

CHAPTER TWO

SCIENTIFIC & TECHNICAL COMMUNICATION

DEFINITION

- “The ability to express information about scientific and technical (S&T) areas, such as engineering and basic sciences” - **INCOMPLETE**
- ✓ S&T communication involves having been exposed to **creative and expository writing**.
 - poems, stories, etc.
 - essays, editorials, letters to the editor, debates
 - express **opinions, feelings, beliefs**

HOWEVER S&T communication

- ✓ must be **based on fact**.
- ✓ requires **clear, precise, unambiguous, unemotional and non-judgmental language**.
 - opinions can be expressed - **substantiated by facts**.
 - persuasion can be exercised- **with a factual rather than emotional basis**.

S&T communication

- ✓ is always a **RESPONSE to a need such as**
 - **permission or funding**
 - a proposal to follow a specific line of research
 - a proposal to obtain grant money to do research
 - a proposal for a piece of equipment necessary to execute a specific function
 - a bid (= ihale) for permission to provide services to a company
 - **to provide information, either requested or volunteered**
 - a journal article describing research results
 - a weekly progress report requested by your supervisor
 - a cost estimate for a specific project or task
 - an oral report to the Board of Directors (= yönetim kurulu) on a new product line
 - **to answer a question or to provide alternatives**
 - a comparative study of ... to make a decision about ...

- a prospective employer might want to know why you think you are qualified for the advertised vacant position
- to provide alternatives to a company's existing process
- to explain why the ... project is unfinished
- **to provide instructions**
 - a journal article describing a new method or application
 - a manual documenting the use of new equipment
 - directions for using software

REQUIREMENTS FOR S&T COMMUNICATION (S&TC)

- ✓ The person providing the information **understands the subject** completely.
- ✓ S&TC should place **emphasis on the subject** and **NOT** on the writer.
 - **opinions** can be stated, but they must be based on **factual evidence**.
 - **interpretation** of results is not prohibited; often it is **encouraged**.
 - ✓ **focus** should remain on the topic being considered
 - ✓ the reader should know that the statement is a **personal opinion** or **interpretation** of the facts.
- ✓ S&TC should be **tailored to the need**,
- ✓ S&TC should be **efficient in presentation**,
- ✓ S&TC should be **unambiguous**.
- ✓ **Wordiness** can be avoided by
 - focusing on the subject and not wandering off the track
 - using precise, concise and effective phrasing to express information.
- ✓ Sentences must be grammatically correct, yet the author can develop his/her own style.

AUDIENCE

- ✓ S&TC can address a variety of audiences.
- ✓ Since S&TC is always tailored to a specific need, it should be presented with the audience's background in mind.
 - **recipients** of information: how many ?
 - **character** of audience: general/scientific/technical/specialized
- ✓ The **non-S&T report**, although the simplest, is the most difficult for highly trained specialists to write:
 - **S&T terminology**
 - minimized

- extensively defined
- glossary - appendix
- The report should be **clear** to the point.
- **Visual aids** are helpful.

USE AND MISUSE OF THE LANGUAGE - ELIMINATING WORDINESS AND JARGON

*When you've got a thing to say,
Say it! Don't take half a day...
Life is short - a fleeting vapor -
Don't fill the whole blamed paper
With a tale which, at a pitch,
Could be cornered in an inch!
Boil her down until she simmers,
Polish her until she glimmers. JCH*

- ✓ **Keep it simple.** Learn to appreciate the beauty of simple **declarative** sentences.

Example-1:

The experiment calls for a condenser to be connected **up** to the cold water tap. The solution should be heated **up** so that the reaction will start **up**. This occurs **at** above 77°C and the directions call for heating for one hour until the reaction is over **with**.

Example-2:

The experiment calls for a condenser to be connected **up** to the cold water tap. The solution should be heated **up** so that the reaction will start **up**. This occurs **at** above 77°C and the directions call for heating for one hour until the reaction is over **with**.

- ✓ **Tautology** - needless repetition of the same idea using different words in the same sentence.

Example-3:

true facts ⇔ **facts** are always **true**!

equally good as ⇔ if it is as **good** as, then it is **equal**!

initial beginning of the experiment ⇔ "**initial**" is the same as "**the beginning**" or "**first**"!

- ✓ **Redundancy** - the use of superfluous words that do not add to the meaning of the statement.

