Technical Writing Essentials: NSCC Edition

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Introduction to Professional Communication in the Technical Fields

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NOVA SCOTIA COMMUNITY COLLEGE
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From Suzan Last

This work, first and foremost, has been a student-driven endeavour. Over the years, numerous students have requested an open, online resource, and have presented compelling research supporting the benefits of such a work. So it is thanks to them that this work first came into being.

It would not have made it this far without the generous support, collaboration, and peer review of many colleagues in the Humanities, Engineering, and Science faculties at the University of Victoria. Thanks is also due to the funding provided by an Open Education Resource grant from the University of Victoria's Office of Research Services and Learning and Teaching Support and Innovation Division.

Finally, I would like to acknowledge the invaluable help and guidance of Inba Kehoe and her colleagues at the Copyright and Scholarly Communications Office at the University of Victoria, whose sharp editorial eyes and diligent quality control helped ensure that this book will be a valuable resource for students.

From Robin L. Potter

I am pleased to have had the opportunity to adapt Suzan Last's *Technical Writing Essentials*. Not only was I working with an excellent, informed, and relevant technical communication text, but I knew I was working on a text that would be appreciated by our students and faculty alike.

I would like to thank Tom Bartsiokas, coordinator and professor of business and technical communication at Seneca College, for offering to me the opportunity to adapt this text. In addition, Tom has provided important editorial feedback as well as logistical support for the distribution of this text to faculty and students at the college. Thanks is also extended to Amanda Nowensky, Chair of the School of English and Liberal Studies for her support for this project. Special thanks goes to Tricia Hylton, who has worked magic to add interactive and visual elements to this text that bring it to life.

This adaptation was sponsored by Seneca's Open Text Adaptation Grant Program. Resources and support were also provided by the Teaching & Learning Centre at Seneca. A special note of appreciation goes to Jennifer Peters, at the Teaching & Learning Centre, for her expert technical assistance. Finally, special thanks goes to our faculty who suggested that we adapt this text and for their continuing feedback and contributions to our bank of ancillary materials. I look forward to using this text in my classes and seeing it adopted by our faculty and students.

Cover photo of ceiling detail of St. Pancras Station in London, UK courtesy of Robin L. Potter

Robin L. Potter, Professor
School of English and Liberal Studies
Seneca College
2021

From Tricia Hylton

I am grateful for the opportunity to contribute to the continued development of this text. The process of witnessing the text come to life with the integration of each interactive element was very satisfying. I am pleased with the understanding that this text will improve the overall educational experience of Seneca College's technical writing students. Thank you to Amanda Nowensky, Tom Bartsiokas, and Robin Potter for this opportunity.

Tricia Hylton, Professor
School of English and Liberal Studies
Seneca College
2022

Amendment Notes

While the original text by Suzan Last was quite complete and stood well as it was, assessing the needs of our college-level students led me to make some amendments and to add chapters that would offer additional guidance.

- The original Common Document Types has been divided into two parts: Communicating Technical Information and Reporting Information. Communicating Technical Information focuses on routine documents, while Reporting Information focuses on reports.
- A chapter on Formatting Documents has been added to Communicating Technical Information so as offer information on formatting options and conventions. In addition, the following chapter has been added to the same section: Standard Operating Procedures (SOPs).
- A separate section has been created for report writing: Reporting Technical Information. Added to the original content is a chapter on outlining and on inspection and incident reports.
- Since our school has adopted the APA style, all citations and reference lists along with information related to citation and documentation have been revised to align with this style. Much of the content of Appendices A, B, and C was integrated into the part on Citing and Documenting Sources (APA Style).
- A section on the job application process has also been added to the text. It includes coverage of the job search process, cover letters, résumés, online applications, and interviewing skills. Thanks to Tom Bartsiokas for sharing this content from his adapted *Communication @ Work*.
- Some content in the Oral and Visual Presentations section was reorganized, which resulted in the creation of new chapters: Designing Presentations and Presenting Virtually.

While editing the text, I came across a lovely gem of a supplement: University of Victoria's, *Engineering Work Term Report Guide: A Guide to Content, Style and Format Requirements for University of Victoria Engineering Students Writing Co-op Work Term Reports*, which had been updated by Last in 2017. Following Suzan's confirmation that this was an open resource, I adapted this guide for our technical communication students; it is now referenced and linked in this text as *A Guide to Writing Formal Technical Reports: Content, Style, Format*.

Robin L. Potter

Introduction: What is Technical Communication?

In our increasingly technological and internationalized workplaces, communication skills are among the most sought-after competencies employers require of job candidates. Every job posting you see will almost certainly ask for candidates with **excellent communications skills** and the ability to **work effectively in teams**. The ability to communicate clearly and effectively in written, verbal, visual, and interpersonal contexts is vital for success and advancement in the workplace. This ability is equally important in technical workplaces, where information must be conveyed using accuracy, precision, and concrete detail. Lending these qualities in your interactions with project teams will facilitate workflow.

"Technical writing comprises the largest segment of technical communication" (Giordano, n.d. 1). Broadly speaking technical writing pertains mostly to information that must be conveyed in a manner that is usable by the reader. Such writing makes complex ideas and concepts understandable and facilitates internal procedures. You will see technical writing in action in user guides, tutorials, inspection reports, standard operating procedures, and other types of documentation.

Technical communication, on the other hand, comprises all the various activities, documentation, tools, systems, and software that contribute to the creation of content that is useable within an organization (Giordano, n.d. 2). Technical writing is only one facet of the process of creating and managing complex information. Think of how we also must make decisions about visual narrative, document design, and mode of delivery, for example.

No matter how brilliant or innovative an idea may be, if it is not communicated clearly and promoted effectively to the right audience, it will not become a reality. For an innovative idea to move from concept to project to completion requires many stages in a design process (see **Figure 1**), almost all of which require clear communication and effective teamwork.

Pre-Project Planning

- Problem Definition: Identify Need, Goals, Objectives, and Constraints
- Define Context and do Research
- Identify Potential Projects
- Public Engagement Projects; Stakeholder Consultation

Project Development

- Propose a Project (budget, timeline, etc)
- Create or Respond to a Request for Proposals; Evaluate Proposals
- Develop or Design Solution Concepts
- Project Management Plan
- Feasibility Studies; Recommendation Reports

Project Implementation

- Write Contracts and Apply for Permits for Construction and Building Sites
- Progress Reports, Status Updates
- Documentation of Project
- Continued Research and Design Improvement
- Requests for Modifications; Collaboration among Designers, Contractors, Builders, Clients, and Users

Project Completion

- Final Reports and Documentation
- Close Contracts
- Ongoing Suport: User Guides, Troubleshooting, FAQs

Figure 1 *Phases of a project and some accompanying communications tasks* (Iconfinder. Free for commercial use). [Image Description]

If the design and implementation teams cannot work and communicate effectively with each other, their final product will fail to meet its potential.

Technical Writing Essentials introduces the key elements of professional style, document design, collaboration, oral presentation, and research skills needed to design productive workplace documents and presentations for a variety of purposes and audiences.

Reference

Giordano, C. (n.d. 1). What is Technical Writing? – Tech Writer Today – TechWhirl

Giordano, C. (n.d. 2). A Strategy for Integrated Technical Communications – Tech Writer Today (techwhirl.com)

Iconfinder.com. Lightbulb image. [Online]. https://www.iconfinder.com/icons/667355/aha_brilliance_idea_think_thought_icon. Free for commercial use.

Image Description

Figure 1 image description:

Once there is an idea, a project goes through a design process made up of four stages.

1. Pre-project planning.
    - Problem Definition – identifying needs, goals, objectives, and constraints.
    - Define context and do research.
    - Identify potential projects.
    - Public engagement projects; Stakeholder consultation.
2. Project Development.
    - Propose a project (budget, timeline, etc.).
    - Create or respond to a request for proposals, evaluate proposals.
    - Develop or design solution concepts.
    - Project management plan.
    - Feasibility Studies, Recommendation Reports.
3. Project Implementation.

- Write contracts and apply for permits for construction and building sites.
- Progress reports, status updates.
- Documentation of project.
- Continued research and design improvements.

4. Project completion.

    - Final reports and documentation.
    - Close contracts.
    - Ongoing Support: User Guides, Troubleshooting, FAQs.

[Return to Figure 1]

1. TECHNICAL COMMUNICATION: A PROBLEM-SOLVING APPROACH

When you hear the term "technical communication," what comes to mind? Perhaps you think of scientific reports, specifications, instructions, software documentation, or technical manuals. You might also think of the audience, requirements, the digital tools used to create the documentation along with the platforms for making the documentation available, and the research that goes into creating that documentation. And you would be correct. Technical communication is an umbrella term that usually is understood to encompass all these–as well as technical writing. Technical writing is a genre of non-fiction writing that encompasses not only technical materials such as manuals, instructions, specifications, and software documentation, but also writing produced in day-to-day business operations such as correspondence, proposals, internal communications, media releases, and many kinds of reports. It includes the communication of specialized technical information, whether relating to computers and scientific instruments, or the intricacies of meditation. And because oral and visual presentations are such an important part of professional life, technical communication also encompasses these as well. This first part of the text introduces you to the basic concepts related to technical communication overall.

Chapter 1 Learning Objectives

This chapter will help you to understand what technical writing is, why its important, and what it looks like:

1.1 Apply a "problem-solving" approach to communications tasks, starting by learning how to fully define the problem before looking for solutions.

1.2 Recognize the main conventions and characteristics of technical writing, and how they differ from other forms, such as academic and journalistic writing.

1.3 Understand the importance of defining the "rhetorical situation" in which you are communicating.

1.4 Apply what you have learned so far by examining "case studies" that demonstrate the costs of poor communication.

1.5 Appreciate the complexity and iterative nature of a writing process in determining what writing process works best for you.

Why are Technical Communication Skills Important?

You may be wondering why a technical communication course is included in your program. Information in the technical fields must be conveyed with precision and clarity. Failing that, inaccuracies can creep into the content of messages resulting in costly and, sometimes, catastrophic errors. Technical communication courses offer opportunities for you to learn the skills and techniques for communicating effectively and efficiently.

In a recent presentation, Sean McConkey of the University of Victoria revealed the following statistics regarding the importance of communication skills in the professional world of engineering (2017):

The Reality: Technical Writing and Communication

- How graduate engineers spend their time:
    - 25-50% Problem solving of some kind
    - 50-75% Communicating (Writing and reading reports, letters, memos, proposals, presentations, discussions w/colleagues, managers, clients)
- Performance evaluations and job advancement usually depend more on communications skills than on technical skills.

He added that engineers who are more advanced in their careers spend only 5-10% of their time engaged in problem-solving of some kind and 90-95% of their time engaging in related communications tasks: researching, writing and reading reports, proposals, emails, letters, memos; giving or attending presentations; discussing and meeting with colleagues, teammates, managers, clients, and so forth. In a recent survey of over 1000 professionals from various professions, over 70% of engineers and almost 50% of programmers rated the quality of their writing as either "very important" or "extremely important" to the performance of their jobs (Swartz, et al., 2018). Clearly, as Barry Hyman (2002) asserts in *Fundamentals of Engineering Design*, "the stereotype that engineering is for inarticulate nerds is way off base."

Technical communication is "transactional" – it entails a purposeful transaction between sender and receiver that provides specific information for practical and specific purposes (informing, instructing, persuading) and is usually geared towards the needs of a specific audience. Technical communicators produce a wide variety of documents and other products, such as

- Proposals and requests for proposals (RFPs)
- Technical or research reports
- Documentation records and product specifications
- User guides (step-by-step instructions, procedures, manuals)
- Online help, technical support

- Reference information (encyclopedia-style information)
- Consumer literature (information for the public about regulations, safety issues, etc.)
- Marketing literature (product specifications, brochures, promotional literature)
- Technical journalism (found in trade magazines, media releases, etc.)

A 2016 Seneca College survey of professionals working in civil, mechanical, and building systems engineering revealed that among these forms of documentation and communication the following were identified as the top five in-demand in technical workplaces (Potter, 2017):

TABLE 1 Top Five Documentation Types

Top Five Documents	Top Five Report Types
1. Email 2. Email reports 3. Formal reports 4. Letters, memos 5. Infographics	1. Investigation 2. Informative, proposal, recommendation 3. Technical brief, feasibility, problem-solving generally 4. Inspection 5. Progress, periodic, completion

Technical communication is a highly "designed" form of communication that requires practitioners to have a heightened awareness of the **conventions** (rules and expectations) and **rhetorical situations** (audience, purpose, context) in which they are communicating.

This textbook aims to provide you with that heightened awareness – that is, to introduce you to the basic conventions of technical communications, and to train you to take a **reader-centred or audience-centred approach** to communications tasks, to find the tools and methods that will work best to communicate your ideas to your target audience, and to achieve the desired results.

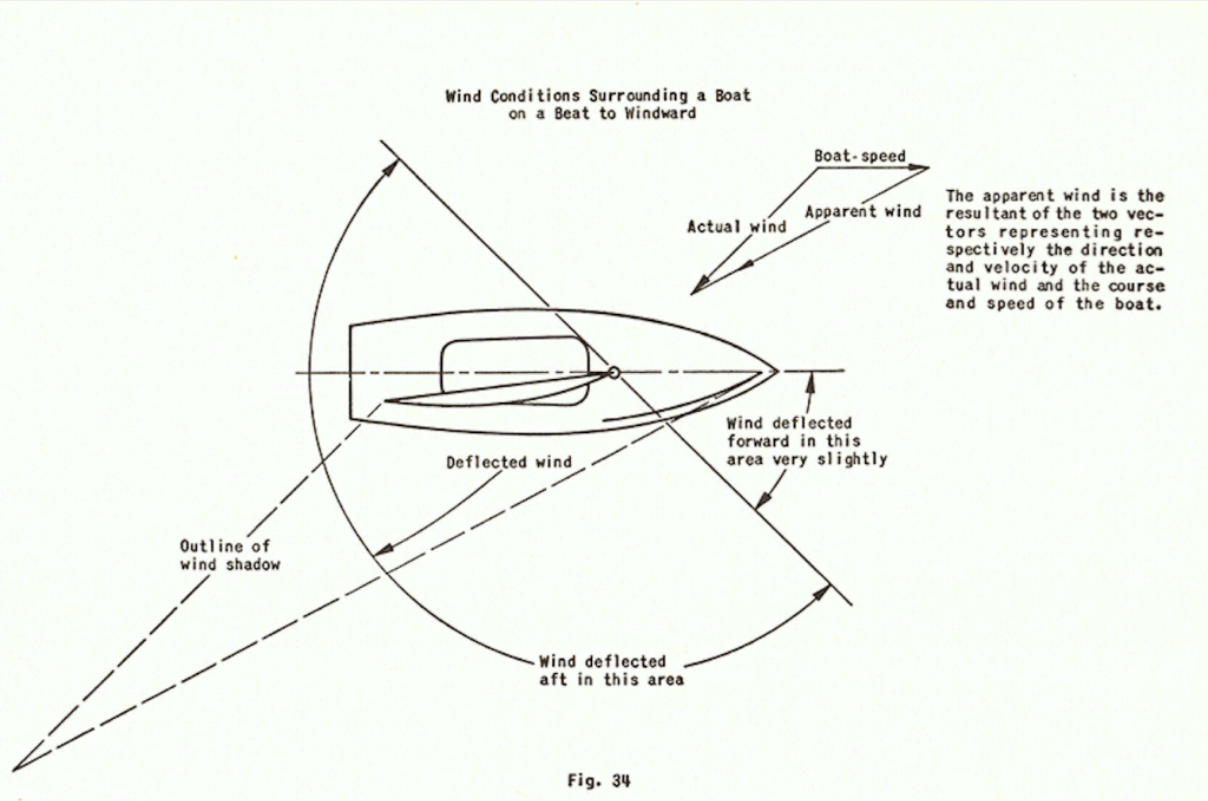
What Does Technical Writing Look Like?

Technical communications can take many forms, depending on the purpose and intended audience. However, the style of technical writing is distinctive. Consider the following example of technical writing, which is an excerpt adapted from a book called *Scientific Sailboat Racing* by Ted Wells (1950). From the excerpt in the box below, what can you tell about the intended audience?

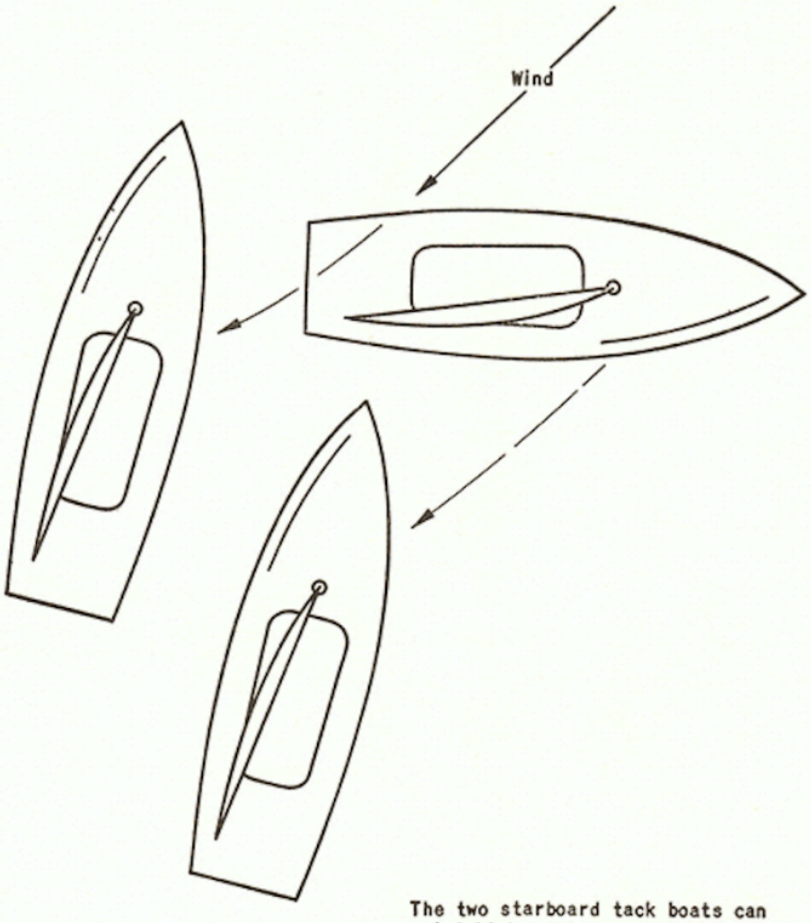
> The most common question asked by skippers wanting to get to the windward mark faster than they have been doing is "**How can I make my boat point higher?"** Getting to the windward mark first depends primarily on the skill and experience of the skipper; however, having a well-rigged boat will make a significant difference. Look for the following, in order of importance:

1. **Sails:** Have good quality sails, and use the appropriate sails for the wind conditions expected. No one can win races with poor sails, so use the best you can afford. Keep in mind that the leeches of all sails flutter a little, the jib will backwind the luff of the main on any full or medium sail, and in very light wind, even a perfectly cut sail will probably develop a wrinkle along the front of the battens. If the sails are obviously no good, replace them.
2. **Mast and Centerboard:** Ensure that the mast is far enough forward and the centerboard is far enough back so that there is little or no weather helm. Make sure the stiffness of the mast suits the sails.
3. **Jib Fairleads**: Ensure jib fairleads are properly located for the type of jib being used and the strength of wind expected.
4. **Cleats:** Have cleats for both jib and mainsheet; place cleats so that crew can easily make small adjustments for varying wind velocities and hang on to the jib sheet without having it pop out of the cleat.
5. **Traveler**: Have a mainsheet traveler that allows the main to be pulled down without pulling the boom in too far; it should allow the sail to be pulled down tightly enough so that the leech does not fall off without pulling the boom in any further than it should be.
6. **Tiller:** Have a flexible tiller extension that allows you to sit well forward, but can be adjusted so that it does not get in the way when coming about.
7. **Boat Weight:** Keep the boat as close to minimum weight as possible. Clearly, a lighter boat is easier to handle, but this is not as critical as other factors. If choosing between a lighter crew member with less skill and experience, and a heavier crew member who has greater skill, the latter is usually preferable.

Once the boat is properly set up, a skilled and experienced skipper can point significantly higher than expected by understanding and using wind deflection from other boats. Immediately to leeward of any boat and extending for a distance of about three-mast lengths, there is a wind shadow where the wind velocity is greatly decreased. To leeward of the bow of the boat, there is a very small region where the direction of the wind is deflected opposite to the normal deflection and where the velocity is accelerated slightly (see Figure 34). Except in the direct wind shadow, the deflection of the wind is more important than the decrease in wind velocity, as the decrease in velocity is very slight except in the immediate shadow of the sails of the windward boat.



Because of this wind deflection, a boat on the opposite tack cutting behind another boat will be able to point appreciably higher than it normally would. Many skippers on port tacks who thought they could clear starboard tackers have been fooled by not realizing this fact. The deflection of their wind in trying to cross in front of the starboard tacker will enable the starboard tacker to point higher without luffing than he normally would be able to do, and the port tacker who thought he could squeeze by suddenly finds that he cannot (See Figure 35).



The two starboard tack boats can point higher because of deflected wind from the port tack boat trying to sneak across in front of them. This one didn't quite make it, although it probably looked as if he could do it easily.

Fig. 35

EXERCISE 1.1 Draft some technical writing related to your interests

Reflect on the description and example of technical writing above in relation to your experience as an employee, as a student, or as a practitioner of a hobby. What kinds of documents have you written that could fall under the genre of Technical Writing?

Write a paragraph or two on a topic about which you have specialized knowledge and can use specialized terminology to explain the idea or instruct the reader. For example, you might write about effective techniques for executing certain skateboard maneuvers or how to execute a yoga position such as a "downward facing dog." Consider your audience when choosing how to write this. Will the audience have to be familiar with the terminology used, as in the above sailing example? See if you can "baffle me with your techno-jargon" and then re-write for a general audience, using plain language.

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1.1 KEY CONCEPT: Problem-Solving Approach to Communications Tasks

In the workplace, many of the communication tasks you perform are designed to solve a problem or improve a situation. Whether you are doing work for a client, for your employer, with your team, or for someone else, you will typically use some sort of design process to tackle and solve the problem. A clearly articulated design process provides you with a clear, step-by-step plan for finding the best solution for your situation.

Take a moment to search the Internet for the term "design process" and look at "images." You will find many variations. Have a look at several of them and see if you can find a common pattern.

One commonality you will likely find in examining other people's design process diagrams is this: the first step in designing any solution is to clearly **define the problem**. **Figure 1.1.1** shows NASA's basic design process. Think about the kind of communication that each step of this process might entail.

