
- Newspapers
- Government documents
- Industrial and trade directories
- Published results of experiments

Secondary research is the most common type of research done at the academic level.

5.8 ORGANIZING AND DEVELOPING YOUR WRITING

Understandable writing must be organized and then developed. Technical writing that rambles on without a clear destination will fail. You must have a purpose that is quickly discernible to the reader. This is why organizing your concepts and then working them into a method of development are so important. Technical writing

must have an obvious structure. Where this structure becomes most pronounced is in instructional procedures. Instructions must be performed in a definite sequence to be effective. Instructions for building a house that start with the roof and work down to the foundation will cause the carpenters and bricklayers grave problems. When you organize your writing, you work it into a method of development that will best serve your writing objective and your mix of readers. There are many ways to develop technical writing. The following methods of development are common in contemporary technical writing.

5.9 GENERAL TO SPECIFIC DEVELOPMENT

This form of development takes a general statement, concept, or position and then moves toward the specific elements that support this general position. These are a typical example of general to specific development in technical writing.

Relative humidity is the percentage of moisture in the air compared to its maximum capability to hold moisture under the same, conditions. Seventy degree air can hold more than 12 times as much moisture as 10 degree air. Outside air at 10 degrees and 70, percent relative humidity drops to 7 percent relative humidity when heated to normal room temperature without other internal, sources of moisture, such as cooking, laundry, showers, etc.

That's only a fraction of the humidity recommended for the average heated home, and it's this "desert dryness" that makes you, feels uncomfortable and takes moisture from your home, furnishings even you and your family. The recommended indoor, relative humidity is 35 percent and up to 45 percent in warmer climates or where special construction prevails and not all, humidifiers have the capacity to reach these levels. (General)

Doctors often times have mentioned dry air as one of the causes for nose, throat, and other physical aggravations. Heated air dries out and shrinks wood framing around doors and window frames. Gaps occur, permitting cold outside air, infiltration. Heat loss and higher heating costs are often the result. Heated, parched air causes separation of wood in floors, trim, and furniture excessive wear of fabrics and carpets loss of, piano tone quality ... wall and ceiling cracks plant damage and annoying static shocks are also a by-product of dry air. Proper humidity reduces heating costs by stopping wood shrinkage, which reduces cold air infiltration around door and, window frames. In turn, you'll feel warm at lower temperatures. You can actually dial down your thermostat and still be comfortable (Specific)

In cases where excessive dry air has been the cause of physical aggravations, doctors have prescribed whole-house humidification. (Specific)

Furnishings are protected with proper humidity too reducing the damaging effects of heated, parched air upon everything from your wood floors to your plants. Specific

5.10 SPECIFIC TO GENERAL DEVELOPMENT

This form of development takes specific statements, concepts, or positions and combines them to form a whole. This is the opposite direction of general to specific in that the specifics are combined to come out with the general conclusion Following are typical example of the specific to general form of development in technical writing.

The paint spray booth is an important element of the finishing operation. If properly engineered and installed and efficiently Specific.

Maintained, the booth provides an efficient and safe working environment for the operators. It does this by drawing particulate and vapors away from the painter. The exhaust also keeps overspray away from products already finished, assuring better finish quality.

Changes in chemical coatings and their method of application often result in significant modification of the spray booth and the Specific overspray collection system. Many of the new coating materials are more expensive. The equipment to apply these coatings is more sophisticated. Industry is looking for methods to apply the coatings with maximum transfer efficiency.

Spray booth designs and overspray collection are being closely scrutinized by government regulatory agencies such as OSHA and EPA and city, county, and state regulatory bodies. The selection and installation of a spray booth must be undertaken with the approval of the appropriate agencies. (Specific)

Four out of five new booths sold today are equipped with dry filters as the means of collecting overspray. As the industry moves more and more to high-solids coatings, water-borne coatings, and powder coatings, while the coating application method puts more of the coating onto the product, the use of dry-filter overspray-collection systems should continue to increase. (General)

5.11 CHRONOLOGICAL DEVELOPMENT

Chronological development is based on time. Events or procedures are normally shown in terms of their occurrence. The time sequence normally reflects past-present-future or future-present-past. Remember that this type of development is only effective if the time sequence is the most important element.

This type of development is used often in the highly theoretical and scientific fields where historically documenting the development or progress of technology is concerned. In the following example major technological advancements during the Middle Ages are put into historical perspective by using a chronological pattern of development.

Significant Advances in Technology in the Middle Ages
1. A.D. 1000 to 1100:
   Astrolabe and lanteen sail
   Stamping and hammer mills
   Gunpowder used in warfare
   Movable type in printing
2. A.D. 1100 to 1200
   Sternpost rudder replaces steering oar
   Papermaking
   Woodcuts used for initial letters
   Manufacture of silk
3. A.D. 1200 to 1300:
   Introduction of "cog" cargo vessel
   English longbow
   Spectacles
   Wheelbarrow
   Distilling techniques
   Minting gold coins
   Coal mining
4. A.D. 1300 to 1400:
   Wind-driven tower mills
   Sluices, locks, and weirs
   Steel crossbow, artillery, plate armor
   Silk mills
5. A.D. 1400 to 1500:
   Development of military technology
   Development of navigational technology

Efficient clocks developed
Gutenberg applies movable type
Sequential Development

This is a method of development in which the order of events determines the structure of the writing. The order or sequence will depend on what criteria are used to set up the sequence. Order of importance or necessity is two likely sequences. Process descriptions and technical instructions are the most common types of writing to use this type of development. The following example shows the sequential order of development for processing a photographic print. The sequence is absolutely necessary for the process to work.

The Process of Making Photographic Enlargements
In darkness or "safe" light, a sheet of photographic print paper is removed from a light-safe container and placed under the enlarger (a type of vertical projector).
In darkness or "safe" light, the image is enlarged and exposed onto the print paper with the enlarger.

In darkness or "safe" light, the exposed print is submerged in developer until the positive image appears.

In darkness or "safe" light, the print is next submerged in stop bath briefly to stop the development action on the emulsion.

In darkness or "safe" light, the print is next submerged in fixer solution to chemically make the image permanent and light "safe."

In complete light, the print is rinsed under running water to remove excess fixer. The print is dried off.

Cause and Effect

This is a method of development that emphasizes a process in which one element causes the next. It does not matter whether you start with the cause and move to the effect or, conversely, start with the effect and explain it with the cause. You can also approach this method from a single cause and a single effect to any combination and number of causes and effects.

Highly scientific and highly technical experiments and processes usually depend on this type of development for explanation and definition. The following example uses cause and effect to explain a scientific principle.

The Doppler Effect

The Doppler Effect was discovered by and named after Christian Doppler in 1842. It states that apparent changes in wave frequency take place relative to the motion of the wave source and observer. [Cause]

Sound is a familiar and typical wave source subject to the Doppler Effect. If you are standing at a railroad crossing and an approaching train sounds its horn at a constant rate as it passes you, the pitch of the horn rises as the train approaches and descends after it passes. The sound of the horn changes from your vantage point but remains constant in pitch from the vantage point of a person in the train. [Effect]

Light is also a wave source and subject to the Doppler effect. It is through this effect that the movement of distant stars can be approximated. If a star is moving toward the earth, there is a shift in the color spectrum toward blue. If the star is moving away from the earth, there is a shift in the color spectrum toward red. These changes in the color spectrum are the results of the Doppler effect on light waves. [Effect]

Comparison

This method of development shows how things are alike as well as different from each other. It is especially useful in explaining unfamiliar concepts by comparing the new concept to a familiar one. In other cases, it may be a simple matter of presenting various types of objects or processes and comparing their characteristics.

Remember first that you must have a basis for comparison. This basis can be anything from cost to strength to reliability. A basis of comparison could also be a combination of things such as cost versus reliability. The following example compares a wing nut to a hexagonal nut. Both are a part of everyday mechanical fasteners, but they are strikingly different in their application.

The Hexagonal Nut Compared to the Wing Nut

A wing nut has "wings" or handles on the sides that can be gripped by hand to tighten or loosen.

A hexagonal nut has six flat sides forming a hexagonal shape that can be gripped with pliers or a wrench.

A wing nut goes on screws that are in the open and that can be easily grasped with the hands. Wing nuts need a lot of room for clearance of the wings and the hands turning them.

A hexagonal nut can go on screws within the tight confines of machinery or other applications where economy of space is needed.

A wing nut can only be tightened to the amount of torque that the human hand can perform.

A hexagonal nut can be tightened to a high degree of torque delivered with such tools as pliers, wrenches, or pneumatic tools.

Wing nuts are best suited to applications where the nut is frequently loosened and tightened by hand.

Hexagonal nuts are best suited to applications that require a high degree of torque and an economy of space.

5.12 SPATIAL DEVELOPMENT

This development method relates to the position and space that physical elements occupy. This type of development is crucial in the description of mechanisms and how their parts interrelate and operate. It is also an integral element of buildings and machines with their relative layout and physical proximities to one another. Exhibit 23 shows the design elements of three types paint spray booths. Notice that the explanation of each type of booth depends on a spatial development of the design description.

The Outline

The Value of Outlining

An outline has much the same use to the technical writer that a map has to the serious traveler. You would not start to drive Bangor to Los Angeles without giving a lot of consideration to the route.

5.13 SPATIAL DEVELOPMENT IN TECHNICAL WRITING

Like the serious traveler, the serious technical writer also requires a map. You also need a route in order to get where you are going in your writing. The route you take is your method of development. The actual physical map that you will use is your outline. Both are absolutely crucial to success as a technical writer. Like a map, your outline will help you in a number of different ways. Consider the following ways that an outline helps a writer:
- It forces parallel structure of your ideas.
- It allows for easy evaluation of your organization and development.
- It shows you completeness.
- It saves you time.

Outlining Forces Parallel Structure Of Your Ideas.

When you write an outline, you set your method of development down in a parallel structure. The very act of outlining forces this. This simply means that ideas of equal importance get equal emphasis. Ideas of lesser importance are always subordinate to some idea of greater importance and related to that idea.

Consider the following example:
- First Main Idea
- First subtopic subordinate to I
- Second subtopic subordinate to I
- Second Main Idea

In this example, there are four elements. All are parallel, and two are subordinate. The first main idea and the second main idea (I and II) are parallel. They will receive equal emphasis and are of equal importance. The second main idea is not subordinate to the first main idea, however. They are both designated with a Roman numeral and are flush with each other in the column, which indicates a

parallel set of ideas. The fact that "I" precedes "II" simply means that based on the organizational method the idea in "I" should come before the idea in "II." They are both equally important and receive equal emphasis.

Also parallel are "A" and "B." These two subtopics are also subordinate to "I." This simply means that like "I" and "II," they will receive equal emphasis and importance in the writing, and they both depend on and relate directly to "I."

Outlining Allows For Easy Evaluation Of Your Organization And Development. This aspect of outlining has a dual advantage. Not only can you evaluate your approach to your writing assignment, but anyone who must pass approval on the writing project can give preliminary approval. This has tremendous value in speeding up the process of revising, correcting, and rewriting. If you look at the previous example, you can tell at a glance where everything is situated logically. If, while looking over an outline, you notice a violation of logic or fact, you can make the change far easier and faster than trying to pick it out of the finished text.

Outlining Shows You Completeness

There is nothing worse than trying to write something and getting to the end of it only to realize that you have left something out. Even though word processing allows you to move or add copy to other locations, you still must rework transitions and make sure that what you had to move or add fits smoothly. Outlining allows you to do this quickly and easily, because you have not yet written anything at this stage. You can spot the problem quickly and make the addition or deletion easily.

Outlining Saves You Time

This is probably the greatest value in outlining and, ironically, the most overlooked. Most who neglect outlining do so in order to save time. The fact is that they actually cause themselves more undue and time-consuming rewriting. Writers who outline as a regular, systematic procedure save themselves time because the outline will point out defects clearly and allow their repair long before they are in final prose. After all, if you don't have time to do it right the first time, you most certainly don't have time to do it over again. By not taking the time to write an outline, you probably are causing yourself the inconvenience and aggravation of time-consuming rewrites.

Outline Formats

When you format technical writing, you are deciding on the actual physical form and appearance that it will have on paper. There are basically three ways to format an outline. However, there are probably an infinite number of combinations of these three. What is important is getting some kind of a physical outline down on paper to use as a guide for your writing. You can't outline something in your mind. You must write it down on paper and follow it as you write. The three basic types of outline are as follows:

- Simple list
- Academic outline
- Engineering outline Simple List

This is the simplest form of outlining. It will suffice for all brief and simple written communications, such as memos and brief letters. Even though these types of writing seem as simple as to not require outlining, it is amazing to find out how often the simple memo has left out needed information such as time, place, or someone's name. This is why even these simple and brief messages should be outlined at least in a simple list form.

The greatest advantages of a list are speed and simplicity. It is an outline that you can write simply and quickly for a routine message. Its main disadvantage is that it does not allow for complex ideas. Be careful not to use this for any writing that requires more than a simple parallel structure. Consider the following example of the listing technique:

Memorandum
Announce meeting at 2:00 P.M.
Have section heads bring weekly reports.
Mention change in travel policy.
This list is for a very simple memo. It allows the writer to see the order and the content of the three points to be written in the memo.

Academic Outline
An academic outline is one of two types of formal outline formats. This particular type is called "academic" mainly because it is the kind of outline format most commonly taught in high schools and colleges. It uses a combination of Roman numerals, Arabic numerals, and uppercase and lowercase English letters.

This format has the advantage of distinctly separating the various parallel structures in the outline. The structures are easily separated because the Roman numerals, letters, and Arabic numbers are distinct. You can see the divisions at a glance. The only disadvantage is that if you go beyond a fourth level of parallel subordination, you must either repeat a symbol previously used or make up a new one. The following is the format of a typical academic outline:

Main Heading
- First subtopic under main heading
- Second subtopic under main heading
- First subtopic under B
- Second subtopic under B
- First subtopic under 2
- Second subtopic under 2
- Main Heading
- Engineering Outline

The engineering outline is also frequently referred to as a decimal outline because of the decimal points that separate each entry. This can be a little misleading, however, because the decimal points do not actually refer to any fractional element in the mathematical sense. Consequently, the term engineering is more appropriate. It is called an engineering outline because of its almost exclusive use in the scientific and engineering communities.

This outline format has the advantage of being able to go to any level of complexity of detail without repeating symbols. Because of the meticulous detail many engineering and scientific reports need, this advantage is a real one. Another advantage is the immediate ability to number all levels of the actual prose in accordance with the outline. In many high-tech companies, even the paragraphs in a technical manual or report are numbered (as in this text). In each case a reference to the paragraph number will take you directly to the same point in the outline and research documentation.

Consider the following example of a typical engineering outline:

The Three Basic Outline Styles
There are three styles of outline, and each has its distinct advantages and disadvantages. The divisions are based on how closely you need to approximate your actual prose before writing the draft. These three styles are as follows:

- Topical outline
- Sentence outline
- Paragraph outline

Topical Outline

A topical outline uses only topic headings or short phrases for each outline entry. Because it is quickly written and easy to use, it is the choice for brief and fairly straightforward types of writing such as memos, letters, and short memo-reports. By outlining in brief topic form, you have very little problem with adding, deleting, or moving topics to other locations in the paper.

The disadvantage with this type of outline is that it is not detailed. If this type is used for a large and detailed communication, you will not remember all of the details concerned with each topic entry. You must then constantly refer back to notes or your memory.

Sentence Outline

A sentence outline has each entry in the form of a complete sentence. The discipline of a complete sentence forces you to think in greater detail about the outline entry. The obvious advantage is that greater detail makes for easier memory of detail when you write the draft.

The disadvantage with this type of outline is that you may be tempted to string the outline sentences together into a choppy prose and call that the written report. You must do more than string skeletal sentences together to create interesting and informative writing. This will be explained in detail in Section 2.4 on writing the rough draft.

Paragraph Outline

The paragraph outline has all the main entries summarized with a complete paragraph. All subordinate entries are then structured as complete sentences. This type of outline is the most complete and comprehensive approach to technical writing you can take. You may choose to use paragraph outlines when it comes to extensive and detailed writings of considerable length such as full manuals and extensive project completion reports.

The major advantage of a paragraph outline is its capacity for detail and completeness. This outline leaves little or nothing to memory later on. It will lead you through your draft with more ease than any other type of outline.

Its primary disadvantage is the time-consuming detail of the writing. You can't write this outline in a hurry and then fire off the piece of writing just in time to meet a deadline. This approach to outlining and writing takes a timely and disciplined approach. It shares the disadvantage of the sentence outline in that you still must write a draft to create readable prose.

The Rough Draft

The first draft you write is the rough draft. This is the only draft that you write without the help of revision. This draft comes out of your head with only the help of your outline. Any other draft has the benefit of at least partial revision of the actual prose.

How to Write a Rough Draft

If this draft turns out any other way than rough, you did it wrong. This is the one time you do not clutter your mind with the mechanical elements of technical writing. The only thing you are striving to do at this point is to turn the outline into prose. To do this, you take everything in your head concerning each outline point and put it on paper in rough form. Just get it down. That is your only concern.

Speed is essential. Don't labor over the writing. Don't wait for "inspiration." Start putting words on paper no matter how poorly written they may seem to you. The faster you write, the easier it is for your mind to quit worrying about how "good" or "bad" it may be.

Don't stop to correct. With the advent of PCs and word processing, it is especially tempting to move the cursor back and correct types and minor mistakes. This is the worst thing you can do, because it will bog down your thinking process. Remind yourself that this is the first draft and not the last draft. There will be ample time and other drafts for correction but not on this draft.

The Rough Draft Cures Writer's Block

The rough draft is the major cure for writer's block, because it gets you started writing, no matter what. People get writer's block because they don't know what to say or how to say it in writing. An outline shows you what you have to say. The rough draft shows you how to say it without worrying about how. You just do it.

If it isn't "good," don't worry. There is a place for revision and correction in the next step.

Do not show anyone your rough draft. Show them your outline or any subsequent drafts after the rough draft but not the rough draft. There is a very good reason for this. By absolutely not showing anyone your rough draft, you have the assurance that no one but you will ever know exactly how bad you write on your first effort. This has the effect of loosening up your mind and putting it at ease so it can just concentrate on getting the ideas into writing from the outline.

