



Scientific Writing



How to make your reports
readable, understandable and
professional

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Disclaimer



It is recognized that certain aspects of
writing are a matter of taste. Opinions in this
presentation are those of the author and not
necessarily those of Louisiana Tech
University or the National Science
Foundation.



What to Strive For



- Clarity
- Brevity
- Variation in style (not boring)
- Completeness



Punctuation

Pay attention to punctuation and spacing!

Protocols such as authentication, authorization and accounting protocol (AAA) ,SIP and Common Open Policy Service(COPS) are used in IMS [1 ,2] .



Capitalization

Capitalize proper names.

A Wheatstone bridge was used.

Capitalize Acronyms (Initialisms).

The Magnetic Resonance Imager (MRI) was

Capitalize numbered items

Figure 1

Equation 1

Task 1



References

Difficult for students to grasp

Back up what is being said

All articles listed under "References" must be referenced

Use a uniform citation style:

Author(s), (Date),Title, Journal, Volume, Page



Journal Reference Style



Walters FF, (2004), "Electrophoretic separation of glycoproteins," *Journal of Platelets*, 201:44-50.

Johnson JR, Bray SP and Dunn PL (2004a), "Chitosan as a material for facial reconstruction," *Journal of Reconstructive Surgery*, 32:122-134.

Johnson JR, Bray SP and Dunn PL (2004b), "Chitosan: Material Properties," *Journal of Material Science*, 99:883-901.



Book Chapter Reference



Fredberg LL (2005) "Photodynamics of the human aorta," in Robert A. Hartman ed. *Recent Advances in Aortic Diagnosis*, Holloway & Sons, New York, 302-339.



Citing References



Carter (1999) developed the first naquida-based microsensor.

O'Neill and Hammond (2001) adapted this work to nuclear weapons.

Carter and Frasier (2002) used tritonin as a cure for diabetes.

Tritonin was also found to be useful for other diseases (Frasier and Jackson, 2002; Frasier et al., 2004).



Citing References



Use last name only. Do not say:

Dr. Samantha Carter (1999) developed the first naquida-based microsensor.

With "et al." list only one name. Do not say:

O'Neill, Hammond et al. (2001) adapted this work to nuclear weapons.



Figures



Figures must be numbered and referenced in the text by their figure numbers.

Wrong: The figure below shows

Right: Figure 4 shows

Wrong: The proposed device has 5 main components Figure 4.

Right: The proposed device (Figure 4) has 5 main components.

Right: Figure 4 shows a sketch of the device.



Figures (continued)



Wrong: (Figure 4) is a sketch of the proposed device.

Right: Figure 4 is a sketch of the proposed device.



Figures (continued)



Magazines commonly have figures that are not referenced in the text of the article – this style is unacceptable for scientific writing.

Each figure must have a descriptive caption.
E.g.

“Figure 4: Schematic diagram of the proposed device.”



Figures (continued)



Each figure appears after the first time it is referenced in the text.

If a figure is from someone else’s work, you must provide the source. E.g.

Figure 4: The first naquida microsensor (from Carter, 1999).



Graphs



X & Y Axis Labels (Large).

Numbers on Axes.

Use the 1, 2, 5 Rule.

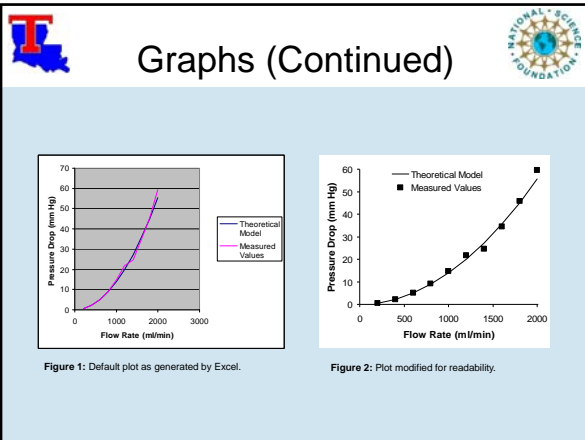
Make sure line modes and symbols are defined.