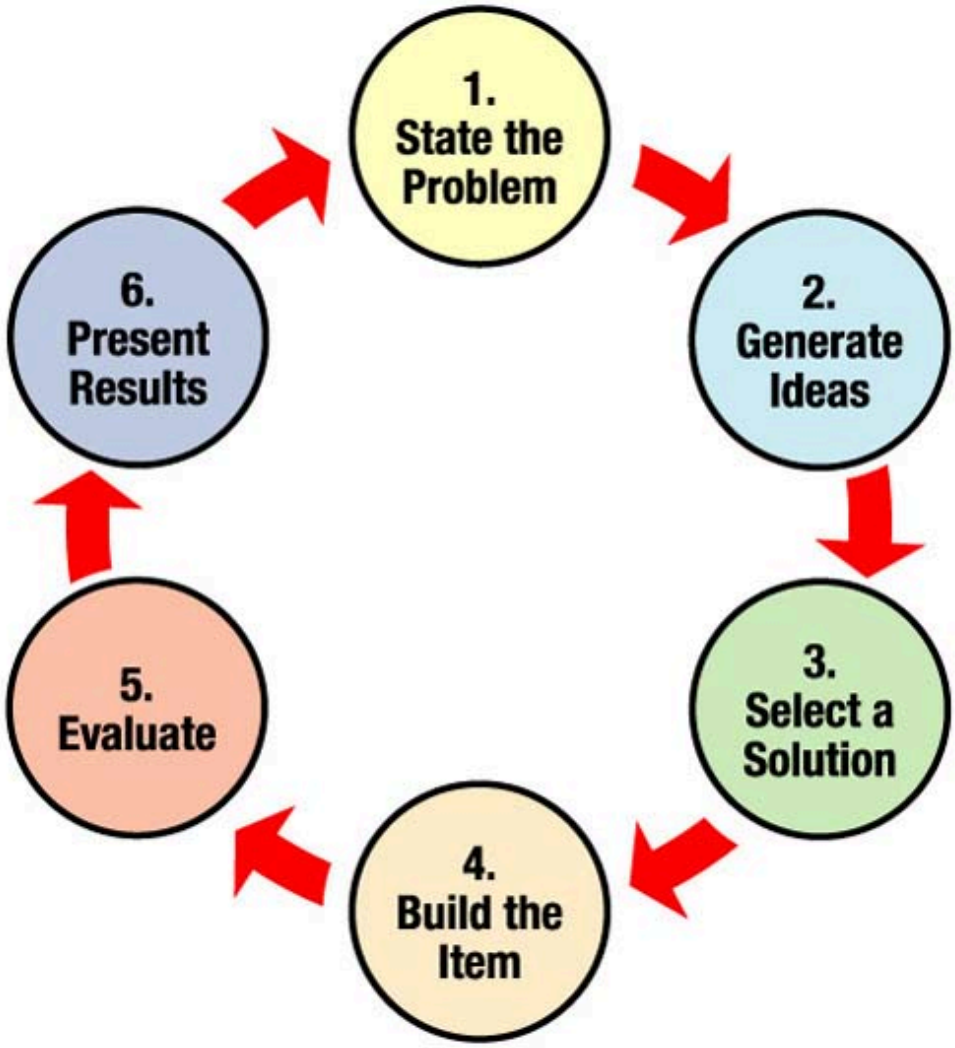

Figure 1.1.1 *NASA's Design Process Diagram (NASA, 2018).*

You cannot begin to work on solutions until you have a clear definition of the problem and the goals you want to achieve. This critical first stage of the design process requires that you effectively communicate with the "client" or whoever has the "problem" that needs solving. Poor communication at this stage can derail a project from the start.

Before we examine the step-by-step process to developing a business/research problem, the video below will review the importance of clearly defining a business/research problem.

For our purposes, we will use Barry Hyman's Problem Formulation model (2002) to clearly define a problem. Hyman's Problem Formulation model consists of four elements:

1. **Need Statement:** recognizes and describes the need for a solution or improvement to an "unsatisfactory situation." It answers the questions, "what is wrong with the way things are currently? What is unsatisfactory about the situation? What negative effects does it cause?" You may need to do research and supply data to quantify the negative effects.
2. **Goal Statement:** describes what the improved situation would look like once a solution has been implemented. The goal statement defines the scope of your search for a solution. At this point, do **not** describe your solution, only the goal that *any* proposed solution should achieve. The broader you make your goal, the more numerous and varied the solution can be; a narrowly focused goal limits the number and variety of possible solutions.
3. **Objectives:** define measurable, specific outcomes that any feasible solution ***should*** optimize (aspects you can use to "grade" the effectiveness of the solution). Objectives provide you with ways to quantifiably measure ***how well*** any solution will solve the problem; ideally, they will allow you to compare multiple solutions and figure out which one is most effective (which one gets the highest score on meeting the objectives?).
4. **Constraints:** define the limits that any feasible solution ***must*** adhere to in order to be acceptable (pass/fail conditions, range limits, *etc.*). The keyword here is ***must*** — constraints are the "go/no go" conditions that determine whether a solution is acceptable or not. These often include budget and time limits, as well as legal, safety and other regulatory requirements.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=26#h5p-1

Communication as Solution

This model can apply to a communications task as well as more physical design tasks. Imagine your communications task as something that will solve a problem or improve a situation. Before you begin drafting this document or presentation, define the problem you want to solve with this document:

- **Understand the Need:** Consider what gave rise to the need to communicate. Does someone lack sufficient information to make a decision or take a position on an issue? Did someone request information? Is there some unsatisfactory situation that needs to be remedied by communicating with your audience? What specifically is unsatisfactory about it? Consider your audience. For example,
  - *A potential client lacks sufficient information on whether the solution I have proposed to solve the client's problem will be feasible, affordable, and effective.*
  - *My instructor lacks sufficient examples of my written work to assign a grade for how well I met the course learning objectives.*
- **Establish a Goal:** Consider your purpose in writing. What do you want your reader to do, think, or know? Do you want your reader to make a decision? Change their opinion or behaviour? Follow a course of action? What is your desired outcome? And what form and style of communication will best lead to that outcome? For example,
  - *Provide the client with enough information, in an effective and readable format, to make a decision (ideally, to hire you to build the solution for the problem).*
  - *Provide my instructor with samples of my writing that demonstrate my achievement of the course learning objectives (provide relevant and complete information in a professionally appropriate format, using evidence-based argument; earn an A+ grade on the assignment.*)
- **Define Objectives:** Consider the specifics of your message and your audience to determine what criteria you should meet. What form should it take? What content elements will you need to include? What kind of research will be required? What information does your audience want/need? What do they already know? For example,
  - *Review the client's RFP to see what specific objectives it lists and how your proposal will be*

assessed.
    - *Review the Assignment Description and Grading Rubric for your assignment to determine specific requirements and objectives that your instructor will use to evaluate your work.*
- **Identify Constraints:** Consider your rhetorical situation. What conditions exist that present barriers or challenges to communication? How can you address them? What are the pass/fail conditions of this document? For example,
    - How much time is your audience willing to spend on this? How long can you make your document or presentation? (word length/time limit)
    - What format and style do they require? Is there a Style Guide you must follow? A template you can use?
    - How much time do you have to create it? Do you have a deadline? (due date)
    - Are there requirements for using sources? (academic integrity rules)

In addition to the process above, the following video provides a slightly different problem solving process; however, it incorporates many of the same principles described above.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=26#oembed-1

(How to Solve a Problem in Four Steps, 2015)

Keep in mind that the document you produce is evaluated in terms of how well it responds to the "problem" — that is, how well it meets the overall goal and demonstrates achievement of specific objectives while abiding by constraints.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=26#h5p-2

EXERCISE 1.2 Define a problem

Think of a problem or an "unsatisfactory situation" that you have recently experienced. It could be as simple as **It's 8 p.m., I haven't had dinner yet, and I'm hungry**. Use Hymen's Problem Formulation schema to formally define the problem — without proposing any particular solutions. Your problem definition should ideally allow a multitude of possible solutions that adhere to the following:

1. Need/Unsatisfactory situation?
2. What is your goal?
3. What are some measurable objectives you want to achieve?
4. What are your constraints?

Map out your analysis to find the most logical next steps.

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1.2 Conventions and Characteristics

Every genre of writing has unique characteristics and rules, called **conventions**, that help readers classify a document as belonging to a particular genre. This also applies to film and music. Think about the last movie you saw. What type of movie was it? What was it about that movie that gave you that impression? Did the characters wear Stetson hats, ride horses, and carry guns? Did they fly in space ships, encounter alien beings, and use futuristic technology? Those elements are typical conventions of Western and science fiction genres.

Non-fiction is a category that can be broken into various genres. The main genres that are relevant to us are journalism (newspaper writing), academic writing (written by scholars and published in peer-reviewed academic journals or books), and technical writing. Before we get into the specific conventions that characterize technical writing, take a moment to think back to your academic writing course and list some conventions typical of journalism (popular press) and academic writing in **Table 1.2.1**.

Table 1.2.1 ***Identify the conventions for journalistic and academic writing***

Criteria	Journalistic	Academic
Purpose		
Audience		
Writing Style		
Tone		
Structure		
Format/Formatting		
Other Features		

Like journalism and scholarly writing, technical writing also has distinct features that readers expect to see in documents that fall within this genre. These include (a) use of headings to organize information into coherent sections, (b) use of lists to present information concisely, (c) use of figures and tables to present data and information visually, and (d) use of visual design to enhance readability (all of these topics are covered in Chapter 3: Document Design). These conventions are connected to the **main purposes** of technical writing, which include communicating the following:

- technical or specialized information, like descriptions of equipment, processes, devices, systems
- clear instructions on how to do something in a sequential manner
- observations related to incidents, inspections, and investigations
- information that advances the goals of the company or organization

Technical documentation is intended to communicate information to the people who need it in a way that is clear and easy to read, at the right time to help make decisions and to support productivity. Designing technical communication is like designing any other product for an intended user: the ultimate goal is to make it "user friendly."

Keywords here are *accessible*, *usable, clear, goal-oriented*, *effective*, and *reader-centred*. The characteristics of technical writing support these goals and concepts.

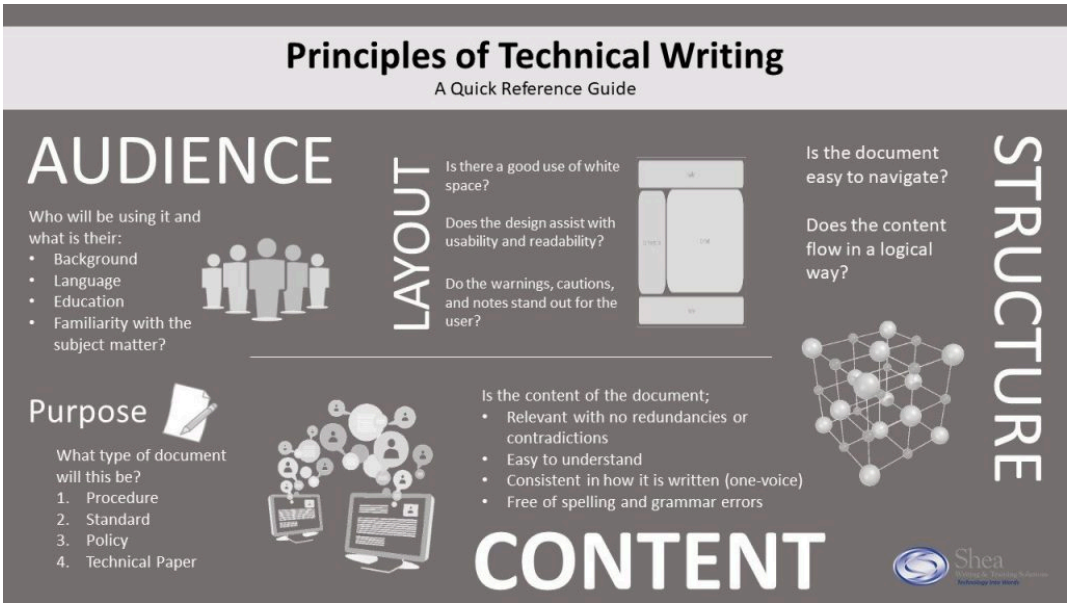

Figure 1.1.1 An overview of the elements of any well written technical document (Shea, 2019).

If we filled in **Table 1.2.1** with typical characteristics of technical writing, it might look something like **Table 1.2.2**:

Table 1.2.2 ***Conventions of technical writing***

Criteria	Technical Writing
Purpose	To communicate technical and specialized information in a clear, accessible, usable manner to people who need to use it to make decisions, perform processes, or support company goals.
Audience	Varied, but can include fellow employees such as subordinates, colleagues, managers, and executives, as well as clients and other stakeholders, the general public, and even readers within the legal system.
Writing Style	Concise, clear, plain, and direct language; may include specialized terminology; typically uses short sentences and paragraphs; uses the active voice; makes purpose immediately clear.
Tone	Business/professional in tone, which falls between formal and informal; may use first person or second person if appropriate; courteous and constructive.
Structure	Highly structured; short paragraphs; clear transitions and structural cues (headings and sub-headings) that highlight document organization.
Format/Formatting	Can be in electronic, visual, or printed formats; may be long (reports) or short (emails, letters, memos); often created with the use of style guides to plan formatting features; uses headings, lists, figures and tables.
Other Features	Typically objective and neutral; ideas are evidence and data-driven; descriptors are precise and quantitative whenever possible.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=29#h5p-3

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Shea Writing and Training Solutions. (2019). Principles of Technical Writing. https://www.sheaws.com/basic-principles-of-technical-writing/.

1.3 Understanding the Rhetorical Situation

SUZAN LAST; CANDICE NEVEU; AND ROBIN L. POTTER

It is common knowledge in the workplace that no one really *wants* to read what you write, and even if they want to or have to read it, they will likely not read all of it. So how do you get your reader to understand your purpose quickly and efficiently? Start by doing a detailed **Task and Audience Analysis** — make sure you understand the "rhetorical situation." Review the video below for an explanation of what is meant by a rhetorical situation.

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(The Rhetorical Situation, 2021)

The "rhetorical situation" is a term used to describe the components of any situation in which you may want to communicate, whether in written or oral form. To define a "rhetorical situation," ask yourself this question: **"Who is talking to whom about what, where, how, and why?"** There are five main components:

- Purpose
- Writer
- Audience
- Message
- Context/Culture

Figure 1.3.1 *The five components that are essential to determining how to respond to any situation.*

PURPOSE refers to *why* you are writing. Determining your purpose requires that you engage in ***Task Analysis*** — that is, determine what you hope to accomplish by writing this document. Ask yourself what you hope the reader(s) will do/think/decide/ or how they will behave as a result of reading the text. There are three general purposes for communication in the workplace: 1) to inform, 2) to instruct, and 3) to persuade.

Within those general purposes, you will find a myriad of specific purposes. For example, your purpose may be to propose an innovative solution to a specific problem. In this case, you want the reader to agree to explore the idea further, or approve funding for further research and development, which would fall under the general purpose of writing to persuade.

WRITER refers to you, the writer/creator/designer of the communication. It is important to examine your own motivation for writing and any biases, past experiences, and knowledge you bring to the writing situation. These elements will influence how you craft the message, whether positively or negatively. This examination should also include your role within the organization, as well as your position relative to your target audience.

AUDIENCE refers to your readers/listeners/viewers/users. ***Audience Analysis*** is possibly the most critical part of understanding the rhetorical situation. Consider **Figure 1.3.2** below. Is your audience internal (within your company) or external (such as clients, suppliers, customers, other stakeholders)? Are they lateral to you (at the same position or level), upstream from you (management), or downstream from you (employees, subordinates)? Who is the primary audience? Who are the secondary audiences? These questions, and others, help you to create an understanding of your audience that will help you craft a message that is designed to effectively communicate specifically to them.

Keep in mind that your different audiences will also have differing purposes for reading your document. Think about what their various purposes might be and how you can best help them achieve them. Considering what they are expected to do with the information you provide will help you craft your message effectively. Remember also that technical writing often has a long "life span" – a document you write today could be filed away and reviewed months or even years down the road.

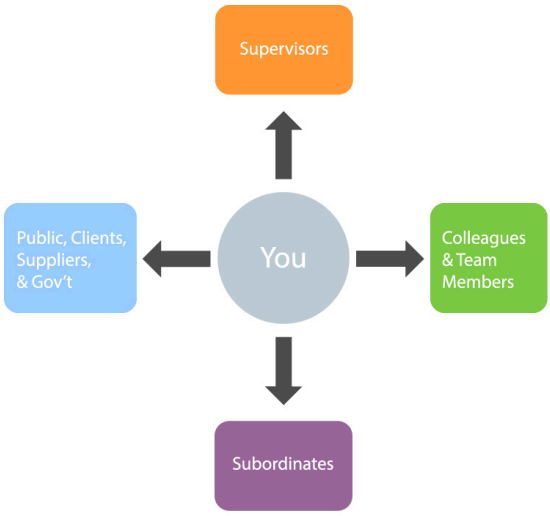

Figure 1.3.2 *Understanding your relationship to your audience.*

Table 1.3.1 ***Workplace audiences and purposes***

Audience	Purpose for Reading
Executives	Make decisions
Supervising Experts/Managers	Advise decision-makers; direct subordinates
Technical Experts/Co-workers	Implement decisions; advise
Lay People/Public/Clients	Become informed; choose options; make decisions

Consider the needs of that audience as well. What is their interest in the matter at hand? What is their anticipated response to your message: will it be positive, neutral, or negative? How much do

they already know about the situation or topic? Thinking about the audience's needs allows you to determine the appropriate tone and the amount and type of information to include in the message.

Some companies develop audience profiles to help guide their communications. This is a good exercise whenever you have to communicate complex information. Here are some questions to consider as part of the audience profile:

Developing an Audience Profile

Identity and role:

- Who are your primary readers? (specific names and titles, or general roles)
- What is their level of authority? Do they have clearance to view your document?
- What is their role? Are they above you in the organizational hierarchy? Lateral, subordinate?
- Who else might read this document? (secondary readers)
- How might cultural differences affect their expectations and interpretations?

Expertise and attitude

- How much do they already know about the topic?
- How much technical background do the readers have?
- What is their attitude towards the topic?

Language:

- Are they familiar with jargon (specialized technical vocabulary) or would plain language be more appropriate for the situation?
- Given their role, would formal language or informal (conversational) language be suitable?
- Given specific language needs, should your document be translated? (applies to documentation sent internationally.)

MESSAGE refers to what information you want to communicate. This is the content of your document. It should be aligned to your purpose and targeted to your audience. While it is important to carefully choose what content your audience needs, it is equally critical to cut out content that your audience does not need or want. "Time is money" may be a tired old cliché, but it is important to avoid wasting your audience's time with information that is unnecessary or irrelevant to them. So, differentiate between the "need-to-know" information, which you must include, from the "nice-to-know" information, which you can omit or place in an appendix. In addition, your message should always be professional and expressed in an appropriate **tone** for the audience, purpose, and context. We will discuss aspects of using a professional style and tone in crafting your message more in **Chapter 3**.

CONTEXT refers to the situation that creates the need for the writing. In other words, what has happened or needs to happen creates the need for communication. The context is influenced by

timing, location, current events, and culture, which can be organizational or social. Understanding context goes a long way in helping you create a useful message. Some questions you might ask relating to context analysis include:

- Are you addressing an internal audience or an external one?
- Where is the audience situated: in a technical or non-technical environment?
- What external factors are affecting the communication? For example, regulatory or legal factors will affect what you can communicate?
- Is this a decision-making or informational context?

Ignoring the context for your communication could result in awkward situations, or possibly offensive ones. It will almost certainly impact your ability to clearly convey your message to your audience.

Consider the subtle (and not so subtle) similarities and differences in the rhetorical situation when you offer feedback on Course Experience Surveys vs when you evaluate an instructor on Ratemyprofessor.com.

EXERCISE 1.3.1 Identify the differences in the rhetorical situations

	Course Evaluation Survey	Ratemyprofessor.com
Purpose		
Audience		
Writer		
Message		
Context		

EXERCISE 1.3.2 Task and audience analysis

Download Task and Audience Analysis Exercises (.docx)

The table below contains a collection of details about a research project you have just completed on rising sea levels. Imagine that you're writing documents for each of the five following audiences:

1. **Your supervisor/boss**
2. **Scientists**

3. **The general public**
4. **Politician**
5. **High school students**

What information about rising sea levels might each audience be interested in? As you go down the list, write in the blank spaces in front of each detail the number that corresponds to the audiences that you think would find this detail most relevant.

Consider what kind of document might contain that information for that audience.

Interested Audience	Categories of Information on Sea Level Rise
	The dollar damage caused by sea level increases each year.
	A literature review of previous research on rising sea levels.
	Descriptions of calibration procedures for your instruments.
	Some basic physics of how tides and currents work.
	How much your project costs.
	A log of all your measurements during the whole project.
	A list of people who worked on the project.
	Specifications of a new instrument to measure water conditions.
	A new result showing a connection between sea level and coastal developments.
	Procedures you used to avoid statistical biases in your data.
	Your plans for further measurements.
	Your recommendations for future research.

1.4 Case Studies: The Cost of Poor Communication

No one knows exactly how much poor communication costs business, industry and government each year, but estimates suggest billions. In fact, a recent estimate claims that the cost in the U.S. alone is close to $4 billion annually! (Bernoff, 2016). Poorly worded or inefficient emails, careless reading or listening to instructions, documents that go unread due to poor design, hastily presenting inaccurate information, sloppy proofreading — all of these examples result in inevitable costs. The problem is that these costs aren't usually included on the corporate balance sheet at the end of each year, so often the problem remains unsolved.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=37#oembed-1

(What is the Cost of Poor Communication, 2022)

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=37#h5p-4

You may have seen the Project Management Tree Cartoon before (**Figure 1.4.1**); it has been used and adapted widely to illustrate the perils of poor communication during a project.

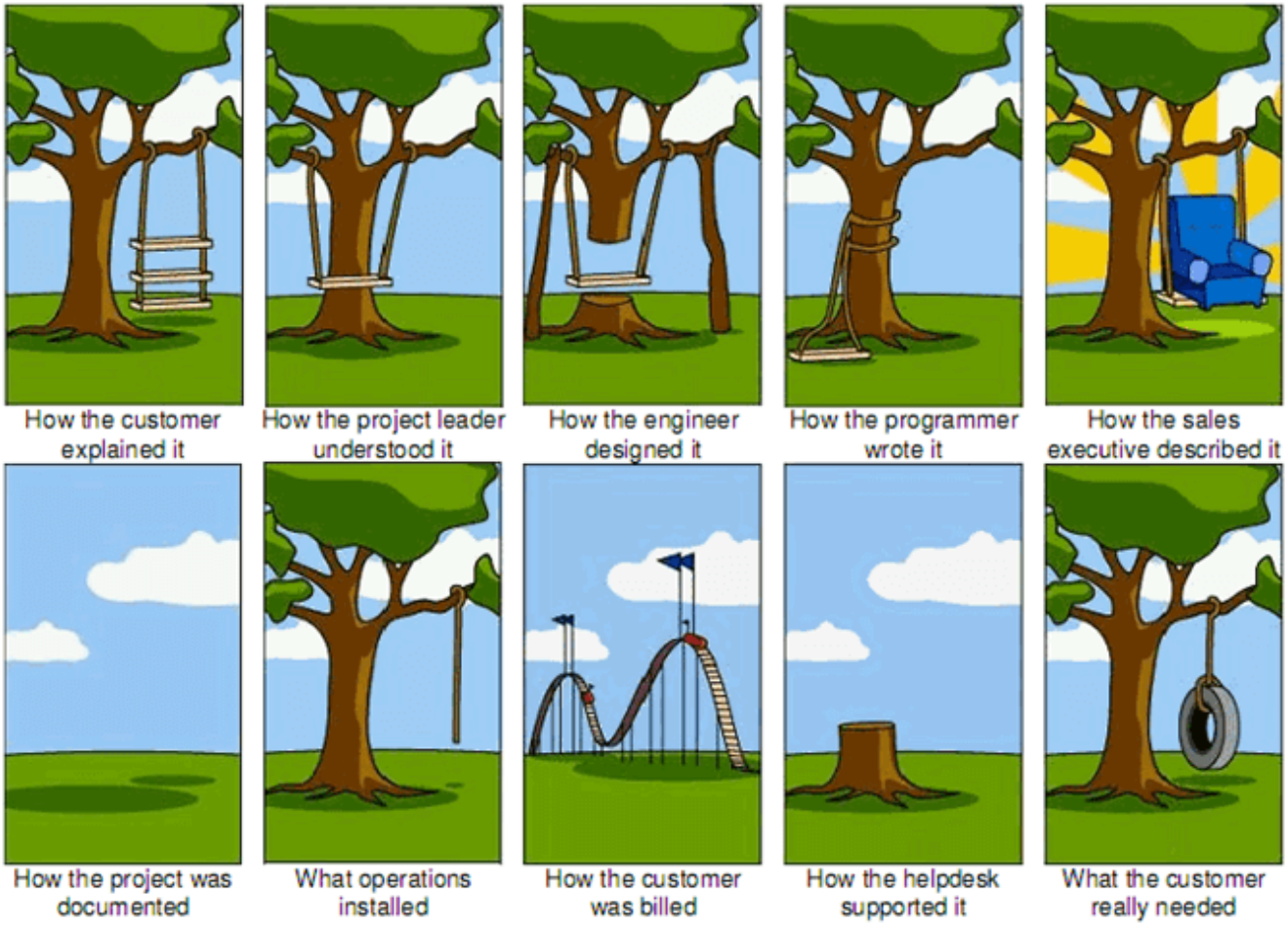

Figure 1.4.1 *Project Management Tree Swing Cartoon (Ward, 2019).*

The waste caused by imprecisely worded regulations or instructions, confusing emails, long-winded memos, ambiguously written contracts, and other examples of poor communication is not as easily identified as the losses caused by a bridge collapse or a flood. But the losses are just as real—in reduced productivity, inefficiency, and lost business. In more personal terms, the losses are measured in wasted time, work, money, and ultimately, professional recognition. In extreme cases, losses can be measured in property damage, injuries, and even deaths.

