

Unit 3

Correct Usage and Mechanics of Style

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Scientific writing is clear, correct, and concise. To write well in science, we have to practice writing effectively. It is a skill that can be honed through constant practice of correct usage and widely-accepted style of writing in science.

Correct usage refers basically to grammar, the system of rules implicit in a language; and mechanics of style refers to the use of abbreviation, numbers, symbols, word forms, capitals, italics, and punctuation (Mills and Walter, 1990). Form, layout, and bibliographical forms are also included in mechanics of style, but they will be discussed separately in the scientific proposal and report.

Objectives

At the end of this unit, you should be able to:

- Identify the common errors of usage in scientific and technical writing;
- Improve and correct these errors;
- List some dependable rules and widely-practiced mechanics of style in scientific writing; and,
- Adapt the rules and style prescribed by the unit in the writing of scientific papers.

Common Errors in Usage

Instead of reviewing all the rules of grammatical usage, only those frequently-committed errors of usage in scientific and technical communication will be discussed in this unit.

Special Subject-Verb Relationships. The subject of a sentence must agree with the verb in number. Simply put, if the subject is singular, the verb must also be singular. If the subject is plural, the verb must also be plural. However, the problem arises when the subject is essentially plural in form but is grammatically treated as singular.

The following are some grammatical rules pertaining to special subject-verb relationships:

1. Compound subjects joined by **and** take a plural verb, **except** when both subjects refer to the same person or they are thought of as a single entity.

Examples:

- The student and the teacher **agree** to meet on Saturday for their make-up class.
- The owner and the manager of the store **is** the mayor of the town.
- Bread and butter **is** my usual breakfast food.

2. Singular subjects joined by *or* or *nor* take plural verbs.

Examples:

- Either a check or a postal money order **is** accepted as payment.
- Neither the boss nor the clerk **is** in the office.

3. Plural subjects joined by *or* or *nor* take plural verbs.

Examples:

- Neither the **parents** nor the **children are** interested in the lecture on fire prevention.
- Either the **girls** or the **boys are** coming to the school party.

4. If the subjects joined by *or* or *nor* differ in number, the verb agrees with the subject nearer to it.

Examples:

- Neither the mother nor her **children know** the plan for their summer vacation.
- Neither the children nor their mother **knows** the plan for their summer vacation.

5. A singular subject followed by words or phrases such as *in addition to*, *together with*, *as well as*, *along with*, and *coupled with* takes a singular verb in formal writing.

Examples:

- The tour guide, **together with** the tourists, visits the UPLB Museum of Natural History.
- Tact, **as well as** patience and grace, **is** essential to a leader.

6. Indefinite pronouns such as **everyone**, **everybody**, **everything**, **each**, **either**, **neither**, **one**, **no one**, **somebody**, **little**, and **much** are always singular.

Examples:

- Each of the candidates in the beauty contest **has** her good points.
- Every student, teacher, and parent **is** required to come to the PTA meeting.

- **Is** either of them around?
7. Plural nouns of amount and distance, when they are used as singular units of measurement, take singular verbs.

Examples:

- A hundred dollars **was** needed to buy a new table.
 - Thirty kilometers **is** a long walk.
 - Twenty years in the teaching profession **is** enough to build character.
8. A collective noun is considered singular when the group is regarded as a unit; it is plural when the individuals of the group are referred to.

Examples:

- The audience was very happy last night.
 - The audience are returning to their seats.
9. **The number** always takes a singular verb; **a number** always takes a plural verb.

Examples:

- The number of street children **is** increasing in Manila.
 - A number of reasons were cited for drug addiction.
10. Relative pronouns such as who, whom, whose, which, and that may require a singular or plural verb depending on the antecedent of the relative pronoun.

Examples:

- This is one of the **parts** which **require** repair.
 - One of the main errors which **were** cited in the cardio-vascular training of the athletes was the erratic training schedule.
11. Quantifiers, including percentages and fractions, are singular when used alone, except when other parts of the sentence require the plural sense.

Examples:

- Two-thirds of the employees **were** dismissed from their work.
- Three-fourths of the land **has** been converted into a subdivision.
- Seventy percent of the farmer-respondents are tenants.