Example-4:

A domino is rectangular **in shape**.

A domino is black and white **in color**.

An elephant is large **in size**.

Example-5:

A domino is rectangular. ⇔ rectangular is shape!

A domino is black and white. ⇔ black and white are colors!

An elephant is large. ⇔ large describes size!

Comparative adjectives, **e. g.** (example given), more, most, less, least, can be used improperly if they modify absolute words.

Example-6:

Our result is the **most unique**.

unique ≡ "being the only one" or "single in kind"

⇒ A result can be unique **BUT NOT** most unique.

- ✓ **Imprecise/vague words** - especially when describing an event or the possibility of its occurrence.

Example-7:

- only (rarely, seldomly, infrequently, once in a while) did the reaction mixture explode...
⇔ **how often and when does it explode?**
- it is (likely/unlikely, almost certain) that the product is toxic...
⇔ **will I be poisoned if I breathe it?**
- the substance was (likely to be, almost always, frequently, usually, generally) contaminated with...
⇔ **how frequently was it contaminated?**
- the disease (tended to be, was often, was most often) fatal... ⇔ **is it fatal or not? will I live any longer or not?**

✓ **Superfluous phrases** - just superfluous... **TO BE OMITTED!**

Example-8:

As a matter of fact

As you already know

For all intents and purposes

In a manner of speaking

In my opinion

It has come to my attention

It is interesting to note that

It may be said that

It would appear that

Last but not least

The bottom line is

The statement may be made that

✓ **Overly complex words** - complex terminology

Example-9:

- securing employment ⇔ finding a job

- obscured meaning by excessive use of large words

⇒ cognitive input device in the form of a randomly accessible instantaneous-read-out batch-processed pigment-saturated laminous-cellulose hard-copy output matrix

- ★ Whenever possible substitute multi-syllabic terms with everyday language without resorting to slang or losing precision of writing.

10 GOLDEN RULES OF GOOD WRITING

- ✓ **Each pronoun** should agree with **their** antecedent.
- ✓ Just between **you** and **I**, **case** is important.
- ✓ **A preposition** is a poor word to end a sentence **with**.
- ✓ Verbs **has** to agree with **their** subject.
- ✓ **Don't** use **no** double negatives.

- ✓ Remember to never split an infinitive ($\infty \neq oo$)
- ✓ When **dangling**, don't use **participles**.
- ✓ **Join clauses** good, like a **conjunction** should.
- ✓ Don't write a **run-on sentence** it is difficult when you got to punctuate it so it makes sense when the reader reads what you wrote.
- ✓ About sentence **fragments**.

USING CORRECT PUNCTUATION

“Mother of baby strangled on ship on court”

“Baby strangled on ship; mother on court”

Period (.)

- ✓ Period indicates **complete closure** of a thought or an idea. Use a (.) at the end of a **complete sentence**.
- ✓ Use a (.) with common abbreviations: Mr. - Mrs. - Ms. - Dr. - Prof. - P.O.B. - etc.
- ✗ **However** many abbreviations used in S&T terminology do not require a period, especially those in the SI or metric systems: kg - m - sec - mL - mm - W - J - °C - Ω - N - μ F - mH - etc.

Question Mark (?)

- ✓ A question mark indicates the end of a direct question.
Why are you late to class?
- ✓ In a quote:
I asked, “Why are you late to class?”, and expected answers.

Exclamation Point (!)

- ✓ An exclamation point is used to denote surprise or signify something unexpected, unusual or overwhelming.

Archimedes shouted “Eureka!” after he discovered a way to detect the amount of gold in the crown of the king.

- ✓ An exclamation point has very limited use in S&T writing (S&TW).

Semicolon (;)

- ✓ A semicolon is used to separate two independent clauses related closely. If a semicolon is used correctly, the sentence can be rewritten by replacing (;) with “and”:

The sodium chloride completely dissolved in the new solvent; the experiment was a success. ⇔ The sodium chloride completely dissolved in the new solvent, **and** the experiment was a success.

- ✓ A semicolon is used to separate items in a series or list of items containing commas:

... potassium chloride, KCl; sodium chloride, NaCl; ...

Colon (:)

- ✓ A colon is used to warn readers that they should pay attention to a list, explanation, or quotation that follows.

Archimedes shouted: “Eureka!”