From time to time you will hear the expression creative writing. This expression is usually reserved for fiction and poetry. The fact is that all writing, including technical writing, is creative writing in the sense that no one says anything exactly like anyone else. When you write the rough draft, you are doing creative writing because no one will turn an outline into raw prose in exactly the same way as someone else. Once it is down on paper, it is exactly you. The only thing left for you to do is to correct it and shape it into good technical prose.

Revision

If you have carefully followed the system to this point, you are now ready to revise your writing. Revision is not simply a matter of correcting spelling errors and placing commas. Revision is a matter of converting your raw creative prose into flowing and readable writing.

Like so many other parts of the writing process, it too has a system. The system is basically made up of three parts:
- Activate the writing
- Clarify the writing
- Simplify the writing

These three steps will turn your technical writing into finished prose that flows with clarity and conciseness.

The order in which you perform the three will naturally vary from writer to writer. You must perform these three steps when you revise, and you should perform them in this order.

Activate the Language

Active, lively writing is at the core of interest and understanding. The central element to active written language is your use of verbs. In technical writing, your

verbs must show action and life. They must do things rather than simply skirt the issues and talk around things. Keep a lean and direct approach to your verb use. Always ask yourself whether there is direct action involved in your sentences. There are two main elements involved in activating language:

- Check active voice and passive voice.
- Activate suppressed verbs.
- Check Active Voice And Passive Voice

As mentioned earlier in this manual, the use of the active voice is the keystone of clear, concise technical writing. Your first editing concern must be for use of the active voice. As a general rule, you will find that most of your sentences will need to be converted from a passive voice construction to an active voice construction. When you edit for the active voice, don't concentrate on the content. Instead, read the sentences for their wording. If you have the wording and the verb form as primary to your interest, the active and passive constructions will seem to jump right out at you. Frequent use of the verb to be linked with participles of other verbs is a sure sign of the passive voice. In most cases these forms will be the passive voice and should be converted to the active voice.

Be ruthless about changing the passive voice to active voice. Remember that it is far easier to change a few active voice constructions back to the passive voice for variety than it is to keep trying to activate.

The following are some typical changes from passive to active:
- Stress is exerted by the load pushing down on the platform. [Passive]
- The load exerts stress on the platform by pushing down on it. [active]
- First, the electrical energy input of the motor must be figured. [passive]
- First you must figure the electrical energy input of the motor. [active]

Activate Suppressed Verbs

Suppressed (weak) verbs are constructions that have held the verb forms back from their most effective expression. This type of construction is usually suppressing the active voice, but not always. Depending on the context, it can also be a passive construction.

Word endings such as "-tion," "-ing," "-ent," and the use of prepositional phrases with verb forms are your best clues to suppressed verbs. These usages signal wordiness that is suppressing verbs from "acting" instead of "being."

The following are some typical suppressed verbs with the appropriate corrections:
Completion of the heat tests has been accomplished by the lab. [Completion is suppressed]

The lab has completed the heat tests. [Activated]

The fluorescent lighting is dependent on a dedicated generation system for its operation. [Operation is suppressed]

A dedicated generation system operates the fluorescent lighting system. [Activated]

Clarify the Writing

If your reader can't understand what you are writing, you've failed. When your writing is clear, your reader can go directly to your ideas and concepts without struggling with the writing.

To achieve this clarity, you should check some primary elements of your writing and correct them when needed. The order in which you check them is up to you, but you must specifically check for all of them. The revision elements that lead to clarity in writing are the following:
- Decide on personal versus impersonal reference.
- Use connotation and denotation.
- Determine whether jargon is helpful.
- Change abstract words to concrete words.
- Eliminate affected language.
- Replace clichés and trite language.
- Correct misplaced modifiers.

Decide On Personal Versus Impersonal Reference
Technical writing tends to lean toward impersonal reference far more than any other type of writing. There is almost a fear of ever using the pronouns you, I, or we. The taboo against first-person (I) and second-person (you) references in technical writing is old and difficult to overcome.

The roots of this preference for the impersonal reference to the actor seem to be in the emphasis on the technical findings, results, or experiments rather than on the performer of these actions. This preference does not hold up, however, when put

to the test of clarity and directness. A strict adherence to the impersonal approach in writing actually begs for passivity in verbs and lack of clarity because of the actor's obscurity.

When you switch from the traditional impersonal to the personal use of pronouns, you allow a much easier approach to clear, active writing. This use of the first- and second-person pronouns in no way hurts the writing other than to break with the traditional. Consider the following examples:
Impersonal passive: Tensile strength tests were made.
Personal active: We made the necessary tensile strength tests.

You as the writer must make the decision whether to use first-and second-person reference or to deal only in the impersonal. Realistically speaking, many organizations (perhaps your own) absolutely demand the impersonal. If this is the case, you can still write actively and clearly by simply altering your approach to the impersonal. In the following construction, the impersonal approach has been maintained but still activated into lively writing.

Impersonal but active: The necessary tensile strength tests showed that...

Use Connotation And Denotation

Words are the basic units of our written language. Words not only have basic meanings that are categorized in the dictionary, but they also have meanings based on the feelings they provoke. If you are considering the basic dictionary meaning of a word, you are dealing with its denotative meaning. If, however, you are primarily considering the feelings and emotions received from the use of a certain word, you are dealing with its connotative meaning.

In technical writing, the more you move toward connotation, the more risk you take that your meaning will not be clear. The difficulty is in the fact that no word is completely free of connotative meaning. As a result, careful choice of words becomes paramount to making your message clear. The following are examples of common words and their more connotative counterparts:

Waste   Junk
Miscellany   Odds And Ends
Things   Stuff
Offspring   Kids
Man   Guy
Woman   Gal
Compact   Smash

Determine Whether Jargon Is Helpful

Jargon is exclusive language and vocabulary. Every organization has its own sub-language or jargon. When a person first comes into a new job or organization, he or she must "learn the language." Jargon is exclusive because the language is coded to mean other than what it would seem to mean denotatively. Only the members of the group understand the actual meaning. As soon as the underlying meaning becomes known to a vast number of people, it is no longer jargon.

Jargon has an advantage and disadvantage, and both stem from its exclusivity. On the one hand, jargon is an abbreviated language that makes for quick and easy messages. When you use jargon in your written or spoken communication, you take a shortcut. You don't have to explain or elaborate on the concepts or their expression. The disadvantage to jargon is that only an exclusive few understand the meaning. If you are not extremely careful in evaluating your audience, you will write a message that is at best unclear and sometimes totally misunderstood.

The broader and more far-reaching the writing, the greater the risk you take with jargon. Jargon can be a helpful tool in a memo of limited circulation and exclusive readership. However, a manual loaded with jargon that is going out to a wide range of customers could be a disaster of misunderstanding. A prime example of this type of mistake was the early days of the personal computer boom. The wide market of buyers could not understand the jargon of the experts who were trying to sell the computers. The following are examples of common computer jargon:

Boot up   glitch
Bit   I/O
Byte   ports
Megs   CPU
ROM   RAM, ,

These terms are exclusive to the world of computers. You must be familiar with that world to understand them. A computer novice would need definitions of all of them.

Change Abstract Words To Concrete Words

Vague and abstract words obscure meaning in technical writing. They are words without precise meaning. Some of these words have such a broad meaning as to mean anything to anyone. Others are imprecise in the context of the writing in which they are used.

Make sure your technical writing is precise and concrete. The following examples show how abstract words can be replaced with concrete words:
The supports must be strong enough ... [abstract]
The supports must have a tensile strength of ... [concrete]
145 pieces of brass rod. [Abstract]
145 lengths of 3/8" OD brass rod each 24" long. [Concrete]

Eliminate Affected Language

Affected language uses complex and impressive vocabulary and sentence constructions that say little. It is writing that attempts to sound official, legal, or scientific. Affected language is a great enemy of clarity. In technical writing, it is most important to write to express ideas and thoughts rather than to impress your reader with your importance or position. One clue that writing is intended to impress rather than express is this affected language.

Consider the following typical examples of pompous, bombastic, and affected language:

Admonish	Warn
Altercation	Dispute
Anathema	Curse
Approximately	About
Ascertain	Find Out
Compunction	Regret
Contiguous	Touching
Convoluted	Twisted
Countermand	Cancel
Edification	Benefit
Elucidate	Make Clear
Expedite	Hurry Along
Facile	Easy
Innocuous	Harmless
Oblique	Indirect
Periphery	Outer Edge
Remuneration	Pay
Stringent	Strict
Subsequently	Later

Replace Clichés And Trite Language

Trite language that is riddled with clichés interferes with clarity and is irritating to your reader. Elongated forms of words, superficial use of foreign words, and idiomatic expressions all add to this enemy of clarity.

Consider the following examples and their corrections of typical clichés and trite forms of language:

At this point in time	presently
Consensus of opinion	consensus
During the course of	during
In the vast majority of cases	in most cases
On a weekly basis	weekly
Refer back to	refer to
Until such time as	until
Due to the fact that	due to/because

Correct Misplaced Modifiers

Gerunds, participles, and infinitives are all verbal's that are frequently used in phrases to add further information or meaning to sentences. The problem is when their placement in the sentence confuses rather than clarifies. When they are obvious, dangling modifiers can be amusing:

Jack and Jill found a dollar walking to the store. [We know who was actually walking to the store.]

The problem is that most dangling modifiers are not obvious and can create problems that are far from amusing. To solve the problem of a dangling modifier, simply stop it from "dangling." You do this by placing it nearest the element you want it to modify. Consider the following example:

The topic of the seminar was digital conversion of analogue systems at our Chicago branch.

The topic of the seminar at our Chicago branch was digital conversion of analogue systems

Either of these statements is plausible. Only the writer would know which of them is correct.

Simplify the Writing

There is a big difference between simplified writing and simpleminded writing. To simplify technical writing is not necessarily to condescend in your written approach. Your readers want to get to your ideas as easily as possible. They don't want to work any harder at it than they have to. Why should they? It stands to reason that wherever you can simplify, you make it easier for your reader.

The following elements are basic to the simplification process in revision:
- Keep down sentence length.
- Keep down word length.
- Eliminate needless words.

Simplify positive and negative constructions.
Watch out for the "It ... that" syndrome. Keep Down Sentence Length
Long sentences are hard to read. The longer the sentence, the more you limit your reader's ability to understand. The reason long sentences are difficult to read is that there is more for your reader to keep track of and assimilate in one complete thought. By the time your readers get to the end of a 30-word sentence, they will be lucky if they remember the beginning of the sentence.

Where this problem really begins to take its toll is in the complete piece made up of many sentences. If one sentence was all your readers had to keep track of, then maybe a 30 to 50-word sentence would not be such a disaster. For one thing, they could spend more time deciphering what that sentence is about. When the writing is clogged with sentence after sentence of inordinate length, it is then that the writing becomes more than readers are willing to digest.

Compound, complex, and compound-complex sentences contain many words and should be used sparingly. They have their place, but an overdose of them can take its toll on readers. Try to break these types of sentences into simple, declarative sentences. Longer and more complex sentences make for variety and sometimes are needed to adequately express a thought.

You will find that your first draft will have many long sentences. This is because your mind is blocking in prose thoughts and tends to cram a lot of information into one sentence. In the first draft your mind tends to write passively rather than actively and thus will produce long and tedious sentences. Vigorously break these long sentences down and rewrite them in simpler constructions.

116

At this point it would be reasonable to ask just what a long, short, or medium sentence is. The length of sentences has to do with average sentence length. It should be evident that some will be short and some will be long, but the average length should be readable. If you have nothing but short, 45-word sentences, the writing will be choppy. On the other hand, 3050-word sentences will bog your readers down. A good, readable length in technical writing falls in the range of 12 to 15 words per sentence.

Having been given this range, don't become dogmatic about it. This range is arbitrary and reflects a personal experience with technical articles and reports. Yours may vary from this. What is important is that in informational writing a declarative sentence is infinitely easier to understand than tomes of compound-complex, passive sentences. The following sentence is too long:

The total quantity of air (Cubic Feet of air per Minute or CFM) to be moved is governed by various local and state codes and if no local or state codes exist, the total quantity of air (CFM) to be exhausted from the hood shall be determined by one of the formulas that follow.

Consider the same sentence after it is broken down into shorter and more easily read sentences:

The total CFM (Cubic Feet of air movement per Minute) must usually conform to local or state code. If there is no code, you can figure the CFM by any one of the following formulas.

Keep Down Word Length
Like sentence length, word length plays an important role in the ease with which readers can get through the writing and into the concept. Word length here refers to the number of syllables rather than the number of letters in the word. Shorter words are one or two syllables; longer words are four or five syllables. Three syllables may or may not be long, depending on how common the word is.

It is here that technical writing presents a far more complicated issue than other types of writing. Technical writing always has a distinct vocabulary of technical terms for each specific technical discipline. The medical field has its own unique vocabulary compared with the vocabulary of mechanical engineering. It is important to remember that you can't dispense with technical terms. You may have to go to great lengths to make sure that they are understood, but you cannot get rid of them. What you can do is control the nontechnical vocabulary. It is in

117

these words that syllable length will make for either easy or difficult reading. It is in the nontechnical vocabulary that you must be careful to monitor word length and to choose common words.

The most blatant example in recent years is the verb "utilize." It is almost impossible to find an instance where the verb "use" won't work better.

Eliminate Needless Words

Get rid of needless words. In almost all cases, needless words are directly or indirectly redundant for the sake of impressiveness. Consider the following example and how the elimination of needless words has helped.

Shipping considerations will be easy because of the flexible nature of the materials.

Shipping will be easy because the materials are flexible.

Two particular problems with needless words crop up when you use of and when you use the. The problem is particularly difficult because neither is an optional word. When you use them correctly, they are absolutely necessary in the construction. When you use either of these two words unnecessarily, you complicate the writing.

Consider the following examples and their corrections using the words of and the:
All of the labs   all labs
Many of the engineers   many engineers
Some of the tests   some tests
The engineers at the test site   engineers at the test site

But always use the, however, if it is a specific reference such as the following:
She is the engineer who performed the initial tests.

Simplify Positive and Negative Constructions
Present positive statements and negative statements in their most simplified and direct construction. Technical writers tend to cause unnecessary complication due to the constructions they use. Making negative statements poses the greatest difficulty. For instance, don't use were not a success or did not succeed when failed makes the statement far more directly.

118

Consider the following examples of positive and negative statements and how they can be simplified to make direct, clear statements:
This project will not be delayed if the lab approves the latest series of tests.
This project will continue on schedule if the lab approves the latest series of tests.
Watch Out For the "It ... That" Syndrome

The "It ... that" construction is the number-one problem with technical writing's overemphasis of the impersonal approach. You can always simplify this tangled approach to language by activating the verb and shortening the statement. Be alert to sentences that start with such phrases as:
It has been shown that ...
It can be proven that ...
It is a known fact that ...

These typical phrases are clues to this impersonal and wordy construction. The following examples show how to correct it:
- It has been shown that the additive helps reduce frictional wear on parts.
- [The additive helps reduce frictional wear on parts.]
- It can be proven that the additive helps reduce frictional wear on parts.
- [Tests prove the additive helps reduce frictional wear on parts.]
- It is a known fact that the additive helps reduce frictional wear on parts.
- [Facts show the additive helps reduce frictional wear on parts.]

The Final Draft
The actual physical form of your technical writing influences your readers before they ever read the first word. There are five basic steps that you must always take to ensure the attractiveness and sense of professionalism your technical writing deserves:
- Allow for generous use of white space.
- Use topic heads often.
- Use listing.
- Use illustrations effectively.
- Include adequate appendixes.

5.14 CONCLUSION

Technical writing process helps in effective communication between writer and reader. For this purpose there is a need to create a document that is appropriate and helpful. Such document facilitates the audience to find that they need. They

are able to understand what they find. On the basis of that understanding they can use it properly. In order to achieve these objectives, one has to follow a process that has been discussed in this unit.

5.15 EXERCISE

Q.1   What is a technical writing process?
Q.2   Discuss before writing strategies
Q.3   How can you online the format?
Q.4   What is a rough draft? How can you revise the rough draft?

5.16 BIBLIOGRAPHY

Freeman, L. H., and Terry R. B. (1991). Writing Style Guide. Rev. ed. GM 1620. Warren, MI: General Motors.
Swales. J. M, & Feak, C.B. (2017). Academic Writing for Graduate Students: Essential Tasks and Skills. Ann Arbor: The University of Michigan Press.
Vincler. J. E, & N. H. Vincler. (1996). Engineering your Writing Success, Professional Publications, Inc. Belmont, CA.

Unit-06

TECHNICAL WRITINGS

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CONTENTS

INTRODUCTION

Technical Writing in English is to fulfill the needs of these who wish to develop technical writing abilities at processional level. It is a specific writing for specific audiences to cater these specific needs. It is the process of conveying technical information through writing of different types. In this unit you will leave about a number of technical genres, for instance, memos, reports, job letter, resume etc.

OBJECTIVES

After reading this unit you will be able to:
1.   Get familiar with the concept of memorandum
2.   Get the basics of reports
3.   Know the requirements of job application
4.   Design a resume

6.1 MEMORANDUM

A memorandum, commonly known as 'memo' is a note, document or other communication that helps the memory by recording events or observations on a topic. The memorandum is among the most versatile of organizational documents. From brief research reports and progress reports to trip reports and thumbnail proposals, the memo form is widely used to communicate technical and administrative information. Memorandums are written for numerous internal purposes for example, to request information, to make announcements, to outline policies, and to transmit meeting minutes. Thus, in most organizations, memos play a crucial role in establishing a record of decisions, requests, responsibilities, results, and concerns.

A memo (short for memorandum) is used only for communication within the organization. It may be from one person to another or to several persons. The purpose of a memo may be to:
• Ask for information
• Give information
• Request decision or action
• Convey information about action or decision

Memos have just two sections: the heading and the body. Many organizations use memo pads with pre-designed formats. The heading of the memo contains four points: To, From, Date and Subject.