Dangling Modifiers

A dangling modifier is one which has nothing to modify logically or grammatically, or one which seems to modify a word it cannot possibly modify. In technical and scientific writing, dangling participial and dangling infinitive phrases are very common because of the difficulties of describing action in passive voice.

1. Dangling Verbal Modifiers

Examples:

- a) After connecting lead A to pin 1 of the second tube, the other lead (B) is connected to pin 2. (Who connects the lead to pin 1 and 2?)

Revision:

After connecting lead A to pin 1 of the second tube , **the technician** connects the other lead (B) to pin 2.

- b) Upon entering the artist's office, the oil painting caught my attention. (Who entered the artist's office?)

Revision:

- As I entered the artist's office, the oil painting caught my attention.

2. Dangling Infinitive Modifier

Examples:

- a) To start the motor, the starter button must be depressed.

Revision:

- To start the motor , **the driver** must depress the starter button.

- b) To achieve a mix of proper consistency, more sand must be added.

Revision:

- To achieve a mix of the proper consistency, **the laborer** must add more sand to the cement.

c) After drying for three days under the sun, the laborer again sprays the concrete with water.

Revision:

- After drying the concrete for three days under the sun, the laborer again sprays it with water.

d) After taking in a constant flow of oil for two days, the supervising engineer will note that the tanks are nearly full.

Revision:

- After the tanks have taken in a constant flow of oil for two days, the supervising engineer will note that they are nearly full.

Lack of Parallelism

Parallelism means the use of similar grammatical structures in writing clauses, phrases, or words expressing ideas or facts which are roughly equal in value.

➤ Parallelism in Word Form

Examples:

1. The proposal was **accurate** and **can easily be read**. (The proposal was accurate and readable.)
2. Research is **tedious**, but **it has many rewards**. (Research is tedious but rewarding.)

➤ Parallelism in Phrases

Examples:

1. The scientific method involves observation, identification and statement of the problem, formulation of the hypothesis, experimentation, and **concluding**. (... statement of conclusion.)
2. Abused children commonly exhibit the following symptoms: withdrawal from society, restlessness in sleep, and **they are depressed in daily activities**. (...depression in daily activities.)

➤ Parallelism in Clauses

Examples:

1. **That** U.S. products are more durable than others and this durability has been tested have been cited by international consumers. (**That** U.S. products are more durable than others and **that** this durability has been tested have been cited by international consumers.)
2. I was worried that the driver would drive fast, that the road will be too slippery, and **that we will be stopped by the traffic police.** (... and that the traffic police will stop us.)

Note:

Lack of parallelism may sometimes be due to the shift in point of view.

Example:

First, I shall raise the disadvantages of using passive voice; next, the advantages of active voice will be considered. (First, I shall raise the advantages of using passive voice; next, the advantages of active voice.)

Basic Principles For Clear and Effective Technical/Scientific Writing

1. **Know your reader. Use a vocabulary level appropriate for your reader.** The purpose of technical/scientific writing is to affect or influence. Thus, the reader is always important. However, research shows that some scientist-writers overestimate reader vocabulary when they write for people outside their disciplines and for non-scientists. Too often, readability index of technical reports is high that effective communication fails.

Examples:

- a) A sonnet is a verse composed of 14 lines of iambic pentameter. (A sonnet is a poem with 14 lines showing in each line five pairs of unaccented and accented syllables.)
- b) A homozygote is a zygote that has a homologous gamete. (A homozygote is a cell derived from the union of parent cells that have similar number of chromosomes.)

2. **If you are not certain that your reader will understand a technical term, use the term accompanied by a more common synonym, or a definition.**

Examples:

- a) **Lobotomy**, the surgical incision into a lobe, is a common practice in medicine.
- b) Many people are interested in **horoscopy**, the reading of a person's future based on astrological signs.

3. **Write clear and short sentences.** As a general rule, every sentence must express one thought only. If the sentence is quite long, it can be improved by satisfying these guidelines:

- a) Make the ideas conceptually related.
- b) Sequence the ideas logically.
- c) Make the main idea easy to find.
- d) Put the subject and the verb as close as possible to each other.
- e) Use commas to attach modifiers to the main clause.
- f) Use active voice.