The following "case studies" show how poor communications can have real-world costs and consequences. For example, consider the "Comma Quirk" in the Rogers contract that cost $2 million (Robertson, 2006). Also, check out how a small error in spelling a company name cost £8.8 million (The Guardian, 2015). Or examine Tufte's discussion (.pdf) of the failed PowerPoint presentation that attempted to prevent the Columbia Space Shuttle disaster (2001). Or you might want to read about how the failure of project managers and engineers to communicate effectively resulted in the deadly Hyatt Regency walkway collapse (McFadden, 2017). The case studies below offer a few more examples that might be less extreme, but much more common.

Knowledge Check

Review the Case Study 1 and 2 below. Answer that questions that follow each case study. Exercises adapted from T.M. Georges' Analytical Writing for Science and Technology (1996).

CASE 1: The promising chemist who buried his results

Bruce, a research chemist for a major petrochemical company, wrote a dense report about some new compounds he had synthesized in the laboratory from oil-refining by-products. The bulk of the report consisted of tables listing their chemical and physical properties, diagrams of their molecular structure, chemical formulas and computer printouts of toxicity tests. Buried at the end of the report was casual speculation that one of the compounds might be a particularly effective insecticide.

Seven years later, the same oil company launched a major research program to find more effective but environmentally safe insecticides. After six months of research, someone uncovered Bruce's report and his toxicity tests. A few hours of further testing confirmed that one of Bruce's compounds was the safe, economical insecticide they had been looking for.

Unfortunately, Bruce had since left the company because he felt that the importance of his research was not being appreciated.

An interactive H5P element has been excluded from this version of the text. You can view it online here: *https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=37#h5p-5*

CASE 2: The unaccepted current regulator proposal

The Acme Electric Company worked day and night to develop a new current regulator designed to cut the electric power consumption in aluminum plants by 35%. They knew that, although the competition was fierce, their regulator could be produced more cheaply, was more reliable, and worked more efficiently than the competitors' products.

The owner, eager to capture the market, personally but somewhat hastily put together a 120-page proposal and sent it to the three major aluminum manufacturers, recommending that their regulators be installed at all company plants.

She devoted the first 87 pages of the proposal to the mathematical theory and engineering design behind this new regulator, and the next 32 to descriptions of the new assembly line she planned to set up to produce regulators quickly. Buried in an appendix were the test results that compared her regulator's performance with present models, and a poorly drawn graph showed how much the dollar savings would be.

Acme Electric didn't get the contracts, despite having the best product. Six months later, the company filed for bankruptcy.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=37#h5p-6

Now, in small groups, examine each "case" and determine the following:

1. Define the **rhetorical situation**: Who is communicating to whom about what, how, and why? What was the goal of the communication in each case?
2. Identify the **communication error** (poor task or audience analysis? Use of inappropriate language or style? Poor organization or formatting of information? Other?)
3. Explain what **costs/losses** were incurred by this problem.
4. Identify **possible solution**s or strategies that would have prevented the problem, and what benefits would be derived from implementing solutions or preventing the problem.

Present your findings in a brief, informal presentation to the class.

CASE 3: The instruction manual that scared customers away

As one of the first to enter the field of office automation, Sagatec Software, Inc. had built a reputation for designing high-quality and user-friendly database and accounting programs for business and industry. When they decided to enter the word-processing market, their engineers designed an effective, versatile, and powerful program that Sagatec felt sure would outperform any competitor.

To be sure that their new word-processing program was accurately documented, Sagatec asked the senior program designer to supervise the writing of the instruction manual. The result was a thorough, accurate and precise description of every detail of the program's operation.

When Sagatec began marketing its new word processor, cries for help flooded in from office workers who were so confused by the massive manual that they couldn't even find out how to get started. Then several business journals reviewed the program and judged it "too complicated" and "difficult to learn." After an impressive start, sales of the new word-processing program plummeted.

Sagatec eventually put out a new, clearly written training guide that led new users step by step through introductory exercises and told them how to find commands quickly. But the rewrite cost Sagatec $350,000, a year's lead in the market, and its reputation for producing easy-to-use business software.

CASE 4: One garbled memo – 26 baffled phone calls

Joanne supervised 36 professionals in 6 city libraries. To cut the costs of unnecessary overtime, she issued this one-sentence memo to her staff:

> When workloads increase to a level requiring hours in excess of an employee's regular duty assignment, and when such work is estimated to require a full shift of eight (8) hours or more on two (2) or more consecutive days, even though unscheduled days intervene, an employee's tour of duty shall be altered so as to include the hours when such work must be done, unless an adverse impact would result from such employee's absence from his previously scheduled assignment.

After the 36 copies were sent out, Joanne's office received 26 phone calls asking what the memo meant. What the 10 people who didn't call about the memo thought is uncertain. It took a week to clarify the new policy.

CASE 5: Big science — Little rhetoric

The following excerpt is from Carl Sagan's book, *The Demon-Haunted World: Science as a Candle in the Dark* (Sagan, 1995) itself both a plea for and an excellent example of clear scientific communication:

> The Superconducting Supercollider (SSC) would have been the preeminent instrument on the planet for probing the fine structure of matter and the nature of the early Universe. Its price tag was $10 to $15 billion. It was cancelled by Congress in 1993 after about $2 billion had been spent — a worst of both worlds outcome. But *this* debate was not, I think, mainly about declining interest in the support of science. Few in Congress understood what modern high-energy accelerators are for. They are not for weapons. They have no practical applications. They are for something that is, worrisomely from the point of view of many, called "the theory of everything." Explanations that involve entities called quarks, charm, flavor, color, etc., sound as if physicists are being cute. The whole thing has an aura, in the view of at least some Congresspeople I've talked to, of "nerds gone wild" — which I suppose is an uncharitable way of describing curiosity-based science. No one asked to pay for this had the foggiest idea of what a Higgs boson is. I've read some of the material intended to justify the SSC. At the very end, some of it wasn't too bad, but there was nothing that really addressed what the project was about on a level accessible to bright but skeptical non-physicists. If physicists are asking for 10 or 15 billion dollars to build a machine that has no practical value, at the very least they should make an extremely serious effort, with dazzling graphics, metaphors, and capable use of the English language, to justify their proposal. More than financial mismanagement, budgetary constraints, and political incompetence, I think this is the key to the failure of the SSC.

CASE 6: The co-op student who mixed up genres

Chris was simultaneously enrolled in a university writing course and working as a co-op student at the Widget Manufacturing plant. As part of his co-op work experience, Chris shadowed his supervisor/mentor on a safety inspection of the plant, and was asked to write up the results of the inspection in a **compliance memo**. In the same week, Chris's writing instructor assigned the class to write a narrative essay based on some personal experience. Chris, trying to be efficient, thought that the plant visit experience could provide the basis for his essay assignment as well.

He wrote the essay first because he was used to writing essays and was pretty good at it. He had never even seen a compliance memo, much less written one, so was not as confident about that task. He began the essay like this:

> On June 1, 2018, I conducted a safety audit of the Widget Manufacturing plant in New City. The purpose of the audit was to ensure that all processes and activities in the plant adhere to safety and handling rules and policies outlined in the Workplace Safety Handbook and relevant government regulations. I was escorted on a 3-hour tour of the facility by...

Chris finished the essay and submitted it to his writing instructor. He then revised the essay slightly, keeping the introduction the same, and submitted it to his co-op supervisor. He "aced" the essay, getting an A grade, but his supervisor told him that the report was unacceptable and would have to be rewritten – especially the beginning, which should have clearly indicated whether or not the plant was

in compliance with safety regulations. Chris was aghast! He had never heard of putting the "conclusion" at the **beginning**. He missed the company softball game that Saturday so he could rewrite the report to the satisfaction of his supervisor.

Exercises adapted from T.M. Georges' *Analytical Writing for Science and Technology* (1996).

Review the video below for a few suggestions on improving workplace communication.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=37#oembed-2

(The Recipe for Great Communication, 2015)

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1.5 Writing Processes

Just as we use design processes to creatively solve complex problems, we use writing processes to create complex documents. In both cases, there are steps or stages, but we don't always proceed directly from one step to the next in a chronological manner. These processes are often iterative, meaning we might return to previous stages in the process from time to time. The more complex the task, the more iteration might be needed. Examine the Design Process (**Figure 1.5.1**) and Writing Process (**Figure 1.5.2**) diagrams below. What similarities and differences can you see in these two processes? How are they similar or different to your own processes?

Figure 1.5.1 *Design process (Girls Get Set for Life, Tufts University, 2002).* [Image description]

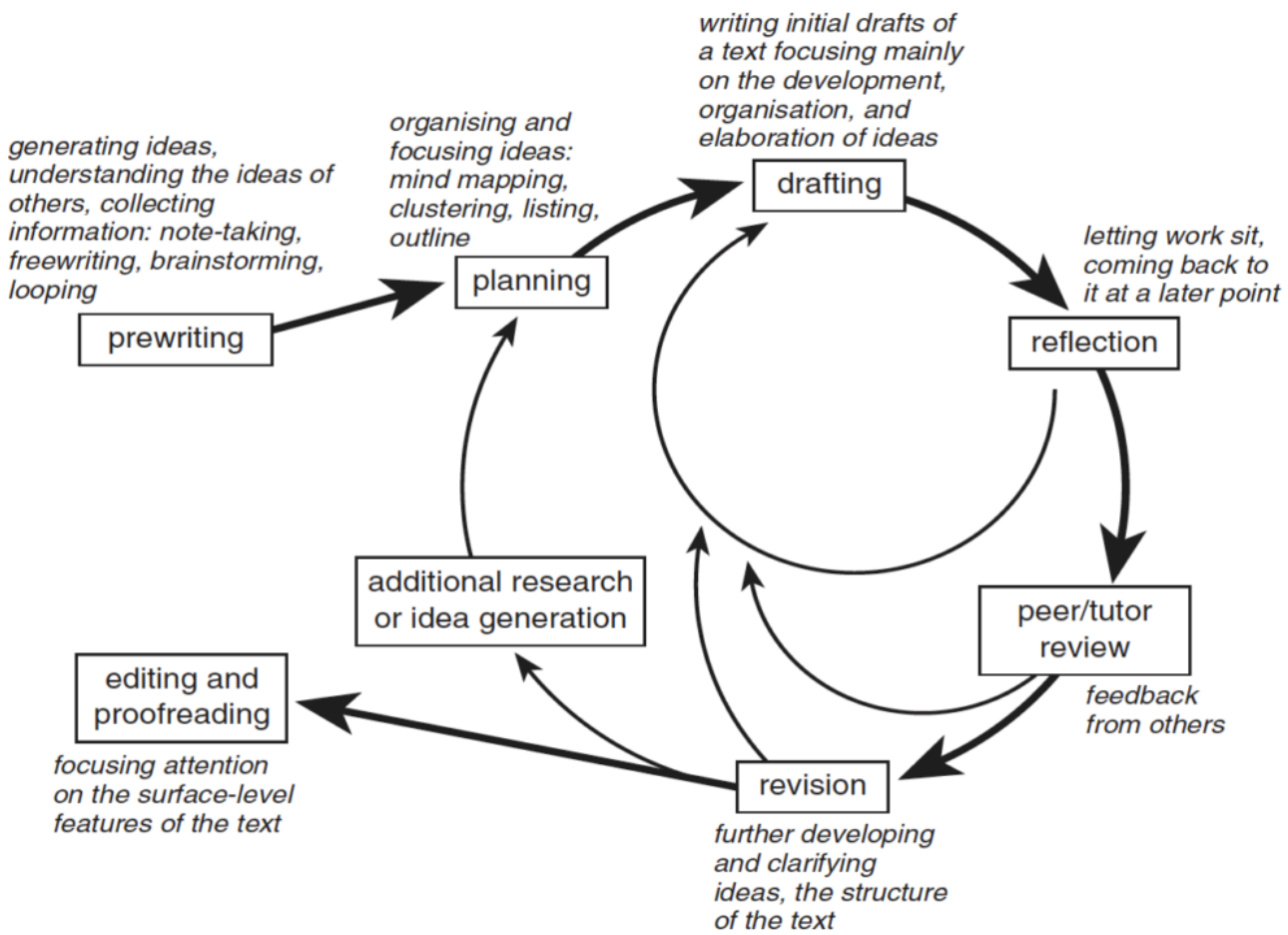

Figure 1.5.2 *Writing Process Diagram (Curry & Hewings, 2003).* [Image description]

You may have come across a "writing process" before, and it may or may not have worked well for you. There is no single process that works for everyone in every situation. The key is to recognize the various steps in a typical writing process and figure out how to use or adapt them most effectively for your situation.

Knowledge Check: *Review the video,* ***5 Steps of the Academic Writing Process****, and answer the embedded questions.*

An interactive H5P element has been excluded from this version of the text. You can view it online here: *https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=41#h5p-7*

You may also have come across the 40-20-40 writing process, which suggests that you should break up the amount of time you spend on the writing task into three distinct stages of planning, drafting and revising, and give each one a specific percentage of the time you have available.

40-20-40 Writing Process

Stage 1 – Planning: Spend 40% of your time planning your document (task analysis, thinking, discussing, free-writing, researching, brainstorming, concept mapping, focusing ideas, outlining, etc.).

Stage 2 – Drafting: Spend 20% of your time writing a rough draft (quickly getting all your ideas down in print, in more or less complete sentences and paragraphs, in more or less the right order, without agonizing over style or grammar choices).

Stage 3 – Revising: Spend 40% of your time revising, editing, and proofreading (polishing your draft, making sure the content is complete and well supported, ideas flow logically, formatting meets expectations, expression is grammatically correct and has the appropriate tone and vocabulary).

These percentages are a helpful guideline, as they emphasize the need to allot significant time for revision, but don't always work for all people in all situations (think of a final exam situation!). It also does not clearly account for the need to iterate; sometimes while revising your draft (Stage 3), you may have to go back to the planning stage (Stage 1) to do additional research, adjust your focus, or reorganize ideas to create a more logical flow. Writing, like any kind of design work, demands an organic and dynamic process.

As with the design process, the writing process must begin with an understanding of the problem you are trying to solve. In an educational context, this means understanding the assignment you've been given, the specifications of that assignment, the objectives you are meant to achieve, and the constraints you must work within (due dates, word limits, research requirements, etc.). This is often referred to as "Task Analysis." In professional contexts, you must also consider who your intended reader(s) will be, why they will be reading this document, and what their needs are, as well as deadlines and documentation requirements.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=41#h5p-8

EXERCISE 1.5 Planning your writing process

Consider an upcoming writing assignment or task you must complete. To avoid putting it off until the last minute (and possibly doing a poor job), try planning a writing process for this task, and build in milestones. Anticipate how long various sub-tasks and stages might take. Make sure to include time for "task and audience analysis" to fully understand what's involved before you start. Consider the following:

- What is the purpose of the document? What are the specific requirements? Who will read it and why?
- How much planning is needed? What will this entail? Will you need to do research? Do you need to come up with a topic or focus, or has one been assigned to you?
- How complicated will the document be? Will it have several sections? Graphics? How much revision will be needed to perfect your document? Will you have time for a peer/tutor review?

You will be asked to complete project plans for some more involved assignments, which will help you plan your work and estimate the amount of time it will take you to complete it. For now, try using Seneca Libraries' **Assignment Calculator** to see if it offers something similar to your planned writing process.

Image descriptions

Figure 1.5.1 image description:

A design process flow chart that encourages you to revisit previous steps as needed.

1. **Define the problem.** This involves a needs assessment, problem statement, designing criteria and goals and background research.
2. **Generate possible solutions.** Brainstorming using the idea trigger method, thumbnail sketching, and creative thinking. At this point, you may need to revisit your problem definition. Once you have a number of possible solutions, move on to the next step.
3. **Evaluate possible solutions.** Do ideas meet design criteria? List the advantages and disadvantages. Select the best design alternatives. Use a decision matrix to evaluate. At this

point, you may need to revisit your problem definition or brainstorm some more. Once you have evaluated possible solutions, move on to the next step.

4. **Make and test a model.** Create detailed technical drawings, prototype or scale models, mathematical and computer models, Conduct performance and user tests. At this point, you made need to go back to brainstorming solutions or evaluating possible solutions. Once you have a model you are happy with, move on to the next step.
5. **Modify and improve design.** Fix problems, improve design, do more testing if needed. In the worse case, scrap the design. You may need to go back to evaluating possible solutions to making and testing the model. Once you have a design you are happy with, move on to the next step.
6. **Communicate final design.** Create final technical drawings, and technical manuals for assembly, operation, and maintenance.

[Return to Figure 1.5.1]

Figure 1.5.2 image description:

A writing process diagram that encourages constantly revisiting previous stages.

1. **Prewriting.** This stage is for generating ideas, understanding the ideas of others, and collecting information (note-taking, free-writing, brainstorming, looping).
2. **Planning.** Here, you are organizing and focusing ideas. This may involve mind mapping, clustering, listing, and creating outlines.
3. **Drafting.** In the drafting stage, you are writing initial drafts of a text focusing mainly on the development, organization, and elaboration of ideas.
4. **Reflection.** In the reflection stage, you can let the work sit and come back to it at a later point. You may cycle back between drafting a reflection a number of times before moving on.
5. **Peer/tutor review.** Now you can get feedback from others. This may require you to return to the drafting and reflecting stages.
6. **Revision.** Here you are further developing and clarifying ideas and the structure of the text. This may require you to return to the drafting and reflecting stages. If the work requires additional research or idea generation, return to the planning stage.
7. **Editing and proofreading.** Here the focus is on surface-level features of the text.

[Return to Figure 1.5.2]

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2. GENERATIVE AI IN CONTENT CREATION

When OpenAI's ChatGPT-3 was released to the general public in November 2022, the world was introduced to a ground-breaking technology that would forever change how people research and analyze information; create documents, images, and graphical elements; brainstorm and outline ideas; create videos and code; interact with artificial intelligence agents; process and interpret large datasets; and more. Its impact extends to all areas of business, science, economics, medicine, education, engineering sectors, to name a few. While fierce debate surrounds the use of generative artificial intelligence (genAI) in all spheres, we cannot ignore its tremendous benefits—from scientific breakthroughs, to improving access to information, to streamlining workflow, boosting productivity, to time-saving content creation, to bulk information processing, and the like. This unit will introduce you to foundational knowledge and skills relating to genAI.

Chapter 2 Learning Objectives

2.1 Learn about genAI within the context of artificial intelligence

2.2 Understand the terminology surrounding genAI

2.3 Acquire knowledge of the benefits and the perils in using genAI

2.4 Choose genAI models that best serve your purposes and use them in a purposeful manner

2.5 Prompt the models using strategies that exercise human agency and protect inclusivity

Generative AI (genAI) consists of large language model systems that can interact with humans using natural language. This type of interaction makes the process of working with artificial intelligence capabilities much more accessible and convenient for humans. While early versions of these tools have been with us for some time in the form of chatbots and rudimentary AI assistants like Siri and Alexa, those emerging since November 2022 eclipse previous tools in terms of their range of capabilities, knowledge bases, and ability to respond to human direction. Moreover, models like ChatGPT, Gemini, and Llama 3 are being integrated with communication tools humans use on a daily basis (like Microsoft Office and Apple products, Google's office suite, along with social media tools like Instagram and Facebook), making them ubiquitous. Despite their current flaws, they are also beginning to form the foundation for other AI tools used daily in technical environments, and it is essential for us to become familiar with the strengths and weaknesses of such tools and how we can integrate them usefully in our daily workflows.

Before discussing genAI, we should consider it in the context of the long history of AI.

What is Artificial Intelligence (AI)?

Artificial intelligence (AI) is the theory and development of computer systems capable of performing tasks that normally require human intelligence, such as interpreting language, recognizing patterns from large amounts of data, and making decisions. Some of the names given to AI, based on the way in which it is designed and what it can do, include neural networks, natural language processing, computer vision, speech recognition, machine learning, and deep learning.

Take a look at the timeline in **Figure 2.1.1** to explore a selection of the key advances in AI.

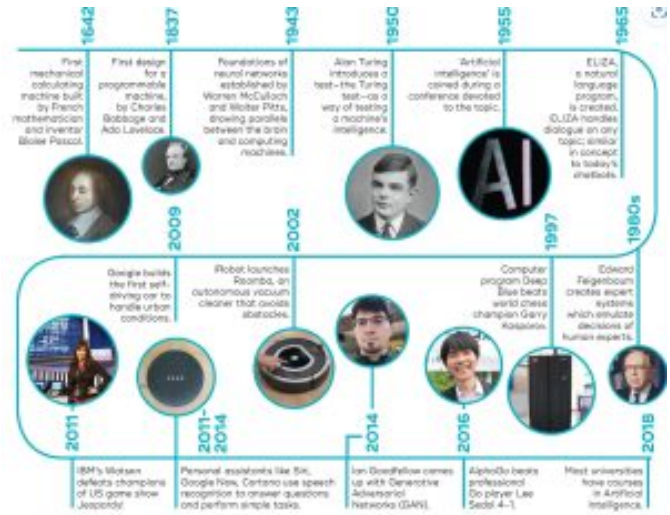

Figure 2.1.1 *The History of Artificial Intelligence (University of Queensland Brain Institute, n.d.).*

While we tend to think of artificial intelligence as a product of the 21st century, it has been in practical use since the middle of the 20th century. We interact with AI every day. Examples of AI include:

- Asking your smartphone to unlock your phone by recognizing your face.
- Navigating to your destination using apps like Google Map or Waze to find the quickest route.
- Getting more posts in your social media feeds that match those with which you previously interacted (that you liked or commented on).
- Receiving a notification from your bank that there has been unusual activity in your account.
- Obtaining a recommendation from an online store (or music or video streaming platform) based on your previous purchases.
- Interacting with a customer service chatbot.
- Feeding your text through a grammar software that suggests better ways to write your text.
- Using Google Translate to translate text from one language into another.
- Using a voice-to-text app on a smartphone.
- Using a personal assistant like Siri, Alex, or Cortana.

What is Generative AI (GenAI)?

While we interact with AI everyday, usually it hides in the background of the technologies we use. GenAI is different in that we can use our voice and text to command the technology to produce content (a.k.a. as output) that we would normally have to create ourselves.

Miao and Holmes (2023) define genAI as follows:

> Artificial Intelligence (AI) technology that automatically generates content in response to prompts written in natural language conversational interfaces. Rather than simply curating existing webpages, by drawing on existing content, genAI actually produces new content. The content can appear in formats that comprise all symbolic representations of human thinking: texts written in natural language, images (including photographs to digital paintings and cartoons), videos, music and software code. GenAI is trained using data collected from webpages, social media conversations and other online media. It generates its content by statistically analyzing the distributions of words, pixels or other elements in the data that it has ingested and identifying and repeating common patterns (for example, which words typically follow which other words).

While OpenAI's ChatGPT was the first large language model to be popularized, other notable text and code generating models, known as frontier models, have been released, namely, Google's

Gemini (formerly Bard), and Anthropic's Claude, and Meta's Llama, along with open source models like Mistral/Mixtral.

Frontier Models	Applications
OpenAI's ChatGPT	Multimodal (text, image, voice, data); integrated into Microsoft products
Anthropic's Claude	Multimodal
Meta's Llama	Multipurpose; integrated into Instagram and Facebook
Google's Gemini	Multimodal; integrated into Google products
Mistral/Mixtral Open Source	Language processing only

At this writing, ChatGPT 4 is considered the gold standard, with both Gemini (select versions) and Claude achieving GPT 4-level performance in 2024 (Mollick, 2024). In addition, image-generating models, such as DALL-E, Stable Diffusion, Stable Cascade, and Midjourney now offer text-based command modes for creating custom images. OpenAI has also released Sora, which can create realistic videos from text commands. The models are rapidly evolving and new versions are released every few months. Each model and application displays differing strengths and capabilities as noted by end-user testing (see the work of Ethan Mollick in particular). In addition, given the rapid developments occurring in the field of genAI, the models and applications are evolving equally rapidly, while new ones are being released.