6.1.1 To

This space is for the name of the person(s) to whom the memo is sent. Courtesy title (Mrs., Ms, Mr.) or professional title (Dr., Dean, etc.) may be omitted if the organization's policy and the relationship between the writer and the addressee allow it. When writing to persons of higher rank the title must always be included. For a formal memo, the addressee's full name must be used; for an informal one, the first name may suffice. If the addressee's name alone is not enough to identify the person, add the job title and/or department name after the name (for example, To: Rameez Ahmad, Accounts Office). If the memo is addressed to several persons, list their names alphabetically or in the order of their seniority in the organization. If many names are required, you can write "To: See Below" and list the names at the end of the message. If the group is too large to list all the members individually, an identifying classification, such as "Faculty and Staff" or "Process Engineers" is written after "To."

6.1.2 From

The writer's own name is written on this line. One's own name is always written without any courtesy title or professional title; it is not appropriate to use a courtesy/professional title with one's own name. If you think the addressee may not know you, add your job title and/or department name.

A memo need not be signed but if you choose to sign it to personalize it or to indicate authorization put your initials below or above or to the right of your typewritten name. Since different organizations have different practices, follow your organization's practice. A memo is always official even if it is not signed.

6.1.3 Date

Write the full name of the month or its standard abbreviation but do not write a number for the month; since practices vary with regard to writing the day or the month first, a date written in numerals can cause confusion; 2/4/2017 will bend, read as 2 April in British practice and as February 4 in American practice. (April 2nd, 2017 will be correct)

6.3.4 Subject

The subject should be stated concisely and accurately. The subject line often determines where the memo is to be filed

A well-written memo is informative and concise. It can be made informative by following the principles of any good writing: preparation and organization.

6.2 PREPARATION

You need to decide the exact objective of your memorandum. What is to be achieved by sending this memo? It should be possible to state the objective in a single sentence. Consider the audience, and decide whether you should include fundamental issues or define technical terms.

6.3 ORGANIZATION
Organize the material to suit the purpose of the memo. The content can be organized in chronological order or by order of importance (emphatic order).

6.4 STYLE OF MEMO

A memo is always brief. Make every effort to be plain, direct and concise while using a comfortable, natural style. Although memos are usually formal, the recent trend is towards a personal style. Careful writers can achieve this style without sacrificing clarity, grace, or precision. It helps to write quickly if you pretend that you are speaking to someone sitting across the table you can achieve a more personal style. Showy style, too much technical jargon, or complicated sentences will make you sound pompous. The style should becordial, straightforward, lucid and conversational while yetbeing formal.

Generally, the tone is neutral or positive, though occasionally, complaints or reprimands may be issued in memo form. Use caution in negative situations, and be aware of the effect of your memo. Spiteful, blunt, condescending, or too coldly formal memos alienate people.

Below are few sample memos for better understanding.

To: All Teaching Staff

From: Principal's office
Date: 25th February, 2017.

Subject: SELF-ASSESSMENT FORM

University circular no. 1234 requires all teaching staff members to complete a self-assessment form at the end of every academic year. The forms are to be sent to the University on 15 April. All members of the teaching staff are requested to collect a copy of the form from the Office Registrar and submit the completed form to the college office by 31 March. Vice-Principals will guide teachers who need clarification and help in completing the form.

126

Here is another example of memorandum.

To: Aqeel Karim, Regional Manager

From: Uzma Anwar, Sales

Date: 6th April, 2017

Subject: Notification of My Resignation

I am writing to inform you of my intention to resign from I & K Holdings.
I have appreciated very much my four years working for the company. The training has been excellent and I have gained valuable experience working within an efficient and professional team environment. In particular, I have appreciated your personal guidance during these first years of my career.

I feel now that it is time to further develop my knowledge and skills base in a different environment.

I would like to leave, if possible, in a month's time on Saturday, 4 May. This will allow me to complete my current workload. I hope that this suggested arrangement is acceptable to the company.

Once again, thank you for your support.

To: Marketing Officer

From: Hasan Mahmud, General Manager

Date: 15 August, 2014

Subject   Export of Jam and Jelly

Recently, I visited the manufacturing plants at Korangi and discussed with the production managers the possibility of increasing the production so that we can export these items to western countries. They see no difficulty in doing so but before they take any define initiatives in this direction; they would like to have an estimate of the demand for our products in these countries.

So, I request you to contact our agents quickly and let me know the estimates by the end of September.

To	Marketing Officer
From	Hasan Mahmud, General Manager
Date:	15 August, 2014
Subject:	Export of Jam and Jelly

Recently, I visited the manufacturing plants at Korangi and discussed with the production managers the possibility of increasing the production so that we can export these items to western countries. They see no difficulty in doing so but before they take any define initiatives in this direction; they would like to have an estimate of the demand for our products in these countries.

So, I request you to contact our agents quickly and let me know the estimates by the end of September.

6.5 REPORTS

A report is written for a clear purpose and to a particular audience. Specific information and evidence are presented, analyzed and applied to a particular problem or issue. The information is presented in a clearly structured format making use of sections and headings so that the information is easy to locate and follow. A report is defined as "A report is a statement of the result of an investigation or of any matter on which definite information is required." (Oxford English Dictionary)

Keeping in view structure there are two kinds of reports: Short reports and long reports. Our focus will only be short reports here. From the perspective of purpose a report may have many kinds, like Progress report, technical report, survey report, feasibility report, research report etc. All of these reports follow same basic structure. A report must have following sections:
- Introduction
- Method of data collection (optional)
- Facts/ Findings / Data
- Discussion
- Conclusions
- Recommendations

Short reports can be written in two basic formats. If the report is to be submitted within the organization in which the writer of report is employed, it will follow the format of memorandum that you have learned. However, if the report is to be submitted to another department or organization it will follow pattern of formal letter.

A long report on the other hand is written in manuscript format and always has a title, introduction, body, and then conclusion. It is always more than one page in length. It sometimes contains a covering letter that mentions all the details that are included in the long report. At the end of the long report, there is bibliography and appendix. It is common to have a long report printed and bound with hard cover. Our concern here is only short report.

6.6 INTRODUCTION

Most of short reports are written in response to a request or a direction given your superior officers in an organization. So we normally begin the introduction section by referring to letter number and date in which you were requested to prepare report on a certain topic. Consider for example this sample introduction of a report on expansion of computer lab for IT department of a university.

"With reference to your letter No. 1234 dated 12th Nov, 2017 in which you directed me to submit a report about possible need to expand computer lab of our department, keeping in view the rising number of students in future, a comprehensive report is submitted for your consideration."

This introduction serves two purposes. Firstly it places the communication in context by referring to a certain communication in past. Secondly, it tells the reader the subject of report.

6.7 METHOD OF DATA COLLECTION

In this section you tell your reader about the method and procedure that you adopted to collect data. Sometimes this section is excluded keeping in view the nature of report. For example if you are writing a report to the editor of a newspaper, this section is not needed. However, research oriented business reports must have this section. In continuation of above example here is sample of this section.

"The findings of this report are based on data collected from various sources. First of all, I have collected the data of students who are going to appear in ICS group through BISE Rawalpindi and FBISE. I collected data of past 5 years. Second is a survey of 500 students of ICS group from various colleges in locality of Islamabad and Rawalpindi. Third data corpus is of number of students enrolled at BS and MSC level in our university in past 5 years."

Facts/Findings

This section provides the facts and findings that have been collected. In continuation of the above example you can see the data being presented in the form of tables.

Number of students enrolled in ICS Group

	2015	**2016**	**2017**	**2018**	**2019**
BISE Rwp	5432	6005	6898	7801	8910
FBISE	2540	2864	3687	4354	5147

Results of survey
Field of choice of students.

Computer Sciences	**Information Technology**	**Software Engineering**
213	138	149

Number of students enrolled in our university in past five years

	2015	**2016**	**2017**	**2018**	**2019**
BS	45	72	94	115	128
MSC	25	28	39	52	63

6.8 DISCUSSION

Bare facts are nothing but a series of information and numbers. They give their meanings when they are discussed and interpreted for the facts and discussion are divided into two headings however sometimes discussion and facts go hand in hand and are given under same heading.

"Over the period of five years, the number of students has almost doubled in BISE Rawalpindi as well as FBISE. When we compare the number of students appearing in these Two Boards that are located in the radius of our university with

the number a students enrolled in our university we find a proportionate relationship. Since a constant increase can be observed in the enrolments stats of Boards as well as our university, we can expect the trend to continue. Additionally, the survey of students reveal that the students intending to enroll in Information technology is considerably good as only two universities are offering this program. Furthermore, the number of students at our university in IT department has doubled over past 5 years while labs were built according to the number of students in 2016."

6.9 CONCLUSION

Just like discussion conclusion are also general statements based on the facts. However, the function of conclusion is to encapsulate the whole discussion and also tell the reader about significance of discussion and facts. For example:

"To sum up my investigation, I can say that over the period of 5 years, the number of students has more than doubled in IT department of our university and it can be attributed to raising number of students who appear in ICS group of Board of Intermediate and Secondary Education exam. The number has been on the rise from past 5 years and is likely to continue this way keeping in view the opportunities that IT field has to offer."

6.10 RECOMMENDATIONS

Conclusion is drawn from the facts and data that have collected as a result of research for report. Recommendations are drawn from conclusion. This section shows a plan of action to cope with the situation. It tells them what can be done to improve the situation and what actions are the need of time. For example:

"In the light of above presented facts and discussion, hereby recommend following actions to be taken:
1. There is a dire need to expand the computer labs available in our department.
2. The computer labs should be expanded by 150 % keeping in view present and future needs.
3. This expansion should be completed before the commencement of new semester so that the teaching and learning process may proceed smoothly"

Here are two samples for proper understanding of the format short reports. If your report is intended for your own department follow memo format as in this example.

To: Safeer Awan, Dean Social Sciences
From: Habib Ullah, Coordinator English Dept.
Date: 6th April, 2017
Subject: Proposal to launch Short course in English

Introduction

In a meeting of the department of English held on 20th Dec, 2016 the view was expressed that our students have a very poor command in English, both spoken and written. So it was proposed that a short course in English should be launched under the management of the English teachers.

Discussion

We realized the need for such a course for good reasons. From the answer scripts of the students of different departments, we found that the standard of English of about 80% of them is far below the average. We interviewed many students of our university, of some other universities, and even some outsiders, and found that they deplorably lacked correctness in writing and fluency in speaking English. We also talked with them about opening a short course in English in order to help them with the basics of written and spoken English. They all highly appreciated the idea and opined that such a course would be of much help for them.

The students need to use correct English in their answers of the exam questions in different courses and subjects. If they are given some knowledge about the basics of spoken and written English, they can go a long way towards their improvement.

Conclusion

So we think that Short Courses in English will be a quite popular programme. It will help students, non-students, and professionals.

Recommendations

We would recommend that Department of English should be allowed to launch such a course in the coming semester and the university should look into the financial aspects of the programme as early as possible.

Signature

However, if a report is to be submitted to an individual in another organization, it will follow the pattern of letter. If the same report were to be submitted to Higher Education Department, it will follow this format:

Dr. Rahmat Ullah Bhatti,
Coordinator, Education Department,
AIOU Islamabad.

4th Oct, 2017.

The Secretary,
Higher Education Department,
Civil Secretariat, Lahore.

Subject: Proposal to launch Short course in English

Introduction

In a meeting of the department of English held on 20th Dec, 2016 the view was expressed that our students have a very poor command in English, both spoken and written. So it was proposed that a short course in English should be launched under the management of the English teachers.

Discussion

We realized the need for such a course for good reasons. From the answer scripts of the students of different departments, we found that the standard of English of about 80% of them is far below the average. We interviewed many students of our university, of some other universities, and even some outsiders, and found that they deplorably lacked correctness in writing and fluency in speaking English. We also talked with them about opening a short course in English in order to help

them with the basics of written and spoken English. They all highly appreciated the idea and opined that such a course would be of much help for them.

The students need to use correct English in their answers of the exam questions in different courses and subjects. If they are given some knowledge about the basics of spoken and written English, they can go a long way towards their improvement.

Conclusion

So we think that Short Courses in English will be a quite popular programme. It will help students, non-students, and professionals.

Recommendations

We would recommend that Department of English should be allowed to launch such a course in the coming semester and the management should look into the financial aspects of the programme as early as possible.

Signature.

6.11 JOB APPLICATION

The following sections present a series of steps to guide you toward focused, personalized, and correct job application documents. Résumés and application (or cover) letters are common job documents, but our focus here is broader—we will ask you to consider the communication situation as a whole, from analyzing job postings to creating the documents as a dynamic process.

Your job materials are not forms to fill out, but strategic and persuasive communications that will need to be customized for each potential employer and at every phase in your career.

The job search is more than finding a job posting for which you fulfill the requirements. This planning phase allows you to gather the information and language that you need to make yourself a strong applicant.

6.12 KNOW YOURSELF

As you begin the process of finding and applying for employment in your chosen field, it is important to take stock of your education, technical skills, and the experiences and characteristics that make you an ideal employee and co-worker. This self-assessment is the foundation for building strong job materials.

Beyond evaluating your skill set, this is also an opportunity to take stock of the types of environments you will thrive in:

Do you work better independently or in groups?

Have you always imagined working for a large company, with the structure and perks that offers? Or do you see yourself working on a smaller team, perhaps taking risks for a project you believe in personally?

Do you like developing new ideas and planning? Do you like seeing through a complex project to the finish?

Use this information as you search for potential jobs and internships and evaluate employers. Seeking out a work environment and job that suits your strengths and preferences will give you an advantage in the job search and in your career.

Know Your Field
Use the resources available to you (career services, job websites, and networking events) to find positions. Go to career fairs and make connections. Even before you are truly "on the market" career fairs and networking events are great ways to build your confidence and become comfortable in professional environments.

Keep yourself informed and up-to-date on the projects and initiatives happening within your chosen field and especially of those employers that most interest you. This is not something you only do the night before a career fair or an interview – expose yourself to these ideas and discussions over a long period of time. These types of resources are a great place to get started:

Organizations and conferences.

Connecting with and simply being aware of the national organizations will expose you to current ideas and developments in the field. Most host conferences on a regular basis and even just reading the Call for Presentations or the titles and

abstracts from a recent conference will introduce you to new terms and concepts, laying groundwork for future learning or research.

Company blogs or white papers

Most companies "talk to" the public or the industry in some way to manage public perception, promote accomplishments, and (often) recruit employees. These might be highly technical or more casual or promotional in tone, depending on the company culture, industry, and their goals – any of these provide valuable insights.

Social Media

Following both companies and individual professionals will introduce you to their work, concerns, and developments in the industry. It also might make it easy for you to get exposed to these ideas as part of your regular online habits.

Local networking or meet up groups

Professionals often hold events at a local level to meet each other and learn about what other companies in the area are doing. These might be purely social or they might include learning opportunities in the form of talks and presentations. On campus, you will also find a variety of discipline-specific groups and students organizations that can also expose you to new ideas and resources, not to mention great professional connections.

Build a vocabulary

Part of what you are doing as you prepare yourself for your career is learning a language – you are developing vocabulary and learning the language of your profession in addition to developing the required technical skills.

In the process of completing the self-assessment, you probably discovered that you have lots of skills and strengths seemingly unrelated to your field. It's important to remember that even unrelated experiences have taught you "transferable skills" – skills that may not be technically related, but are considered important to any field.

These "soft" skills are consistently ranked high on employer lists of desired attributes and include organizational skills, leadership abilities, teamwork

experience, communication skills, problem solving, meeting deadlines, and so on. In the job search process, it is important to be able to describe your previous experiences in language that employers recognize as valuable.

Designing An Effective Résumé

A résumé, from the French word for "summary," is a concise, standardized document that introduces you as a professional, most often for the purposes of seeking employment. It is also useful in other situations, such as applying for awards or seeking a promotion.

It is likely a document you are already somewhat familiar with and you might even already have a résumé of your own, but learning how to strategically and confidently build a résumé for a particular audience and purpose is a vital professional communication skill. The résumé is more than a list of jobs – it is a prioritized, condensed introduction to you, the job applicant, and it demands close attention.

Here are four basic rules regarding how to approach writing your résumé:

Create multiple versions

A résumé should be customized to the specific job you are applying for and adapted based on your knowledge of the employer. You should also consider how you will be submitting the document to determine the best formatting.

Learn the conventions of your discipline

Not every professional context is the same – it is invaluable for you to have someone in the field or even the specific companies to which you are applying review your résumé. An engineer's résumé will likely look very different from a designer's résumé simply based on the audience's expectations.

Update on a regular basis

Even if you expect to stay in a job in the long term, take notes and gather information for your résumé every couple of months or after you finish a major project. It's difficult to remember the details of a complex project after the fact, so having that information documented is a huge asset.

137

Eliminate errors from the document

Because the résumé is condensed and since it is used to evaluate you as a potential employee, there is little tolerance for typos or errors. Check grammar, spelling, design consistency, punctuation, and language. Then check it again and ask a friend to review it. And then again.

What to Include in Your Résumé

The content in your résumé should be carefully selected to present the best, most applicable qualifications for a particular employer or purpose.
Here are the basic types of information that you will select from as you build your résumé:

Strong action verbs are words that you should use to describe your activities throughout the résumé, typically beginning each bullet point in the experience descriptions. These words should be varied (avoid repetition), vivid (be specific, descriptive), and honest (don't overstate your activities or experience).

Here are some useful strong action verbs

Analyzed, assessed, built, calculated, collaborated, coordinated, created, defined, delivered, designed, developed, documented, evaluated, examined, interpreted, managed, monitored, prepared, presented, programmed, provided, reported, researched, resolved, supervised, solved, supported

Strong action verbs to emphasize results

Achieved, completed, improved, reduced, resolved, succeeded, surpassed As you are planning what content to include in your résumé, know that information placed at the top of the document typically has the most impact. That's why education is almost always one of the first sections, since the first requirement in an internship posting is typically your year in school, major, and GPA. As you move down the page, though, lead with the most relevant, interesting sections, and organize the content to feature the experiences and skills that this employer will most value.

You will have many questions about what you should and should not do as you are compiling and revising your résumé. You can try to find answers to these

questions online, but once you know the basics, ultimately, you will need to make your own choices about the best way to present your qualifications.