Example:

The classification of the respondents and their characterization were accomplished by the consideration of their participation in the community activities in the population and their contribution to the upland development, also within the population.

Revision:

The researcher classified and characterized the respondents based on their community work and contribution to upland development.

4. **Eliminate waste words.** Write more concisely by omitting redundant combination of words. Prefer single words and simple ones,

a greater number of	more
a number of	several
a small number of	few
a sufficient number of	enough
tendered her resignation	resigned
joined in holy matrimony	married
due to the fact that	because/due to
for the purpose of	for
in the absence of	without
in the presence of	with
it is possible that	might/possibly
as the same time as	during

within the perimeter	in/inside
out of the perimeter	outside
call attention to the fact that	note
adequate	enough
assist	help
at this point in time	now, at present
along the lines of	like
active participation	participation
acute crisis	crisis
all of	all
around the world	worldwide
are found in cultivation	are cultivated
a decreased number of	fewer
at a rapid rate of speed	rapidly
at the present time	now, at present
a very limited number of	few
an enumerable amount of	tiny
a majority of	most
a number of	many
accounted for by the fact	because
an order of magnitude faster	10 times faster
are of the same opinion	agree
as a consequence	because
as of this date	today
at an earlier date	earlier, previously
based on the fact that	based, because
beneficial	helpful
by means of	of
blue in color	blue
commence	begin
circular in shape	circular
close proximity to	near
conducts an examination	examine
completely eliminated	eliminated
completely full	full
connected together	connected
despite the fact that	although
due to the fact that	because, since
during the course of	during
during the time that	while
affect an alteration	change
elucidate	explain
employ	use
end result	result
endeavor	try
exerts a lethal effect	kills

fabricate
 fewer in number
 finalize
 first of all
 for that reason that
 for the purpose of
 frequently
 from the point of view of
 for the purpose of
 give rise to
 has the capability of
 having regard to
 hold a meeting
 inasmuch as
 in accordance with
 in attendance at
 initiate
 in order to
 inquire
 in some cases
 in the event that
 in the initial instance
 in the very near future
 in the nature of
 in a satisfactory manner
 in today's modern society
 in length
 in many cases
 inundate
 in view of the fact that
 in the event of
 in all cases
 in close proximity to
 in consequence of this fact
 in this day and age
 is equipped with
 it is apparent that
 it is clear that
 it would thus appear that
 in a number of cases
 in a position to
 in a satisfactory manner
 in case
 in connection
 in relation to
 in some cases

make
 fewer
 end
 first
 because, since
 to
 often
 for
 to, for
 cause
 can
 about
 meet
 because, since, for, as
 by, under
 attend
 begin
 to
 ask
 sometimes
 if
 at first
 soon, promptly
 like
 satisfactorily
 today
 long
 often
 flood
 since, because
 if
 always
 near, close
 therefore
 today, now
 has
 apparently
 clearly
 apparently
 some
 can, may
 satisfactorily
 if
 close, near
 toward, to
 sometimes

in terms of	about
in the possession of	has, have
initiate	begin, start
is defined as	is
it is clear that	clearly
it is possible that	possibly
it is evident that a produced b	a produced b
it is often the case that	often
it may, however, be noted	but
lacked the ability to	couldn't
large in size	large
large number of	many
magnitude	size
militate against	prohibit
obtain	get
an account of	because
on behalf of	for
on the basis of	by
on the part of	by, among, for
of great importance	important
on a prior occasion	before
on the ground that	because, since
on the order of	about
on the basis of	by
pass away	die
perform	do
pooled together	pooled
prior to	before
protein determinations were performed	proteins were determined
purchase	buy
quite unique	unique
rather interesting	interesting
red in color	red
referred to as	called
relative to	about
refer back	refer
remunerate	pay
repeat again	repeat
request	ask
seven in number	seven
showed higher value	was higher
state of the art	most up to date, advanced
subsequent	next
subsequent to	after
sufficient	enough
surrounded on all sides	surrounded

smaller in size	smaller
take into consideration	consider
the avoidance of	avoiding, avoid
the present paper	this paper
tiny veins	veins
terminate	end
the great majority of	most
the question as to whether	whether
this result would seem to indicate	this result indicates
through the use of	by, with
ultimate	last
until such time as	until
utilize/utilization	use
was found to be lacking	was lacking
was of the opinion that	believed
we wish to thank	we thank
whether or not	whether
which resembles in nature	like
with a small amount of effort	easily
with a view to	to
with reference to	about
with regard to	concerning, about
with respect to	about
with the possible exception of	except
with the result that	so that

