Clear Expression

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Winter 2018
Clear expression: writing in a way that is no harder to read than necessary.
So, what makes a piece of writing hard to understand?

Apart from hard or unfamiliar concepts?
Some answers

• Abstraction
• Long sentences
• Compressed phrases
• Unfamiliar vocabulary
• Mistakes of grammar or syntax
• Poor organization of ideas at any level (sentence, paragraph, section, report)
ABSTRACTION

WHEN UNECESSARY, IT LEADS TO VAGUENESS AND UNCERTAINTY
Abstractions that are generalizations: there are degrees of abstraction.

- Mammal
- Horse
- Palomino
- Trigger

Very abstract

Concrete
Abstract words in English tend to be longer than concrete words.
Abstract words tend to be longer than concrete words, particularly when they are derived from French, as they very often are.

Abstract words are very often of 3 or more syllables.
Take “constitution,” for example.

\[ \text{con} + \text{stit} + \text{utio} \]

From Latin word for “with”
A form of Latin word for “stand”
Latin morpheme indicating “abstract noun”
The more syllables per 100 words, the harder a text is to read.

The more “hard words” (words of three or more syllables) in a text, the harder it is to grasp.

Both statements allude to abstraction: they mean that the more abstract words a text contains, the harder it is to understand.
Thus, measuring the average number of syllables per or 100 words, or measuring the frequency of three-syllable words in a text, gives a rough measure of reading difficulty.

The length of sentences is considered too.
These observations resulted in
The Flesch-Kincaid reading difficulty scale
The Gunning Fog Index
The SMOG Index

Among other ways of measuring reading difficulty
The Gunning “Danger Zone”

A reading level higher than 12th grade.

http://www.signprintables.com/printable-danger-zone-sign/
Use plain, short words when you can.

Write manageable sentences.
You will find readability formulas at

http://www.readabilityformulas.com
Abstraction is not limited to words: they can be strung together into difficult, or even meaningless phrases.
“Capital One is on a mission to help our customers succeed by bringing ingenuity, simplicity, and humanity to banking.”

And

“We believe that innovation is powered by perspective and that teamwork and respect for each other lead to superior results. We elevate each other and obsess about doing the right thing. Our associates serve with humility and a deep respect for their responsibility in helping our customers achieve their goals and realize their dreams.”

--From Capital One job ad for EE and CS interns
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What is compression?
“A motor tachometer angular velocity versus time graph was constructed from the ‘Coasting Stop with Motor Engaged’ data for all trials.”
“A motor tachometer angular velocity versus time graph was constructed from the ‘Coasting Stop with Motor Engaged’ data for all trials.”

A graph was constructed of the data taken from all trials during which the motor was allowed to coast to a stop. The graph shows the angular velocity of the motor tachometer across time.

21 words vs. 35, but which is clearer?
Do not compress your statements too much.
Some points on paragraphs
Terrorists will use technology against us, so we have to fight fire with fire. We should use any technological means to fight terrorism. We shouldn't be afraid of infringing on people's civil rights because new technologies should allow us to fight terrorism without violating privacy. Only technology will allow us to fight an enemy who can hide in any country, and so we have no choice anyway. Information-mining is actually a good intelligence technique because it pinpoints suspects for surveillance, and the FBI won't have to snoop on people at random. This will insure that most people's privacy is preserved.
First topic

1. We are obliged to use technology to fight terrorism.

Terrorists will use technology against us, so we have to fight fire with fire. We should use any technological means to fight terrorism. Only technology will allow us to fight an enemy who can hide in any country, and so we have no choice anyway.
Second topic

2. Technology will allow us to fight terrorism without undue violation of people’s rights.

We shouldn't be afraid of infringing on people's civil rights because new technologies should allow us to fight terrorism without violating privacy. Information-mining is actually a good intelligence technique because it pinpoints suspects for surveillance, and the FBI won't have to snoop on people at random. This will insure that most people's privacy is preserved.
Therefore be sure your paragraphs are both unified and coherent.
Explain unfamiliar terms.
An atomic force microscope is a scanning probe microscope capable of resolving objects on the order of fractions of a nanometer. It uses a cantilever with a very sharp tip to trace out the profile of the sample. A laser is focused on the cantilever . . .

--Adapted from a student report.
Use the passive voice sparingly and with care.

This does not mean “Do not use the passive voice.”
Costs of the passive voice

Less direct, so less forceful than active voice

Hides agent acting upon passive subject, unless additional phrase is added to indicate it
Use verbs to express actions: avoid nominalization.

Unless the action itself is the subject or object of the sentence.
The state was engaged in the construction of a suspension bridge.
The state was engaged in the construction of a suspension bridge.

The state constructed a suspension bridge.
The state was engaged in the construction of a suspension bridge.

Thus

The state constructed a suspension bridge.

Thus

The state built a suspension bridge.
Use a clause, phrase or sentence to be clear: often, shorter is not always clearer.
Because the predicted ambient total suspended particulate concentrations met Department of Environment, Lands and Parks' Level B ambient air quality objectives, a further evaluation was not required.