Comma (,)

- ✓ A comma indicates a brief pause in the sentence.
 - ✓ In a compound sentence, use a comma before conjunctions, such as, **and**, **for**, **nor**, **or**, and **but**.
 - ✓ When an incomplete phrase is used to introduce a sentence, set it off by a comma.
Since I started taking vitamins, I became less frequently.
 - ✓ Use a comma to list a series of items when there is no internal punctuation.

- I need to buy paper, ink, pencils and markers.
- ✓ Use a comma to emphasize the meaning in a sentence.
Except for the laboratory, **room space** was limited.
Except for the laboratory room, **space** was limited.

Apostrophe (')

- ✓ An apostrophe indicates a contraction or omission of letters.
- ✗ However, do NOT confuse contractions with possessive pronouns. **It's** means **it is**, but **its** is possessive; **who's** means **who is**, but **whose** is possessive.
- ✓ Use an apostrophe to indicate ownership when a proper name is involved.

Einstein's theory of relativity ...

Maxwell's Equations...

Jones' car ...

Quotation Marks ("...")

- ✓ Use quotation marks for direct quotes.

Archimedes shouted: "Eureka!"
I asked, "Why are you late to class?", and expected answers.
- ✓ Quotation marks are used to show that some words are being used in a special or new way.

I am not sure who first called the phenomenon "acid-rain".

unique ≡ "being the only one" or "single in kind"

SELECTING THE APPROPRIATE VERB

- ✓ Verbs can be a major problem in S&TW. The most common errors are
 - ★ use of wrong tense
 - ★ use of wrong voice
 - ★ artificial creation of a verb from a noun

Tense

- ✓ In S&TW a verb's tense has more importance than most people realize.
 - ★ When the **information** presented in a S&T document is **part of the established knowledge**, the **present tense** should be used.
 - ★ Previously **published material** is acknowledged in the same way.
 - Einstein stated that mass **can be converted** into energy.
- ✓ In a typical S&T document, use the **present tense** predominantly in the **INTRODUCTION** where **background information** (previously established knowledge) is being given.
- ✓ Use the **present tense** for most of the content in the **DISCUSSION** or **CONCLUSION** sections.
- ✓ In the rest of the S&T document (**MATERIALS AND METHODS, FINDINGS, RESULTS**), use primarily the **past tense**. The reason for past tense is that you are describing **what you did**.

Voice

- ✓ In a typical S&T document, choose the **active voice** as frequently as possible; it is
 - more direct
 - less ambiguous
 - less awkward (less wordy)
 - easier to use than the passive voice
- ✓ In a typical S&T document, choose "we" or "I" - it leads to a more straightforward presentation.
- ✓ When you make a **choice** between the active and the passive voice, think about what you want to **emphasize** in the sentence.
 - My **car** hit the tree.
 - The **tree** was hit by my car. - **Is the tree responsible** for the accident!?
 - ★ If you want to emphasize your subject, use the passive voice.
- ✓ Use the **passive voice** whenever the "**acting source**" or the "**agent**" is **not known** or is **not important** to the topic.

Example-10:

- The samples were maintained at ✓°C for 2✓ hours.

AND NOT

- The refrigerator maintained the samples at ✓°C for 2✓ hours.

Example-11:

- The computer was stolen overnight.

AND NOT

- Someone stole the computer overnight.

- ✓ **Business letters** should **NOT** contain many **passive constructions**. However, they often do to conceal the active person or the agent.

Example-12:

- **It was decided** that your position would be terminated (you are fired).
- **By whom?**

Example-13:

- Your TL 1.000.000.000 **was placed** in a wrong bank account.
- **By what idiot?**

- ✓ Use the **active voice** when **action is required** or when **specifying instructions**:

Example-14:

- **Stir** the solution until it turns green.

AND NOT

- The solution **should be stirred** until it turns green.

Example-15:

- I will notify your supervisor if my order is not delivered soon.

AND NOT

- Your supervisor will be notified if my order is not delivered soon.

Artificial or Contrived Verbs

- ✓ The world of business and technology is notorious for creating new complex verbs to replace simple ones.
 - He **keyboarded** the entries.
IS A LOT LESS CLEAR THAN
 - He **typed** the entries **into the computer**.

OR

- He **typed** the entries **on the keyboard**.

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