If you are wondering whether or not to include a piece of information, focus on the audience's needs. Will they find this information valuable in making a decision about you as a candidate? Does it reveal something important about your skills, interests, and qualifications? Does it reveal something new about you that are not already revealed in the document?

If you are wondering how to present a piece of information, know that the options are endless, but, again, you will want to focus on the audience. Is the content presented in a way that is easy to see and understand? Is it logically connected to the information around it?

Be confident as you make these decisions. There are fewer "rules" than you might think—the challenge is to create a document that is not just correct, but that strategically reveals you as a candidate for a job and an individual. You don't want your résumé to look like a form or to be exactly like everyone else's. Look for ways to include those things that express your personality and passion—the things that make you unique.

Visual Design Considerations

The content and language in your résumé, as discussed in the previous section, is the first priority, as you figure out how to explain your experiences and show the employer that you meet the requirements for the position. The visual design of your résumé—the way the information is presented on the page—also deserves some careful planning and consideration because it has an impact on the way your audience will be able to read and understand the information.

Recall that your reader might be reviewing many résumés in a row and perhaps reviewing them quickly. An effective visual design can help ensure that your résumé is accessible and that it makes a good impression, which will make them more likely to consider you a strong candidate!

Here are some simple things to keep in mind as you are finalizing the design of your résumé

Clear headings

Content needs to be categorized visually; with main section headings (e.g., Work Experience) and subheadings Font size and type help visually organize the text on the page. All caps and bold are you best options for emphasizing headings and subheadings; italics and underlining are more difficult to read and should be used less often.

White space

A résumé that is full of dense blocks of text becomes difficult to read. Our eyes need white space to help us understand how information is connected and how it relates to the content around it. Add space above headings and subheadings. Don't use unnecessary lines or embellishments—white space is often more effective.

Balance

White space may be a helpful organizing principle, but you want to avoid too much white space or empty spaces on the page. Adjust the length of lines or the layout to ensure that each "quadrant" of the document has a roughly equal amount of content. The most common issue is a large "channel" of white space down the right side of the page.

Vertical alignment

To keep a document visually organized, similar headings and elements (e.g., a bulleted list) should fall along the same vertical line. If you drew a straight line from the top of the page to the bottom, all the bullets would fall along the line. This keeps the document clear and organized (compare the example in the previous section with the "needs improvement" résumé below).

Coherence and consistency

The same types of information (e.g., company name, dates) should be presented in the same way. This helps "train" the reader's eye, making sure they know where and how to find the information.

Fonts and typography

To ensure that your résumé displays correctly and is compatible with Applicant Tracking Software (ATS), it's best to use a common, standard, and professional font (Arial, Times New Roman, Tahoma). However, you can use more than one font. A serif font works well for headings alongside sans-serif fonts for body text. Reflection & Discussion: Consider how the design of the résumé below affects you as a reader. How does your eye travel down the page? How would it make you feel about the job applicant's qualifications?

6.13 WRITING THE APPLICATION LETTER

Traditionally, the application letter or cover letter is a formal letter that accompanies your résumé when you apply for a position. Its purpose is to support your résumé, providing more specific details, and to explain in writing why you are a strong candidate for the specific position to which you are applying. It should not simply reiterate your résumé; it's an opportunity for you to make a case for your candidacy in complete sentences and phrases, which gives the reader a better sense of your "voice."

As always, it's helpful to start by first thinking about the audience and purpose for the application letter. What information does your reader need to glean from your letter? At what point in the hiring process will they be reading it?

As you draft the letter, consider what you would want to say if you were sitting across the desk from your reader. It should be written in a formal, professional tone, but you still want it to flow like natural speech—this will make it easier for your reader to absorb the information quickly.

What to Include in the Application Letter

It can be helpful to think about writing the application letter in sections or "blocks." This provides a basic structure for the letter; once you have an understanding of this foundation, you can customize, update, and personalize the letter for different applications and employers.

Introductory Paragraph
Open the letter with a concise, functional, and personable introduction to you as a job candidate. This is your chance to establish the essential basics of your qualifications and to set the themes and tone for the rest of the letter.

Name the position you're interested in (by exact name and number, if available), and where you heard about it

Clearly state that you are applying for the position—remember that you are requesting (not demanding) that they consider you as a candidate for the position Identify your major, year or graduation date, and school (this should be a brief preview of your educational status/area—you will go into more detail in the Education paragraph)

Create a theme (essentially a thesis statement) for the letter, based on the job requirements and your knowledge of the employer (this may not be possible until you write the other paragraphs, so save it for last) → NOTE: Once you have established the thesis (the key reasons for your qualifications), keep in mind that the remaining paragraphs must specifically "prove" or "show" that you possess these qualifications.

Education & Academics Paragraph(s)

Since you will have already stated your basic educational status (major/year/school) in the introductory paragraph, the purpose of this paragraph is to paint a more detailed picture of you as a student, making progress in your academic program and gaining valuable experiences along the way. Your opportunity in this paragraph is to describe your academic progress in more specific detail, explaining the activities and knowledge you are developing that most matter for this position and employer. Carefully consider what the employer will value most about your educational experiences.

Emphasize specific skills and knowledge that you are developing

Describe significant coursework or projects—don't be afraid to focus in on a particularly compelling example or experience

If you have a lot of project experience or several key experiences that you want to highlight, this information may be written in multiple paragraphs.

This content should NOT be a laundry list of course titles. Instead, describe how your academics have shaped your understanding of the field you are entering and significant skills you are developing, but always tie it back to what the employer is looking for—stay focused on the information your audience needs and what they will care about.

Employment Paragraph (if applicable)

It is important for employers to feel that they are hiring responsible, reliable people who know how to hold down a job. If you do have work experience in this field such as a previous internship, this is a perfect time to discuss that. If you have previous work experience, even if it's not related to your field, this is your opportunity to describe the value of that experience—the value for you, but, more importantly, to your reader.

Describe your previous work experience (show, don't tell that you're a good employee)
Be specific about the company, the time frame, your responsibilities, actions and the outcomes/results

Focus on relevant and transferable skills developed on the job

Activities Paragraph (if applicable)

Activities and involvement in things outside of your coursework and work experiences such as student organizations, clubs, and volunteer work are a great way to show that you are a well-rounded, motivated person with good time management skills. Personal, human connections are an important part of the job application process, and describing some of these activities and interests can help your reader start to feel a more personal connection.

Demonstrate personality, values, and transferable skills through sports, volunteer, travel or other professional experiences

Describe your specific actions and involvement honestly, while still trying to connect to transferable skills and the keywords in the job posting

Concluding Paragraph

As you conclude the letter, tie everything together, acknowledge the next steps, and end on a positive note.

Reference your resume ("You will find additional information on my résumé")
Request (don't demand) an interview ("I would appreciate the opportunity to meet with to learn more about the position and discuss my application")

Provide contact information in the paragraph (phone number and email address)—don't put this below your name

Reiterate interest in the position, the employer—another opportunity to demonstrate your knowledge about the company

Topic Sentences

As you reinforce the main idea or purpose of the letter (that you have the necessary skills, qualifications, and temperament for the job), make sure you prioritize what your reader needs to know about you and that all of the experiences you describe are meaningful to them. One good way to do that is to focus on how you construct the topic sentences. The first sentence in each paragraph should clearly explain the purpose of the information contained in that paragraph.

Begin each paragraph with a statement that connects your experience to the employer's requirements and desired qualifications.

Topic Sentence = My experience + Why it matters

Consider how the following examples were revised to focus more on the value of the experience to the employer rather than simply stating the information about the experience.

EXAMPLE 1

Original: During the past three summers, I worked at Ray's diner in my hometown.

Revised: Working at Ray's diner in my hometown for the past three summers has taught me a lot about responsibility and reliability.

EXAMPLE 2

Original: During my freshman year, I was part of an Alternative Energy Vehicle project group.
Revised: I gained firsthand experience with collaborative problem solving and project management while working on an Alternative Energy Vehicle project during my freshman year.

The revised versions explicitly connect the experience (working at the diner, being on a project team) with the value and lessons learned, making it easier for your reader to understand, even while reading quickly, how this supports your qualifications.

Letter Formatting Considerations

Your application letter should use formal letter formatting. In today's job market, where many applications are online, the letter might be delivered in a variety of different formats. For example, it might be a PDF file uploaded to an online application system or if might be simply sent in the body of an email. In any case, consider the following as you decide how to format the letter:

- If you are delivering it as a standalone file or an attachment, use a formal letter format and save it as a PDF (unless otherwise instructed).
- If you are sending the application letter content directly in the body of an email, you do typically need to include the sender's (your) address, the date, or the recipient/inside address. You would begin the email with the greeting.

Job Application and Resume/CV Samples

A job application letter, also known as a cover letter, should be sent or uploaded with your resume when applying for jobs. The job application letters your send explain to the employer why you are qualified for the position and why you should be selected for an interview. Here is information on how to write job application letters, along with job application letter sample. This letter responds to a job advertisement; it includes the background of the writer and asks for an interview.

Name
Address   (Applicant's Name and Address)
City State,

December 05 2018
Name
Title (Name and Title of person who will review your application)
Address
Subject: Application for the Post of Sales Representative

Dear Sir/Madam,

I am writing in response to your advertisement in the December issue of The News, in which you announced an opening for a sales representative with Ghulam Rasool & Sons.

I have five years of retail experience in the book industry. For the past three years, I have managed Books for an independent bookstore located in Anarkali. I am familiar with the products that you publish and believe may experience as a retailer and with the buying public would benefit your company. As the manager of a independent bookstore, I have demonstrated my ability to set goals and complete projects in a timely and thorough manner.

In my current job, I am responsible for buying both new publications and backlist inventory as well as analyzing sales trends using a computerized inventory system. I have a B.A. in English literature, and I am an Active participant in local writers' workshops. Have enclosed a copy of my resume for your review.

I would like to meet you and will contact your office the week of April 27 to determine if an interview may be arranged. If you wish to contact me before that date, please call 55-2434.

Sincerely,
Signature
Name

Resume

A resume is a written compilation of your education, work experience, credentials, and accomplishments and is used to apply for jobs. Resume is brief and not longer than one page however Curriculum Vitae (CV) is more detailed description of you education and your achievements. This is sample template for writing your Resume. However, it can be modified keeping in view one's personal needs.

Name:	**Dr. Zafar Iqbal**
Designation	**Vice Principal (BS-18)**
Address:	Federal Directorate of Education Islamabad.
Mailing address:	House No. 165, Street No.9 3, G-11/3, Islamabad
E-mail:	malikzafar74@gmail.com
Father's Name:	MUHAMMAD IQBAL
Date of Birth:	1-1-1974
Nationality:	Pakistan
National ID No:	35402-2173548-7
Contact No.:	0300-8810082

Qualification:-

- **Ph.D Education**   NUML, Islamabad
- **M.A (English)**   BZU, Multan

Research Work:-

- Problems of English Teachers in Punjab. Unpublished Master Thesis, Govt. College of Education for Men Lower Mall Lahore, University of the Punjab.
- System Analysis of Federal Directorate of Education and Development of a Futuristic Organizational Model. Unpublished Ph. D. Thesis. NUML, Islamabad

Research Papers:-

- Ten Research Papers published in different National & International Generals on Educational Issues.

Professional Experience:-

- ➢ Ten years teaching experience.
- ➢ Nine years Administrative experience.
- ➢ Five years experience as a reviewer at Curriculum Wing Ministry of CADD.
- ➢ Five years experience as reviewer and author of English Textbooks from class 6 to 10 at Punjab Curriculum Authority, Lahore.

Languages:

Language	Read	Write	Speak
Urdu	Good	Good	Good
English	Good	Good	Good

REFRANCES:

(1)   Dr. ALLAH BAKHSH MALIK
       Head of Education Deptt. NUML Islamabad

(2)   Dr. Nabi Bukhsh Jumani
       Dean Faculty of Social Sciences
       International Islamic University Islamabad

6.14 EXERCISE

Q.No.1   What is a memorandum? Discuss its different parts

Q.No.2   How to write report? Discuss in detail.

Q.No.3   How can you design effective resume?

Q.No.4   What are the pre-requites of a job application?

6.15 BIBLIOGRAPHY

Bailey. S. (2018). Academic writing: A Handbook for International Students. New York, NY: Routledge.

Blake. G. and Bly, R. (1991) The Elements of Business Writing. Macmillan, New York.

Shertzer. M. (1986). The Elements of Grammar, Macmillan, New York.

Swales. J. M, & Feak, C.B. (2017). Academic Writing for Graduate Students: Essential Tasks and Skills. Ann Arbor: The University of Michigan Press.

Vincler. J. E, & N. H. Vincler. (1996). Engineering your Writing Success, Professional Publications, Inc. Belmont, CA.

U.S Government Printing Office. (2001). A Manual of Style. 29th ed. New York: gramercy.

Unit-07

WRITING A RESEARCH PROPOSAL

Written By: Dr. Zafar Ullah Shaheen
Reviewed By: Dr. Zafar Iqbal

149

CONTENTS

INTRIDUCTION

Research proposal counts as an integral part of higher education. In this unit the concept of research proposal is discussed at length so that the students may get an idea of compiling a research proposal at the end of their degree program. There are various section of a research and its introduction, literature, philosophy, methodology, data selection, discussion and conclusion. All these sections are highly sophisticated a need a keen attention from the students in order to get mastery over it. The concepts presented in this unit may be handy in compiling a research proposal and doing practical research. A research proposal is a synopsis which is presented before doing actual research and should not be confused with research/thesis.

OBJECTIVES

After reading this unit you will be able to:
1.   Get familiar with the concept of research proposal
2.   Get the basics of research writings
3.   Exhibit different mechanics of research
4.   Know the philosophical dimension involved in research
5.   Master research template/format

7.1 WHAT IS A RESEARCH PROPOSAL?

A research proposal is usually written at the end of a bachelor or master program BS/B.Ed/MS/MEd. It is mandatory to write a research in higher educational degrees like MS/PhD. A research proposal should be coherent and concise summary of you upcoming research project. It should include a set of questions that you need to answer in you proposed study. You should choose an area of you interest which refers to the current knowledge on the subject. It should be your original idea/topic to contribute in the existing body of literature available on the topic.

The proposal is most important section of your study that demonstrates the students' ability to tackle a problem and offer its solution in an academic environment. It is written in a clear and understandable language following a specific format given by the university. The numbers of steps which are followed in any research proposal are discussed below in order to give the students' a clear idea of what to do.

7.2 COMMON SECTIONS IN WRITING A RESEARCH PROPOSAL

7.2.1 Title of research proposal

The first and foremost step is to search out a tentative topic of your intended research. The proposed title should have the flexibility to be revised and edited at any stage of research. Topic should include two things; dependent variable and independent variable. It means it should include your subject area and the population you intend to include in your research. It should manifest both. What has been observed generally that students' tend to waste a lot of time hunting for research topic? Whereas, instead of going after the topic/title the students' should be able to define and select a research area, after the selection of desired area a student must read maximum literature on the area. A time will come when the student will be able to locate a gap within the research filed. This is the exact thing a student should look after rather than having the topic/tile on the very first day of research.

7.2.2 Abstract
The second step in writing a research proposal is to write down an abstract of your study. An abstract will follow the main body of research. An abstract is a written concise statement which tells the whole study in a nut shell. It is a small

breakup of the research, including all the details in a short manner. Usually, it is written at the end of doing all the research. But sometimes the researcher has to write it before, in this case one can do it plausibly assuming the various steps/methods and predicting the research outcomes. In a research proposal it should be in a continued form without breaking the text into different paragraphs. Last, but not the least it should not exceed one page length.

7.2.3 Introduction:

The next step in writing a research proposal is to introduce your topic to the reader/audience. In philosophical terms it is called ontological perspective of research. The researcher should start a proposal with a clear ontological position dealing with the fundamental existence of nature. Crotty (2003) defined ontology as 'study of being'. It is about 'what kind of world we are investigating, with nature of existence, with structure of reality as such'. Guba & Lincoln (1989) stated that ontological assumption are considered those that can respond to the question 'what is out there, which can be known? Or what could be the nature of existing reality?

After identifying the ontological relationship of your study it is important to understand that it is related to the meaning of social world. First, the research will have to suppose that the world that is being investigated contains human beings with full emotions and thoughts and they can interpret their thoughts to deduce different meanings. The investigation of the researcher adopts different techniques and approaches and also chooses a research design that best suits the objective of the study. The researcher can either use interviews or make a questionnaire in order to take the opinions of his population being used in the study. This is the only way the researcher can reach to the inner feelings and thoughts of the subjects being investigated.

7.2.4 Background of the study

After introducing your study, the next step is to give a little bit background so that the readers' can get a clearer understanding of research proposal. There is a difference between the introduction and background of the study, the students' should not confuse the two. An introduction is an attempt to present preliminary data of research proposal because the readers' will be interested to read it. The background of the research proposal discusses it at length whereas in introduction only a brief overview is given.

7.2.5 Statements of the problem

Usually a statement of problem is given under this heading. In this statement the researcher define the problem at length, and try to capitalize it under the given circumstances. The problem statement is mandatory and must highlight the issues which need to be addressed in the research proposal.

7.2.6 Objectives of the study

After giving a problem statement, the next step of a research proposal is to state its objectives. The researcher should state clear and achievable objectives which are realistic. Sometimes it may happen that the objectives look very rosy on paper but it becomes difficult for the researcher to meet them. Such objectives should be avoided, last but not the least objectives should be in line with the research questions.

7.2.7 Research questions/Hypothesis

There is no research proposal which does not include research questions or hypothesis in the study. Research questions are guiding principles of the study that are necessary to be defined in the beginning of any research. If the study is quantitative, it should include a hypothesis—which is a guess or hunch statement about the topic of the study. This statement should be proved positive or negative with the findings of the study. If the research is qualitative it must include at least three questions regarding the research of which the research must seek its answer.

7.2.8 Significance of the study

In this section the researcher should highlight the sociological, economic and cultural importance of the proposed research. What kind of impact this research would have, and what it could achieve? The significance would tell the reader that if this research is not done it could have a negative impact on the desired population and similarly by doing this research the community could get the maximum benefit.

