Technical Writing and Speaking in English
Class 7: Providing Proper Emphasis and Using Your Writing Time Efficiently[1]

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[1]This course is based on the book The Craft of Scientific Writing, Michael Alley.

Motivation

Emphasis is important to convey your ideas in the text

"I wanted to transmit my concern about the ability of the O-rings to provide a secondary seal. Then I came up with this title" ☹

Subject: Visit to Precision Rubber Products Corporation and Parker Seal Company

This is a stronger title. ☺

Subject: Concern by O-ring Manufacturers about the Secondary Seal Design in the Shuttle's Solid Rocket Boosters

Three overall strategies to provide emphasis:

- Emphasise details with wording
- Emphasise details with repetition
- Emphasise details with placement

Emphasise details with wording

Many details float, ungrounded, because the author did not show **why** the details were included ☹

One of the panels on the north side of the solar receiver will be repainted with Solarcept during the February plant outage.

Emphasise details with wording

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One of the panels on the north side of the solar receiver will be repainted with Solarcept during the February plant outage.

- What is the most important detail in the phrase?
  - Is it that the panel is on the north side?
  - Is it that the panel is being repainted with Solarcept?
  - Is it that the repainting will occur during the February plant outage?

Emphasise details with wording

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One of the panels on the north side of the solar receiver will be repainted with Solarcept during the February plant outage.

- What is the most important detail in the phrase?
  - Is it that the panel is on the north side?
  - Is it that the panel is being repainted with Solarcept?
  - Is it that the repainting will occur during the February plant outage?
- We don't know

Emphasise details with wording

The writer shows the relative importance the details by giving reasons for their inclusion ☺

Because the February plant outage gave us time **to repair the north side** of the solar receiver, we repainted the panels with Solarcept, a new paint developed **to increase absorptivity.**

Emphasise details with repetition

- Mentioning a detail two or three times in the document helps to increase the likelihood of retention.
- Typical scientific documents let you repeat in three places: summary (abstract), middle, and conclusion

Emphasise details with repetition: summary (abstract)

What do we expect from an abstract?

Emphasise details with repetition: summary (abstract)

What do we expect from an abstract?

- It is a sum of the significant points, and only the significant points, of the work
- Every detail written in a summary is either a repetition or condensation of something in the main text
- Stands on its own. It is self-contained

Emphasise details with repetition: summary (abstract)

Two types of abstract

- Informative abstract
  - Present a synopsis of the work, highlighting the important and secondary results
- Descriptive abstract
  - States what kind of information will occur in the document
  - It is a table of contents in paragraph form

Emphasise details with repetition: summary (abstract)

Most summaries are a mix of informative and descriptive. Can you identify where they are? ☺

Title: New Chemical Process for Eliminating Nitrogen Oxides From Engine and Furnace Exhausts

Abstract: This paper introduces a new chemical process for eliminating nitrogen oxides from engine and furnace exhausts. Nitrogen oxides are a major ingredient of smog and contribute heavily to acid rain. In our process, isocyanic acid – a nontoxic chemical used to clean swimming pools – converts the nitrogen oxides into steam, nitrogen, and other harmless gases. While other processes to reduce nitrogen oxides are expensive and, at best, only 70 percent effective, our new process is inexpensive and almost 100 percent effective.

In laboratory tests, our process eliminated 99 percent of nitrogen oxides from the exhaust of a small diesel engine. If incorporated into diesel engines and industrial furnaces, this new process could greatly reduce the 21 million tons of nitrogen oxides released each year into the atmosphere of the United States. Besides presenting experimental results, this paper also presents a scheme of chemical reactions to explain how the process works.

- Where is the scope and importance?
- Where the author distinguishes the novelty of the work?
- Where the author describes how effective is the new approach?