Do not use color to distinguish data sets.

Do not use spline fits. They can be misleading.


Lines for theory, Symbols for data.

When borrowing graphs from other sources, make sure the legend key is included!






Contractions




Do not use Contractions:
(wouldn't, couldn't, can't, don't).

Wrong: The device can't be used in cold weather.
Right: The device cannot be used in cold weather.

"It's" is a contraction of "it is," not the possessive of "it."
Wrong: It's a robust algorithm.
Wrong: Its a robust algorithm.
Right: It is a robust algorithm.



Acronyms



The first time you introduce an acronym you must spell it out completely.

- Right: Amyotrophic Lateral Sclerosis (ALS) affects 30,000 Americans.
- Wrong: ALS is Amyotrophic Lateral Sclerosis, and it affects 30,000 Americans."

Keep acronyms to a minimum. Do not use an acronym unless you will use it at least 3 more times.

Do not use an acronym just because it sounds good.



Affect vs. Effect

In general, you will use “affect” as a verb and “effect” as a noun.

Temperature affects viscosity. (“Affects” is a verb).

Temperature has an effect on viscosity. (“Effect” is a noun).

Effect can be used as a verb, as in “the hammer effects a knee-jerk reflex.” However, it’s better in this case just to say, “the hammer causes a knee-jerk reflex.”



Dangling Participle

Eating is good. – Gerund

I am eating. – Present Participle

I was eating. – Past Participle

English no longer distinguishes these parts of speech.
German does. English did.

Right: Eating the pretzel, I slipped on a rock.

Wrong (probably): Eating the pretzel, the black cat crossed my path.

When you use a construction that starts with a participle, the first thing after the comma needs to be the subject of the participle.



Dangling Participle

Some manuals on writing go so far as to suggest that you avoid words that end in –ing altogether. Consider:

“Eating the pretzel with my fingers, which were covered in honey, I became frustrated.”

“Eating the pretzel with my fingers, which were covered in honey, was the most fun I ever had.”



Other Common Errors



Et al. (abbreviation of et alii). Not “et al” or “et. al.”

Non parallel constructions:

Wrong: “The proposed device is practical, inexpensive, and it provides comfort to the patient.”

Right: “The proposed device is practical, inexpensive, and comfortable for the patient.”

Semicolons separate complete sentences. Commas separate phrases.

Right: The man was happy; he had finally found his dog.



Other Common Errors



Do not use “etc.” It makes you sound lazy.
The word “data” is plural (singular is datum).

Wrong: The data is erroneous.

Right: The data are erroneous.



Quotes



Use only when presenting something that is someone else's opinion.
When expressing fact, it is better to paraphrase.


Effective Quote

- According to Johnson et al. (2004), meningitis is the most painful of all neural disorders.
- Johnson et al. (2004) have said, “meningitis is the most painful of all neural disorders.”


Ineffective Quote

- Meningitis affects over 50,000 Americans each year (Johnson et al., 2004).
- According to Johnson et al. (2004), “Over 50,000 Americans contract meningitis each year.”


The version with the quote sounds as if you are shedding some doubt on what Johnson et al. have said.




Words/Phrases to Avoid



Instead of	Use
a lot	many
kids	children
kinds	types, varieties, models
big	large
kind of	somewhat (use sparingly)
due to the fact that	because
utilize	use
actually	nothing
obviously	nothing
rather (as in "It is rather surprising")	nothing (as in "It is surprising")
very	nothing
essentially	nothing
It can be seen that (and variants)	nothing



Malapropisms



Malapropisms


Mrs. Malaprop in "The Rivals" (R. B. Sheridan, 1775)

All in the family.


Shakespere

"We will use sophistical analysis software to accomplish these goals."