5. Omit the phrase or words in time, quantity, or dimension when they are already expressed or can be assumed to avoid needless repetitions.

Examples:

- a) The farmer has the unused **time of** 30 minutes for watering his plants. (The farmer has the unused 30 minutes for watering his plants.)
- b) The report describes the results of the experiment done **during the period** from June 2007 to May 2008. (The report describes the results of the experiment done from June 2007 to May 2008.)
- c) The Waste Disposal Committee calls a meeting **from time to time** when needed. (The Waste Disposal Committee calls a meeting when needed.)
- d) The farmer died due to **the level of** pesticides accumulated in his body. (The farmer died due to pesticides accumulated in his body.)
- e) The farmer applied **fertilizer at the rate of** 60 kg. N/ha. (The farmer applied 60 kg. N/ha.)
- f) The poster is 2 by 2 feet **in size**. (The poster is 2 by 2 feet.)
- g) The containers are cylindrical **in shape**. (The containers are cylindrical.)

6. **Prefer active voice over passive voice sentence constructions.** In active voice construction, the doer/actor comes before the action. On the other hand, in passive voice, the actor/doer comes after the action or the verb. Active voice is preferred because it is more concise and emphatic. Thus, the meaning of the sentence is easier to understand.

Examples:

- a) **Passive :** A hectare of forest area was planted to Benquet pines by foresters for growth and survival response experiment. This experiment was done in 2007.

Active: Foresters planted Benguet pines to a hectare of forest area for growth and survival response experiment. They did the experiment in 2007.

More concise: In 2007, foresters planted ... for growth and survival response experiment.

- b) **Passive:** Studies were continued to establish the flight range of BPH (Black Plant Hoppers).

Active: Entomologists continued their studies to establish the flight range of BPH.

7. **Use specific and concrete words. Avoid weak nouns such as cause, effect, factor, function, influence, occur, result in, and tend.**

Examples:

- a) The **effect of** fertilizer was to increase yields. (The fertilizer increased yields.)
 b) Bad weather **caused damage** to the rice crops. (Bad weather damaged rice crops.)
 c) The **influence** of rain was the **result of** losses in crops. (Rain resulted in crop losses.)

8. **Check *who, that, and which*. When combined with *there is* statements, these words are often wasted.**

Examples:

- a) **There were** three plots **which** received treatments. (Three plots received treatments.)
 b) **There is** a flywheel on the drive shaft **that** ensures a constant speed. (A flywheel on the drive shaft ensures a constant speed.)
 c) For the operation of the machine, **there are** five steps **that** must be done. (For the operation of the machine, five steps must be done.)

9. Do not bury action in nouns because this makes the sentence more hard to understand. Avoid nominalization.

Examples:

- a) Varieties must have **tolerance** for environmental stresses. (Varieties must **tolerate** environmental stresses.)
- b) The paper **focuses on estimation** of yield distribution. (The paper **estimates** yield distribution.)
- c) Figure 1 includes a **listing** of the advantages of cardiovascular training. (Figure 1 **lists** the advantages of cardiovascular training.)
- d) Section 1 gives the **descriptions** and **illustrations** of the machine parts. (Section 1 **describes** and **illustrates** the machine parts.)

10. Avoid constructions using weak verbs.

Examples:

- a) Fertilizer **exerted a positive effect** on rice yields. (Fertilizer **improved** the rice yields.)
- b) An experiment **was initiated to test** nitrogen's effect on corn yield. (An experiment **tested** nitrogen's effect on corn yield.)