27 words

From a Canadian government document

Sample taken from http://www.sfu.ca/~whitmore/style/clarity_05.htm
Because the predicted ambient total suspended particulate concentrations met Department of Environment, Lands and Parks' Level B ambient air quality objectives, a further evaluation was not required.

27 words

Flesch-Kincaid Index: 20.29

Adjective-noun string overuse phenomenon problem.

Sample taken from http://www.sfu.ca/~whitmore/style/clarity_05.htm
Sample re-written

Because the total of the ambient suspended particulate concentrations that were predicted met Level B of the ambient air quality objectives of the Department of Lands and Parks, a further evaluation was not required.

Flesch-Kincaid Index: 19.19

34 words
Sample re-written again

The total of the ambient suspended particulate concentrations that were predicted met Level B of the ambient air quality objectives of the Department of Lands and Parks. Therefore, a further evaluation was not required.

Flesch-Kincaid Index: 12.9

34 words: 27 words and 7 words.
The Department of Lands and Parks has set ambient air quality objectives. The total of the ambient suspended particulate concentrations that were predicted met Level B of those objectives; therefore, no further evaluation was required.

Flesch-Kincaid reading level: 11.55

35 words: clauses contain 11, 17 and 6 words
Avoid logical doublets

The car’s antilock brake system is designed for emergency situations.

The CD’s lands and pits were small in size.

The laser beam was red in color.
Avoid dangling phrases

The multimeter works by following a few simple steps.

Considering all of the equipment in the lab, the oscilloscope proved the most resistant to abuse.
Avoid dangling phrases

The multimeter works **by following a few simple steps.**

**Considering all of the equipment in the lab,** the oscilloscope proved the most resistant to abuse.

Neither red-marked phrase modifies anything actually in the sentence.
Don’t separate too far the subject of a sentence from its verb.
“This is the division into which most cars, until about five years ago when manufacturers started including blind-spot detection and other safety devices on ordinary models, would have been placed.”
Distinguish clearly between restrictive and non-restrictive clauses
A restrictive clause is necessary to the sentence in order to identify clearly the thing modified.
A non-restrictive clause adds information about the subject, **but that information is incidental and not necessary to identify the thing modified.**
Examples

We callibrated the atomic force microscopes that we used in class. (Restrictive)

We callibrated the atomic force microscopes, which had been in the laboratory for a year. (Non-restrictive)
Two things to note

Restrictive clauses often use “that” (or “which” or “who” or “whom”) and no comma to set them off from the main clause.

Non-restrictive clauses use “which” (or “who” or “whom”) and a comma to set them off from the main clause.
Incorrect punctuation leads to confusion: the meaning of the sentence changes, sometimes quite radically.
Two problems

The Pivot Power Strip is a variation on the common power strip that is able to bend into different shapes.
The Pivot Power Strip, which is able to bend into different shapes, is a variation on the common power strip.

Proper positioning and use of non-restrictive clause.
Some problems from previous terms
The problem here?

By only considering the left side of the system, the motor and flywheel one, the model shown in Eq. 10 is used to determine the damping condition of the left side.
The problem here?

By averaging the results at different input voltages, the $R_m$ was determined to be $X$ Ohms.
Suggested Revisions
What might you do?

By only considering the left side of the system, the motor and flywheel one, the model shown in Eq. 10 is used to determine the damping condition of the left side.
By only considering the left side of the system, the motor and flywheel one, the model shown in Eq. 10 is used to determine the damping condition of the left side.

We considered only the left side of the system (the motor and flywheel one), and used the model shown in Eq. 10 to determine the damping condition of the left side.
The problem here?

By averaging the results at different input voltages, the $R_m$ was determined to be $X$ Ohms.
By averaging the results at different input voltages, the $R_m$ was determined to be $X$ Ohms.

We averaged the results at different input voltages and determined that the $R_m$ was $X$ Ohms.
The last two examples show that when using participial phrases as modifiers, you should not put the main clause in the passive voice.
What is a paragraph?
A paragraph is a unit of written text

- That deals with a single topic
- Whose sentences flow smoothly from one to the next

Therefore, a paragraph is unified and coherent.
Our company recently acquired an atomic force microscope (AFM) and the manager of the metrology division has asked our team to calibrate the instrument. The AFM is capable of resolving objects on the order of fractions of a nanometer and produces images well beyond the diffraction limit of visible light. After calibration we were asked to use the device to determine whether the mechanical structure of various optical storage media agrees with industry specifications. The AFM uses a cantilever with a very sharp tip to trace out the profile of a sample, and a laser is focused on the cantilever and reflected onto a photodetector to monitor deflections in the cantilever caused by surface changes in the sample. Further, we were asked to provide a recommendation for an opto-mechanical design for a multimedia player that can read information from three sorts of optical storage media: a CD, a DVD, and a Blu-Ray disk.
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Features of a good paragraph

• Topic sentence that governs or expresses the main idea;
• Several sentences in support of the idea;
• Each sentence logically and clearly linked to the one before.
Organization
Outlining
Outlining: 50%
Writing: 25%
Revising: 25%
Hamas

upsurge & Military aid to
the PLO Rome J. Army until
the rise of Arafat
Organize before you write