OpenAI's ChatGPT draws from a genAI model that was trained on a large number of datasets and documents available on the internet to identify and predict how language works (how to create sentences). The GPT in ChatGPT stands for "Generative Pre-trained Transformer", referring to a type of machine learning involving a neural network in which a computer learns to perform a task by analyzing training examples. For example, the training data used by ChatGPT 3.5 is a dataset that includes 570GB of data from sources like books, Wikipedia, articles, and other pieces of writing on the internet up to 2021 (Gupta, 2023). The GPT model learned the probability that one word (or a part of a word also known as a token) should follow another, based on context or conversation topic. This ability to predict sentence patterns enables it to generate outputs that seem surprisingly "human" – conversational and coherent.

Users engage with the genAI in the form of a written or verbal conversation often referred to as prompts. The GPT acquired the conversational ability through a process of "Reinforcement Learning with Human Feedback (RLHF) – a method that uses human demonstrations and preference comparisons to guide the model toward desired behaviour" (OpenAI). Essentially, RLHF involves using human feedback to train the model in giving outputs that are socially acceptable—imperfect though they may sometimes be.

Fundamentally, tools like Copilot, ChatGPT, Gemini, etc. are designed to employ your prompts to generate a response based on context and conversational topic. You ask questions (prompts), upload

reference images or documents, and ask follow-up questions to fine-tune the GenAI's responses until you obtain output or content that meets your needs.

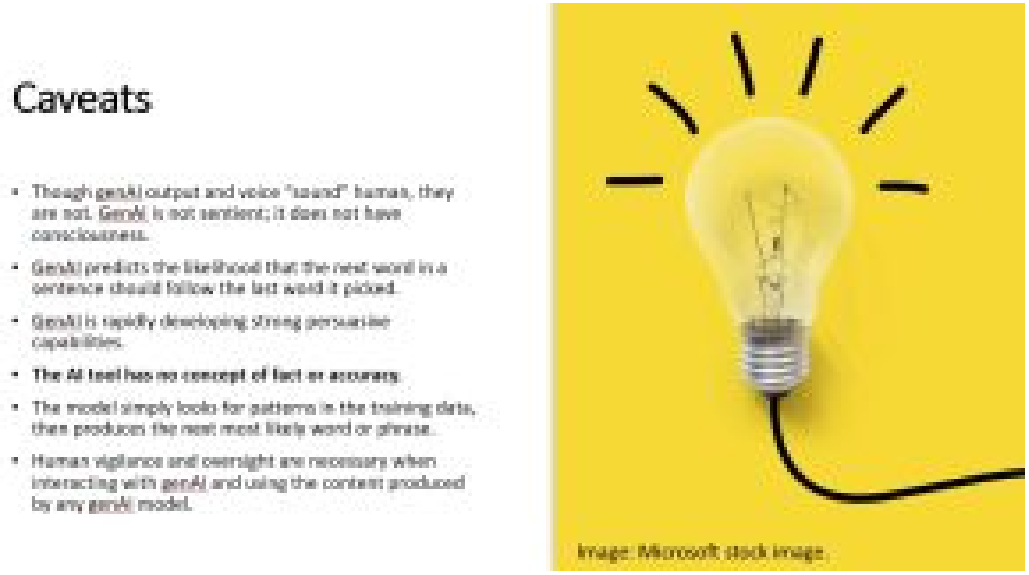

Figure 2.1.2 *Caveats: Use caution when using genAI (Potter, 2024).*

Interestingly, giving the same prompt to the same genAI tool does not always produce the same result. Each time a tool like Copilot or ChatGPT is prompted, it often creates a new output. While there will probably be similarities between outputs from the same prompt on the same topic, they will not be identical. This is even more apparent when you use the same prompt across multiple AI products.

GenAI is evolving as we write, and capabilities increase with each version of the models that are released. Below you will find a list of basic capabilities for text-based modalities that form the basis for more complex multimodal capabilities being released. These multimodal capabilities in ChatGPT, Gemini, and Claude include the following:

- Verbal capabilities: Interact with the user verbally using natural language, cadence, tone, and pace.
- Visual capabilities: Make use of the user's camera to engage with dynamic visual elements in the world (not just photos and documents).
- Emotion and facial expression detection: Interpret facial expressions and identify emotions.
- Memory: Remember your conversations unless settings have been adjusted so that it does not do so.

Basic Capabilities

While each text-based genAI tool has specific functionalities, some common capabilities include:

- Create informative, well-written text: prose, poetry, dialogue, code, business reports, correspondence
- Provide examples and references; Note: references may be 'hallucinated' (which occurs when the model offers fake or inaccurate information all the while sounding knowledgeable)
- Generate outlines, questions, tables, long form text
- Render images
- Analyze large data sets
- Summarize inputted text
- Provide feedback on text – both form and structure
- Explain concepts at different levels of understanding
- Translate between languages
- Remember information both within a thread and across threads

Seneca Libraries offers an overview of genAI that covers a description, uses, basic prompting, and citation practices: Generative Artificial Intelligence

Also take a look at this video, Introduction to AI for Teachers and Students, by Ethan Mollick and Lilach Mollick of the Wharton School at the University of Pennsylvania. These pioneers in the use of genAI make the topic easy to understand.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=46#oembed-1

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GenAI Terminology—A Primer

Review the following genAI terminology to become familiar with not only the vocabulary but also the components and processes that comprise this technology. The more familiar you become with these elements, the more confident you will feel working with the tools.

The following glossary is offered in two parts: **The GenAI System** and **Usage**. The GenAI System glossary has been largely adapted from the Glossary of Artificial Intelligence Terms for Educators (Ruiz & Fusco, 2024) and follows a non-alphabetic order as the items are listed in logical sequence. The Usage glossary has been compiled alphabetically mainly from the University of British Columbia's Glossary of GenAI Terms. Both glossaries have been supplemented with information from other sources as indicated.

Glossary: The GenAI System

Artificial Intelligence (AI): AI is a branch of computer science. AI systems use hardware, algorithms, and data to create "intelligence" to do things like make decisions, discover patterns, and perform some sort of action. AI is a general term, and there are more specific terms used in the field of AI. The term is also more broadly used to refer to applications. AI systems can be built in different ways, two of the primary ways are: 1) through the use of rules provided by a human (rule-based systems); or 2) with machine learning algorithms. Many newer AI systems use machine learning (see definition of machine learning below).

Algorithm: Algorithms are the "brains" of an AI system and what determines decisions. In other words, algorithms consist of the rules for the actions the AI system takes. Machine learning algorithms can discover their own rules (see Machine Learning for more) or be rule-based where human programmers give the rules.

Artificial Narrow Intelligence (ANI): AI can solve narrow problems through what is known as artificial narrow intelligence (ANI); it is used mostly for specific, task-focused purposes. For example, a smartphone can use facial recognition to identify photos of an individual in the Photos app, but that same system cannot identify sounds. ANI exists in much of the technology that we use daily.

Artificial General Intelligence (AGI): Artificial general intelligence (AGI) is predicted to be available by 2026 (Schroeder, 2024). It will be capable of completing human tasks and exercising higher order cognitive abilities, including: exercising abstract thinking, applying background knowledge, exercising common sense, determining cause and effect, and transferring learning (Hashemi-Pour & Lutkevish, n.d.). The range of capabilities of the technology will greatly extend what current artificial intelligence is capable of doing.

Artificial Super Intelligence (ASI): Building on the capabilities of AGI, artificial super intelligence (ASI) is thought to be an evolution that would see AI surpass human intelligence, acting autonomously in all spheres of activity. "These machines would feature highly advanced reasoning,

decision-making, and problem-solving capabilities far beyond the creative or logical capabilities of any human being" (Keary, 2024), which will have crucial implications for humanity.

Generative AI (GenAI) and chat-based generative pre-trained transformer (ChatGPT) models: A system built by OpenAI with a neural network transformer type of AI model that works well in natural language processing tasks (see definitions for Neural Networks and Natural Language Processing below). In this case, the model: 1) can generate responses to questions (**G**enerative); 2) was trained in advance on a large amount of the written material available on the web (**P**re-trained); and 3) can process sentences differently than other types of models (**T**ransformer).

Transformer models: Used in genAI (the T in GPT stands for Transformer), transformer models are a type of language model. They consist of neural networks and are classified as deep learning models. They give AI systems the ability to determine and focus on important parts of the input and output.

Data: Data are units of information about people or objects that can be used by AI technologies.

Training Data: Training data is used to train the algorithm or machine learning model. ChatGPT, for instance, was trained on massive datasets and information available on the internet. Evaluating training data is important because the wrong data can perpetuate systemic biases. Algorithms take on the biases that are already inside the data. People often think that machines are "fair and unbiased," but machines are only as unbiased as the humans who create them and the data upon which it trains.

Foundation Models: Foundation models are trained on large datasets and can then be used for other purposes. Large language models (LLMs), such as employed by ChatGPT and similar systems, "are trained on large-scale text data and can generate human-like text" (NAIAC, 2023). Controversy surrounds foundation models since, depending on where their data comes from, different issues of trustworthiness and bias may arise.

Large Language Model: Large Language Models (LLMs) are artificial intelligence systems specifically designed to understand, generate, and interact with human language on a *large* scale. These models are trained on enormous datasets comprising a wide range of text sources, enabling them to grasp the nuances, complexities, and varied contexts of natural language. LLMs like GPT (Generative Pre-trained Transformer) use deep learning techniques, particularly transformer architectures, to process and predict text sequences, making them adept at tasks such as language translation, question-answering, content generation, and sentiment analysis. (UBC, n.d.)

Human-centered Perspective: A human-centered perspective sees AI systems trained to work in alignment with humans, helping to augment human skills.

Reinforcement Learning with Human Feedback (RLHF): RLHF is a "machine learning approach that combines reinforcement learning techniques, such as rewards and comparisons, with human guidance to train an artificial intelligence agent" (Patrizio, n.d.). After the model has been pre-trained, it undergoes human testing and feedback that are supported with a system of rewards.

The AI system then uses the feedback and rewards to improve its performance. (Patrizio, n.d.) This method has stirred controversy due to the ways humans have been used to review genAI outputs.

Intelligence Augmentation (IA): Augmenting means making something greater; in some cases, perhaps it means making it possible to do the same task with less effort. It can also mean letting a human choose to not do all the redundant tasks but automate some of them so they can do more things that only a human can do. It may mean other things. There's a fine line between augmenting and replacing, and technologies should be designed so that humans can choose what a system does and when it does it.

Machine Learning (ML): Machine learning is a field of study with a range of approaches to developing algorithms that can be used in AI systems. AI is the more general term. In ML, an algorithm will identify rules and patterns in the data without a human specifying those rules and patterns. These algorithms build a model for decision making as they go through data. (You will sometimes hear the term machine learning model.) Massive amounts of data are required to train the algorithms used in machine learning, so they can make decisions. Because they discover their own rules in the data they are given, ML systems can perpetuate biases.

In machine learning, the algorithm improves without the help of a human programmer. In most cases the algorithm is learning an association (when X occurs, it usually means Y) from past training data. Since the data is historical, it may contain biases and assumptions that we do not want to perpetuate. Many questions arise about involving humans in the loop with AI systems; when using ML to solve AI problems, a human may not be able to understand the rules the algorithm is creating and using to make decisions, leading to a black box situation. This could be especially problematic if a human was harmed by a decision a machine made and there was no way to appeal the decision.

Neural Networks (NN): Neural networks also called artificial neural networks (ANN) are a subset of ML algorithms. They were inspired by the interconnections of neurons and synapses in a human brain. In a neural network, after data enter in the first layer, the data go through a hidden layer of nodes where calculations that adjust the strength of connections in the nodes are performed, and then go to an output layer as depicted in **Figure 2.2.1**.

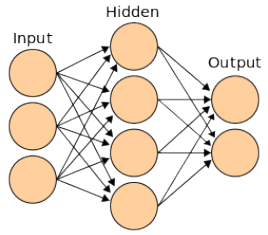

Figure 2.2.1: *Illustration of the topology of a generic artificial neural network. This file is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license.*

Natural Language Processing (NLP): Natural Language Processing is a field of Linguistics and Computer Science that also overlaps with AI. NLP uses an understanding of the structure, grammar, and meaning in words to help computers "understand and comprehend" language. NLP requires a large corpus of text (usually half a million words) to work effectively.

NLP technologies help in many situations that include: scanning texts to turn them into editable text (optical character recognition), speech to text, voice-based computer help systems, grammatical correction (like auto-correct or Grammarly), summarizing texts, and more.

Conversational or Chat AI: Conversational AI or Chat AI refers to the branch of artificial intelligence focused on enabling machines to understand, process, and respond to human language in a natural and conversational manner. This technology underpins chat bots and virtual assistants, which are designed to simulate human-like conversations with users, providing responses that are contextually relevant and coherent. Conversational AI combines elements of natural language processing (NLP), machine learning (ML), and sometimes speech recognition to interpret and engage in dialogue. (UBC, n.d.)

Robots and Bots: Robots are embodied mechanical machines that are capable of doing a physical task for humans. "Bots" are typically software agents that perform tasks in a software application (e.g., in an intelligent tutoring system). Bots are sometimes called conversational agents when they can interact using natural language with humans (as in the case of chatbots). Both robots and bots can contain AI, including machine learning, but do not have to have it. AI can help robots and bots perform tasks in more adaptive and complex ways.

Tuning: Tuning describes the process of adjusting a pre-trained model to better suit a specific task or set of data. This involves modifying the model's parameters so that it can more effectively process, understand, and generate information relevant to a particular application. Tuning is different from the initial training phase, where a model learns from a large, diverse dataset. Instead, it focuses on refining the model's capabilities based on a more targeted dataset or specific performance objectives. (UBC, n.d.)

Note: The original version of this glossary was reviewed by Michael Chang, Ph.D., a CIRCLS postdoctoral scholar.

Glossary: Usage

Agent: An agent is a computer program or system that is designed to perceive its environment, make decisions and take actions to achieve a specific goal or set of goals. The agent operates autonomously, meaning it is not directly controlled by a human operator.

Anthropomorphizing: The tendency for humans to refer to or think of inanimate objects using human qualifiers is called anthropomorphizing. Given that genAI interacts with humans in a conversational way that is human-like, it is common for humans to refer to genAI tools using anthropomorphisms.

Bias: Bias is viewed in two distinct ways in relation to genAI:

Firstly, bias can refer to a systemic skew or prejudice in the AI model's output, often reflecting inherent or learned prejudices in the data it was trained on. Bias in AI can manifest in various forms, such as cultural, gender, racial, political, or socioeconomic biases. These biases can lead to AI systems making decisions or generating content that is unfair, stereotypical, or discriminative in nature.

Secondly, in the technical construction of AI models, particularly neural networks, bias refers to a parameter that is used alongside "weights" to influence the output of a node in the network. While weights determine how much influence an input will have on a node, biases allow for an adjustment to the output independently of its inputs. The bias parameter is essential in tuning a model's behaviour, as it provides the flexibility needed for the model to accurately represent complex patterns in the data. Without biases, a neural network might be significantly less capable of fitting diverse and nuanced datasets, limiting its effectiveness and accuracy.

Bot: In the context of Generative AI, a 'bot' (short for robot) typically refers to a software application that is programmed to perform automated tasks. These tasks can range from simple, repetitive activities to more complex functions involving decision-making and interactions with human users. They are often equipped with advanced capabilities such as understanding and generating language, responding to user queries, or creating content based on specific guidelines or prompts.

Certain tools such as ChatGPT and Poe allow you to create your own 'bots' (called GPTs in the case of OpenAI; a subscription is required).

Chat Bot: A chatbot is a software application designed to simulate conversation with human users, especially over the internet. It utilizes techniques from the field of natural language processing (NLP) and sometimes machine learning (ML) to understand and respond to user queries. Chatbots can range from simple, rule-based systems that respond to specific keywords or phrases with pre-defined responses, to more sophisticated AI-driven bots capable of handling complex, nuanced, and context-dependent conversations.

Context window: A context window is the location in the genAI workspace where users input their prompts and reference documents. Only some models offer context windows that can handle a large capacity of information. The capacity of the context window is changing rapidly as various models evolve, so by experimenting with different models you will become familiar with the amount of information they can handle.

Critical AI: Critical AI is an approach to examining AI from a perspective that focuses on reflective assessment and critique as a way of understanding and challenging existing ethical and cultural structures within AI. Read more about critical AI (Ruiz & Fusco, 2024).

Fine-tuning: Fine-tuning is the process of taking a pre-trained AI model and further training it on a specific, often smaller, dataset to adapt it to particular tasks or requirements. This is relevant in scenarios where a general AI model, trained on varied datasets, needs to be specialized or optimized for specific applications.

A general language model could be fine-tuned with academic papers and texts from a specific discipline to better understand and generate text relevant to that field. This process involves

adjusting the model's parameters slightly so that it better aligns with the nuances and terminologies of the target domain while retaining the broad knowledge it gained during initial training.

Fine-tuning offers a balance between the extensive learning of a large, general model and the specific expertise required for particular tasks.

GenAI Model vs GenAI Application: When we speak of the model, we are referring to the complex interconnections of algorithms and technologies that go into creating the system that powers the generation of output. When we speak of the tool or application, we are referring to the specific interface, such as ChatGPT or Bing Chat–which are both anchored to the generative pretrained transformer model (GPT) (Paul R MacPherson Institute for Leadership, Innovation and Excellence in Teaching, 2024).

Hallucinating: Hallucinations are incorrect or misleading results that AI models generate. These errors can be caused by a variety of factors, including insufficient training data, incorrect assumptions made by the model, or biases in the data used to train the model. The concept of AI hallucinations underscores the need for critical evaluation and verification of AI-generated information, as relying solely on AI outputs without scrutiny could lead to the dissemination of misinformation or flawed analyses.

Intelligent Tutoring Systems (ITS): A computer system or digital learning environment that gives instant and custom feedback to learners. An Intelligent Tutoring System may use rule-based AI (rules provided by a human) or machine learning in the underlying algorithms and code that an ITS is built with. ITSs, for example, can support adaptive learning in company professional development programs (Ruiz & Fusco, 2024).

Prompt Crafting and Prompt Engineering: Prompt engineering in the context of genAI refers to the creation of input prompts to effectively guide AI models, particularly those like Generative Pre-trained Transformers (GPT), in producing specific and desired outputs. This practice involves formulating and structuring prompts to leverage the AI's understanding and capabilities, thereby optimizing the relevance, accuracy, and quality of the generated content. Prompt engineering is a process that is typically completed by specialists with the technical knowledge and skills that guide them in challenging the GPTs to achieve optimal outputs. See OpenAI's Prompt Engineering page for more information.

More specifically, according to Carl G. (2023), "Prompt engineering refers to the process of designing and using structured prompts to generate text responses for a wide range of NLP tasks, such as language modelling, text classification, and question answering. Prompt engineering involves using design patterns and various techniques, such as one-shot and few-shot learning, to improve the accuracy and efficiency of the generated responses."

GenAI end-users (i.e., the general public) often refer to their process of prompting as prompt engineering, but they are actually simply prompting, a term that will be used in this text to refer to the process of crafting prompts to elicit end user output from genAI systems. Remember "[p]rompt engineering is a technique used to generate responses to a wide range of NLP tasks, while

prompting [crafting] is a technique used to elicit a specific type of response or information from a user or system" (Carl, 2023).

Tokens: Tokens are the smallest units of data that an AI model processes. In natural language processing (NLP), tokens typically represent words, parts of words (like syllables or sub-words), or even individual characters, depending on the tokenization method used. Tokenization is the process of converting text into these smaller, manageable units for the AI to analyze and understand.

When using AI tools such as ChatGPT, the platforms will often quote how much a query costs in terms of tokens. Also, many subscriptions for AI applications will be quoted according to token costs.

Attribution

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Ruiz, P., and Fusco, J. (2024, updated). Glossary of artificial intelligence terms for educators. Educator *CIRCLS Blog*. Glossary of Artificial Intelligence Terms for Educators – CIRCLS Used under a Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/).

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GenAI Considerations

While the generative pretrained transformer (GPT) upon which the ChatGPT model is based is not new, OpenAI's launch of ChatGPT in November 2022 marked the fastest recorded adoption of a technology tool to date. In October 2023, the site had 1.7 billion visits in one month, marking the highest level of usage of any application (Carr, 2023). The rapid proliferation of tools and advancements in the technology saw over 100 leaders in AI technology write an open letter urging a collective pause on AI developments more powerful than GPT 4 to give time for security and safety features to develop and for the creation of regulations and governance structures. The need for such regulation or governance extends to full nations, organizations as well as education.

The innovation and creativity in the area of genAI are exciting. They can assist with ideation and writing, video and presentation production, research on small and large scales, data analysis and interpretation, image generation, music production and more. However, these systems do not come without limitations or ethical challenges. Some of these challenges speak to the specifics of academic contexts – like academic integrity – while others intersect with communities, organizations, governments, the environment, and humanity as a whole. Broader issues related to genAI include privacy of personal data, risks of misinformation, existential risks, concerns about job dislocation or loss, environmental costs, labour exploitation, and copyright. And specific to the technology, many AI experts have documented alarming concerns relating to the size and scale of large language models, misinformation, AI misalignment, and existential risks to humanity.

Whereas we may, as typical users, have little if any control over how the models are trained, what data is used for training, and how the algorithms process the data, we nonetheless have some control over how we use the models, their applications, and their output. As the humans in the process, we have the responsibility to maintain agency in the human-AI interaction, and we have the obligation to engage in the process by applying due diligence, ethical standards, and a critical perspective. And the way to embrace this human agency is to develop literacy about genAI and apply sound principles for use.

The ethical issues surrounding the development, operation, use, and maintenance of genAI models and applications are numerous and complex. This chapter offers an overview of key areas of concern; for more detailed discussions of the topics, please refer to the References, which provides additional resources for consideration.

Bias

GenAI tools are trained on a range of data, and some frontier models like GPT and other large language models (LLMs) were trained on a wide range of sources including internet sites, books, reports, and datasets. Biases inherent in the training data — those that may discriminate against or marginalize underrepresented, minority, and equity-deserving groups — may appear in the outputs generated by these tools. While efforts have been made by companies like OpenAI to create

'guardrails' to prevent hateful and discriminatory results from being generated, the risk of bias persists in the limitations of the training data itself. That is to say existing biases in the training data may make a discriminatory result statistically more likely, so the genAI tool is more likely to produce that result.

For instance, in a prompt to generate a story about slaying a dragon, the probabilistic result is to have a prince (and not a princess) slay the dragon because that is the most common pattern in the training data. This somewhat innocuous example points to the broader risk of unexamined bias in genAI results; that is to say, the result doesn't have to be hate speech to be harmful, nor does it have to be extreme to be biased. Take a look at this video from the London Interdisciplinary School (2023) for more insight.

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Users, either consciously or unconsciously, may also inject bias into their prompts, resulting in biased output. Being aware of one's own attitudes, beliefs, and prejudices will enable the user to reflect on the situation and mitigate any potential harm through a thorough review of both the prompt and output.

As communicators, we need to be thoughtful about the ways these biases might be perpetuated or left unexplored when we use genAI output in all types of documents and media.

Take Action: Completing a bias check for all prompts and output then editing the content to remove bias is an important obligation for the ethical use of genAI. To do this, you must be well informed about the issues relating to bias, so taking the steps to become literate on issues relating to representations of race, socioeconomic status, gender, ethnicity, ability, and other forms of bias will help you develop a keen awareness of what to watch for in genAI output.

Hallucinations

GenAI tools make things up, and they convey those falsehoods with such a confident tone that humans can be fooled into accepting the fake content. As probabilistic models, they are designed to generate the most likely response to any given prompt. Given that these tools do not 'know' anything, and are — in most instances — limited in their ability to fact check, the responses generated can include factual errors and invented citations/references. This known phenomenon has been termed 'hallucination,' and is one persuasive reason to evaluate and fact-check all output a genAI tool produces because the use of inaccurate information and data in technical and scientific

contexts in particular can have serious implications relating to safety. Take a look at this video below to find out about why genAI hallucination occurs.