7.2.9 Delimitation of the study

The next most important step is called delimitation. In this section the research would delimit the already selected area. What could be achieved remaining in the limited time period and having required resources? Definitely, the researcher

154

cannot study and investigate the whole desired area; therefore, it is mandatory to cut it short according to sizable population and subject.

7.2.10 Time scale

The last step in this section is giving a time scale, which would elaborate a tentative time period for each chapter. It would not only clear the researcher's mind but it will also give an idea to the supervisor or guide that how much time will the proposed study will take to get it finished.

7.2.11 Literature Review

A literature review must contain the summary of what kind of knowledge is already available on a particular subject. It must be gathered through secondary sources, which have been already written by other theorists and researchers. It does not dig not new information and new knowledge rather it can pave the way for further research. It focuses on the relevant material which should be brought in by the researcher to illustrate the topic or point under discussion. It always contains the data collected by the previous researchers on the same subject and it may also present theoretical stand point given by the theorists or recognized experts working in the field.

Literature review is a collection of material gathered from the books, already done researches and journal articles. It must be structurally sound and ideas of the researcher must flow logically from one part to the next. There must be coherence and cohesion among sentences and paragraphs. The researcher must try to write in a clear manner in order to illustrate his point of view, i.e. grammatical mistakes, errors, and punctuation mistakes must be avoided.

A good idea to hunt for literature material is to start with bibliography. If you lay hand on your topic related books or dissertation, directly go to scan the bibliography written by these authors. By skimming through the entire list, one can immediately identify some of the most related books, articles and theories which will definitely help you in writing literature review. Library catalogue and search engines can also be looked into by entering few keywords. Keep trying a range of keywords to get different results and avoid overgeneralization. A handy idea is to type you selected area in the catalogue to find out maximum results. The researcher should narrow down the field to get most desired results.
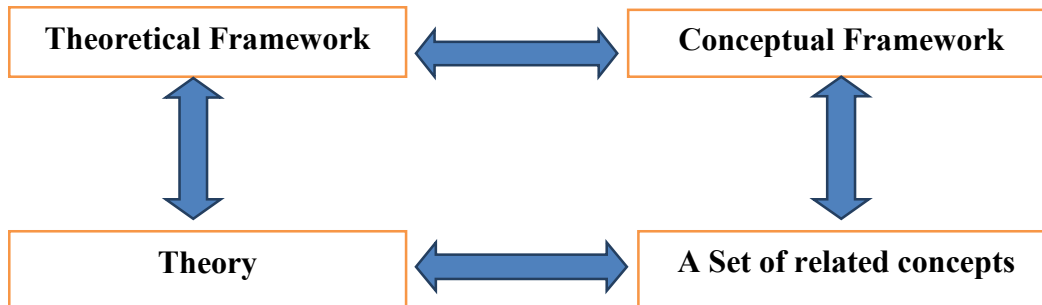
155

Online search engines could be used to lay hands on some of the most recent journals and articles. For this purpose different online search engines can be accessed, there are some resources online which are paid, the researcher can ask the librarian of your university to access these journals. For permanent use any student can take a login for the available journals from the library administration. If someone asks how much journals and articles should a student review, there is no answer to this question. It will depend on the size and length of you desired project how many articles and journals will suffice. Sometimes one needs a longer literature review and at other times it could be shorten.

The students' should try to set the boundaries of already available knowledge in your desired area; whatever the other authors have said on this subject. In this way the researcher can identify gaps available in literature on which he could write how to fill these existing gaps in the body of knowledge. The placement of literature review is always done after the introduction chapter. A handy piece of advice for the researchers' that they should always write literature review after doing the analysis chapter. This should be strictly followed in qualitative study, however in quantitative studies one can write literature review first, and then go for methodology and data analysis.

There are two main tenants in the chapter of literature review, which are discussed below.
- Theoretical framework
- Conceptual framework
- Theoretical framework

While writing a research proposal students' are required to define their ideas that inform the work in some general or specific way. Theoretical framework may refer to the idea or a set of ideas employed in an academic writing or research proposal. It can be defined as a framework that can refer to the larger assumption which falls under the ambit of research. For instance if a student desire to work on linguistics, he will definitely read the theories given by Chomsky and De-Saussure among many others. A theoretical framework usually provides macro, all-encompassing structure of ideas that a researcher can have to draw on his research in the beginning. It is necessary to point out theoretical framework in research proposal so that students' can explicitly ascertain the assumption on which they are going to work. It also provides the reader an instant chance to get familiar with the idea of the study and as well as the starting point of analysis.

Theoretical Framework	⟷	Conceptual Framework

(diagram: Theoretical Framework ⟷ Conceptual Framework; Theory ⟷ A Set of related concepts, connected with bidirectional arrows)

Conceptual Framework

Theoretical framework refers towards some general ideas and assumption of the research proposal whereas; conceptual framework provides specific ideas and theories on which the researcher is going to work. For instance if a student decided to work on Syntax, which is a subpart of linguistics he would leave De-Saussure and read Chomsky because he is considered a theorist who has worked at length on Syntax.

The only difference theoretical framework and conceptual framework is of a scale—the former refers to the large and big ideas while the later to small. Conceptual framework ideas are used in a specific way taking the guide from the larger theoretical framework. The ideas or theory of theoretical framework may not be exploited fully in the research proposal whereas; all ideas of conceptual framework are bound to be explored in a research proposal.

7.2.12 Methodology:

In this section, the researcher will answer the question 'how', what ways and means to be adopted to bring out expected result. It will include larger methodological breakup including research paradigm, type and methods of analysis to be included in research proposal.

7.2.13 Design

Research design is an organised approach that a researcher can use in the research proposal. It is the handsome synchronization of all the mentioned components along with data which result in a possible outcome. The research design should have a proper methodology in order to comply with accurate and authentic results. There are different types of research design which are mentioned below:-
- Descriptive research

- Exploratory research
- Explanatory research
- Evaluation research

Descriptive Research

Descriptive research is a kind of in depth study that can answer the question, 'what' and 'how'.

Exploratory Research

As the name suggests, descriptive research explores by finding out something and answer the question of 'what' and 'how'.

Explanatory research

This research type explain the subject matter under study and answer the question, 'what', 'how' and 'why'.

Evaluation research

This type of study is used to measure the effectiveness of a phenomenon in an extensive manner.

7.2.14 Population

A population is generally considered a huge collection of subjects and individuals who are main focus of the research proposal. All such individuals and subjects within the whole population must bear the common characteristics and traits.

7.2.15 Sample

For example suppose NUML is the whole population of a proposed bilingual study. Now we can deduce research sample from the mentioned population. The research was conducted at NUML, GS Department. The students of ELT, 2nd Semester, were selected suitable for the study sample. There were 12 students in the class: 11 females & 1 male. All were sample population for the study.

Out of twelve, 2 speakers (1 male & 1 female) were late bilinguals as they got early education from Urdu medium institutions. The rest of 10 speakers are early bilinguals as they had English medium background.

Following is the tabularized information regarding sample population:

Total # of Speakers	12
No. of Male Speakers	1
No. of Female Speakers	11
Early Bilinguals	10
Late Bilinguals	2
Educational Background of all Speakers	B.A/B.Sc, M.A Eng, M.A Political Science, LLB.

7.2.16 Tools

There are different kinds of tools used in a research to elicit data from the subjects/population. Some of the tools are listed below:-

7.2.17 Questionnaire

It is one of the main tool or instrument to collect data from the respondents in a research. It is considered quite handy tool to elicit specific information in a qualitative research. It consists of a set of questions to be asked from respondents. These questions are also called test items. It can also be used in a survey and statistical analysis. It is generally very less expensive way of gathering large data from a bigger population. It helps researcher to save his energy, time and money.

Types of Questionnaires

There are following types of questionnaires.

Open Ended Format

In open ended questions the respondents are free to answer in their own words. Open ended questions are best because:

- All the respondents are at liberty to express their views and share ideas
- They are used in intensive research studies for a limited number of respondents
- There is no built-in structure on the questionnaire
- Questions are prepared in advanced and their order is determined beforehand

Closed Format

In closed format the respondents did not have a choice for their own. They are bound to answer in a fixed format.

The respondents are left with the mentioned choices only

The choice can be to say YES or NO

Respondents are not able to express themselves and share ideas

Multiple Choice

In multiple choice questionnaires the respondents are required to choose from more than one alternative. Which could range from the best to the worst? For example, EXCELLENT, GOOD, OK, POOR, and VERY POOR.

Matrix Questions

In this type of questionnaire, the answers of test items are arranged in a matrix. The answer choices are placed at the top space and test items are listed on the right side opposite of which there is matrix list for the respondents to be choose from. A sample questionnaire of this format is attached in appendix.

7.2.18 Interview

Interview is a systematic way of listening and talking to people and a way to collect data from research population through conversation. In another definition it is described as a way to collect data as well as to gain knowledge from individuals.

7.2.19 Types of interview

Structured Interviews

Structured interviews contain questions which are made in advance and all the interviewees have to answer the question in the same order. In this way the researcher can compare and contrast data of one answer with the other because many respondents has answer the same questions in a different way.

Unstructured Interviews

These interviews are less reliable in research owing to the fact that questions are not prepared in advance and the interview is conducted in an informal style. There are likely high chances of biased opinion from the respondents and the comparison is difficult with other answers because the questions which are asked tend to vary from one another.

Focus Group

Focus group interviews tend to share many features with unstructured interviews. There are many more things involved than just collecting similar kind of data from a number of participants at the same time. It is a group of discussion on an assigned topic which is arranged for research proposal. This discussion must be navigated, monitored and can be recorded by the researcher. They are very useful in gathering rich understanding of participants' beliefs and experiences.

7.2.20 Travel Grant for Research

The students' are required to fill the following form in order to obtain travel grant for their research paper. Higher Education Commission Pakistan provides the students' travel grant option if they want to go abroad to present their paper in a conference. Students' need to familiarise themselves with the following details in order to get it approved.

DETAILS OF PAPER		
Title of the Research Paper (as per acceptance letter) (both hard and soft copies of the paper are required)		
Mode of Presentation (please tick one) (Letter of acceptance/invitation should clearly indicate the mode of presentation)	Oral	Poster
Has the abstract/paper been reviewed by the technical reviewers? (Documentary evidence that paper has been peer-reviewed must be attached)	Yes	No
Will the abstract/paper be published in Book of Abstracts/ Proceedings/Journals of Conference etc.? (Documentary evidence that abstract/paper will be published as an outcome of the conference)	Yes	No
Please note that an email from organizer clarifying the mode of presentation, peer review and publication would also be acceptable.		

FINANCIAL ASSISTANCE PROVIDED BY EVENT ORGANIZERS OR OTHER SPONSORS		
Item	Amount (Rs.)	Sponsor
Travel Cost		
Registration Fee		
Accommodation Charges		
Daily Allowance		
Any Other		
Total		

FINANCIAL ASSISTANCE REQUESTED FROM HEC		
Item	**Amount (Rs./US$)**	**Documents Required**
Travel Cost (Economy class return air fare from origin to destination)		Quotation from travel agent for the shortest route (optional)
Registration Fee (as per actual or maximum of US$ 500 whichever is less)		Attach documentary evidence (mandatory)
Accommodation (for event days plus one day – max. 6 days - @ US$100 per night)		Attach documentary evidence (optional)
Daily Allowance (event days plus one day, maximum of 6 days),		-
Total		

7.2.21 Data Analysis:

This chapter is reserved for data presentation, tabulation and analysis. The data collected in the previous chapter via different tools mentioned are analysed with

various methods of analysis. The statistical representation and tabulation are one form of exhibiting the data.
Considerations in Data Analysis

There are various issues the research should be aware of while doing data analysis. These are:-

* The researcher must possess necessary skills of analysis
* Awareness of data selection methods and data analysis methods

Conducting Unbiased Inference

The researcher should follow standardized format
Awareness of data recording mechanism
Presentation of analysed data in a suitable style
Training of the co-author or other staff involved in data collection/analysis
Codification of the text

Computer assisted data analysis software's

The following software's are available which can assist while analysing the data.
ATLAS.ti
CLAN
Coding Analysis Toolkit
ELAN
NVIVO
Quantitative Discourse Analysis
AntConc
Wordsmith

7.2.22 Discussion

This section is reserved for discussion on the various themes emerged from the data analysis chapter. The sole purpose of discussion is interpretation and description keeping in view the significance of the known findings of the proposed research study. The discussion would be in line with the given introduction, research questions, hypothesis, and literature review. It should not simply repeat the stated sections of the study but inform the readers' that how

their understanding has been developed regarding the research problem being investigated and data being analysed.

The discussion section seems very important because of the various elements mentioned below:-

It can bring out the inside critical ability hidden within a researcher to think on a selected issue and move forward with an intent to dig out its solution.

It can also bring out new understanding of the problem being investigated.

It can bring forth the essential meaning of the proposed study, and provides a chance to note implication in other related areas which can further improve the study.

It will certainly highlight the importance of your study and how it may be able to contribute to and/or help fill existing gaps in the field. If appropriate, the discussion section is also where you state how the findings from your study revealed new gaps in the literature that had not been previously exposed or adequately described, and Engage the reader in thinking critically about issues based upon an evidence-based interpretation of findings; it is not governed strictly by objective reporting of information.

7.2.23 Conclusion

The main goal of your proposal is to let the board know what you will be writing your paper on. It is a research idea that needs to be original and add to the overall knowledge on the subject. It needs to convince the board that your paper has enough information on it to conduct a study on. It also has to be unique and something that builds on the knowledge in the field. You won't be able to move on to actually writing your paper until this part is completed.

The conclusion is designed to wrap the paper up. In this case it needs to stress the overall importance of your study. It should identify three main things:

The kind of research that you chose for the project;
The overall importance of conducting the research;
The purpose of the research or what you want to accomplish through conducting it.

How to Include these Points

In your conclusion, you will want to make sure that you restate your problem. This will help show the board why your study is important. In the literature review section, you have found the "holes" in the research on the topic. This is the areas where the study is lacking in information. This will help you show the board how your paper will add to the overall knowledge in the field.

The dissertation is usually utilized as a requirement for your degree program and something that shows that you have learned the necessary concepts to contribute as a professional in the field. Therefore, your dissertation has to prove that you have really mastered your overall concepts relating to your field of study.

Content of the Conclusion

The entire purpose of the conclusion is to summarize the important points in your paper. You don't want to present information that you already talked about. The focus needs to be on why your study is unique and whether there are things that may stand in your way. Acknowledging that you have thought about the things that may stand in the way is a good way to prove that you have thought about it and that will go a long way in this process.

I've found this site. They have a lot of information that is perfect for concluding the dissertation proposal. You will be able to master this important part of your dissertation proposal this way.

APPENDIX

A sample questionnaire for students:

Assessment of Level of Self Esteem

SERIA No. ------------

CONFIDENTIAL QUESTION Airdate: - / /.

This is an important survey questionnaire. You are requested to encircle / tick only one option as per your personal observation.

Age (Yrs.)Department: EE/CS/MS/Math   **Sex**: Male/ Female **Place Of Birth**: Urban / Rural

No. of Years Uni: 1/2/3/**4Social Involvement**: Introvert/ Extrovert/**Religious Involvement**: Traditional/ Rigid/ Liberal/ Moderate

Birth Order in the family: 1st 2nd 3rd 4rth 5th 6th 7th 8th

Socio-Economic Status: Lower class/ Middle class/Upper class

Medium Of Instructions (High School Level): Urdu/ English/ Others

Parent	Profession	Education	Socio-Economic Status	Geographical Status
Father	Self Employed Employed Un Employed Retired Professional	Under Matric Matriculate Under Graduate Graduate Post Graduate	Lower class Middle class Upper class	Rural Urban
Mother	Self Employed Employed Un Employed Retired Professional	Under Matric Matriculate Under Graduate Graduate Post Graduate	Lower class Middle class Upper class	Rural Urban

Sr. #	Questions	Possible Answers				
		a	b	c	d	E
		Strongly Agree	Agree	Indifferent	Disagree	Strongly Disagree
1	Whenever I make a commitment to myself, I often tend to break it					
2	I am not sure that I will get a job of my choice after graduation.					
3	When I say no to any one, I feel guilty					
4	If I have to express my thoughts, I usually express them with some hesitation					
5	I am not as good looking as most people are					
6	Sometimes I become over conscious while talking to unknown people					
7	People take advantage of my weaknesses as I give up easily in unexpected conditions					
8	My family members always assert their thoughts while making my career decisions					
9	It's hard for me to stand in the class to answer the questions asked by my teachers.					
10	It seems that I have no control over my fate and future plans.					
11	Whenever I commit any mistake, I feel ashamed and self conscious.					
12	It is hard for me to take a stand in a novel situation.					
13	It is hard for me to make assignment without consulting my class fellows.					
14	In social situations I lack confidence in discussions.					
15	If someone ever falls in love with me, I do my best to prove worthy, because it may never happen to me again.					
16	If I make a mistake, I see myself as a failure.					
17	If I do not perform like others, it means that I am an inferior person.					
18	I think I made a wrong decision to join this institution.					
19	I wish I did not have to stand for class room presentations.					
20	Due to my economic conditions, I feel myself low among my friends.					
21	I try hard to create an attractive image for the opposite sex.					

22	I think there should be a course for improving self-confidence.					
23	I wish that other people should appreciate my efforts.					
24	I am considerate to follow my family rules and regulations.					
25	I smile to hide my disliking in order to please others.					
26	I feel nervous to talk freely with opposite sex in class room settings.					
27	I prefer to sit quietly and observe other people instead of participating in a group.					
28	I perform rituals (formal procedures) as they are important for success.					
29	I pay a lot of attention to my physical appearance to attract other people.					
30	I often get discouraged when other people criticize me.					
31	I need some strong emotional support to face environmental challenges.					
32	I mostly get scared while appearing for interviews					
33	I like listening to others' songs in place of singing for others					
34	It is hard for me to make a professional decision for myself.					
35	I like to be a charismatic leader instead of forcing others to follow me					
36	I feel that I do not have enough qualities to live a successful life.					
37	I have a poor control on my nerves.					
38	I give up easily under pressure of my friends					
39	I get tired while facing social challenges in my life.					
40	It is hard for me to disagree with my friends.					
41	I feel that I'm always being pushed by other people.					
42	I feel upset while making eye to eye contact with the opposite sex.					
43	I feel that my parents will impose their decisions on me regarding my marriage.					
44	I feel that I should improve my drawbacks / weaknesses.					
45	I feel relaxed to sit in the back row instead of front row in the class room.					