Mechanics of Style

This section refers to the use of abbreviations, numbers, symbols, word forms, capitals, italics, and punctuation. The purpose of this is to cite dependable "rules" for handling problems of style and usage in technical/scientific communication even though they are not standardized throughout the country or worldwide. The rules cited in this section have been based on accepted and widespread practice in technical/scientific communication.

➤ **Abbreviations**

Abbreviations should be used only when they can be understood by the reader. In general, abbreviations indicate informality; thus, they are not used too often in formal technical communication. However, some abbreviations have been accepted as a matter of style of an institution.

- Spell out the term completely on its first appearance, and then enclose its abbreviation in parenthesis. Succeeding reference to or citation of the term may be in abbreviated form.

Example:

Although the Philippine National Railways (PNR) commuter trains are in operation daily, they can pick up only 20.8 percent passengers. Thus, the PNR has to expand its operation to a greater area.

- Use abbreviations for units of measurements only when they are preceded by an exact number.

Example:

16 in.

Several inches

- Do not abbreviate a term which is the subject of discussion. However, in tables, diagrams, maps, and drawings, where space is needed, abbreviations are justified.

Example:

The bp was quickly reached. (The boiling point was quickly reached.)

- Spell out short words (four letters or less).

Example:

ton, mile, day, hour, cans, etc.

- Do not use periods after abbreviations unless the omission would cause confusion, as where the abbreviation is identical to a word.

Example:

4 in. for 4 inches (Deleting the period here might confuse the abbreviated inches for the preposition “in” .)

- Do not add an “s” to form the plural of an abbreviation. The number preceding an abbreviation of a unit of measurement sufficiently marks the expression as plural. Some exceptions to this rule are “Nos.” for Numbers, “Figs.” for Figures, and “Vols.” For Volumes.

Examples:

10 kgs. (not 10 kgs.)

5 ha. (not 5 has.)

- Write abbreviations in small letters unless the term abbreviated is a proper noun.

Examples:

Btu for British thermal unit

hp for horsepower

- Abbreviate titles only when they precede a proper name which is prefaced by initials or given names.

Examples:

Professor Cruz

Prof. J.C. Cruz

Prof. Jose C.Cruz

- Use abbreviations which are more readily recognized than the spelled-out form.

Examples:

scuba for self-contained **u**nderwater **b**reathing **a**pparatus

sonar for **s**ound **n**avigation **a**nd **r**anging

- In reports where a term is used repeatedly, use the accepted abbreviation but spell out the term enclosed in parenthesis when first using it.

Examples:

50 kph (kilometers per hour)

100 cps (cycles per second)

50 rpm (revolutions per minute)

➤ **Symbols**

Generally, symbols are avoided in text. However, they are justifiable in tables, diagrams, and the like because of the need to conserve space. A few symbols are permitted in the text such as % for per cent and # for number.

Examples:

“ for inches

‘ for feet

/ for per

& for and

➤ **Numbers**

- Use figures for exact numbers for ten and above and spell out numbers below ten. Where several numbers, some above and some below ten, appear in the same passage, use figures exclusively.

Examples:

15 days
seven weeks
five bottles
15 test tubes, 5 flasks, and 11 feet wire

- Use figures in giving a number of technical units, as with units of measurement, whether below or above ten.

Examples:

hp
20,000 Btu

- Spell out either the shorter or the first number in writing compound number adjectives.

Examples:

thirty 12-in. bolts
8 six-cylinder engines

- To avoid any confusion in reading, place a zero before the decimal point in writing numbers with no integer.

Examples:

0.789
0.007

- Spell out fractions standing alone.

Example:

Two thirds of the respondents had no answers.

- Do not use numerals at the beginning of a sentence or for round-number estimates or approximations.

Examples:

Thirty students enrolled in the course. (Not 30 students ...)
 Nearly five students dropped the course.

- Do not use numerals in succession where confusion may occur.

Example:

On May 31, twenty teachers resigned.

➤ **Hyphenation of Compound Words**

- Hyphenate compound adjectives which precede the term they modify.

Examples:

alternating-current motor
 4-cycle engine
 two-inch wire

- In general, hyphenate compound verbs.