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In a recent Forbes article, Michael Ringman (2023) describes some measures being taken by developers to mitigate or prevent these hallucinations. These measures include setting up guardrails to create topical, safety, and security constraints for the models. He also suggests that monitoring and fine tuning them to produce more accurate results is essential. However, ultimately we as users are responsible for whatever output we use in our documents. Applying our own informed knowledge and skills in the critical evaluation of the output is key to ensuring that whatever output we transfer to our documents is factual and otherwise accurate. As communicators, we must seize agency in the process of ensuring accuracy.

Take Action: Apply a healthy skepticism when reviewing genAI output and adopt a consistent practice of checking outputs against verified sources. GenAI often includes unsupported claims in its output. Verify outputs for claims lacking evidence and/or taken out of the context of the original argument. Then follow up to correct and/or support claims made ensuring that they align with the original intent.

MisInformation, Disinformation, and Malinformation (MDM)

The ability of genAI to create realistic and plausible text, video, audio, and code makes the creation of false, biased, or politically motivated media faster and easier to produce. For example, the technology currently enables bad actors to realistically represent people speaking words that they did not speak and can place them in visual contexts (such as in photos or videos) where they have never been. When put out into the world, deepfakes and other such media can have profound impacts on decision making, social and political attitudes and movements, political races and elections, economies, journalistic integrity, and emotional states, to name a few areas.

So what are misinformation, disinformation, and malinformation (MDM)?

Misinformation: Misinformation is the use of false information in credible formats and contexts, which leads consumers to believe that it is true. Such information is not intended to cause harm (Government of Canada, 2022).

Disinformation: Disinformation is the deliberate use of false information to deceive consumers. Such information may lead people, organizations, and governments to make decisions that are based on manipulation and errant guidance. (Government of Canada, 2022)

Malinformation: Malinformation is often fact-based information presented in ways that deliberately mislead consumers. (Government of Canada, 2022)

MDMs have become significant influencers in today's information economy. This video summarizes several key concerns.

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The Government of Canada's "How to identify misinformation, disinformation, and malinformation" (2022) offers some great information about MDM along with suggestions on how organizations and consumers can take action to manage it. Sohaib et al. (2023) suggest practical steps for addressing the challenges posed by deepfakes. They range from technical detection and authentication to collaborative filtering approaches to end user vigilance. Here are some of their suggestions on what you can do as a typical user within a workplace context.

Take Action:

- Develop routine vigilance, skepticism, and critical thinking using a keen eye for finding fake information. People speaking words in videos that normally they would never be caught saying or noticing flawed images, such as of people with seven fingers on one hand for example or other visual inconsistencies for videos and images, are good indicators that what you are viewing may constitute MDM.
- Become AI-literate on the issues (such as discussed in this chapter). Once you know what to look for you can then be proactive in mitigating the impact of misrepresentations on you and your decision making.
- Check the facts. If they don't match up with verifiable sources, then don't make use of the material.
- In community-driven contexts such as social media or other collaborative platforms or message boards, Sohaib et al. (2023) suggest that you establish moderation so as to filter out potential MDM. In addition, they suggest implementing crowd-sourcing (when a large group of people are marshalled to work on one task) to verify facts when the context warrants and makes possible such an approach. Real time fact checking for live events is another way that MDM can be combatted.

Copyright

As discussed previously, genAI models have been trained on wide range of data from many disciplines and many cultures and areas of life. Many of these models include in their datasets content created and shared publicly – such as internet sites and social media like Twitter or Reddit – as well as that created by artists or users. Whereas much of the output created by the models does not contain language or images that can be linked directly to copyrighted work (which raises the important issue of tracing provenance or origin), some 8000 creators are insisting that they be compensated fairly if genAI models are to be trained on their work (Associated Press, 2023). Ongoing lawsuits related to copyright filed by artists are challenging the inclusion of creative works in these training datasets, while others are navigating questions around what might be fair use.

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Efforts are being made to address the copyright issue relating to training data. For example, organizations and models can be certified by Fairly Trained for exclusively making use of fairly obtained data. The KL3M, created by 273 Ventures, is the first certified LLM that has been created with clean, non-toxic intellectual property, which KL3M (2024) characterizes as content that has a clear provenance and is free of copyright issues, synthetic (made up) data, and toxic sources. While its performance has yet to match that of GPT class models, it is having a promising start.

For more information on the topic of copyright and genAI along with best practices, please see Seneca's Copyright and Generative AI. The following are additional steps you can take.

Take Action:

- Ensure that the genAI output you use contains accurately cited information. For example, if you see a statement that claims that productivity has increased by 40% with the use of genAI in information processing tasks, you would want to then research that statistic to find out its origin. Which study did that data first appear in? Who are the authors of that study? Is that bit of data accurately represented in the output? You would then correct the statement (if necessary) then apply citation practices to reference that data.
- When choosing platforms to work with, when possible, choose one that prioritizes the creators of original work. Some platforms, like Adobe Firefly, are participating in initiatives that aim to protect and reward contributors, while others are tailoring their datasets to include content with consent for inclusion explicitly obtained.
- Choose to work within protected environments. While some people and organizations will refuse to use genAI due to the uncertainty relating to possible litigation for use of copyrighted content (if ever provenance becomes traceable), others will choose to work within protected AI

environments. Microsoft, for example, has established a Copyright Commitment for Azure OpenAI customers, which protects them from copyright litigation and its costs (Smith, 2023). Choosing to work within this framework is limiting and gives no rest for those concerned about the moral implications of using genAI output, but from a business standpoint, it gives some reassurance to organizations and end users as they adapt to the unavoidable ubiquitous presence of the technology.

Environmental Concerns

While AI can be used to help find solutions to mitigate climate change (Cho, 2023), the exact environmental costs of genAI models are difficult to know but they are widely acknowledged to be exorbitant. Data centers where models are trained and run need considerable amounts of water to cool processors and generate electricity (Crawford, 2024). Also, in California, OpenAI's ChatGPT is consuming enough energy to power about 33,000 homes (Crawford, 2024). Long term, the impact on the environment could be ruinous.

At a July 2023 event, Sam Altman, Chief Executive Officer of OpenAI, stated that the cost of training ChatGPT cost over $100 million, and the cost is increasing along with the model's capabilities (Smith, September 2023). The size of the model, the training approach used, and the capabilities of the tool influence how much energy the model uses (Cho, 2023; Smith, 2023). Likewise, very different energy needs exist for training a model and for using it.

Some prominent companies – like Google and Microsoft – have also pledged to be carbon neutral or carbon negative in a way that – ostensibly – would account for the energy use of their genAI tools Gemini and Copilot/Bing Chat, respectively. That said, the known energy-consumption and overall environmental impact of these tools should not be a limitation left unexamined. See what Sam Meredith, Correspondent of CNBC International, has to say on the topic in this video.

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Developers are aware of the enormous environmental cost involved in sustaining operations, so with each iteration of the models, they are making efforts to reduce the costs. Peter Gostev, Head of AI at Moonpig, depicts in a dynamic visualization the differences in pricing representing an 80% in savings in one year with the evolution from ChatGPT-3.5 to 4o (omni): OpenAI Models – Elo & Pricing Over Time | Flourish.

As a community at Seneca, we have an opportunity to make a difference by contributing to carbon offsetting programs and to educating ourselves on the environmental cost of these tools. As

professionals who will be contributing to an organization's sustainability practices, you too have a role to play. Below are some initiatives relevant to end users suggested by Professors Kumar and Davenport in their 2023 *Harvard Business Review* article.

Take Action:

- Be discerning on when you use a genAI model. Is it worth using an expensive machine to create content you can easily create yourself? Using it for tasks that will augment not replace your abilities is perhaps one way to decide when and when not to use it. Or use it for tasks, like analyzing a large dataset, that you simply could not do within a reasonable amount of time.
- Encourage your organization to use existing large language models and not to create their own. Using existing ones saves the planet from the significant environmental, material, and financial costs involved in creating a new one.
- When an existing model does not exactly suit your organization's needs, ask your organization to tweak the existing one. Fine tuning using organizational or purpose specific knowledge bases will again save on the huge costs involved in creating a new model.

Human Labour

Just as there is variation in the environmental impact of genAI tools based on their size and capabilities, there are variations across frontier models in how they are trained. Some tools, like ChatGPT, have been trained using 'reinforcement learning through human feedback.' This kind of training involves humans reviewing a prompt and the generated output and using ranking or 'up or down voting' in a way that gives the model feedback about the accuracy and helpfulness of the generated output. In addition to training the accuracy of outputs, workers are also used to review outputs against guardrails of appropriate content ('content moderation'). While technology tools, including social media and generative AI, have long employed human workers for content moderation, OpenAI came under criticism for outsourcing this practice to low-wage workers in Kenya. These workers sifted through toxic and explicit content with an aim of creating safer systems for the broader public without full consideration of their psychological wellbeing.

Another human labour issue that has raised concerns are the predicted job losses and job changes resulting from the adoption of genAI technologies in the workplace. Some professions welcome the technology as a significant contributor to improving skills and information processing, while others understandably worry about job losses and change (see CBC's The National video panel discussion below).

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Since we are relatively early in the adoption of these technologies within disciplines, the predictions for job losses, though numerous and wide ranging, are only speculations at best. Nevertheless, the numbers can give us a good idea as to how much of an impact we can expect to experience based on predictors. Take a look, for example, at the chart in **Figure 2.3.1** from the World Economic Forum's white paper *Jobs of Tomorrow: Large Language Models and Jobs* (2023) which predicts genAI's impact on some jobs based on task analyses.

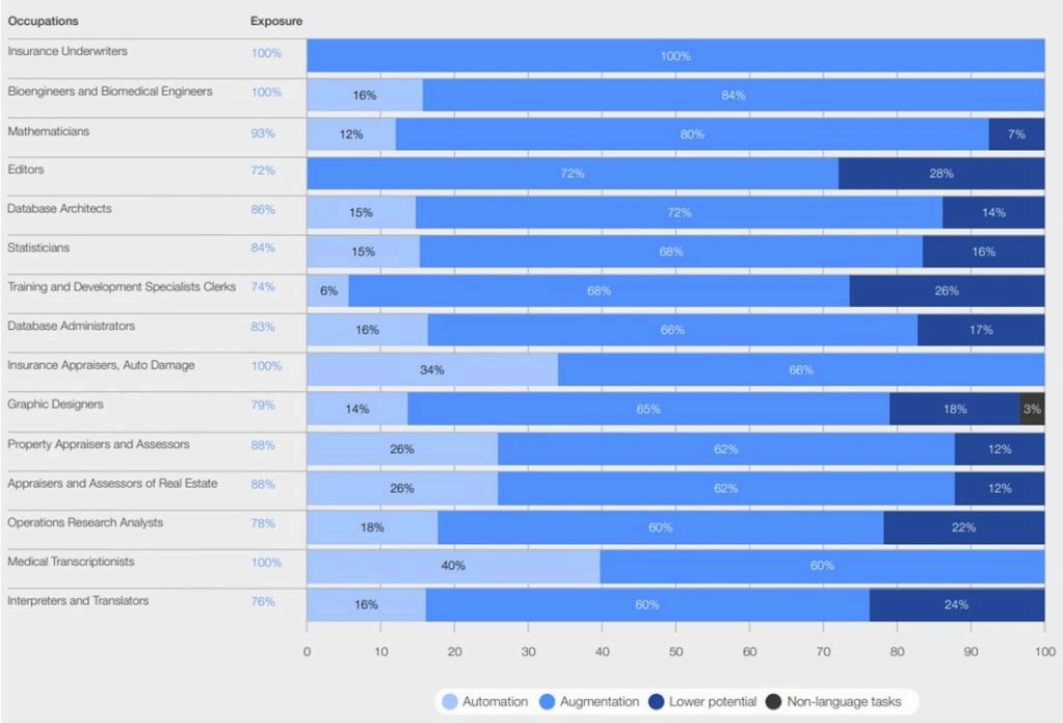

Figure 2.3.1 *Results from task analyses revealing jobs with the highest potential for automation (World Economic Forum, 2023).*

The many occupations listed will either be significantly affected by automation or will be augmented by genAI. Those occupations depicted here, however, represent a small slice of occupational sectors, and the data reported are to be taken as predictors only.

Take Action:

- Have conversations on the ethical development of genAI tools and encourage your organization to work with genAI development companies that exercise ethical oversight in their upgrading process.
- Complete a deep dive into your career field to find out how your future job may be affected by genAI. Find out how the technology fits into day to day workflows. Does the type of work lend itself to genAI adaptation/augmentation or replacement? Perhaps you could learn how to use genAI to augment your knowledge and skills and to improve your employability.

Privacy and Safety

GenAI companies collect personal information from the time that a user visits their site through to their completion of using their services. At minimum, account data includes enough information to associate the individual with their account to login (this is usually name and email address). Sometimes setting up accounts includes providing additional demographic data that is either optional or mandatory. For services that require payment, the payment information directly associates the individual based on how they pay with the account and associated content making it harder to anonymize or alias the individual.

Types of Personal Data Collected by GenAI

Below is a listing of the types of personal data that genAI systems routinely collect.

Usage Data: The types of content requested, the types of content produced, features used, actions taken, time zone, country, dates and times of each request and response produced, user operating system version, user browser version, type of device used (computer, phone, tablet by brand and model), internet provider, IP address.

Device Data: As indicated above but without the details of how each feature was used with a device, but only the individual device information saved as a separate entry.

Session Data: Information about previous sites visited (ie. cookies), the individual sites visited on the genAI company's network, information about next sites visited, quality assurance data collected during site visits.

Log Data: Browser type, IP address, browser settings, date and time of using the service, how the user interacted with the functionality of the service.

All personal information ends up being associated with each individual's account, and generated third party personal information is also associated with each individual's account and linked to the use of services by that individual. The result is that an individual's use of genAI services associates identifiable individuals with requests for products, and may associate identifiable third parties within that identifiable user's resulting products.

Watch this video to find out why privacy concerns are so important to every individual.

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Privacy and safety issues extend to the *use* of the tools as well. Any organization making use of genAI technologies in Canada are guided by the Office of the Privacy Commissioner of Canada's Principles

for responsible, trustworthy and privacy-protective generative AI technologies. Organizations must also abide by the Freedom of Information and Protection of Privacy Act (FIPPA) requirements. These obligations also extend to employees. Though some genAI tools, such as ChatGPT, have settings that allow users to turn off data collection, which means the tool will not use the inputted prompts or data for later use or training, users still have an obligation to treat information they input in their prompts ethically and to proceed mindfully.

Take Action:

- **Carefully review user agreements and understand the ways in which genAI tools may collect and make use of your data before consenting to use of the tools.**
- Turn off the chat history and data training features, when the tool allows you to do so.
- Recognize that when engaging with genAI tools, you are responsible for the information you share with the tool.
- Do not share confidential or personal information or information for which you do not hold the copyright.
- Do not share colleagues' work in part or in full using a genAI tool without their informed consent.
- Do not share in part or in full information considered the property of the organization you work for (e.g., policies, internal documents, resources) unless there is a license or permission that explicitly allows such use.
- Review user agreements inclusive of privacy and data management policies because genAI companies are mainly private and assert ownership of data used in the services they provide. (Adapted from Centennial College, 2023).

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Using GenAI Tools

GenAI models have evolved considerably since their initial release and new ones as well as AI assistants are being developed on an ongoing basis in commercial and open source arenas. The capabilities are also expanding: We can now create organized systems of AI agents wherein several AI models or tools can take on specific roles then interact autonomously with each other to achieve a common goal. Regardless of the structure, good direction will result in effective outcomes.

Whereas initially you had to use text to command the genAI model, now you may choose to use voice, text, images, camera, data, and PDF files in your prompting strategy, though capabilities will vary from one model to another. For example at this writing, Mistral/Mixtral offers only text-bases functions. In addition, genAI models have been trained to interact with you using a conversational approach, allowing you to engage with them in a multimodal way that is as familiar as speaking to any human.

Figure 2.4.1 *How to engage with genAI (Potter, 2024)*

Given the general public's lack of familiarity with the technology itself and the implications of its use on our own work, on organizations, and on society, proceeding with courage, curiosity, and caution is advisable. The following offers some general tips on how to use genAI models along with an overview of selected tools that would be useful in technical contexts.

Tips for Using GenAI

With some genAI models, you can direct the model to use a specific tone: friendly, casual, professional, technical, and the like. Selecting the tone in the features or requesting it in your prompt will affect the vocabulary, syntax, and content of the output. It will also affect the manner in which the genAI tool interacts with you. In fact, you will find that genAI tools often sound very much like humans, and can exhibit unexpected traits such as cuteness, curtness, flamboyance, and

rudeness. Most times, and depending on the model, it will tend to respond in a manner in which it is prompted to respond, so the general rule for focused interaction in business contexts is to be polite and professional. Your degree of politeness is significant. Researchers have discovered that the use moderate politeness in prompting will result in better outcomes and that this approach applies to modulations for cultural contexts and different languages (Yin et al., n.d.). Besides, when using politeness, your interaction with the model will be that much more pleasant.

While you can certainly use genAI in a casual manner by simply inputting a question and seeing what comes up in the output, in the workplace we tend to have limited time, a specific purpose, and contextual information we want to see in the output, so taking a more deliberate, problem-solving approach in the use of genAI will result in usable output and time saved.

The following tips, organized according to a typical workflow, aim to help you use genAI models in your day-to-day professional tasks such as email, report, and presentation drafting. Be sure to work within the requirements and constraints of the organization you are representing. Remember that you should always consider genAI outputs as draft material to be revised and supplemented and that you should always declare your use of genAI content. Doing so will sustain your credibility as a reliable communicator.

Before Beginning

Conversational prompting is the most effective way to draft typical workplace documents including summaries, routine correspondence, reports, and presentations. Assessing your goals and situational needs and constraints will help you develop a game plan for using the genAI tools to advantage. The amount of preparation will be determined by how complex your request and expected output will be. Of course, in situations requiring only brief one-time interactions for simple tasks, not so much planning would be required.

- **Consider your audience's needs and the context:** Completing thorough audience and context analyses before beginning will help you to narrow the focus of your work, address the needs of the audience, and adapt your communication strategy to the situation at hand.

- **Identify your objectives:** Clearly articulate your goal, and reflect on how the genAI model can assist you in achieving it. For example, your objective may be to write a proposal for conducting a fire safety inspection at a manufacturing plant. To narrow your focus on the objective, ask yourself: Are you responding to a request, analyzing data, addressing an opportunity or problem? Are you creating a proposal, sending correspondence, creating a presentation or video? It might help at this stage to think of achieving your goal in a step by step manner in order to plan an efficient research, drafting, and revision strategy and determine how the model can assist at each stage.

- **Determine the types of output you are seeking:** Tell the genAI tool what you expect it to produce: "Draft an outline for a proposal for the fire safety inspection to be conducted at a boot manufacturing plant." Ask yourself: Are you requesting a document outline, a summary, a draft video or presentation, ideas for a topic, or a chart or graph that illustrates a point?

- **Gather existing information and data:** Collect the information and data you will be using to create the prompts. You will use whatever information you have available to guide the genAI model in focused tasks. Right now in most workplaces this is still done manually, but the process will soon be automated. Other ways of using existing documents is to upload PDF versions of them to the genAI tool, then providing instructions on how you want that document to be processed: summarized, analyzed, or otherwise used in the development of output.

- **Select the GenAI application:** Choose the genAI model that will best achieve your goal by considering the following factors: degree of reliability, cost, in-application tools, accessibility, and privacy policy. Many organizations will provide you with approved tools, so your choice of models will be limited to what is available. At Seneca, Copilot (connected to ChatGPT 4 and the internet) is available through Seneca accounts. In other contexts, you have great latitude in the choice of tools to use: open source or commercial, by subscription or free, by version, and you can choose based on capacity, features, ethical practices, capability, and the like.

- **Align with your organization's policies:** Review your organization's privacy, confidentiality, and other applicable policies, so you can work within its legal and ethical standards when using genAI applications and their output.

When Using GenAI

Once you have a plan, you can more efficiently develop a strategy for prompting the genAI model to offer the output that will align with your purpose.

- **Develop a prompting strategy:** Review prompting techniques (see the GenAI Prompting chapter). Does the task at hand lend to conversational or a more complex structured prompting? Choose the method that will best help to achieve your goal. Doing so will reduce the amount of time and the number of iterations required.

- **Consider whether to use an "all in" or a phased approach:** You may want to try inputting a prompt that encompasses the entire task (one-shot), or you may choose a phased strategy (chain of thought) that involves breaking up the task into sequential stages. Again, think of what you want to achieve and decide on the best approach.

- **Craft specific prompts:** The more specific the prompts, the more likely the genAI model will provide outputs that match your needs. Use your planning data and information to create prompts that contain information about context, problem or need, criteria, goal, etc. The more information you provide regarding context and topic, the more useful the output.

- **Treat prompting as an iterative process:** Review the outputs and refine your prompts to achieve more precise, goal-oriented responses. The first output is usually not the best, so engage with the application in a conversational manner and ask it to refocus its work using additional information. If the genAI tool does not provide the necessary output, consider using

a different model.

Reviewing the Output

Reviewing the content created by the genAI application is a critical step in ensuring that what you include in your final document is accurate, whole, and reflecting of your own and your organization's values. While genAI tools offer many advantages, their known hallucinations and lack of verifiable citations can make your final document questionable. When your reputation is on the line, opt for a careful review of the work you submit.

Use this method to compete a scaffolded review of all genAI output before you make use of it in your communications:

- **Corroborate the claims:** Regardless of variations in conventions of use, you must be vigilant when reviewing genAI output. Some genAI models do not include citations, so you must check or corroborate all assertions or claims, complete the research to confirm claims, revise arguments, and add the citations when they have not been included. Other models like MS Copilot will include citations; however, the content of the output may be copied in whole or in part from a source or the citation may be altogether incorrect or incomplete. Remember, most readers are interested in your ideas not those of a bot, so avoid including large swaths of genAI content in your documents.You may find Mike Caulfield's SIFT model shown in **Figure 2.4.2** helpful in conducting your review.

Figure 2.4.2 *The SIFT model for checking content for citation accuracy and relevance (Caulfield, 2019. CC by 4.0).*

The Four Moves of the SIFT Model–In brief and adapted for GenAI output

1. **Stop:** Take a moment to glance through the genAI output to highlight claims that are and are not documented.
2. **Investigate the source:** For claims that have not been documented, complete the research to verify the information and document the source. For claims that have citations, check the source material. Has the claim been copied with or without quotations? Ensure the citations are accurate.
3. **Find better coverage:** If the claim does not accurately represent the idea you want to convey,

search for a better source.

4. **Trace claims, quotes, and media to the original content:** Ensure that the claim or quote is not taken out of context by going to the original source to understand the original context of use.

- **Review the output:** Remember that you are responsible for all genAI-produced content that you include in your communications. Ensure that the output you include in your documents reflect the values of the organization you serve:
  - **Accuracy and relevance:** Determine if the output aligns with your intended purpose and if the information is accurate. Some parts of the output may be on track, while others not so much so. Use a discerning eye to review all content. Note that genAI is known to "hallucinate" or make up information, so be sure to also complete an accuracy check.
  - **Bias:** GenAI models sometimes create outputs that contain bias related to race, religion, ethnicity, socio-economic status, and gender. Biased assumptions are harmful to people and may be damaging to the company's and your own reputation. Responsible use of genAI involves ensuring that the content that you use is inclusive.
  - **Sustainability principles:** Companies recognize the importance of responding to issues such as climate change, global developments, income disparities, unemployment, and indigenous inequities. Ensure that the genAI output you use aligns with the organization's sustainability policies and practices.