46	I feel nervous while appearing in the exams.					
47	I feel nervous to attend a lecture / presentation in a crowded hall.					
48	I feel hesitant to ask questions to my teacher for clarity of concepts in the class room.					
49	I feel happy when I make eye contact with my teacher.					
50	It is difficult for me to handle the consequences of certain events.					
51	I feel confused when I have to make a decision about important family matters.					
52	I don't like to take help from others while facing any difficulty.					
53	Usually, I have to pay a price for getting favours from others.					
54	My teacher should have groomed my personality.					
55	It looks that I have no control on my thoughts and they are controlled by a super power.					
56	I want to be loved and respected by others.					
57	I need knowledge, experience and skills to handle stressful situations in life.					
58	It is hard to accept criticism without putting myself down.					
59	I believe that I'm a perfectionist as I am satisfied only when most things turn out very well.					
60	I believe in miracles when a person becomes helpless.					
61	It is hard for me to make new friends.					
62	I'm not satisfied with my present output/result.					
63	I always look for the approval and acceptance of my dear ones in day to day matters.					
64	I always get afraid that something worse is going to happen.					
65	I think I made a wrong decision in selecting my current subjects.					
66	I'm sure about my decisions regarding my future career.					
67	I wish my teachers would have taken interest in developing my personality.					
68	To get a good grade, I even tolerate improper attitude and behavior of my teacher.					
69	Even if I try, it is hard for me to hide my inner feelings from other people.					
70	Even if I don't comprehend the lecture, I					

	keep on nodding my head to please the teacher.					
71	Due to family training, I just keep on smiling to please others.					
72	I have not developed self esteem during my academic career.					
73	My institution should have developed self confidence in my personality.					
74	During my stay in the institution, class room participation hasn't developed enough inter personal skills in me.					
75	The medium of "English instruction" is a great block in my communication and comprehension skills.					

7.3 EXERCISE

Q.No.1   What is a research proposal?

Q.No.2   Explain its different parts.

Q.No.3   What is difference between theoretical framework and conceptual framework?

Q.No.4   What are different types of interview?

Q.No.5   Write a note on questionnaire.

7.4 BIBLIOGRAPHY

Coley. S. M.. & Scheinberg, C. A. (2000). Proposal Wwriting. Thousand Oaks, Calif: Sage Publications.

Crotty. M. (2003). The Foundations of Social Research: Meaning and Perspectives in the Research Process, London: Sage Publications, 3rd edition.

Dodd. J. D. ed. (1986). The ACS Style Guide, American Chemical Society, Washington, DC.

Geever. J. C. & Foundation Center. (2012). The Foundation Center's Guide to Proposal Writing. New York: Foundation Center.

Goldstein. N. E. (1993). The Associated Press Stylebook and Libel Manual, The Associated Press, New York.

Guba & Lincoln (1989). Fourth Generation Evaluation. London: SAGE Publications.

Riordan. D. G. (2014). Technical Report Writing Today. Boston, MA: Wadsworth, Cengage Learning.

Unit-08

DOCUMENTING TECHNICAL RESEARCH WRITING

Written By: Dr. Zafar Ullah Shaheen
Reviewed By: Dr. Zafar Iqbal

171

CONTENTS

INTRODUCTION

This Unit introduces few key concepts to the students which include formatting style, how to insert footnotes and endnotes, and how to avoid plagiarism while writing down thesis. It also distinguish between two famous formatting styles used extensively in writing theses, i.e. MLA and APA. It further teaches students' to compile references of their primary and secondary sources which they have consulted during the course of study. All these basic concepts are very handy and can pave the way for the students' to become really independent writers and researches.

OBJECTIVES

You will be able to learn at the end of Unit.
1. To enunciate different formatting styles including APA/MLA, Chicago. Etc.
2. To be able to understand writing footnotes and endnotes
3. To learn different techniques of avoiding plagiarism
4. To distinguish between referencing and bibliography

8.1 WRITING FOOTNOTES

8.1.1 Footnotes/endnotes

A footnote is a constant style that should be followed throughout the document of the thesis or research proposal. If there is a need footnotes can be converted to endnotes via MS WORD.

It is style manuals (APA, MLA, Chicago/Turabian, etc.) on which the content of footnotes depends. Or it could be done as suggested by your supervisor.
Font Arial/Times New Roman 10pt.

Single-spaced with spacing between entries.
Each footnote should be comprised of a single paragraph.
Always use Words' auto-numbering feature while inserting footnotes. (There are some exceptions as inserting footnotes for objects, such as Tables, Figures, etc.

8.1.2 Fixing text and/or layout issues in your footnotes

If there is some problem with a footnote's layout then apply the Footnote Text Style to the footnote's text, but do not apply it to the footnote's reference number.
If you are unable to change some text in the footnote (e.g., font-face or font-size), just select that text and apply the Footnote Text Style on it directly.

If a footnote's reference number isn't superscripted in the text or the footnote area, apply the Footnote Reference style to the reference number.

To edit all footnotes in one window to ensure formatting consistency and uniformity:
- Choose View, Draft (or click the respective icon at the bottom right of the Word screen)
- Find a footnote reference number in your document and double-click it.
- Your screen will split, and all the footnotes will appear in the bottom window
- Choose View, Print Layout to return to exit the split screen.

Make the formatting uniform:
If necessary, superscript footnote numbers by applying the Footnote Reference style.

Remove extra paragraph markers appearing within or between footnotes. To make some text in a footnote go over to the next line, use a line-break (Shift+Enter). To remove a paragraph marker between footnotes, try deleting one and, if you get an error message, try removing the other one.

8.1.3 Moving endnotes to the end of each Unit

Type Endnotes or Notes at the end of each Unit
Apply HEADING 2 style to the heading
Insert a next-page SECTION BREAK. After doing this, your endnotes should appear after each section break.
As stated earlier that footnotes can be changed to endnotes.
Extra section breaks can have an adverse effect on page numbering and margins see Troubleshooting page numbers in theses.
The content in footnotes is governed by style manuals (APA, MLA, Chicago/Turabian, etc.). As in the list of references or the bibliography, footnote entries should be single-spaced, with spacing between entries.
Footnotes are desirable to endnotes and may be:
Number in sequence through the whole document (the template is designed to do this).
Number all through each Unit or its part.
Endnotes should appear at the bottom of the page or at the end of the Unit, or at the end of the text.
If you have difficulty placing endnotes at the end of a Unit or essay opt for one of these two methods:"
Convert endnotes to footnotes (this is considerably a good practice for the readers as footnotes appear on the page on which they are referenced) OR
Place a SECTION BREAK where you'd like your endnotes to start.

8.2 CITING REFRENCING

Documenting your sources means following a citation system to indicate whose ideas you are using. Two methods are commonly used: the American Psychological Association (APA) system, and the Modern Language Association (MLA) system. All will be explained briefly. For more complete details, consult:
Publication Manual of the American Psychological Association
MLA Handbook for Writers of Research Papers

8.2.1 How in-text Citation Works

Each method has two parts: the in-text citations and the bibliography, labelled "References" (APA) or "Works Cited" (MLA). The in-text citation works in roughly the same manner in both methods. The author places certain important items of information in the text to tell the reader which entry in the bibliography is the source of the quotation or paraphrase. These items could be the author's last name, the date of publication, or the title of an article.

In the APA method, the basic items are the author's last name and the year of publication. In the MLA method, the basic item is the author's last name and sometimes the title of the work, often in shorthand form.

In each method, the number of the page on which the quotation or paraphrase appears goes in parentheses immediately following the cited material.

Today human hands are reaching deep into Arabia's seas and taking more treasure than the seas can possibly replenish. Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms.

8.2.2 APA Method

The APA method requires that you use just the author's last name and include the year of publication and a page number.

According to Warne (2012), "Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms" (p. 73).

To find all bibliographic information on the quotation, you would refer to "Warne" in the References section.

Warne, K. (2012, March). The Seas of Arabia. National Geographic, 66–88.

8.2.3 MLA Method

The MLA method of citing the passage requires that you should include at least the author's last name with the page number.

As the author notes, "Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms" (Warne 73).

To find all the publication information for this quotation, you would refer to "Warne" in the Works Cited list.

Warne, Kennedy. "The Seas of Arabia." National Geographic Mar. 2012: 66–88. Print.

8.2.4 The "Extension" Problem

A common problem with internal documentation is indicating where the paraphrased material begins and ends. If you start a paragraph with a phrase like "According to Warne," you need to indicate which of the sentences that follow come from Warne. Or if you end a long paragraph with a parenthetical citation (Warne 73), you need to indicate which preceding sentences came from Warne. To alleviate confusion, place a marker at each end of the passage.

Either uses the name at the start and page numbers at the end or use a term like "one authority" at the start and the citation at the end.

According to Warne, human activity is having negative impacts on Arabia's seas. The people are taking more from the seas than is sustainable. Due to this activity there is an increase in algae problems which decreases the quality of the water (73).

One authority explains that human activity is having negative impacts on Arabia's seas. The people are taking more from the seas than is sustainable. Due to this activity there is an increase in algae problems which decreases the quality of the water (Warne 73).

8.2.5 The APA Method

8.2.5.1 APA Citations

Once you understand the basic theory of the method—to use names and page numbers to refer to the References—you need to be aware of the variations possible in placing the name in the text. Each time you cite a quotation you give the page number preceded by p. or pp. Do not use pg. If you are paraphrasing, page numbers are not required. The following variations are all acceptable.

1. The author's name appears as part of the introduction of the quotation or paraphrase.
    As Warne (2012) noted, "Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms" (p. 73).

2. The author is not named in the introduction to the quotation or paraphrase.
    It is noted that "Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms" (Warne, 2012, p. 73).

3. The author has several works listed in the References. If they have different dates, no special treatment is necessary; if an author has two works dated in the same year, differentiate them in the text and in the References with a lowercase letter after each date (2012a, 2012b).
    Warne (2012a) notes that "Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms" (p. 73).

4. Paraphrases are handled like quotations. Give the author's last name, the date, and the appropriate page numbers.
    Warne (2012) states that human activity is having negative impacts on Arabia's seas.

5. When citing block quotations (more than 40 words), the period is placed before the page in parentheses. Do not place the quotation marks before and after a block quotation. Starting on a new line, indent the left margin a half inch and double-space. Do not indent the right margin.

    According to Warne (2012)

    Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms. In 2010 a group of marine scientists described the region's most strategic waterway, the Persian Gulf, as "a sea in decline," bedevilled by a storm of malign influences. "If current trends continue," they wrote, we will "lose a unique marine environment." (p. 73)

6. If no author is given for the work, treat the title as the author using an abbreviated title for the parenthetical in-text citation, and list the full title first in the References.an unstable investment year, "TIPS, like other kinds of Treasuries, gained as investors rushed into investments perceived as safe" ("Kiplinger 25," 2012, p. 64).

    The Kiplinger 25 Update. (2012, April). Kiplinger's Personal Finance, 64.

8.2.5.2 APA References

The references list (titled "References") contains the complete bibliographic information on each source you use. The list is arranged alphabetically by the last name of the author or the first important word of the title. Follow these guidelines.

- Present information for all the entries in this order: Author's name. Date. Title. Publication information.
- Double-space the entire list. Entries should have a hanging indent, with the second and subsequent lines indented.
- Use only the initials of the author's first and middle names. Note: Many local style sheets suggest using the full first name; if this is the style at your place, follow that style.
- Place the date in parentheses immediately after the name.
- Capitalize only the first word of the title and subtitle and proper nouns.
- The inclusion of p. and pp. depends on the type of source. In general, use p. and pp. when the volume number does not precede the page numbers (or for a newspaper article).
- Place the entries in alphabetical order.

  Baron, N. (2008). Always on: Language in an online and mobile world. New York, NY: Oxford University Press, Inc.
  Bauerlein, M. (2008). The dumbest generation. [Kindle version]. New York, NY: Penguin Group.
  Brooks, K. (2011). Death to high school English. Salon. Retrieved from http://www.salon.com

- If there are two or more works by one author, arrange them chronologically, earliest first. Baron, N. (2000).
  Baron, N. (2008).
  Several common entries are shown below.

8.2.5.3 Book with One Author

Crystal, D. (2008). Txtng: The gr8 db8. New York, NY: Oxford University Press.
- Capitalize the first word after the colon.
- Use postal abbreviations for states.

8.2.5.4 Book with Two Authors
Reinking, J., & von der Osten, R. (2012). Strategies for successful writing:
A rhetoric, reader and research guide (9th ed.). New York, NY: Longman.

8.2.5.5 Book with Editors

St. Amant, K., &Sapienza, F. (Eds.). (2011). Culture, communication, and cyberspace: Rethinking technical communication for international online environments. Amityville, NY: Baywood.

8.2.5.6 Essay in an Anthology

Cacho, L. (2011). Racialized hauntings or the devalued dead. In G. K. Hong & R. A. Ferguson (Eds.), Strange affinities: The sexual and gender politics of comparative radicalization. (pp. 25–52). Durham, NC: Duke University Press.
Capitalize only the first word of the essay title and subtitle (and all proper nouns). Use p. with inclusive page numbers.

8.2.5.7 Corporate or Institutional Author

Teachers Insurance and Annuity Association-College Retirement Equities Fund. (2012, March 1). Summary prospectus. New York, NY: Author.
When the author is also the publisher, write Author for the publisher.
In the text, the first citation reads this way (Teachers Insurance and
Annuity Association-College Retirement Equities Fund [TIAA-CREF], 2012, March 1). Subsequent citations read (TIAA-CREF, 2012, March 1).
This entry could also read
Summary prospectus. (2012, March 1). New York, NY: Teachers Insurance and Annuity Association-College Retirement Equities Fund.
Cite this entry as (Summary prospectus).

8.2.5.8 Work Without Date or Publisher

Radke, J. (n.d.). Writing for electronic sources. Atlanta, GA: Center for Electronic Communication.

8.2.5.9 Brochure or Pamphlet
Explore the outdoors in the summer program at the child and family study center [Brochure]. (2012). Menomonie, WI: Child and Family Study Center.
- Treat brochures like books.
- Place any identification number after the title.
- Place the word Brochure in brackets.
- This entry could also read

Child and Family Study Center. (2012). Explore the outdoors in the summer program at the child and family study center [Brochure]. Menomonie, WI: Author.

- In the text, reference this entry as (Child).

8.2.5.10 Later Edition of a Book

American Psychological Association. (2010). Publication manual of the American psychological association (6th ed.). Washington, DC: Author.
Article in a Journal with Continuous Pagination
Carr, B., Haas, C., & Takayoshi, P. (2011, July). Building and maintaining contexts in interactive networked writing: An examination of deixis and intertextuality in instant messaging. Journal of Business and Technical Communication, 25, 276-298.

8.2.5.11 Article in a Journal without Continuous Pagination

Cook, D. (2010). Dr. Johnson's heart. The Cambridge Quarterly, 39(2), pp.186–195.

- Put the issue number in parentheses after the volume.
- You could also give the month or season, if that helps identify the work: (2011, Summer; 2012, January).

8.2.5.12 Article in a Monthly or Weekly Magazine

Kiplinger, K. (2012, April). Straight Talk on Taxes. Kiplinger's Personal Finance, 22. If the article has discontinuous pages, a comma indicates a break in sequence (4, 22–23).

8.2.5.13 Article from an online periodical

An article from an online periodical is similar to a hard copy article. Include the volume number and digital object identifier (DOI) when available. If the DOI is not listed, include the URL of the retrieval homepage:

Parry, M. (2012, March 7). Could many universities follow Borders bookstores into oblivion? The Chronicle of Higher Education. Retrieved from http://www.chronicle.com

Note: The DOI, if available, would be put in the place of the retrieval URL.

8.2.5.14 Newspaper Article

Melo, F. (2012, April 12). Echos of the old roar: The renovation of Union Depot nears completion, with officials hoping it can be a transit hub again.
St. Paul Pioneer Press, p. B1.
- Note: If the article has multiple pages, use pp. (pp. B1, B15).

8.2.5.15 Personal Communication

Note: The Publication Manual of the American Psychological Association suggests that personal communication—private letters, memos, e-mail, personal interviews and telephone conversations—should appear only in the text and not in the References. However, because these entries might be critical in research reports, a suggested form for their use in the References is given here.
1. In the text, reference personal communication material this way:
   T. Henry (personal communication) suggests that . . .
2. In the References, enter it this way:
   Henry, T. (2011, February 21). [Personal communication]
   - Arrange the date so the year is first.
   - If the person's title is pertinent, place it in brackets.
   Henry, T. (2011, February 21). [Personal communication, Founder, Accidental
   Creative, Cincinnati, OH].

8.2.5.16 Professional or Personal Website—Homepage

Essential for citing webpages is that you give the URL where you retrieved the site. Give as much other information as possible.
Henry, T. (n.d.). Accidental Creative. Retrieved from:
http://www.accidentalcreative.com
- Cite this version as (Henry).

Explanation: Web owner; if available. (Date of the last update, if available).
Title of article or document. Title of website. The site and the site's URL. Note:
If the owner and the date are not available, the above entry would look like this:
Accidental creative. (n.d.). Retrieved from http://www.accidentalcreative.com
Cite this version as ("Accidental").

8.2.5.17 Professional or Personal Website—Internal Page

For an internal page of a website, give the URL of the document, not the homepage.
Henry, T. (n.d.). Would you kill your "precious"? Accidental creative. Retrieved from http://www.accidentalcreative.com/productivity/ would-you-kill-your-precious
Explanation: Web owner, if available. Date of the last updating, if available—note that internal page updates and homepage updates can be different; use the date of the page whose information you use. Title that appears on the document page. Title that appears on that homepage. The URL.

8.2.5.18 Online Forums and Discussion Group Messages

Gould, D. (2012, March 2). Re: Would you kill your "precious"? [Online forum comment]. Retrieved from
http://www.accidentalcreative.com/productivity/would-you-kill-your-precious#comment-454491121

- If available, use the author's last name followed by initials. If not, use the screen name.