Examples:

heat-treat
 blow-dry
 air-dry

- Do not hyphenate adverb-adjective combinations.

Examples:

newly installed
 readily seen
 easily availed

- In general, do not hyphenate compound nouns, except those of distinct engineering units of measurement.

Examples:

boiling point

Some exceptions:

gram-calorie

circuit breaker

foot-candle

Note: In very specific cases, try to observe and follow the practice of careful, reputable writers.

➤ **Capitalization**

- Capitalize all important words in titles, division headings, side headings, and captions. These preclude articles, prepositions, and conjunctions.
- Capitalize Figure, Table, Volume, Number as part of titles. Thus, when reference would be made to them, write Figure 1 or Table 2.
- Capitalize proper nouns.

Examples:

Names of people, and titles referring to specific people: Randy David, Mr. Defense Secretary

Days of the week, months, holidays : Monday, July, Christmas Day

Religions and religious groups : Islam, Roman Catholic, Buddhism

Nationalities, organizations, institutions : Russians, Rotary Club, UP Los Banos

Places (specific location) : Grove, College, Laguna, Lantican St.

- Capitalize specific course titles and course titles derived from proper nouns.

Examples:

English 10

Filipino

➤ **Punctuation**

Punctuation is necessary to clarify thought and to make reading easy. It indicates subordination and coordination of ideas in a sentence, thus suggesting which of them are more important or of equal importance. Difficulties with punctuation are likely to arise in the use of the comma, the semicolon, and the colon.

- **The Comma (,)**

Use a comma:

1. Between independent clauses (a group of related words with a subject and verb and can stand alone) connected by conjunctions (and, but, for, or, nor, and yet). If commas are used within any of the independent clauses, a semicolon must be used between the clauses

Examples:

The air valve on one compartment closes, and a relief damper admits counter-flow air to clean the bags.

The fixed coil, providing a unidirectional magnetic field in which the moving coil acts, is permanently connected across the line; and the movable coil, which operates to close the indicated contact, is connected across the motor armature.

2. After introductory clauses or phrases preceding the main clause of the sentence.

Examples:

Having completed the first project, the contractor immediately worked on the second.

Since you are here, you may as well stay.

3. Between a series of words, phrases, and short clauses.

Examples:

Have you seen Maria, Fe, or Daisy? (words)

We have searched everywhere, in the bedroom, the living room, and in the kitchen. (phrases)

Roy has gone out, Boy is asleep, and Jake is taking a bath. (clauses)

4. Around parenthetical, interrupting expressions, appositives, and nonrestrictive modifiers.

Examples:

The report, unless revised, will be unacceptable.

The auditorium, obviously, is beyond repair.

Mr. Martin , the project director, would like to meet us.

The principal, who used to work in the bank, is very organized.

- **The Semicolon (;)**

Use a semicolon between two or more independent clauses of a compound sentence not joined by *and*, *but*, *or*, or *nor*. Join only clauses closely related in thought; you must be able to insert *and* or some other conjunction without changing the sense.

Examples:

I'm tall; so is Ben. (And can be inserted.)

I knocked; no one opened the door. (But can be inserted.)

It took the first team 1 day to finish their science project; the second team took them only half a day to do it.

Even after more than two months of rehearsal, the LB Choir lost in the Choral Competition; but, in some ways at least, it benefited from it by performing better than last year when it had little time to practice.

- **The Colon (:)])**

1. Use a colon after the salutation of a business letter.
- 2.

Examples:

Dear Sir:
Gentlemen:

3. Use a colon before two or more items introduced by such words as *the following*, *as follows*, or *these*, or by a *specific number*.

Examples:

The following students should report to the CSO:
Lily Tan
Tim Cruz
Pat Medina

The teacher has three virtues: patience, integrity, and wit.

Note: Do not use a colon before direct objects, predicate nominatives, or objects of preposition.

We shall need butter, bacon, and cream. (direct object)

Supplies needed are butter, bacon, and cream. (predicate nominatives)

We have had letters from Bill, Ken, and Boy. (objects of preposition)

4. Use a colon to express hours and minutes in figures.

Examples:

10:00 A.M

2:00 P.M.

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