- **Engage with the content:** Most readers will be able to distinguish between an authentic voice (your own) and the disembodied voice of a genAI model. Which would *you* rather be reading? Unfortunately, recent research (Dell'Acqua et al., 2023; Dell'Acqua, n.d.; Mollick, 2024) has revealed that in hybrid genAI/human collaboration, humans tend to disengage from the work and settle for outputs that are only just good enough without striving to improve on the output. Use genAI output as the basis for your own creation, and don't settle until you have achieved authenticity, precision, completeness, and excellence. Incorporate information based on your own expertise, and edit for style and tone so that the genAI content you use reflects your own uniqueness. Remember genAI is intended to augment your own knowledge and skills rather than to replace them.
- **Document and declare your use of genAI:** Remember that ethical citation/declaration and documentation standards must be applied to all work that you produce—with or without the assistance of genAI. At Seneca, you are required to quote or declare genAI output. Check with your professors regarding their expectations. And you may wish to consult Seneca's Guide on Citing and Documentation: Artificial Intelligence for specific detail on citation practices approved by the institution for documents you create for course related work.

In most technical contexts, a declaration of use (model, mode, usage, date) would suffice. When in the workplace, do the following:

- Check on genAI declarations practices with the ethics officer or your immediate supervisor to learn about the genAI policies and practices there.
- Keep records of the prompts and outputs you have used to prepare your content.
- Recognize that you are responsible for the genAI output that you use in your technical documents, correspondence, presentations, meetings, and so forth.
- Let your audience know how you have used genAI; doing so will help to sustain trust with your audience. See the GenAI Use section below for an example.

Choosing GenAI Tools

A good place to start when choosing which genAI tools to use is to ask yourself the following questions:

- What am I trying to create: images, document, music, code, presentation, video?
- What do I want the genAI tool to do for me: summarize, outline, code, research?
- What is the outcome that I want to achieve? Here, consider the degree of precision, accuracy, agility, resolution, reliability, etc. in the output you need as the different tools exhibit varying degrees of performance.

List of Selected Tools

Many thousands of AI applications are available. The following is a list of selected genAI applications depicting examples of the types that can be used for technical communication purposes. These tools offer features that will help you to create content and documents, draft code, summarize documents, create presentations and videos, conduct research, create customized images, and work in multimodal ways in office productivity platforms.

Note: At the time of writing, many items in the following list have not been approved by Seneca and are to be used only with your personal login credentials and at your own risk and responsibility. Seneca encourages you to make use of the approved Microsoft Copilot for academic purposes. Please see Seneca's Generative Artificial Intelligence (GenAI) Policy for more information.

Chatbots (Multipurpose Content Generators)

- BingChat, ChatGPT, Claude, Gemini (formerly Bard), HuggingChat, Llama3, Mistral/Mixtral: Each of these applications are conversational agents that will create outputs based on prompts given. They each offer various features and capabilities. Their capabilities generally include content creation, summarization, and image generation through text and/or voice prompting.

Content created will display varying degrees of accuracy and precision, so the outputs are always considered draft material.

Coding Applications

- Advanced Data Analysis (formerly Code Interpreter): This OpenAI application will allow you to write and run Python code. It is also used to analyze large data sets.
- Code Whisperer: Code Whisperer is Amazon's code generator that suggests code in real time.
- Github Copilot: Github Copilot suggests code and functions in real time based on context in comments and previous code.
- Tabnine: Similar to Github Copilot, with a few differences including the claim to only train the models on open source code with licenses that permit such use.

Document Formatting

- Canva: Canva offers templates for any number of communications including documents, presentations, infographics, cards, social media posts, banners, etc. With Magic Writer, the composition task is initiated but must be completed with editing.
- Gamma: Gamma features beautiful formatting for documents, presentations, and webpages.

Productivity

- MS Copilot: With or without access to your organizational data, Copilot in the enterprise version of Microsoft can summarize meeting notes, help draft documents, and offer other prompt-based services. Copilot is available on Microsoft Office 365 with a purchased license and is also available for individual use for free or by subscription for the Pro version. Access to full capabilities is dependent on the administrator release of functions.
- Notion.so: An all-in-one productivity platform, with Notion.so you can write, collaborate, and plan projects using AI-powered technology.
- Otter.ai: Otter is a meeting assistant that can join, transcribe, summarize, and record meetings. It's a great example of the types of meeting assistants now available.

Research

- Consensus: This AI search engine quickly goes through published research papers to find information based on your search parameters. Citations are provided.
- Elicit: Elicit searches through papers and citations then extracts and synthesizes key information according to your specified research focus. Best for scientific research.
- Perplexity: Perplexity is a search engine employing user-selected All Web, Academic, Reddit, YouTube, and Wolfram Alpha as databases. It also offers writing capabilities without accessing the internet.
- Research Rabbit: Research Rabbit is a citation-based mapping tool that focuses on the relationships between research works. It uses visualizations to help researchers find similar papers and other researchers in their field.

Image Generation

- Adobe Firefly: Firefly is an Adobe product that generates images based on a text prompt. Its filters allow you to quickly and intuitively modify the initial image (e.g., re-creating the same image in a different style). It's currently free to use, but requires you to create an account and sign in.
- DALL-E 3:DALL-E is OpenAI' s image generation tool. DALL-E 3 will generate realistic images using voice and text prompting and includes inpainting (adding image elements), outpainting (removing image elements), and variations.
- Stable Diffusion: Stable Diffusion is a deep learning, text-to-image model released in 2022 based on diffusion techniques. It is primarily used to generate detailed images conditioned on text descriptions, though it can also be applied to other tasks such as inpainting, outpainting, and generating image-to-image translations guided by a text prompt.

Presentations

- Canva: Select the Presentations feature and use Magic Design to help you develop the content for your presentation in minutes.
- SlideGPT. SlideGPT is free to use to create presentations. Once the presentation has been generated you can download it as a Power Point file for a small fee.
- Tome: Tome generates presentations in minutes based on text provided or even a short prompt, complete with AI-generated images.

Video Creation

- Canva: Canva offers video creation tools that are powered by AI. Features include content and image commands that are created through Magic Media. This tool also includes talking heads.
- Sora: Released by OpenAI, Sora enables users to create realistic, near true-to-life videos using text commands.

Futurepedia is a good compendium site where you can search for free and premium genAI tools according to your specified purpose.

Attributions

Content for the section on genAI tools has been partially adapted and updated from:

Center for Faculty Development and Teaching Innovation. (2023). GenAI Tools – Generative Artificial Intelligence in Teaching and Learning (pressbooks.pub) Centennial College. CC by 4.0.

University of British Columbia (UBC). AI Tools. Tools – AI In Teaching and Learning (ubc.ca) CC by 4.0.

University of Georgetown. Artificial Intelligence Tools – cndls website (georgetown.edu)\ CC by 4.0

GenAI Use

Copilot (Creative Mode) was used by Robin L. Potter to ideate content for the section on Tips for Using GenAI using the following prompt: "Draft a set of tips for business professionals on the use of generative AI; include the following sections: Before You Begin; When Using GenAI; Reviewing the Output." Related references have been included in the list below.

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the influence of prompt politeness on LLM performance.

2402.14531.pdf (arxiv.org) Via Ethan Mollick, LinkedIn, March 2024, Ethan Mollick on LinkedIn: Here's an initial answer to the question I get asked most about prompting:... | 69 comments

ROBIN L. POTTER

GenAI Prompting

A prompt is how human end users communicate with genAI. Prompting may be conducted using voice, text, images, and reference documents. It may also be conducted using verbal and visual modes involving two-way verbal interactions and AI camera access. Regardless of the mode used, remember that a prompt is one important way for humans to maintain agency in the process of using genAI applications. It is the way humans can direct the tools to provide output that serves human purposes.

When you direct a genAI model to analyze data and reports or to create a document, message, or image, you are engaging in an opportunity to have control over the kind of information included in the output. To exercise this control, you must apply your critical thinking, planning, and analytical skills because the more specific the prompt, the better you will be able to direct the model to deliver the output that serves your purpose. Remember that you are accountable for any genAI output that you use in your communications. For this and many other reasons, it is important to know how to prompt the model and how to analyze its output. For more on this imperative, see Miao and Holmes (2023).

This chapter will cover prompting strategies. To get started, view this video by Ethan Mollick and Lilach Mollick (2023) of the Wharton School at the University of Pennsylvania, which covers GenAI prompting basics.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=62#oembed-2

Prompting Modes

Prompt crafting is the process by which you create statements or questions that direct a genAI model to respond in a way that serves your purpose. A prompt is the statement or question that may or may not be accompanied by an image, reference text, or a data set that serves as the knowledge source so the model can respond using information that pertains to your context.

Though prompt crafting is similar to prompt engineering, prompt crafting is the activity in which most end users engage; whereas, prompt engineering is mostly performed by those with the technical skills to refine the model's ability to process prompts or by those with advanced prompting

skills who want to tighten or limit the model's mode of response. Ramlochan (2024) mentions that prompt engineering is conducted by those with specialized encoding skills. Unfortunately, as of this writing, many who communicate on the topic of prompting do not differentiate between the two terms.

How you go about the process of prompting is up to you: You may choose to elicit an output all at once with one prompt, or you may choose to break up the prompting task into phases, proceeding in a step-by-step manner. You may also choose to create a prompt that directs the application itself to proceed using a phased approach. We can categorize prompting into three types:

- Casual
- Conversational
- Structured

With **casual prompting**, you can simply ask a question or give a command. This is the easiest form of prompting using a one-sentence format. You can also elicit an output using **conversational prompts** in which you engage in a back-and-forth type of conversation or using a question and answer approach in order to refine the output. **Structured prompts** may consist of several paragraphs and examples created to specifically direct the application to create a more narrow and purpose-driven output that addresses an identified problem.

With verbal and audio functions, your interactions with genAI models and applications can very much resemble the kind of conversation you would have with any person. When you use voice, the genAI application will respond to you using both voice and text. For example, OpenAI's GPT 4o (o for "omni") can engage with you in verbal interactions that simulate real life conversations in terms of cadence, tone, content, and pace. Paired with the camera access, the AI can also interact with the world around it as you communicate.

If you feel timid about prompting, you can choose to adapt prompts created by others. Some organizations will have their own prompt libraries where you will find prompts relevant to company goals and situations. You may also choose to ask the genAI tool to create the prompt for you by giving it some basic information. As you build confidence in prompting, though, you will notice that creating your own will result in output that is more aligned to your purpose and context thus saving you time in the long run.

Your preferred method(s) will develop over time, and with experience they will become adaptable to the context and purpose at hand. Whichever approach you choose, **always consider the output as draft material** that will require your thorough review before use in your communications.

See two examples of simple prompts below. The document for Example 2 has been created using an enterprise version of Copilot in Creative mode, which gives access to ChatGPT 4.

Example 1

Review the following draft email message written to employees at a mid-sized engineering company and provide suggestions on how it can be improved. Offer suggestions to improve the approach, idea development, tone, vocabulary, organization, and inclusivity. Suggest any other additional content that would be useful to achieve the stated purpose.

> [The user would input the draft message followed by the prompt asking for a review by the genAI application, which would then respond with suggestions for improvement.]

Example 2

A brief, mid-value business-related prompt submitted to Copilot:

Draft an email message to colleagues reminding them of the recent company sustainability initiative that encourages car pooling. You should mention the benefits and include an incentive.

Draft email message created by Copilot using the Professional mode on January 23, 2024.

Subject: Carpooling for a greener future

Dear colleagues,

I hope this email finds you well. I am writing to remind you of the recent company sustainability initiative that encourages car pooling among employees. As you may already know, carpooling is a great way to reduce your carbon footprint, save money on gas and parking, and make new friends. It also helps to ease traffic congestion and improve air quality in our city.

To support this initiative, our company is offering a special incentive for carpoolers. For every week that you carpool with at least one other colleague, you will receive a $10 gift card that you can use at any of our partner stores or restaurants. You can also earn extra points for your team in the monthly wellness challenge.

To join the carpooling program, please register on the company intranet and fill out a short survey about your preferences and availability. You will then be matched with other colleagues who live near you and have similar schedules. You can also create your own carpool group if you already have some potential partners in mind.

If you have any questions or concerns about the carpooling program, please feel free to contact me or the HR department. We are happy to assist you and provide more information.

Thank you for your participation and commitment to making our company more sustainable and environmentally friendly.

Sincerely,
Your name

Note how the resulting draft output in the second example goes beyond what is requested (see the text highlighted in blue) by also including information about how to register for the car pooling program. In this particular example, the additional information is useful and would probably be included in the final copy. However, this added information is also an example of how the genAI

model can include content that is not requested and that, without careful review, could send your document's intent into a direction that may not work with your purpose. As such, this example illustrates the necessity for a careful review and edit of the output.

Prompt Elements

Various practitioners have developed strategies for creating prompts and with experience have identified the most effective methods for prompting. Ethan Mollick (November 2023) offers the best advice: "You can become a world expert in the application of AI to your domain by just using AI a lot until you figure out what it is good and bad at." His best advice is to not complicate things. As an example, Mollick offers the following prompt: "I need to write an email to a teacher for an extension. help" (November 2023). It can be that simple. Most prompts created for technical purposes, however, will require specific and concrete information, as in the following example:

> Draft a message requesting all technicians to comply with the new X0986 standard operating procedure (SOP) relating to power line inspections. (The new SOP would be uploaded to the genAI tool as a reference text followed by the prompt.)

Whatever approach you use, adopting skillful and thoughtful methods that are adapted to changing contexts, purposes, technologies, and challenges will save you time and result in usable outputs. Completing a careful problem analysis including your purpose, audience, and context, as discussed in the chapter on Choosing and Using GenAI, is the first step in effectively creating your prompting strategy. Eventually, with experience and experimentation, you will find a strategy that works best for you and your routine needs.

Essentially, prompts will contain any, all, or a combination of the following genAI cues (OpenAI, n.d.); selecting information to include in prompts should be governed by your organization's privacy and confidentiality policy along with your purpose and audience needs. Whatever you do, be flexible and modify your prompting as the process unfolds. You are not going for the perfect prompt; rather, you just want the one or the sequence that works.

1. **Role**: Roles can be delineated in two ways depending on the genAI model you are working with. You can give the model a role ("You are an environmental sciences technician working for a small engineering office"; "You are a tutor specializing in the subject of coding"), or you can identify your role ("I am a surveyor working with a civil engineering company"). Note that no actual company identifiers are included; this is to align with the need to maintain confidentiality especially if you are not using an enterprise version of the genAI model. Identifying your role or attributing one to the genAI itself will help the application understand the range of responsibilities and knowledge from which it can draw for its response and how it will interact with you.
2. **Context:** Context can be addressed in several ways: you may want to do any of the following, whatever the context calls for:

- Explain the overall situation or circumstance that is creating the need for the prompt.
- Describe the **type** of industry, department, client, institution, etc.
- Describe the communication strategy. For example, are you creating a technical description, a set of instructions, or meeting collateral?
- Explain a complication, challenge, opportunity, etc.

Again, for confidentiality reasons, while being specific avoid identifying actual people, companies, and places.

3**. Purpose or goal:** Clearly state the goal you want to achieve in terms of any one or a combination of the following types:

- **Desired output**: State what you want the genAI application to produce for you in terms of document type or content. Do you want the model to create a draft table or chart, or a draft email message, proposal, or other document? Do you want it to draft content for a presentation?
- **Communication intent:** Describe your communication objective: Do you want to persuade, direct, or inform? Do you want to *request* time away from the office to catch up on a backlog of work? Do you need to *persuade* a client about the lack of safety of their building's structure? Are you *informing* employees about an update to a standard operating procedure?

4. **Information required:** Include key information that will enable the genAI model to further narrow its activity. Be specific. Include relevant data. If necessary include information about the organization's sustainability, inclusion, and other policies. Consider uploading a reference document or case study from which the model can cull information (Mascellino, 2023), or if working within the Microsoft Copilot enterprise environment, allow the system to access relevant reference documents–if access is available. You want to provide enough information to ensure that the model will create output that aligns with your needs.

5**. Example:** You can also include examples for what you are looking for in terms of output. If you already have a sample SOP that needs updating, for example, you can upload the sample document (again only if the organization's confidentiality policy allows) and ask the GenAI application to revise it given more current information you provide.

6. **Steps:** You can direct the model on how to proceed:

- You can break up your prompt into a set of steps and insert prompt segments sequentially following model responses.
- You can instruct the genAI application itself to respond in a step-by-step manner so the information is organized and sequential.
- You can instruct the application to work in a phased manner such that certain information is released before other information (Mollick & Mollick, September 2023; Mollick, November 2023)

Table 2.5.1 below outlines some simple approaches to creating prompts. Once you become more comfortable with the process, try combining the techniques to save time, narrow the focus, and boost output.

Table 2.5.1: ***Prompting techniques, formulas, and examples*** (Carrigan, 2023; Center for Faculty Development and Teaching Innovation., 2023).

Technique	Description	Formula	Example
Clear Intent	Clearly state the desired output or question.	"Generate an output that **[condition]**."	*Generate a summary that captures the main ideas.*
Specificity	Be specific about the required content or format.	"Generate a **[output] that includes [specific content]**."	*Generate a poem that rhymes and has 10 lines.*
Constraints	Set limitations to guide the response.	"Generate a **[output] within [specified constraints]**."	*Generate a story using only 100 words.*
Personas	Assign a persona or role to define tone or expertise.	"Acting as **[role]**, write a **[output] about [topic]**."	*Acting as an expert journalist, write a creative title for this article.*
Evaluation	Specify criteria for assessing the response quality.	"Review the **[output] against [criteria]** and suggest ways to improve.	*Review the essay against the rubric and suggest edits.*
Style	Specify the desired tone or writing style.	"Generate a **[output] in a [specific style]**."	*Generate a persuasive essay using formal language.*

Conversational Prompts

With the evolution of the technology, it's becoming easier to elicit output from the applications. "For most people, you can just talk to the AI to ask for what you want. You can even talk to the AI if you don't know what you want – just tell it what you might need and see what happens" (Mollick, November 2023). This has become more true than ever with the release of GPT-4o, which has verbal capabilities. Output is refined through a process comparable to human conversation whereby you follow up to correct or change the focus or information, add details, narrow the context and purpose, etc. You can simply and informally just tell the application what you want, or you can plan your prompt using the elements discussed above. Whichever method you use, it's best to keep at it until the application responds with output that satisfies your needs. You can then edit the output to reflect your voice and ensure accuracy. Keeping a watchful eye on the output activity will help you save time: You can stop the activity if you see that the application is off topic.

More complex conversational prompts take the process a step further by combining any or all the various prompt elements (role, context, purpose, information, steps, and example) to quickly and conversationally narrow the focus of the output (Mollick, November 2023; Ramlochan, 2024). The

example below shows how the user establishes the role, context, and purpose then combines key necessary information to make for a more specific prompt.

> You are a summer camp director and are tasked with writing a job notice for camp counsellors for an activities camp that operates from July to August on a university campus. The job notice must include a camp description, list of responsibilities, and a list of qualifications. The summer camp will operate from July 1 to August 31. Training will occur on June 15. A current Canadian First Aid certificate is required along with a police check. Hourly rate: $17. Please draft the job notice.

In this sample prompt, the writer is assigning the genAI application a role (summer camp director), provides the context (summer activities camp on a university campus that runs from July through August), purpose (job notice for camp counsellors), along with additional information (camp information, qualifications, and role responsibilities). The various prompt elements serve to narrow the focus of the genAI tool so that it can create an output that responds to your request. Sometimes the application will give you a workable draft the first time; at other times, you will have to continue to give direction and information until it gets it right.

Prompt Value

Consider prompting as a way for you to direct and have control over a machine with a vast knowledge base. The more information you provide to the tool through your prompt, the better it will narrow its focus and perform according to your expectations and requirements. So attending to prompt quality will in the long run save you time and effort. Consider, for example, this comparison of three prompts in **Figure 2.5.1**:

Figure 2.5.1 *Comparison of prompt values across three examples: Low Value, Mid-Value, and High Value (Potter, 2024–based on a similar chart seen on LinkedIn but which cannot be found).*

Any of these sample prompts can be workable depending on the purpose: document mapping, brainstorming, or focused drafting. However, evidently the **Low Value** example is sparse in detail, and its use as a prompt will result in a pretty generic version of a proposal. The output will contain no content that would be specific to the user or context. The **Mid-Value** example would offer output on the topic of sustainability, but the model would be hard pressed to narrow the focus to one or two areas of sustainability and conform to the 5-page limit. Sustainability is a broad topic area and any useful proposal would have to be focused on a specific area. In the **High Value** example, the prompt is narrow and specific to a purpose, and directs the genAI application to produce output that will be more aligned to the context and the user's goal.

Note: Prompting has become more convenient with ChatGPT's "memory" capabilities (Open AI, 2024). ChatGPT can remember details from previous conversations, including personal details. This memory streamlines the prompting process by eliminating the repetition of conversational details from previous chats. If the model can carry over previously used information relating to context (overall company, situation, goals, for example) into current conversations, then the user can simply focus on the immediate situational prompt requirements. Users, however, are also able to direct the model to "forget" specified information or may turn off the memory capability in Settings.

Structured Prompts

More advanced users of genAI models who work in contexts where certain tasks have become routinized, standardized, and repeated may be interested in structured prompting. Mollick (November 2023), Cumming (2023), and Ramlochan (2023 and 2024) refer to structured prompts as those that can be used repeatedly to perform a task. Ramlochan (2024) describes such prompting as follows: "Structured prompting involves carefully programming instructions, examples, and constraints to make large language models handle challenging objectives predictably."

Structured prompts can be used in contexts where users must complete the same tasks in the same way every time or when they must repeatedly create similar types of content for various purposes (Cumming, 2023). By using structured prompts, technical professionals and their organizations, scientists, and managers, to mention a few types of users, can maintain some consistency and order in the process of engaging with genAI models.

These types of prompts consist of tightly defined prompt elements as discussed above that can be shared with a group of people who will then use them as is or adapt them to their purpose before use in a genAI application, as can be done with a class of students or a group of employees in a team or at a meeting.

In organizational settings, structured prompts could be curated, then selected and adapted for specific contexts or audiences by various teams (Cumming, 2023). "For example, a marketing campaign prompt may execute sequential workflow steps of customer persona definition, targeted message crafting, channel identification, budget allocation, and results tracking – each a prompt subsection" (Ramlochan, 2024).

Take a look at an example of a structured prompt used in recruiting: Dan Shapiro's Glowforge JD highly detailed job description prompt is shared with employees tasked with creating job advertisements for recruiting purposes. This context requires consistency for every job ad created: Each should have the same structure, style, and tone. When every recruiter or department head uses the same prompt, they produce a job description that aligns with the organization's vision. The prompt can be adapted for specific jobs, as shown. The more detailed the prompt, the better and more consistent the output and the less time it will take for review and editing.

Structured prompting then can serve as a vehicle for organizing frequent, repetitive types of communications, such as marketing materials, notices, sales letters, proposals, product information, periodic reports—any type of routinized content that can be created then repurposed using standardized prompts. "For instance, if you decide to alter your brand's voice or change a genre, you can simply update the corresponding prompt to reflect this change. All teams can then use this updated prompt, ensuring that the AI-generated content is always up-to-date and consistent across all platforms" (Cumming, 2023).

Though at this writing it's early to predict how organizations will manage prompt libraries, Cumming suggests the possibility of an organized system of prompt operations to curate, share, adapt, and implement structured prompts in much the same way that other organizational content is managed. On the other hand, Acar (2023) suggests that as the models evolve and become more intuitive, we will need to worry less about prompting and focus more on problem formulation, "the ability to identify, analyze, and delineate problems" so as to better direct the model.

Using Delimiters

Delimiters are notations that users add to prompts to clearly delimit specific content like examples or reference text. Here is an example from OpenAI (n.d.):

> USER
>
> Summarize the text delimited by triple quotes in about 50 words. """insert text here"""

While delimiters are helpful, some genAI models such as ChatGPT and Copilot tend to distinguish the instructions from example or reference text when the prompt clearly indicates what follows. Uploading the reference text followed by the prompt results in better performance. As such, delimiters are not always necessary. If this approach does not seem to work so well, then try using delimiters. It's all about experimentation.

Prompting for Tables and Graphs

One of the great benefits of using genAI in document preparation is the amount of time it can save as you analyze and prepare various elements for your documents including tables and graphs.

Analyzing content: GenAI can be used to analyze charts, graphs, and tables in the same manner that it can for images. Begin by uploading the visual aid you want analyzed, then create a prompt that directs the model on the exact type of information you want it to extract from the charts, graphs, or tables. In addition, you can upload a data set of any size using Advanced Data Analysis (formerly Code Interpreter) and direct the tool to analyze or extract data according to specific instructions. Again, the more precise your prompt, the more useful the output will be.