8.2.5.19 Blog Post

A blog post, or weblog post, is cited similarly to an online forum for discussion group post. Use this form:
Henry, T. (2012, February 29). I'm writing another book! (why!?!). [Web log post]. Retrieved from http://www.toddhenry.com/miscellaneous/im-writing-another-book-why

As with an online forum, or discussion group post, comments to blogs also use the author's full name, if available, screen name otherwise. Use this form:
McBreen, C. (2012, March 2). Re: I'm writing another book! (why!?!). [Web log comment]. Retrieved from http://www.toddhenry.com/miscellaneous/im-writing-another-book-why
Podcast
Henry, T. (Producer). (2012). AC podcast: Peter Bregman [Audio podcast]. Retrieved from http://www.accidentalcreative.com/acpodcast-peter-bregman-on-18-minutes
Video Blog Post (i.e. YouTube)

184

Dretzin, R. (2010, January 12). PBS frontline digital nation: Going digital at 83 [Video file]. Retrieved from http://www.youtube.com/watch?v=CoJOHu-eieI&feature=channel

8.2.5.20 Social Media Posts—Twitter and Facebook

Note: The Publication Manual of the American Psychological Association currently does not have a standard for citing social media posts such as Tweets and Facebook statuses. However, this type of entry may be necessary to include.
A suggested form for such entries is given here.
1.   In the text, reference social media posts this way: nprnews, (tweet) states that
2.   In the references section, list it this way: nprnews. Digital Technologies Give Dying Languages New Life n.pr/FS72Kd.
2012, March 19.2:50 PM. Tweet.

If available, use the author's last name followed by first initial and put the username following in parentheses. Otherwise, just use the username.

For a Facebook post, just put Facebook in place of Tweet at the end—likewise for other social media applications.

8.2.5.21 E-Book

Maushart, S. (2011). The winter of our disconnect [Kindle version]. Retrieved from http://www.amazon.com

8.2.6 The MLA Method

The following section describes variations in MLA citation and explains entries in the MLA Works Cited section.

8.2.6.1 MLA Citations

Once you understand the basic theory of the method—to use names and page numbers to refer to the Works Cited—you need to be aware of the possible variations of placing the name in the text. In this method, unlike APA, each time you refer to a quotation or paraphrase, you give the page number only; do not use p. or pg.

1. The author's name appears as part of the introduction to the quotation or paraphrase.
   As Warne notes, "Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms" (73).
2. Author is not named in introduction to quotation.
   What seems quite evident is that "Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms" (Warne 73).
3. Author has several sources in the Works Cited.
   Warne points out that "Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms" (Seas, 73).
4. Paraphrases are usually handled like quotations. Give the author's last name and the appropriate page numbers.
   Warne states that human activity is having negative impacts on Arabia's seas (73).
5. In block quotations (more than four typed lines), place the period before the page parentheses. Do not place quotation marks before and after the block quotation. Indent the left margin 10 spaces and double-space. Do not indent the right margin.

   According to Warne,

   Overfishing, pollution, seabed dredging, and massive coastal modification are crippling marine ecosystems by degrading water quality and exacerbating toxic algal blooms. In 2010 a group of marine scientists described the region's most strategic waterway, the Persian Gulf, as "a sea in decline," bedeviled by a storm of malign influences. "If current trends continue," they wrote, we will "lose a unique marine environment." (73)

6. If no author is given for the work, treat the author as the title because the title is listed first in the Works Cited list.
   In an unstable investment year, "TIPS, like other kinds of Treasuries, gained as investors rushed into investments perceived as safe" ("Kiplinger" 64).

8.2.6.2 MLA Works Cited List
The Works Cited list contains the complete bibliographic information on each source you use. The list is arranged alphabetically by the last name of the author or, if no author is named, by the first important word of the title.

Follow these guidelines:
- Begin the list on a new page
- Present information for all the entries in this order: Author's name. Title. Publication information (including date).
- Capitalize the first letter of every important word in the title.
- Enclose article titles in quotation marks.
- Double-space an entry if it has two or more lines.
- Indent the second and succeeding lines one half inch.
- If the author appears in the Works Cited list two or more times, type three hyphens and a period instead of repeating the name for the second and succeeding entries. Alphabetize the entries by the first word of the title.

Several common entries appear below. For more detailed instructions, use the MLA Handbook, 7th ed., (New York: MLA, 2009).

8.2.6.3 Book with One Author

Crystal, David. Txtng: The Gr8 DB8. New York: Oxford UP, 2008. Print.
Only the name of the publishing company needs to appear: You may drop "Co." or "Inc."

8.2.6.4 Book with Two Authors

Reinking, James A., and Robert von der Osten. Strategies for Successful Writing: A Rhetoric, Reader and Research Guide 9th ed. New York: Longman, 2012. Print.
A long title may be shortened in the text, in this case to Strategies.

8.2.6.5 Book with Editors

St. Amant, Kirk, and Filipp Sapienza, eds. Culture, Communication, and Cyberspace: Rethinking Technical Communication for International Online Environments. Amityville: Baywood, 2011. Print.

8.2.6.6 Essay in an Anthology

Cacho, Lisa M. "Racialized Hauntings or the Devalued Dead." Strange Affinities: The Sexual and Gender Politics of Comparative Racialization. Ed. Grace K. Hong and Roderick A. Ferguson. Durham: Duke UP, 2011. 25–52. Print.

- In the text, both the article title and the book title may be shortened; for example the article title could be "Racialized Hauntings" and the book title could be "Strange Affinities."

8.2.6.7 Corporate or Institutional Author

Teachers Insurance and Annuity Association-College Retirement Equities Fund. Summary Prospectus. New York: TIAA-CREF, 2012. Print.
- In the text, the first citation reads this way (Teachers Insurance and Annuity Association-College Retirement Equities Fund [TIAA-CREF]).Subsequent citations read (TIAA-CREF).
- This entry could also read
  Summary Prospectus. New York: Teachers Insurance Annuity Association-College Retirement Equity Fund, 2012. Print.
- Cite this entry as (Summary).

8.2.6.8 Work without Date or Publisher

Radke, Jean. Writing for Electronic Sources. Atlanta: Center for Electronic Communication, n.d.
- Use n.p. for no publisher or no place.

8.2.6.9 Brochure or Pamphlet

Explore the Outdoors in the Summer Program at the Child and Family Study Center. Menomonie: Child and Family Study Center, 2012. Print.

8.2.6.10 Later Edition of a Book

American Psychological Association. Publication Manual of the American Psychological Association. 6th ed. Washington, DC: APA, 2010. Print.

8.2.6.11 Article in a Journal with Continuous Pagination

Carr, Brandon J., Christina Haas, and Pamela Takayoshi. "Building and Maintaining Contexts in Interactive Networked Writing: An Examination of Deixis and Intertextuality in Instant Messaging." Journal of Business and Technical Communication 25 (2011): 276– 98. Print.

8.2.6.12 Article in a Journal Without Continuous Pagination

Cook, Daniel. "Dr. Johnson's Heart." The Cambridge Quarterly 39.2 (2010): 186–95. Print.

8.2.6.13 Article in a Monthly or Weekly Magazine

Kiplinger, Knight A. "Straight Talk on Taxes." Kiplinger's Personal Finance Apr. 2012: 22. Print.
- If the article has discontinuous pages, give the first page only, followed by a plus sign: 22+.

8.2.6.14 Newspaper Article

Melo, Frederick. "Echos of the old roar: The renovation of Union Depot nears completion, with officials hoping it can be a transit hub again." St. Paul Pioneer Press 12 Apr. 2012, B1. Print.
- Identify the edition, section, and page number: A reader should be able to find the article on the page.
- Omit the definite article (the) in the title of the newspaper in the text of the article: If the newspaper is a city newspaper and the city is not given in the title, supply it in brackets after the title (e.g. Guardian [London]).

8.2.6.15 Personal or Telephone Interview
- In the text, interviews are cited like any other source: (Henry).
- In the Works Cited list, enter it this way:
  Henry, Todd. Personal interview. 21 Feb. 2012.
- If the person's title or workplace are important, add them after the name:
  Henry, Todd, Founder, Accidental Creative, Cincinnati, OH. Telephone interview. 22 Feb. 2012.

8.2.6.16 Personal Letter or E-mail

Henry, Todd. Letter to author. 23 Feb. 2012.
- For E-mail messages include the subject (if available) and the recipient.
  Henry, Todd. "Re: Latest Blog Post." Message to the author. 24 Feb. 2012. E-mail.

8.2.6.17 Professional or Personal Website

Essential for citing webpages is that you give the date of the retrieval on which you viewed the site. MLA no longer requires the URL; however, if you feel it is necessary to include, place it after the date inside angle brackets like this: <http://www.accidentalcreative.com>

Otherwise, cite websites like this:
Henry, Todd. Accidental Creative. N.p., n.d.Web. 11 Apr. 2012.
Explanation: Web owner, if available. Title of the Website. Publisher or sponsor (if available). Date of last update (if available). Date of retrieval.
Note: Use this same format for blog posts.

8.2.6.18 Professional or Personal Webpage

For an internal page of a website, include the title of the page and the title of the overall website.

Henry, Todd. "Would You Kill Your 'Precious'?" Accidental Creative. N.p., n.d. Web. 11 Apr. 2012.

Explanation: Author (if available). "Title of Internal Page." Title of the Entire Website (from the homepage). Publisher or Sponsor (if available). Date of publication (if available),Web. Date of retrieval.

Note: Use this same format for online forums, discussion group messages, blog post comments, podcasts accessed from the Web and video blog posts (i.e., YouTube).

8.2.6.19 Social Media Posts—Twitter and Facebook

nprnews. "Digital Technologies Give Dying Languages New Life n.pr/FS72Kd." 19 Mar. 2012, 2:50 PM. Tweet.
- If available, use the author's name (last name, first name) with the username following in parentheses. Otherwise, just use the username.

8.2.6.20 E-Books

Maushart, Susan. The Winter of Our Disconnect. 2011. Amazon.com. Kindle file.
Explanation: Author. Title. Publication date. File location. Medium of file.

8.2.6.21 Article Available from an Online Source

Many libraries and companies use online services like EBSCO host to find full text articles. In your text, cite the full-text articles by using the author's last name. Include page numbers when available. An entry in the Works Cited section would look like this:

Yu, Han. "Intercultural Competence in Technical Communication: A Working Definition and Review of Assessment Methods." Technical Communication Quarterly 21.2 (2012): 168–86. EBSCO host. Web. 11 Apr. 2012.

Explanation: Author. "Title of Article." Title of the Hard-Copy Periodical date of original publication: page numbers, if available. Title of the database. Web. Date of access.

8.2.6.22 Article Available from an Online Periodical

Treat an article from an on-line periodical like a hard copy article. Note that you must add the medium (Web) and date of retrieval.

Wrotham, Jenna. "A Billion-Dollar Turning Point for Mobile Apps." New York Times. The New York Times Company, 10 Apr. 2012. Web. 11 Apr. 2012.
Explanation: Author. "Title of Article." Title of On-Line Periodical date of original publication. Web. Date of retrieval.

8.3 AVOIDING PLAGIARISM

8.3.1 What is plagiarism?

According to Merriam Webster to 'plagiarise' is to:
- Steal and pass off others' ideas as one's own
- Use someone material without mentioning source
- Commit literary theft
- Present an idea or concept as new which is derived or taken from an already existing source
- Once can say that it is an act of committing fraud, which involves taking or stealing others work and not giving its due credit to original author.

8.3.2 Can words and ideas be stolen?

The next pertinent question is that can someone stole our words and idea, the answer is 'yes'. The ideas are originally considered intellectual property and they are always protected by copy rights, the way original inventions are protected. All forms and manifestations come under copy right protection as long as they are written in a book and in a computer file.

8.3.3 All the mentioned ideas comes under plagiarism

- Claiming someone else ideas/work as your own
- Taking someone else ideas and copying them without credit the original author
- Failing to cite reference in text or failing to use quotation marks
- Putting incorrect information about original source
- Changing the original words and coping other's sentence structure without mentioning original author

In many cases the author can avoid plagiarism by citing original sources, and by acknowledging that this material is borrowed and at the same time provide the reader the source, which is enough to avoid plagiarism. See the section above of citing reference.

8.3.4 Techniques avoiding plagiarism

8.3.4.1 Planning the writing draft

Planning the writing draft is the first and foremost thing in order to avoid plagiarism. If there is a need to include external sources in your paper/thesis then you should know how to include them and you should plan it. In this way the writer can make out a balance between his ideas and borrowed ideas. A clear outline and a statement of thesis can help the writer to strike a balance and find boundaries between the two. To what extent the writer will employ his own ideas and to what degree he would incorporate his own ideas.

8.3.4.2 Consult your instructor

If you are not clear about plagiarism the help of supervisor could be taken in order to make things clear. If there are unanswered questions in your mind the

supervisor can play his/her part to answer them. There is always a manual or guidelines given by the university or the supervisor, the student needs to read them out carefully before embarking ahead. If they are properly followed there could be lesser problems for the students.

8.3.4.3 Taking notes

One of the best methods to avoid plagiarism is to take effective notes from the material the researcher has collected. The writing stage comes very late, first the writer has to make certain observation and jot important points about the given subject. When all the important points have been written and their sources have been laid down then the writer can prepare the first draft of his writing. This is the best way to defeat someone else' writing style and copying his material. If there are more than one source, the writer can use different colours and colour pencils to distinguish among all the sources.

8.3.4.4 In case of doubts, cite source

The writer must take credit of his own ideas and concepts. He must avoid the impression that he has taken all ideas from outsides and there is nothing new he has expressed. Sometimes it becomes really unclear whether the ideas you have taken are you own ideas or you have taken them from somewhere else. The writer must make his impression strong rather than weakening his stance by following the certain instructions:

The writer must demonstrate that he has not only taken other ideas but has added more information to them.

He must highlight the ideas which has been originally used by him and created by him and which he has taken from other sources.

8.3.4.5 Making it clear who said what

Whenever you cite sources there must not be any ambiguity that can create confusion and hint out about being at the sight of plagiarism. There should be a clear distinction between your originals ideas and borrowed ideas and their sources. If there is only one person being discussed the use of pronoun must be very clear that the reader must not get confused over identifying it. For example if the writer writes about T. S. Eliots' opinion on Shakespeare, "He has superbly portrayed the situation prevailing in the society" who is he in this sentence, either T.S. Eliot, or Shakespeare? It is the responsibility of the writer to make it clear what he is talking about and who is he talking about.

8.3.4.6 Knowing the art of paraphrasing

The aim of a paraphrase is to restate the original in your own words. This means that the vocabulary and the sentence structure used in the paraphrase must differ significantly from the used in original. For this reason paraphrasing requires a good vocabulary and a good understanding of sentence structure. If the vocabulary and the sentence structure of your paraphrase closely resemble that of the original, you will leave yourself open to a charge of plagiarism. While a paraphrase may be just as long as the original, it should be clearer and more easily understood. There is no point in paraphrasing if the paraphrase if more difficult to understand than the original. The source of the material that is paraphrased must be clearly acknowledged in your text. In many disciplines, paraphrasing is not encouraged. It is better to use a short direct quotation that is supported or rejected through the use of your own examples or arguments.

8.4   EXERCISE

Q.No.1   How can you write footnotes?
Q.No.2   Describe in detail APA referencing method.
Q.No.3   Explain in detail the MLA citation Method.
Q.No.4   What are different techniques to avoid plagiarism?

8.5   BIBLIOGRAPHY

Coley. S. M.. & Scheinberg, C. A. (2000). Proposal Writing. Thousand Oaks, Calif: Sage Publications.

Crotty. M. (2003). The Foundations of Social Research: Meaning and Perspectives in the Research Process, London: Sage Publications, 3rd edition.

Dodd. J. D. ed. (1986). The ACS Style Guide, American Chemical Society, Washington, DC.

Geever. J. C. & Foundation Center. (2012). The Foundation Center's Guide to Proposal Writing. New York: Foundation Center.

Goldstein. N. E. (1993). The Associated Press Stylebook and Libel Manual, The Associated Press, New York.

Guba & Lincolin (1989). Fourth Generation Evaluation. London: SAGE Publications.

Riordan. D. G. (2014). Technical Report Writing Today. Boston, MA: Wadsworth, Cengage Learning.

Unit-09

AVOID THESE TECHNICAL WRITING MISTAKES

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195

CONTENTS

INTRODUCTION

A technical writer does know how to overcome some very common mistakes due to various reasons. In this unit there is a dozen common problems, including poor organization, inappropriateness for the audience, "technicalese," long sentences, big words, inconsistent usage, redundancy, a poorly defined topic, and inadequate content.

OBJECTIVES

After going through this unit, you will be able to:
1. Organize the writing
2. Read the reader
3. Overcome the lengthy sentences and big words
4. Understands the writer's block

9.1 PROBLEM IN TECHNICAL WRITING

The average people are unable to write clear and lucid prose. He or she may know the basics sentence structure grammar, punctuation, and exposition. However, most people have just a few poor stylistic habits that mar their technical writing resultantly making it dull and difficult to read.

Why do people write so poorly? Many people do not give proper attention to that writing, thinking if time consuming, unimportant, and unpleasant. There is lack of confidence in their ability to communicate. They don't know how to get started. There is a third group who has the desire to write well, but lacks the proper training.

Here are most common problems in technical writing and a technique provides tips on how to recognize them and how to solve them.

1. **Poor Organization**

   The poor organization is the most common problem in writing. It is observed that poorly organizaed content is dull and boring for the reader. A reader goes only through it if it is important to him. There's no way to make sense of dull content with lengthy sentences and big words..

   Poor organization stems from poor planning. A computer programmer can write a complex program by first drawing a flow chart. For this he would probably knock out a draft of a user's manual by making notes or an outline. In the same way, a builder who requires detailed blueprints before laying the first brick. A writer will write a letter by considering the message, audience, or purpose.

   It is better to plan before start writing. You create a rough outline that spells out the contents and organization of you paper or report. The outline need not be formal. A simple list, doodles, or rough notes will do. Use whatever form suits you.

   By the time you finish writing, some things in the final draft might be different from the outline. The outline is a tool to and in organization, not a commandment etched in stone. If you want to change it as you go along, fine.