Emphasise details with repetition: summary (abstract)

Cold hard truth: Most readers will not continue reading the document after reading the abstract

- The goal of the text is to engage readers who are **interested in the details** of our work **to continue** reading
- The idea is to inform or persuade the **intended audience** as efficiently or effectively as possible

Emphasise details with placement

Where text borders **white space** is where you receive emphasis.
Examples:

1. Titles: they are surrounded by white space
2. Headings: surrounded by white space. The higher the heading, the more white space it has
3. Beginning and end of sections: they are bounded by white space
4. Beginning and end of paragraphs: whitespace by the tab at the beginning of paragraphs and by the white space at the end of the paragraph's last line.
5. Illustration: surrounded by white space
    - Caution: a large number of illustrations dilutes the importance given to them

Emphasise details with placement

Placing important information in the wrong place can greatly reduce the emphasis

Read this paragraph carefully ☹

This report uses data from both the test and evaluation and power production phases to evaluate the performance of the Solar One receiver. Receiver performance includes such receiver characteristics as point-in-time steady state efficiency, average efficiency, start-up time, operation time, operations during cloud transients, panel mechanical supports, and tube leaks. Each of these characteristics will be covered in some detail in this report.

Emphasise details with placement

Question: what are the characteristics that will be covered in the report?

Emphasise details with placement

Question: what are the characteristics that will be covered in the report?

- People often memorize in groups of two, three, or four items
- Possible solutions:
  1. Group the items into smaller sets
  2. Reduce the number of items (keep the essentials)
  3. Put the items at the end of the paragraph

A better version ☺

This report uses data from both the test and production phases to evaluate the performance of the Solar One receiver. In this report, we will evaluate performance by studying the receiver's efficiency, operation cycle, and mechanical wear.

Part 2: Using Your Writing Time Efficiently

Writing is difficult

- There is no such thing as “Perfect”
- It is often a lonely work
- It demands energy: how to convey complex ideas
- It demands imagination: you need to imagine yourself being the audience

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- There is no such thing as “Perfect”
- It is often a lonely work
- It demands energy: how to convey complex ideas
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- **Typical working environment is not optimal for writing**

Four steps

1. Preparing
2. Drafting
3. Revising
4. Finishing

Preparing: advises

- **Clear your mind:** give yourself the chance to think about the structure of the document, play a strategy through in your mind, and see whether it makes sense.
  - Having a good sleep and work in the morning
  - Walking, running, cycling
- Find a block of time that avoids interruptions
  - Early in the morning
  - Late at night
  - What suits you best
- Plan a working schedule: prepare yourself for the task ahead

Drafting: advises

- Prepare yourself for the long task ahead: you are not going to finish the draft in one sitting. If you do, chances are that the draft will not be any good.
- **How do you get words onto paper?** Idea: create a strong outline

Drafting: advises

Outline

Measurements of Surface Roughness
on Additively Manufactured Cooling Channels

Audience

The principal audience consists of engineers at gas turbine manufacturers. They have detailed knowledge about cooling channels in gas turbine engines but not about additive manufacturing. Some of these engineers are antagonistic to putting time and money into this research because they want to fund ideas that will have a quicker return on investment.

One secondary audience would be officials at the DOE and FAA. This audience, which has a general knowledge about gas turbine engines, is mainly concerned about what roadblocks exist to prevent cooling channels from being additively manufactured. Another secondary audience would be engineers in the electronics industry who are interested in using additively manufactured channels to cool electronics.

Introduction

Identity of research:

This report discusses effects of build direction on surface roughness in additively manufactured cooling channels. Initial background includes

(1) Recent advances in laser sintering—now we are able to additively manufacture metal alloys that can withstand high temperatures;
(2) Limitations on use of such parts but not parts that experience high stresses; and
(3) What else?

Reasons that research is important:

(1) One application in stationary hot portions of the turbine section of jet engines; another application in cooling of electronics.
(2) In such additively manufactured parts, engineers desire to incorporate complex designs that conventional manufacturing cannot produce.
(3) Using additive manufacturing offers the possibility of creating such designs.

Scope and Limitations:

(1) Laser power bed fusion, which is a specific type of three-dimensional printing, is the additive manufacturing technique to be considered.

Revising: advises

- Before revising, get some distance from the text
  - Work on something else, do another activity in between drafting and revising
- Try to revise large chunks in each sitting
  - It will help to improve the smoothness of the text
- Ask revisions from others

Finishing: advises

- It's a correcting phase and not an improving phase
- Looking for typos, misspellings, etc
- Do not fully rely on spell checkers (including Grammarly, LanguageTool, etc)
  - Although these tools are nice, especially LanguageTool