Creating tables: First, think through the data and table elements that you would like the application to include in the table, then create a specific prompt telling the genAI application exactly how you want that data to appear in your table. Here is an example using the following prompt:

> ***Prompt:*** Create a table comparing Bing Chat, ChatGPT, Gemini, Llama 2, and Claude using these criteria: ease of use, accuracy, safety, and cost to run; include verifiable citations and a list of references in APA style. (Prompt Information: ChatGPT 3.5, free version, February 14, 2024)

Criteria	Bing Chat	ChatGPT	Gemini	Llama 2	Claude
Ease of Use	Moderate ease with familiar interface (Microsoft, 2022)	User-friendly interface with customizable options (OpenAI, n.d.)	User-friendly interface with intuitive features (Gemini, 2022)	Moderate learning curve due to complex setup (Llama Labs, n.d.)	Moderate ease with guided interface (Claude, 2022)
Accuracy	Relatively accurate results in search queries (Microsoft, 2022)	Highly accurate in generating text based on input (OpenAI, n.d.)	Accurate in generating text and answering queries (Gemini, 2022)	Accuracy may vary depending on training data (Llama Labs, n.d.)	High accuracy in generating text (Claude, 2022)
Safety	Generally safe; subject to search engine guidelines (Microsoft, 2022)	Safe; content moderation and filtering in place (OpenAI, n.d.)	Safety protocols in place to filter content (Gemini, 2022)	Safety protocols implemented to filter content (Llama Labs, n.d.)	Safety measures implemented for content moderation (Claude, 2022)
Cost to Use	Free to use; integrated with Bing search (Microsoft, 2022)	Paid subscription model; cost varies based on usage (OpenAI, n.d.)	Paid subscription model; cost varies based on usage (Gemini, 2022)	Free and open-source; requires computational resources (Llama Labs, n.d.)	Free and open-source; requires computational resources (Claude, 2022)

References:

- Microsoft. (2022). About Bing Chat. Retrieved from https://www.microsoft.com
- OpenAI. (n.d.). ChatGPT. Retrieved from https://openai.com
- Gemini. (2022). About Gemini. Retrieved from https://gemini.com
- Llama Labs. (n.d.). Llama 2 Documentation. Retrieved from https://llamalabs.com

- Claude. (2022). Claude Documentation. Retrieved from https://claude.com

Reflecting on Usage: Several attempts were made to create the table using Copilot (GPT 4), but the application was unable to provide verifiable references. So ChatGPT 3.5 was put to the task. It responded more quickly and with better accuracy than the Copilot version of the model. Moreover, both versions were unable to offer information about the "cost to run" the models; rather, both versions responded with information about "cost to use" despite several attempts to elicit the correct information. The relevant row stub in the chart has been changed to reflect that information.

While the tools helped to save time in finding information and creating the table, any user must be fully engaged in refining the prompts, checking the output, and ensuring the citations are accurate and verifiable. For example, while ChatGPT was able to produce citations and references, those provided for the chart do not lead to the exact webpages where the information can be verified. Human review would then lead the user to find the correct webpages and refine the URLs in the References so they are more accurate.

With practice and experimentation, you will develop a broader knowledge of the capabilities of different genAI models, which will enable you to quickly shift to the tools that will meet particular purposes.

Creating Graphs: While several applications such as Graphy are available to assist in creating beautiful AI generated graphic aids, there may be times when working with large data sets that you would want to work with a genAI application such as ChatGPT's Advanced Data Analysis (formerly Code Interpreter) (Gewirtz, 2023). (Previously, access to this plug was available only with a subscription; however, with the release of GPT-4o, Advanced Data Analysis is available for free to all.) With this added tool, you can create the graphics by uploading data (in any number of formats—CVS, Excel, and TXT files—and providing specific requests for the type of graphic aid that would best represent that data (MIT, n.d.).

For better performance, consider uploading your file first, then provide the prompt instructions for how you want the data to be analyzed. As such, prompts should not only ask the model to read the data file that you upload, but also customize the desired graphic aid using the parameters you provide. Watch this video to find out more about how to create graphic elements using ChatGPT (Downing, 2023).

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=62#oembed-1

Prompting for Image Creation

Several genAI models, such as Midjourney and Stable Diffusion, have become known for creating stand-out images that fall anywhere between total fantasy to complete realism. Initially, users had to have some specific knowledge related to photography in order to prompt for photo-realistic image outputs. However, these models, along with Copilot and ChatGPT—both of which access OpenAI's DALL-E image generator—have evolved such that a user need only provide a detailed description using plain language for any image to be rendered.

Prompting strategies for image creation must include highly descriptive language if users want to direct the model towards producing images true to purpose. The descriptions should direct the model in any or a combination of the following areas—among so many others:

- Background and foreground
- Contextual signifiers (places, landmarks, time, seasons)
- Cultural imagery
- Degree of realism
- Diversity and inclusion
- Historical imagery (historical sites, monuments)
- People (roles, activity, relationships)
- Photographic qualities (realistic, painterly, cartoony)
- Social situations
- Sustainability cues
- Symbolism
- Technological contexts

Compare the following prompts and image examples:

Prompt 1: Create an image of a family of pink elephants out on a walk. (Copilot, February 14, 2024)

Figure 2.5.2 *Sample image originating from Prompt 1 (Copilot, February 14, 2024).*

Prompt 2: Now create a realistic image of a family of

four pink elephants on a hike; they are exploring a mountainous area in October; in the background there are mountains, in the foreground there is a meadow, and trees all around. (Copilot, February 14, 2024)

Figure 2.5.3 *Sample image originating from Prompt 2 (Copilot, February 2024).*

As you can see, the more concrete and specific information you provide, the better the image will be. This version includes the requested elements of the landscape and season indicators. Now consider a situation in which the representation of diversity is key in promoting inclusivity and opportunity for all in workplace settings:

Prompt 3: Create an image of three legal professionals consulting about a case. (Copilot, February 14, 2024)

Figure 2.5.4 *Sample image originating from Prompt 3 (Copilot, February 2024).*

The four images created by the model depicted men and one woman in the image, suggesting that legal professionals are a group comprised mostly of men. In the image shown here, diversity has somewhat been represented. Note the extra (seventh)

hand on the shoulder. GenAI is known to have difficulties representing hands; take this as one example of how vigilance in image review is necessary. Let's push the model to depict more inclusion:

Prompt 4: Create a realistic image of legal professionals representing various racial, disabled, and gendered groups. The professionals should be consulting with each other on a case in a legal office that is modestly appointed and well lit. The image must be realistic. (Copilot, February 14, 2024)

Figure 2.5.5 *Sample image originating from Prompt 4 (Copilot, February 2024).*

Though this sample image gets the diversity and inclusivity right, it could include more lighting. And though realism is requested twice, the model was not able to produce a more realistic image. While this example is enough to illustrate the power of prompting that is descriptive and specific, it also emphasizes the importance of prompting specifically for diversity and inclusion if you want it represented in the imagery you incorporate into your documents.

Tips for Prompting Efficiently

The following tips will help you keep on track as you develop your prompting skills (adapted from Durham College, 2023):

- **Be Specific**: If you ask a vague question, you may get a vague answer. The more details you provide, the better the response the model will be able to provide.
- **State Your Intent**: If there's a specific purpose for your question, state it in the prompt.
- **Direct the Output Format**: If you want the answer in a specific format, state it in your prompt. Do you want a table or an image? A paragraph? A step-by-step process?
- **Ask Follow-Up Questions**: If the response wasn't what you expected, or if you need more information, ask follow-up questions to clarify and get to what you need.
- **Experiment with Different Phrasings**: If you're not getting the response you want, try asking

the question in a different way. The model might understand one phrasing better than another.
- **Prompt for Diversity and Inclusion**: Ensure that the text and image outputs reflect the diversity of our society and promote inclusion.

What to Watch For

Prompting is only one step in the process of obtaining usable content. Remember that you are accountable for the accuracies and inaccuracies, the biases, and the citations of the genAI output you include in your documents. Once you have draft output to work with, routinely go through the content to avoid these issues:

- **Biases:** Ensuring that your documents and images are inclusive of all groups entails a careful screening of genAI output for racial, sexual, age-related, religious, and socioeconomic biases. These biases perpetuate inequities in society and in organizations, which you would want to avoid doing. These inequities affect how people relate to each other as well as how they can do their jobs, their opportunities and remuneration. Your goal should be to ensure that these inequities are not perpetuated. Images in particular display a lack of diversity. When creating your prompt, be sure to specify that any people represented in the images represent diverse groups.
- **Disengagement or "falling asleep at the wheel":** Dell'Aqua (n.d.) has discovered through research that many employees tend to simply use genAI output as is, without taking the time to check the contents. While genAI outputs are continuously improving in quality, the times when inaccuracies, hallucinations, biases, and unsupported claims can appear are substantial enough to significantly damage a company's reputation and an employee's career if the output is used without careful review. Always become engaged with the output to maintain your agency in the process of content creation.
- **Errant symbolic references:** Images will contain elements with symbolic meaning that will influence how a person reacts to the image and to your overall message. Think for example, how the color red embodies different meanings for various groups and occasions. Being sensitive to what the image can represent to your audience can help you keep a tight focus on your messaging. Especially when using images to support information in your documents, ensure that all the imagery aligns with your purpose and contains no elements that could potentially cause offense. Checking images requires scrutiny.
- **Inaccuracies or hallucinations:** Although each successive versions of the genAI models show some improvement in accuracy with fewer outright hallucinated or fake (obviously made-up) information, the output must be checked for accuracy. You want to ensure that the genAI content you use aligns with your specific purpose and contains verifiable facts and information for which you can otherwise ascertain as being accurate..
- **Privacy violation:** Check the output for content that can compromise privacy. Enterprise versions of genAI applications are set up to protect the privacy of the users. However, if you are using free versions of non-enterprise genAI models, private information that had been used to either train the model or as input in chats can reappear in output. Ensure that the information

in the output does not contain private personal, medical, financial or other such information. Also do not include personal or private information in your prompts.

- **Sandbagging:** Sometimes genAI models will perform beyond your expectations; at other times the output will be underwhelming. Depending on which genAI model you use, the model may respond only to the limits established by the knowledge you exhibit in your prompt, and no further. So while many think that genAI will automatically augment knowledge generation capabilities watch for output that will only match your ability and knowledge and not more. This potential response on the part of the genAI model emphasizes the need for users to not only create specific prompts, but also to follow up on output that is less than satisfactory with a request that the model stretch the limits of the current output. Use your critical thinking skills to not only analyze the output but to also refine prompts to obtain correct, narrow, and specific output that meets your purpose at the degree of expertise that is required. And if the model you are using does not perform as expected, choose a different one. For more information on sandbagging, see Section C in Perez et al. (2022).
- **Unsupported claims:** As a general rule, do not use genAI models for research unless they are made specifically for that purpose, such as Perplexity, Elicit, Consensus, ResearchRabbit, and other such models. ChatGPT, for example, is great for ideation (e.g., "list some topic areas in the field of sustainable heating and cooling"), but it is not a research engine and often responds with output that contains unreliable information. GenAI output obtained from chat models will often contain claims that are not supported with sources or that are not relevant. Copilot sometimes copies from internet sources as well, so beware of using plagiarized content! Always ensure that claims are supported with verifiable sources by doing the research. Also ensure that the claims are not taken out of context: They must be true to the intent of the original document from which they originated.

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3. WRITING FOR TECHNICAL WORKPLACES

Most writing produced in technical workplaces consists of a combination of technical writing (which transmits technical information) and business writing (which transmits information that promotes smooth business operations). In the previous chapter, we defined technical writing as a "transactional" and primarily "problem-solving" genre and described some of the key conventions and considerations technical writers must keep in mind. In this chapter, we will look more deeply into the style of writing expected of this genre.

Chapter 3 Learning Objectives

This chapter will help you achieve the following objectives:

3.1 Understand how to use reader-centred writing (rather than a writer-centred one) that focuses on knowing your audience and writing specifically to meet their needs

3.2 Learn how to incorporate inclusive principles and language into your communications

3.3 Review and practice techniques to communicate with precision

3.4 Understand how to write to persuade using rhetoric in a professional context, avoiding logical fallacies and inappropriate marketing language

3.5 Recognize the importance of verbs and learn how to choose strong verbs as the "engines" that drive efficient and effective sentences; revise passages to improve concision and flow

How does technical writing style differ from essay writing? It is mostly characterized by high-information, goal-oriented sentences that are characterized by the following stylistic elements:

Characteristics of Technical Style

Active: The subject precedes the verb in most sentences to highlight action and actor.
Concise: Sentences contain only the necessary words to convey the intended idea or information.

Fact-based: A careful reliance on facts to support ideas will boost your credibility.
Objective: A presentation of accurate, unbiased information is essential for decision-making.
Specific: Concrete information will fully inform the reader.
Straight-forward: A direct approach will create a focus on the key message.

Technical writing requires accuracy and clarity not only in terms of content but also in terms of grammatical and mechanical accuracy. For a review of grammar basics, see **Appendix B: Sentence Structure** and **Appendix C: Punctuation Rules**.

To begin, complete the exercise below.

EXERCISE 3.1 Describe some differences between writing for school vs. writing for work

	Writing for School	Writing for Work
Purpose		
Audience		
Content		
Document Life Span		
Liability		
Format & Design Elements		
Writing Style		

What key differences do you note between the two writing contexts? What do you think accounts for those differences?

3.1 KEY CONCEPT: Reader-Centred Writing

Writing can be conceptualized as **writer-centred** or **reader-centred**. Things like diaries and journals are primarily writer-centred, in that they are written for the benefit of the writer. Your schoolwork may also have been somewhat writer-centred, in that often your goal was to "show what you know" and thereby "get a good grade." Technical communications require that you shift this mindset and write for the benefit of your reader—or design the content and structure of your communication for your "user." This mindset should be informed by an understanding of your audience. Use these guidelines and ask yourself the following questions:

- **Who is my target audience?** Are they internal or external readers? Upstream, downstream or lateral from you? Do I have multiple readers?
- **What are their perspectives on the topic, on me, and on the document I will write?** What are they expecting to do with the document? What is the document meant to accomplish? Why has it been requested? What is my role and relationship to my readers? Will their response be positive, negative, or neutral?
- **What is my goal or purpose in writing to these readers?** What am I trying to communicate? What do I want them to do as a result of reading this document? How can I plan the content to meet my readers' needs?
- **What does my reader need to know to be able to act?** What kinds of information would help the reader understand the situation and make decisions? What is the reader's degree of expertise on the subject? What does the reader already know? What does the reader need to know? What does my reader NOT need to have explained?
- **What is my reader's goal?** Why does this audience want or need to read this document?

Review the video below for additional information on profiling an audience for your message.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=65#oembed-1

(Foundation of Communication, 2018)

Getting a clear understanding of your audience is important in communicating effectively. It also enables you to imagine your audience as you write and revise. Keep asking yourself whether what you have said would be clear to your audience. How could you say it better?

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=65#h5p-9

EXERCISE 3.1.1 Audience analysis

Choose one of the topics below. Then perform an audience analysis, using the questions above to gain an understanding of the needs of different audiences. Write a profile of your intended reader(s) and consider what sort of information they will need and why?

You have been asked to

1. Write a report on **Maintaining Internet Privacy** for
   a) A new internet user who just signed up for internet service
   b) A start-up e-commerce website developer
2. Prepare a document on **Food-borne Diseases** for
   a) Restaurant workers (servers and kitchen staff)
   b) A health inspector training course
3. Provide information on a proposed **New Bus Shelter Design** to
   a) Mayor's office
   b) Contractor
   c) Newspaper reporter writing an article on the issue

Professional Tone

"Tone" refers to the attitude that a document conveys towards the topic and/or the reader. You have likely read something that sounded angry, or optimistic, or humorous, or cynical, or enthusiastic. These words characterize the tone. Technical communication tends to avoid displaying an obvious emotion and instead strives for a neutral tone.

Tone is created through word choice (diction), word order (syntax), sentence construction, and viewpoint. Consider a piece of academic writing that you may have read. It creates a formal tone through its use of specialized terminology, sophisticated vocabulary, complex sentence structures, and third-person voice. This style suits the genre because it is directed at experts and scholars in the field and seeks to convey complex information densely and objectively, with an emphasis on reason, logic, and evidence.

Now consider a piece of business writing that you may have read. The tone may be slightly less formal but not colloquial–rather, it is conversational in tone. The language is direct and plain, and the sentences are shorter and more straightforward. It may make use of the second person ("you"). This style suits business writing because it is directed at colleagues, management, or clients who are seeking information clearly and quickly and who may need to take action on it.

https://www.youtube.com/watch?v=XXnRM1WJ_Ac

(We Grow People, 2021)

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=65#h5p-10

Writing Constructively

Striking the appropriate tone involves understanding your purpose, context, and audience. It also involves an understanding that workplaces are often hierarchical and that cooperation and teamwork are required. Therefore, it is important to consider how you want your reader to feel, and what may make your reader feel that way. Your goal is to write constructively, which means using positive phrasing to convey your message to your reader. **Table 3.1.1** illustrates the differences between destructive/negative and constructive/positive feelings the reader may experience as a result of the tone used in a document.

Table 3.1.1 ***Differences between destructive/negative and constructive/positive attitudes***

Negative	Constructive
misunderstood	understood
outraged	conciliatory
disgusted	pleased
guilty	capable
belittled	empowered
patronized	respected
defensive	proud
chastised	valued
humiliated	honoured
excluded	a sense of belonging
resentment	contentment

Considering how your reader may feel after reading your document is an important part of revision. Did your tone come across like you hoped it would? Could it be misconstrued? Often this is where peer reviewing can be helpful. Asking a colleague to review your document before sending it off to its intended audience is a common professional practice.

Sometimes, you will need to communicate information that is unpleasant, such as delivering bad news or rejecting a request. Communicating constructively is possible—and arguably even more important—in these situations. Regardless of the message, how can you ensure you are communicating constructively?

- **Adopt an adult-to-adult approach:** That is to say, avoid talking down to your reader in a patronizing tone, and likewise avoid sounding petulant or unwilling to take responsibility. Aim to communicate respectfully, responsibly, confidently, and cooperatively — as one responsible adult to another.
- **Be courteous:** Focus on the reader as much as possible. Use "you" unless it results in blaming (one effective use of passive verbs is to avoid assigning blame: "mistakes were made"). Use traditionally accepted forms of courtesy and politeness. Use gender-neutral phrasing and plural forms, unless you are referring to a specific person and you know their gender.
- **Focus on the positive:** Emphasize what you *can* do rather than what you can't. Try to avoid negative wording and phrasing (no, not, never, none, isn't, can't, don't, etc.). Focus on what *can* be improved.
- **Be genuine:** Apologize if you have made a mistake. Take responsibility and promise to do better. Be authentic in your expression. Avoid sounding like marketing material (ad-speak). Make reasonable claims that can be backed with evidence.

Consider the following perspectives:

Writer-Centred (I, we)	Reader-Centred (you)
If I can answer any questions, I'll be happy to do so.	If you have any questions, please ask.
We shipped the order this morning.	Your order was shipped this morning.
I'm happy to report that ...	You'll be glad to know that ...

Negative Phrasing	Constructive Phrasing
We cannot process your claim because the necessary forms have not been completed	Your claim can be processed as soon as we receive the necessary forms
We do not take phone calls after 3 p.m. on Fridays	*You try* ...
We closed your case because we never received the information requested in our letter of April ...	

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=65#h5p-11

EXERCISE 3.1.2 Revise an email for appropriate tone

A colleague has asked you to review his email before sending it. What revisions to content, tone, and style would you suggest?

From: Jake Burns
To: J. Parsons, Project Co-ordinator
Date: 12 December 20XX
Subject: Two Problems

Hi Ms. P

Say, we may need to increase the budget on this project by $12,000. Sam screwed up when he calculated material costs. Now we don't have enough budgeted to add the additional G3 servers with the 36GB 15k hot-pluggable hard drives. I know you don't know what all that means, but trust me. WE NEED THOSE SERVER UPGRADES!!!

Also, I would like to talk about getting my office moved closer to the rest of the IT department. All the running back and forth is disturbing other employees. I am so far away from everyone that I figure I must need to change deodorant or something. ;)

JB

EXERCISE 3.1.3 Revise for constructive tone

How do you think the following memo will make the recipients feel? How would you revise the following memo to more constructively address the problem?

From: Ann Onymous
To: All Employees
Date: Feb. 3, 20XX
Subject: Littering

For some time now, smoking has been strictly prohibited within five metres of the Main Building entrance. Do NOT smoke anywhere near the doors!

Some of you still insist on smoking and have been doing so inside this area. As a result, the areas near the rear exit and around the picnic tables are constantly littered with smoking-related debris (filter tips, half-smoked cigarettes, empty lighters, etc.), creating an eyesore and making more work for my staff, who have to keep cleaning up this mess.

Starting Monday, sand buckets will be provided outside the read doors and in the picnic area. Use them!

For further reading, see "Communication in the workplace: What can NC State students expect?" a study based on the responses of over 1000 professionals from various fields, including engineering, on how important business, technical and scientific communication is to their work.

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References

OpenEducation Resources. (2018). *Foundation of communication – Audience analysis* [Video]. Youtube. https://www.youtube.com/watch?v=APJCWgOtnKo

We Grow People. (2021). *How to create a purposeful tone in your writing* [Video]. Youtube. https://www.youtube.com/watch?v=XXnRM1WJ_Ac

3.2 Inclusive writing

Inclusive language is integral to communication, and business is no exception. When you communicate, you want to ensure that your language conveys respect and creates a safe environment for your audience. Inclusive language means words, phrases or tones that do not contain discriminatory, stereotyped, or prejudiced ideas of groups of people. By being inclusive in the way you write, you will not exclude any members of your audience.

Seneca's (2023) Inclusive Writing Guide provides six basic principles you can apply to help you communicate with care.

1. **Respect individual preferences & avoid generalizations —** Individuals and groups are diverse, and each may have their own preferred language. Don't assume that the same language or term can be applied to all individuals in the same group. If you're unsure of what terminology to use when writing about a person or group, it's always best to ask them whenever possible.
2. **Be respectful —** Choose words with care. Review and reflect on the words you're using and ensure that they're respectful and don't reinforce stereotypes. In addition, consider that the overall content (including the images that you use and tone of your writing) is inclusive and respectful.
3. **Be conscious of false hierarchies —** When conducting comparisons, consider which groups are compared. For example, describing one group as "normal" can exclude other groups and make readers think that they are "abnormal" (APA). Similarly, be thoughtful when determining the order in which groups will be presented. Automatically mentioning socially dominant groups at the beginning can make it seem that the groups that follow are less important or inferior.
4. **Share only what is relevant —** Ask yourself if you need to refer to a person or group's identity (e.g., gender, race) in your writing. For example, it may be sufficient to say "a group of doctors" instead of "a group of female doctors".
5. **Be consistently inclusive —** Inclusive writing is not a one-time thing. Inclusive writing style, techniques, and language should be used in all forms of communication. Your school or workplace may also have their own inclusive writing guidelines. If this is the case, follow your organization's guidelines to ensure that your writing is consistent with your organization's preferred language and style.
6. **Create content for everyone —** Inclusive writing techniques work together with principles of effective communication. In addition to using inclusive language, create content for your audience that is clear, accessible, and accurate.

Disability inclusive language

When writing about people with disabilities, the APA's Inclusive Language Guide recommends the following approaches:

1. **Person-first**
2. **Identify-first**

Person-first language focuses on the person and puts less emphasis on the disability or diagnosis. For example:

- A person who uses a wheelchair
- A person who uses a walking cane

Identity-first language places emphasis on the disability. Some individual and groups may prefer identity-first language since they view their disability as an important part of their identity. For example:

- Wheelchair user
- A blind person

Always ask the person or group you are writing to identify their preference. This will ensure that you do not offend or alienate your audience.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=67#oembed-1

Watch this video to learn more about identity-first versus person-first language.