Sophistical (adj): Seemingly correct, but erroneous



This, That, These, Those



These words should be followed by a noun to ensure clarity.

The error was caused by an additional force exerted by the actuator. This was large and difficult to quantify.

Does "this" refer to "error," "force," or "actuator?"



Orthography

Context	Correct Word
When ascending, a <u>feeling</u> of some safety existed	feeling
I could only <u>were</u> the device when I was extremely fatigued.	wear
Multimeters and <u>sauntering</u> irons will be used in the laboratory.	soldering
... small enough to put into a circuit <u>with ought</u> dramatically increasing its original size.	without
In today's fast <u>paste</u> and competitive world...	paced
The synthetic fiber could cost <u>any wear</u> from ...	anywhere
Obstructive sleep apnea affects the quality of life of many who suffer from this <u>deplatory</u> disease.	debilitating (unless obstructive sleep apnea causes hair loss).
Our approach to the mapping of the atria makes this device <u>potable</u> .	portable (I do not think that the investigators intended to drink the device).



Extra Words

... In a recent study, it has been found that

Johnson et al. (2003) found that ...



Extra Words

The addition of more components to the existing design must be designed as to not inhibit sleep.

The added components must not inhibit sleep.



Extra Words

The major problem that I intend to address is that standard axillary crutch users need a safer and easier way to ascend and descend stairs.

Standard axillary crutch users need a safer and easier way to ascend and descend stairs.



Extra Words

Stair climbing requires a certain amount of strength and confidence.

Stair climbing requires strength and confidence.



Extra Words

The person can't really feel them.

The person cannot feel them.



Extra Words

The electrodes would have to be cordless and be able to be detected by the sensors.

The electrodes must be cordless and detectable by the sensors.



Extra Words

Installing the driver would cost a lot of money plus paying for the software and electrodes would be expensive also.

The software, the electrodes, the driver, and installation would be expensive.



Extra Words

My group measured an EKG of the heart.

My group measured an EKG.



Extra Words

The importance of an effective drug delivery system lies in the population effected, which is basically the whole of society.

Nearly everyone would benefit from a more effective drug delivery system.



Extra Words

Using a laser pointer, there is a risk of eye injury because disabled people might use the pointer to point to a person and by mistake they will point the laser to their eye.

Laser pointers can cause eye injury if they are pointed into a person's eyes.



Extra Words

The limiting factor in TDD systems is governed primarily by skin permeability.

TDD systems are limited by skin permeability.



Extra Words

The flexibility of the device will be ensured to fit on children from ages one to five.

The device must fit on children from ages one to five.



Extra Words

Research shows that kidney transplantations are the optimum treatment.

Kidney transplants are the optimum treatment (reference, date).



Extra Words

An article attributes such discrepancies to be not only genetic, but also due to access to health care for certain minorities (Obrador et al., 2002).

Obrador et al. (2002) attribute such discrepancies to both genetic disorders and lack of health care access for certain minorities.



Extra Words

The device will be able to be replaced by the user.

The device will be replaceable by the user.



Extra Words

There are two ways to go by troubleshooting a medical device.



There are two ways to troubleshoot a medical device.



Extra Words

The problem that will be addressed upon completion of this project



The problem that will be addressed by this project...

Extra Words

In a recent study, it has been found that



A recent study found that ...(reference, date).

Extra Words

This infection is one that can go unnoticed.

This infection can go unnoticed.

Extra Words

The need for an improved surgical swab is apparent.

An improved surgical swab is needed.



Extra Words

However, we know that cotton can leave lint.

However, cotton can leave lint.



Extra Words

As you can see, each one of the solutions to the problem is flawed.

Each of the solutions to the problem is flawed.



Extra Words

We learn from Fluid Mechanics that the greater the surface area touching the fluid, the faster the absorption occurs.

Absorption is proportional to the surface area in contact with the fluid.



Extra Words



Another way to evaluate if the design is functioning as desired is

Another way to evaluate the design is