   The outline helps you divide the writing project into many smaller, easy-to-handle pieces. The organization of these parts depends on the type of document you're writing.

In general, it is best to follow the standard formats. A laboratory report, for example, includes an abstract, table of contents, summary, introduction, main body (theory, apparent and procedures, results, and discussions), conclusions and recommendations, nomenclature; references; and appendices. An operating manual includes a summary, introduction, description of the equipment. Instructions for routine operation, trouoperation, and an appendix containing a parts list, spare-parts list, drawings, figures, and manufacturer's literature.

If the format isn't strictly defined by the type of document you are writing, select the organization scheme that best fits the maternal. Some common formats include.

- **Order based on location.** An article on the planets of the solar system might begin with Mercury (the planet nearest the sun) and end with Pluto (the planet farthest out).
- **Order based on increasing difficulty.** Computer manuals often start with the easiest material and, as the user masters basic principles, move on to more complex operations.
- **Alphabetical order.** This is a logical way to arrange a booklet on victims (A, B-3, B-12, C, D, E, and so on) or a directory of company employees.
- **Chronological order.** Here you present the facts in the order in which they happened. History books are written this way, as are many case histories, feature stories, and corporate biographies
- **Problem solution.** Another format appropriate to case histories and many types of technical reports, the problem/solution scheme begins with "Here's what the problem was" and ends with "here's how we solved it."
- **Inverted pyranud.** This is the style used in newspapers, where the lead paragraph stunmarizes the story and the following paragraphs present the tracts in order of decreasing importance. You can use this format in journal articles, letters, memos, and reports.
- **Deductive order.** You can start with a generalization, then support it with particulars scientists use this format in research papers that being with the findings and then state the supporting evidence.
- **Inductive order.** Another approach is to begin with specific in stances, and then leads the reader to the idea or general principles the instances suggest. This is an excellent way to approach trade journal feature stones.

- **List,** A list is a series of words or numerals such as list of the names of persons or objects. You are now reading a list article because it is described, in list form, the most communion problems in technical writing. A technical list article might be titled "Six Tips for Designing Wet scrubbers" or "Seven Ways to Reduce your Plant's Electric Bill."

2. Misreading the Reader

Written communications are most effective when they are targeted and personal. Writing should be built around the needs, interests, and desires of the reader.

Most technical documents articles, papers, manuals, reports; brochures are for many readers and not for an individual. Even though we don't know the names of our readers, we need to develop a picture of which they are their job title, education, department and interests.

A person's job influences his perspective service, or idea. Are you writing for plant engineers? Office managers? CEOs? Machinists? Make the tone and content of your writing compatible with the professional interests of your readers.

- Education. Are your readers PhDs or high-school dropouts? Are they chemical engineers? Do they understand computer programming, thermodynamics, physical chemistry, and the calculus of variations? Write simply enough so that even the least technical of your readers can understand what you are saying.

- "Is your reader interested or disinterested? Friendly or hostile? Receptive or resistant? Understanding the reader's state of mind helps you tailor your message to meet that person's needs.

If you don't know enough about your reader, there are ways to find out. If your are writing an article for a trade journal, for example, get several copies of the magazine and study it before your write. If you are presenting a paper at a conference, look at the conference brochure to get a feel for the audience who will be attending your session. If you are contributing text to product descriptions, ask the marketing or publications department about the format in which the material will be published, how it will be distributed and who will be reading it.

3. Writing in "Technicalese"

Anyone who reads technical documents knows the danger of "technicalese" the pompous, overblown style that leaves your writing sounding as if it were written by a computer or a corporation instead of a human being. "Technicalese," is language more complex than the concepts it serves to communicate. By loading up their writings with jargon, clichés, antiquated phrases, passive sentences, and an excess of adjectives, technicians and bureaucrats hide behind a jumble of incomprehensible memos and reports.

To help you recognize "teclncalese," a few samples from diverse sources in Table 1. Note how the authors seem to be writing to impress rather than to express.

Table 1. Avoid "Technicalese" Such as This
"Will you please advise me at your earliest convenience of the correct status of this product? Memo form an advertising manager.
All of the bonds in the above described account having been heretofore disused of, we are this day lerminating same. We accordingly enclose herein check in the amount of $ 30.050 same being your share realized therein, as per statement attached." Letter from a stockbroker.
This procedure enables users to document data fields described in master files that were parsed and analyzed by the program dictionary." Software user's manual.

Table 2. Use the active voice to make your writing more direct and vigorous.	
Passive Vice	**Active Voice**
Control of the bearing-oil supply is provided by the shut off valves.	Shutoff valves control the bearing-oil supply.
Leaking of the seals is prevented by the use of O-rings.	O-rings keep the seals from leaking.
Fuel-cost savings were realized through the installation of thermal insulation.	The installation of thermal insulation cut fuel costs.

How do you eliminate "technicalese" from you writing? Start by avoiding jargon. Don't use a technical term unless it communicates your meaning precisely. Never write "mobile dentition" when "loose teeth" will do just as well. When you avoid

jargon, your writing can be easily read by novices and experienced professionals alike.

Use contractions. Avoid chches and antiquated phrases. Write simply.

Use the active voice as much as possible. In the active voice action is expressed directly. "John performed the experiment" In the passive voice the action is indirect. "The experiment was performed by John."

When you use the active voice, your writing will be more direct and vigorous, your sentences, more concise. As you can see in the samples in Table 2, the passive voice seems puny and stiff by comparison.

4. Lengthy Sentences

Lengthy sentences confuse the reader and make your writing hard to read. The sentences become difficult to understand when they exceed 34 words in length.

First, determine the average sentence length in a short (100 to 200 words) writing sample. To do this, divide the number of words in the sample by the number of sentences. If parts of a sentence are separated by a semicolon (;), count each part as a separate sentence.

Next, calculate the number of big words (words with three or more syllables) per 100 words of sample. Do not include capitalized words, combinations of short words (butterfly, moreover), or words that are three syllables because of the suffixes-ed-or-es (accepted, responses).

Go over your text, and break long sentences into two or more separate sentences. To further reduce average sentence length and add variety to your writing, you can occasionally use an extremely short sentence or sentence fragments.

Short sentences are easier to grasp than long ones. A good guide for keeping sentence length under control is to write sentences that can be spoken aloud without losing your breath.

5. Big Word

People sometimes prefer to use big, important-sounding words instead of short, simple words. This is a mistake; fancy language just frustrates the reader. Write in plain, ordinary. English and your readers will love your for it.

There is a list of big words in the following table that occur often in technical literature, along with shorter and preferable, substitutions:

Table 3. Use short words instead of long ones	
Big Word	Shorter Alternative
Terminate	End
Utilize	Use
Incombustible	Fireproof
Substantiate	Prove
Biminate	Get Rid Of
Penury	Dire Poverty
Nostalgia	Homesickness
Clandestine	Something Kept Secret
Lecher	Immoral Person
Enervate	Exhaust
Vegetate	Stagnate
Alleviate	Lessen
Vacillate	Waver
Obsequious	Excessively Polite
Querulous	Complaining
Dolorous	Sorrowful

Technical terms are helpful shorthand when you're communicating within the profession, but they may confuse readers who do not share your special background.

Take the word "yield, for example;. Yield is a measure of how much product a reaction produces. But, to car drivers, yield means slowing down (and stopping, if necessary) at an intersection.

Other words that some people have special meaning to but have a different definition in everyday use include vacuum, pressure, batch, bypass, recycle, concentration, mole, purge, saturation, and catalyst.

Use legitimate technical terms when they communicate your ideas precisely, but avoid using jargon just because the words sound impressive. Do not write that material is "gravimetrically conveyed" when it is simply dumped.

Technical readers are interested in detailed information-facts. Figures, conclusions, and recommendation is do not be content to say something is good, bad, fast, or slow when you can say how goods, how bad, how fast, or how a slow. Be specific whenever possible, as shown in Table 4.

Table 4. Be as specific as possible in technical descriptions.	
General	Specific
A Tall spray dryer	A 40-ft-tall spray dryer
Plant	Petroleum refinery
Unit	Evaporator
Unfavorable weather conditions	Rain
Structural degradation	A leaky roof
High performance	95% efficiency

The key to success in technical writing is to keep it simple. Write to express-not to impress. A relaxed, conversational style can add vigor and clarity to your work, as illustrated in table 5.

Table 5. Keep it simple by using an informal conversational style.	
Formal Technical Style	Informal Conversational Style
The data provide by direct examination of samples under the lens of the microscope are insufficient for the purpose of making a proper identification of the components of the substance.	We can't tell what it is made of by looking at it under the microscope.
We have found during conversations with customers that even the most experienced of extruder specialists have a tendency to avoid the extrusion of silicone profiles or hoses.	Our customers tell us that experienced extruder specialists avoid extruding silicone profiles or hoses.
The corporation terminated the employment of Mr. Joseph Smith.	Joe was fired.

6. Writer's Block

Writer's block isn't just for professional writers; it can afflict educationist and manager, too. Writer's block is the inability to start putting words on paper or computer, and it stems from anxiety and fear of writing.

When technical people write, they're afraid to make mistakes, and so they edit themselves word by word, inhibiting the natural flow of ideas and sentences. Professional writers know that writing is a process consisting of numerous drafts, rewrites, deletions, and revisions. Rarely does a writer produce a perfect manuscript on the first try.

Here are a few tips to help you overcome writer's block.

- Break the writing up into short sections, and write one section at a time. Tacking many little writing assignments seems less formidable a task than taking on a large project all at once. This also benefits the reader. Writing is most readable when it deals with one simple idea rather than multiple complex ideas. Your entire paper can't be simple or restricted to one idea, but each section of it can.
- Write the easy sections first. If you can't get a handle on the main argument of you report or paper, begin with something routine, such as the section on "apparatus" or Procedures" this will get you started and help build momentum.
- Write abstracts, introductions, and summaries last. Although they come first in the final document, it doesn't make sense to try to sum up a paper that hasn't been written yet.
- Avoid grammar-book rules that inhibit writers. One such rule says every paragraph must being with a topic sentence (a first sentence that states the central idea of the paragraph. By insisting on topic sentences, teachers and editors throw up a block that prevents students from putting their thoughts on paper. Professional writers don't worry about topic sentences (or sentence diagrams or ending a sentence with a preposition). Neither should you.
- Sleep on it. Put your manuscript away and come back to it the next morning-or even several days later refreshed, you'll be able to edit and rewrite effectively and easily.

7.   Poorly Defined Topic

Effective writing begins with a clear definition of the specific topic you want to write about. The big mistake many writers make is to tackle a topic that's too broad. For example, the title "Project Management" is too all-encompassing for a technical paper. You could write a whole book on the subject. But, by narrowing the scope, say, with the title "Managing

Chemical Plant Construction Projects with Budgets under Rs500, 000," you get a clearer definition and a more manageable topic.

It's also important to know the purpose of the document. You may say. "To give technical information." But think again. Do you want the reader to buy a product? Change methods of working? Look for the underlying purpose beyond the mere transmission of facts.

8. Inadequate Content

You have defined your topic, audience, and purpose. The next step is to do some homework, and to gather information on the topic at hand. When they are writing a trade journal article, for example, their attitude is, "I'm the expert there. So I'll just rely on my own experience and know-how."

That is a mistake. Even though you're an experts, your knowledge may be limited, your viewpoint lopsided. Gathering information from other sources helps round out your knowledge or, at the very least, verify your own thinking. And there is another benefit; backing up your claims with facts is a real credibility builder.

Once you have crammed a file folder full of reprints and clippings, take notes on index cards or a computer. Not only does note-taking put the key facts at your fingertips in condensed form, but reprocessing the research information through your fingers and brain puts you in closer touch with your material.

9. Starting Writing

Once you gather facts and decide how to organize the piece, the next step is to sit down and write. When you do, keep in mind that the secret to successful writing is rewriting.

You don't have to get it right on the first draft. The pros rarely do E. B. White, essayist and co-author of the writer's resource book "The Elements of Style," was said to have rewritten every piece nine times.

Maybe you don't need nine drafts, but you probably need more than one. Use a simple three-step procedure that is called SPP-Spit, Prnne, and Polish. When you sit down to write, just spit it out. Don't worry about how it sounds, or whether the grammar's right, or if it fits your outline. Just let the words flow. If you make a mistake, leave it. You can always go back and fix it later. Some writers find it helpful to talk into a tape recorder or dictate to an assistant. If you can type and have a personal computer, great. Some old-fashioned folks even use typewriters or pen and paper.

In the next step, pruning, print out your first draft (double-spaced, for easy editing) and give it major surgery. Take a red pen to the draft and cut all unnecessary words and sages to make them smoother, but if you get stuck, leave it and go on, come back to it later. Use your word processing program's cut-and-paste feature to cut the draft apart and reorganize to fit your outline of to improve on that outline. Then, print out a clean draft. Repeat the pruning step, if necessary, as many times as you want.

In the final stage, polish your manuscript by checking such points as equations, units of measure, references, grammar, specking, and punctuation. Again, use the red pen and then print out a fresh copy with corrections.

10. Inconsistent Usage

"A foolish consistency," wrote Ralph Waldo Emerson "Is the hobgoblin of little minds". "This may be so, but, on the other hand, inconsistencies in technical writing will confuse your readers and convince them that your scientific work and reasoning are as sloppy and unorganized as your prose.

Good technical writers strive for consistency in the use of numbers hyphens, units of measure, punctuation, equations, grammar, symbols, capitalization, technical terms, and abbreviations.

For example, many writers are inconsistent in the use of hyphens. A common rule is two words that form an adjective are hyphenated. Thus, write; first-order reaction, fluidized bed combustion, high-sulfur coal, space-time continuum.

The organization's writing manual can guide you in the basics of grammar, punctuation, abbreviation and capitalization.

11. Dull, Wordy Prose

Technical professionals are busy people. Make your writing less time-consuming for them to read by telling the whole story in the fewest possible words.

How can you make your writing more concise? One way is to avoid redundancies-a needless form of wordiness in which a modifier repeats an idea already contained, within, the word being modified.

For example, a recent trade ad described a product as a "new innovation" Could there be such a thing as an old innovation? The ad also said the product was "very unique" Unique means "One of a kind," so it is impossible for anything to be very unique.

By now, you probably get the picture. Some other redundancies that have come up in technical literature are listed in Table 6. Along with the correct way to rewrite them.

Table 7. Substitute simple words for wordy phrases	
Wordy Phrase	Suggested substitute
During the course of	During
In the form of	As
In Many cases	Often
In the event of	If
Exhibits the ability to	Can

The list in Table 7 includes some of the wordy phrases that appear frequently in technical literature. The column on the right offers suggested substitutes.

Table 8. Use Graphics Effectively.	
Type of Visual	What it illustrates
Photograph or illustration	What something looks like
Map	Where something is located
Exploded View	How something is put together
Schematic Diagram	How something is organized
Graph	How much there is (quantity): How one parameter Varies as a function of another
Pie chart	Proportions and percentages
Bar Chart	Comparisons between quantities
Table	A body of related data
Mass and energy balances	What goes in and what comes out

12. Poor Page Layout

To enhance readability, break you writing up into short sections. Long, unbroken blocks of text are stumbling blocks that intimidate and bore readers breaking your writing up into short section is and short paragraphs as in this article makes it easier to read.

Use visuals, Drawings, graphs, and other visuals can reinforce your text. In fact, pictures often communicate better than words; we remember 10% of what we read, but 30% of what we see.

Visuals can make your technical communications more effective Table 8 summarizes the different types of graphics and what they can show

Table 6. Avoid Redundancy	
Redundant	Concise
Advance Plan	Plan
Actual Experience	Experience
Two Cubic feet in volume	Two Cubic Feet
Cylindrical in shape	Cylindrical
Uniformly Homogeneous	Homogeneous

9.2 CLOSING THOUGHTS

These tips should help eliminate some of the fear and anxiety you may have about writing, as well as make the whole task easier and more productive.

Finally, keep in mind that success in writing or any form of communication is largely a matter of attitude; If you don't think writing is important' enough to take the time to do it right, and you don't really care about improving, you probably won't. However, if you believe that writing is important and you want to improve, you will.

9.3 CONCLUSION

For effective technical writing the following should be followed:
- Keep sentences short and to the point.
- Use simple subject-verb-object sentence structure.
- Avoid the use of embedded or dependent clauses.
- Use short paragraphs to allow for easier paragraph-by-paragraph interpretation.
- Avoid regional idioms or turns of phrase.
- Avoid any visual, textual, or interactive metaphors based on a specific national or social context (e.g., mailboxes and envelopes vary from country to country, so a mailbox icon that indicates "send mail" in the United States may just look like a blue box to the international visitor).
- Define technical terms as directly as possible, avoiding elaborate metaphor whenever possible.
- If you have any doubt about users' knowledge of a specific term, define it.
- Accompany all graphical buttons with a verb-based identifier (e.g., left-pointing arrow with "Go Back").
- Use the top-down strategy (tell them what you will say, then say it).

- Use headings (like headlines in newspapers)
- Use chunks (short paragraphs).
- Bstablish a consistent visual logic by making similar elements in your document look the same.
- Use a plain, unambiguous style that lets readers easily grasp details and relationships.

9.3 EXERCISE

Q.No.1   What is a poor organization in writing? How it can be overcome?
Q.No.2   What is the role of reader in technical reading?
Q.No.3   What is the technicalese in technical writing?
Q.No.4   How can you overcome on lengthy sentences and big words in technical writing?

9.5 BIBLIOGRAPHY

Bailey. S. (2018). Academic writing: A Handbook for International Students. New York, NY: Routledge.

Blake. G. and Bly, R. (1991) The Elements of Business Writing. Macmillan, New York.

Blake. G. and Bly, R. (1993). The Elements of Technical Writing, Macmillan, New York.

Shertzer. M. (1986). The Elements of Grammar, Macmillan, New York.

Swales. J. M, & Feak, C.B. (2017). Academic Writing for Graduate Students: Essential Tasks and Skills. Ann Arbor: The University of Michigan Press.

Vincler. J. E, & N. H. Vincler. (1996). Engineering your Writing Success, Professional Publications, Inc. Belmont, CA.