Gender-inclusive language

It has been commonly accepted for many years that the use of 'man' as a generic term excludes women and non-binary individuals. Words like 'mankind' and 'chairman' make people think 'male' rather than 'female' and render other genders invisible (QUT, 201). The use of 'man' or 'men' and 'woman' or 'women' is an expression of binary language and doesn't allow for people who don't identify as male or female. Use inclusive words (**review Table 1**) that are non-binary and gender-neutral (QUT, 2010).

Table 3.2.1: ***Using gender-neutral language***

Language and practices to avoid	Good practice inclusive language
man, mankind, spokesman, chairman, workmanship, man the desk/phones, man power	humans, humankind, spokesperson, chairperson, quality of work/skill, attend the desk/ phone, workforce
The supervisor must give his approval	Supervisors must give their approval
girls in the office, woman doctor, male nurse, cleaning lady, female professor, authoress, manageress	office staff, doctor, nurse cleaner, professor, author, manager
Good morning ladies and gentlemen	Good morning colleagues/everyone
The guys in the office will help	The staff in the office will help

Note. Always avoid phrases that may be gender-specific, stereotypical, or potentially exclusive. Instead, use non-binary pronouns so that misgendering doesn't occur. Reprinted from Andersen, 2022.

Pronouns and Neopronouns

Pronouns are linguistic tools that replace a person's name in conversation. While some languages have pronouns that denote gender, others do not.

In the English language, 'he/his' and 'she/her' are frequently used gender-specific pronouns for third-person singular references. Using 'they' as a gender-neutral or general pronoun can make your writing more inclusive. In fact, the pronoun 'they' has been utilized as a gender-neutral term for centuries.

Because pronouns can reflect a person's gender identity, it's crucial to use the correct ones for respectful and inclusive communication. To prevent incorrect gender identification, it's always recommended that you ask your audience.

People who identify as non-binary often use 'neopronous' in place of gender-specific pronouns (**review Table 3.2.2**). If you are not sure how to use a person's neopronouns, always ask.

Table 3.2.2: Neopronouns

Subjective	Objective	Possessive
ze	zir hir	zirs hirs
ey	em	eirs
per	per	pers

Note. Examples of common neopronouns. Reprinted from Seneca's Inclusive Writing Guide, 2023.

Activity: Pronouns

Complete this online interactive pronoun exercise.

Gender and sexuality diversity terms

It is also important to know the meanings of words people use about gender and sexual diversity. This includes sexual orientation, gender identity and expression, and sex characteristics.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=67#h5p-247

Titles of address

Titles of address are now considered redundant when not linked to professional positions such as Professor, Doctor, or Senator. Titles such as 'Mr' and 'Ms' are no longer necessarily linked to a marital status like 'Mrs' and 'Miss' and in professional arenas marital status is irrelevant. 'Ms' is widely used for women regardless of marital status but, rather than misgendering a person, it is better to be consistent and not use gendered titles. 'Mx' is a gender-neutral non-profession/qualification-related title that is also used. Where possible confirm with the individual their preferred title of address.

Table 3.2.3: ***Titles and salutations***

Insensitive Language	Gender-inclusive alternative
Ms. Alex Cruz	Alex Cruz
Dear Ms. Cruz	Dear Alex Cruz
Dear Sir Dear Madam Dear Sir or Madam	Dear Homeowner/ Colleague/ Hiring Manager/ etc.

Note. Always omit any references to gender when you are writing to an unknown audience. Reprinted from Seneca's *Inclusive Writing Guide*, 2023.

Indigenous Peoples

Deciding what terminology to use to identify Indigenous people is important, especially considering the historical and present context in which terminology is used to marginalize and oppress the original inhabitants of this land.

The word Indigenous is itself a good place to start. Those who are considered Indigenous today, are descendants of people who were living on this land prior to colonization by Europeans. You will still find the term 'Aboriginal,' rather than Indigenous, used in some contexts, including official Canadian Government documents, but the term Indigenous is becoming the preferred overall term to use.

In what is now known as Canada, there are three distinct groups of Indigenous people — First Nations, Métis, and Inuit. According to their own traditions and teachings, the Inuit and First Nations people have been on this land since time immemorial (forever). People who identify as Métis are descendants of First Nations and European parentage.

Indigenous people identify themselves in many different ways. A term that one person embraces could offend another (**review Table 3.2.4**). Therefore, it is important to be respectful of how Indigenous people themselves want or choose to be identified.

To get started, watch the short video, How to Talk About Indigenous People, that clearly explains use of the terms Indigenous, Aboriginal, First Nations, Métis, and Inuit.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=67#oembed-2

Table 3.2.4:*Outdated and inappropriate terms*

Instead of...	Consider...
Indian, Native People, Indigenous Canadian, Native Canadian, Aboriginal(s) (noun)	Indigenous Peoples (collectively refers to Indigenous population and includes First Nation, Métis, and Inuit) First Nations, Métis, Inuit Name of specific community Note: In Canada, Aboriginal (adjective) may still be used although Indigenous is the more preferred term.
Eskimo	Inuit (plural), or Inuk (singular)
Avoid using possessives when discussing Indigenous Peoples since it implies that Indigenous Peoples belong to Canada. Examples: Canada's Indigenous Peoples, Canada's Métis people, our Aboriginal people, Indigenous Peoples of Canada	You could use something like: • Indigenous Peoples in Canada • Indigenous Peoples within Canada • Indigenous Peoples in Ontario • Indigenous Peoples in the territory formerly known as Ontario

Note. Do not use these outdated terms that are no longer acceptable. Reprinted from Seneca's *Inclusive Writing Guide*, 2023.

Racialized communities or groups

Before you write about or mention an individual's identity, always confirm how they identify first. A person's race should only be mentioned if it is relevant. For example, 'this week will discuss civil rights activist Dr Martin Luther King Jr. who is remembered as one of the most influential and inspirational African-American leaders in history.'

Terms such as 'visible minority' and 'person of colour' are outdated terms (**review Table 5**). Instead, consider using the following, depending on the context:

- racialized person
- racialized group
- member of a racialized community
- equity-deserving group

The Ontario Human Rights Commission uses the term members of racialized communities. This expression may also be used to for members of marginalized religious groups.

Table 3.2.5: ***Insensitive language and suggested alternatives***

Insensitive Language	Suggested Alternatives	Notes
Caucasian	white people	In reality, there is no biological "race". The term Caucasian was created as a way to make white supremacy scientifically justifiable. For more information, see Is the Word Caucasian Racist?
coloured, blacks	Black people	The word Black (as an adjective) is generally acceptable. Never use Black as a noun, either singular or plural.Some people may use terms such as Black Canadian, African Canadian, or African American. Note that not all Black people may identify with these terms. Learn more.
visible minority, racial minority	Equity-deserving group	The word "minority" creates the false impression that non-white racial groups form a smaller percentage of the population than the white "majority".
Ghetto, inner-city	Use the name of the neighbourhood or area. If appropriate, use neutral terms such as city centre or central urban. If referring to low-income neighbourhoods, use words such as under-resourced, under-served, or low-income.	
Orientals	Asian people, Asian Canadian individuals, [specific nationality]	The term "Oriental" is outdated and is associated with a period in U.S. history when people from East Asia had subordinate status in society.
Foreigners, illegal aliens	newcomers, refugees	Avoid dehumanizing or othering language.
People(s) of Colour (POC)	Write specifically about the particular person or group. If you need to generalize, use the term "racialized people(s)"	While terms such as POC and BIPOC have become popular over the past years, some writers and activists believe grouping different populations together erases the experiences of each group.
slave; slavery	enslaved person; enslavement	The term "slave" reduces a person to a position they never chose to be in. It can also strip the person from their human identity. Continuing to use terms such as slave, slavery and slave master normalizes the enslavement as a state of being.
slave master, slave owner	enslaver	Human beings cannot be "owned". The verb "enslave" helps bring attention to the horrific acts involved in enslavement

Note. Never use language that might marginalize, offend, or inaccurately represent people based on their race, ethnicity, or other aspects of their identity. Reprinted from Seneca's *Inclusive Writing Guide*, 2023.

Conclusion

Always remember that words matter. They reflect the values and knowledge of people using them and can reinforce both negative and positive perceptions about others. Language is not neutral. Inclusive language acknowledges the unique values, skills, viewpoints, experiences, culture, abilities and experiences of individuals or groups (QUT, 2010). Your use of inclusive language — how you speak, write and visually represent others — is an important part of workplace communication.

Additional inclusive language resources

To help authors write in ways that are inclusive and respectful of diversity, most style guides now include guidelines for inclusive and bias-free language. For example:

- The Government of Canada has released Guidelines for Inclusive Writing. The guidelines provide advice on:
  - Gender-inclusive writing techniques
  - Representation of non-binary gender in written communications
- The American Psychological Association (APA) has released its second edition of the Inclusive Language Guide. The APA has also developed bias-free language guidelines covering:
  - Age
  - Disability
  - Gender
  - Racial and Ethnic Identity
  - Sexual Orientation
  - Socioeconomic status
  - Intersectionality
- Other resources
  - Resources for inclusive and respectful language
  - Seneca's Inclusive Language Guide
  - Quick reference sheet on inclusive writing

Attributions

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References

QUT. (2010). Working with diversity: a guide to inclusive language and presentation for staff and students. QUT Equity Services Brisbane.

3.3 Communicating with Precision

So far we have discussed the importance of writing with the reader in mind; of striking the right tone for your audience, message, and purpose; and of writing constructively. Now we move onto the actual writing itself. Two key characteristics of professional communication are that it is precise and concise. This precision and concision must be evident at all levels, from the overall document, to paragraphing, to sentence structure to word choice, and even to punctuation. Every word or phrase should have a distinct and useful purpose. If it doesn't, cut it or revise.

The 7 Cs of Professional Writing

The 7 Cs are simply seven words that begin with C that characterize a strong professional style. Applying the 7 Cs of professional communication will result in writing that is

- Clear
- Coherent
- Concise
- Concrete
- Correct
- Complete
- Courteous

CLEAR writing involves knowing what you want to say before you say it because often a lack of clarity comes from unclear thinking or poor planning; this, unfortunately, leads to confused or annoyed readers. Clear writing conveys the purpose of the document immediately to the reader; it matches vocabulary to the audience, avoiding jargon and unnecessary technical or obscure language while at the same time being precise. In clarifying your ideas, ensure that each sentence conveys one idea, and that each paragraph thoroughly develops one unified concept.

COHERENT writing ensures that the reader can easily follow your ideas and your train of thought. One idea should lead logically into the next through the use of transitional words and phrases, structural markers, planned repetition, sentences with clear subjects, headings that are clear, and effective and parallel lists. Writing that lacks coherence often sounds "choppy" and ideas seem disconnected or incomplete. Coherently connecting ideas is like building bridges between islands of thought so the reader can easily move from one idea to the next.

CONCISE writing uses the least words possible to convey the most meaning while still maintaining clarity. Avoid unnecessary padding, awkward phrasing, overuse of "to be" forms (*is, are, was, were, am, be, being*), long preposition strings, vagueness, unnecessary repetition and redundancy. Use active verbs whenever possible, and take the time to choose a single word rather than a long phrase or cliched expression. Think of your word count like a budget; be cost-effective by making

sure every word you choose does effective work for you. Cut a word, save a buck! As William Zinsser (1980) asserts, "the secret of good writing is to strip every sentence to its cleanest components."

CONCRETE writing involves using specific, precise language to paint a picture for your readers so that they can more easily understand your ideas. If you have to explain an abstract concept or idea, try to use examples, analogies, and precise language to illustrate it. Use measurable descriptors whenever possible; avoid vague terms like "big" or "good." Try to get your readers to "see" your ideas by using specific terms and descriptions. For example, when describing an amount use actual values like 0.1 ml or 250 grams.

CORRECT writing uses standard English punctuation, sentence structure, usage, and grammar. Being correct also means providing accurate information, as well as using the right document type and form for the task.

COMPLETE writing includes all requested information and answers all relevant questions–as well as anticipated questions. The more concrete and specific you are, the more likely your document will be complete and useful. Review your checklist of specifications before submitting your document to its intended reader.

COURTEOUS writing entails designing a reader-friendly, easy-to-read document; using tactful language and appropriate modes of addressing the audience; and avoiding potentially offensive terminology, usage, and tone. As we have discussed in an early section, without courtesy you cannot be constructive.

In some cases, some of these might come into conflict: what if being too concise results in a tone that sounds terse or an idea that seems incomplete? In such a situation, you have the flexibility to adapt the language to suit the circumstances.

Figure 3.3.1 illustrates one method of putting all the 7Cs together.

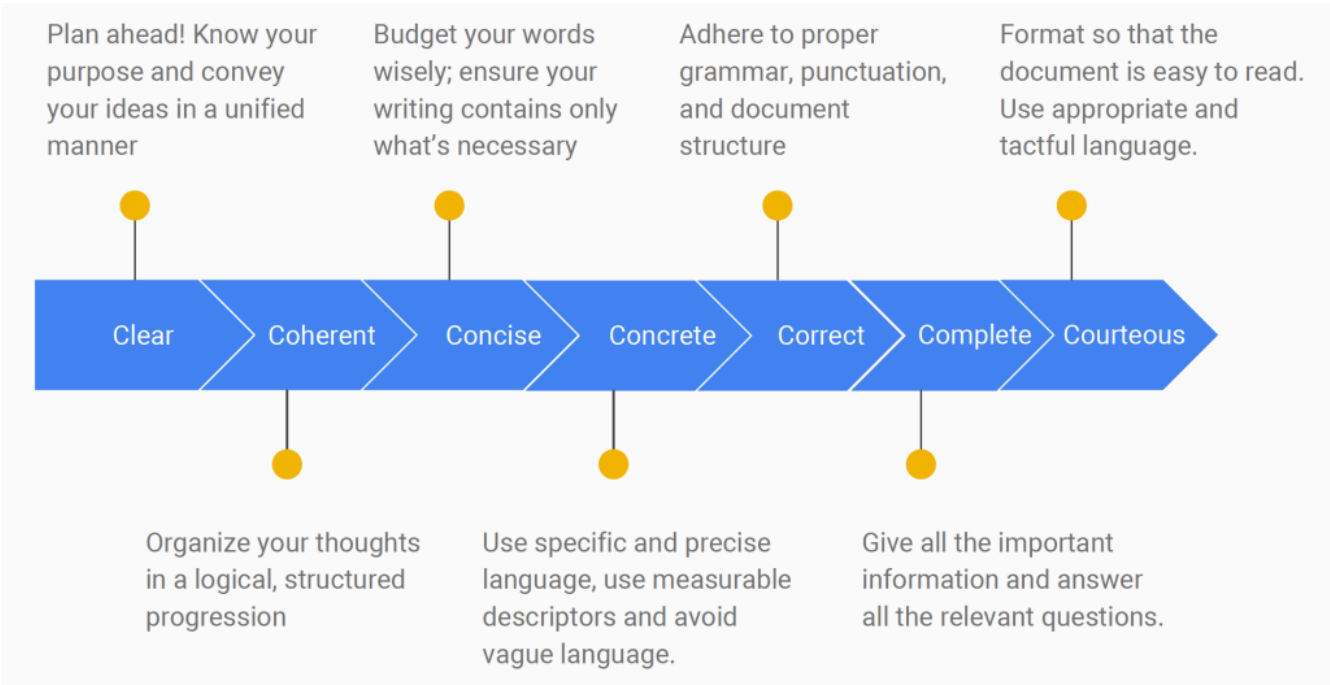

Figure 3.3.1 *Putting all the 7 Cs together (Zicari & Hildemann). [Image description]*

Be mindful of the tradeoffs, and always give priority to being **clear**: writing that lacks clarity cannot be understood and therefore cannot achieve its purpose. Writing that adheres to the 7 Cs helps to establish your **credibility** as a technical professional.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=70#h5p-12

EXERCISE 3.3.1 Revise for clarity

Remember the librarian's "garbled memo" from the Case Studies in Chapter 1.4? Try revising it so that it adheres to the 7 Cs; make it clear, coherent, concrete and concise, while also being complete, courteous and correct.

MEMO

When workloads increase to a level requiring hours in excess of an employee's regular duty assignment, and when such work is estimated to require a full shift of eight (8) hours or more on two (2) or more consecutive days, even though unscheduled days intervene, an employee's tour of duty shall be altered so as to include the hours when such work must be done, unless an adverse impact would result from such employee's absence from his previously scheduled assignment.

Sentence Variety and Length

While variety makes for interesting writing, too much of it can also reduce clarity and precision. Technical writing tends to use simple sentence structures more often than the other types. That said, simple does not necessarily mean "simplistic," short, or lacking in density. Remember that in grammatical terms, simple just means that it has one main clause (one subject and one predicate). You can still convey quite a bit of concrete information in a simple sentence.

The other consideration for precise writing is length. Your sentences should vary in length just as they can vary in type. However, you want to avoid having too many long sentences because they take longer to read and are often more complex. That is appropriate in academic writing but less so in technical writing. The goal is to aim for an average of around 20 to 30 words per sentence. Reserve the short sentences for main points, and use longer sentences for supporting points that clarify or explain cause and effect relationships. If you feel the sentence is too long, break it into two sentences. You do not want your reader to have to read a sentence twice to understand it. If you make compound or complex sentences, ensure that you use appropriate coordinating or subordinating strategies to make the relationship between clauses perfectly clear. See Appendix B for information on simple, compound, and complex sentence structures.

Precise Wording

Technical writing is precise writing. Vague, overly general, hyperbolic or subjective/ambiguous terms are simply not appropriate in this genre. You do not want to choose words and phrasing that could be interpreted in more than one way. For example, if you asked someone to define what makes a "good dog," you might get responses like "obedient, effective hunter/retriever, well-behaved, affectionate, loyal, therapeutic, goofy" and "all dogs are good!" Choose words that most precisely, concisely, and accurately convey the idea you want to convey. Below are some guidelines and examples to follow for using precise wording.

1. Replace abstract nouns with verbs.

Verbs, more than nouns, help convey ideas concisely, so where possible, avoid using nouns derived from verbs. Often these abstract nouns end in –***tion*** and –***ment***. See examples in the following chart.

Abstract Noun	Verb
acquisition	acquire
analysis	analyze
recommendation	recommend
observation	observe
application	apply
confirmation	confirm
development	develop
ability	able, can
assessment	assess

For example, change the noun into a verb as follows:

Instead of: The inspector made the recommendation for the safe disposal of construction debris.

Use: The inspector **recommended** the safe disposal of construction debris.

The second sentence is clearer and more concise than the first.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=70#h5p-13

2. Prefer short words to long words and phrases.

The goal is to communicate directly and plainly so use short, direct words whenever possible. In other words, don't use long words or phrases when short ones will do. Write to *express*, not impress.

Long	Short
cognizant; be cognizant of	aware, know
commence; commencement	begin, beginning
utilize; utilization	use (v), use (n)
inquire; make an inquiry	ask
finalize; finalization	complete, end
afford an opportunity to	permit, allow
at this point in time	now, currently
due to the fact that	because, due to
has the ability to	can

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=70#h5p-14

3. Avoid clichés.

Clichés are expressions that you have probably heard and used hundreds of times. They are overused expressions that have largely lost their meaning and impact.

Clichés	Alternatives
as plain as day	plainly, obvious, clear
ballpark figure	about, approximately
few and far between	rare, infrequent
needless to say	of course, obviously
last but not least	finally, lastly
as far as ___ is concerned	?

4. Avoid cluttered constructions.

This category includes redundancies, repetitions, and “there is/are” and “it is” constructions.

Redundancies		
combine/join ~~together~~	fill ~~completely~~	unite ~~as one~~
finish ~~entirely~~	refer/return/revert ~~back~~ to	emphasize/stress ~~strongly~~
examine (closely)	~~suddenly~~ interrupt	~~better/further~~ enhance
~~eventually~~ evolve ~~over time~~	~~strictly~~ forbid	rely/depend ~~heavily~~
plan ~~ahead~~	~~harshly~~ condemn	protest ~~against~~
~~completely~~ surround ~~on all sides~~	estimate/approximate ~~roughly~~	gather/assemble ~~together~~
~~clearly~~ articulate	~~carefully~~ consider	~~successfully~~ prove
~~future~~ plan	~~mutual~~ agreement	years ~~of age~~
in ~~actual~~ fact	~~positive~~ benefits	~~end~~ result/product

Regarding “there are/is” or “it is” sentence constructions–the general rule is to avoid beginning sentences with these words since they do not contain information. Rather, begin with information words as follows:

Instead of: There are five joists that need replacing.

Use: Five joists need replacing.

This second sentence is much more concise and clear than the previous one.

5. Use accurate wording.

Sometimes this requires *more* words instead of fewer, so do not sacrifice clarity for concision. Make sure your words convey the meaning you intend. Avoid using words that have several possible meanings; do not leave room for ambiguity or alternate interpretations of your ideas. Keep in mind that readers of technical writing tend to choose literal meanings, so avoid figurative language that might be confusing (for example, using the word “decent” to describe something you like or think is good). Separate facts from opinions by using phrases like “we recommend,” “we believe,” or “in our opinion.” Use consistent terminology rather than looking for synonyms that may be less precise.

Qualify statements that need qualifying, especially if there is the possibility for misinterpretation. Do not overstate through the use of absolutes and intensifiers. Avoid overusing intensifiers like “extremely,” and avoid absolutes like “never, always, all, none” as these are *almost* never accurate. Remember Obiwan Kenobi’s warning:

“Only a Sith deals in absolutes.” (Lucas, 2005)

We tend to overuse qualifiers and intensifiers, so below are some that you should be aware of and consider whether you are using them effectively.

Overused Intensifiers					
absolutely	actually	assuredly	certainly	clearly	completely
considerably	definitely	effectively	extremely	fundamentally	drastically
highly	in fact	incredibly	inevitably	indeed	interestingly
markedly	naturally	of course	particularly	significantly	surely
totally	utterly	very	really	remarkably	tremendously

Overused Qualifiers					
apparently	arguably	basically	essentially	generally	hopefully
in effect	in general	kind of	overall	perhaps	quite
rather	relatively	seemingly	somewhat	sort of	virtually

For a comprehensive list of words and phrases that should be used with caution, see Kim Blank's "Wordiness, wordiness, wordiness list" (2015).

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=70#h5p-15

6. Prefer the active voice.

The active voice emphasizes the person/thing doing the action in a sentence. For example, *The outfielder throws the ball*. The subject, "outfielder" actively performs the action of the verb "throw." The passive voice emphasizes the recipient of the action. In other words, something is being done to something by somebody: *The ball was thrown (by the outfielder).* Passive constructions are generally wordier and often leave out the person/thing doing the action.

Active	Passive
S →V →O	**S ←V ←O**
Subject → actively does the action of the verb → to the object of the sentence	Subject ← passively receives the action of the verb ← from the object
Subject → acts → on object	Subject ← is acted upon ← by the object
Example: Bineshii submitted the report.	**Example: The report was submitted by Bineshii.**

Whenever possible, use the active voice to convey who or what performs the action of the verb. The active voice is used most of the time in technical communication because it is a clear, direct, and concise way of conveying ideas. It is appropriate, however, to use the passive voice when you want to distance yourself from the message, such as when delivering negative news. While the passive voice has a place—particularly if you want to emphasize the receiver of an action as the subject of the sentence or the action itself, or if you do not know who is performing the action, or if you want to avoid using the first person—its overuse results in writing that is wordy, vague, and stuffy.

Precise writing encapsulates many of the 7 Cs; it is clear, concise, concrete, and correct. But it is also accurate and active. To write precisely and apply the 7 Cs, look critically at your sentences, perhaps in a way you may not have done before: consider the design of those sentences, from the words to the phrases to the clauses, to ensure that you are communicating your message effectively.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=70#h5p-16

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Lucas, G. (Director). (2005). Star *Wars: Episode III – Revenge of the Sith*. [Film].

Zicari, A. & Hildemann, J. Figure 2.2.1. Used with permission.

Zinsser, W. (1980). Simplicity. http://www.geo.umass.edu/faculty/wclement/Writing/zinsser.html

Image descriptions

Figure 2.2.1 image description:

A priority list of the 7 Cs.

1. Clear: Plan ahead! Know your purpose and convey your ideas in a unified manner.
2. Coherent: Organize your thoughts in a logical, structured progression.
3. Concise: Budget your words wisely; ensure your writing contains only what's necessary.
4. Concrete: Use specific and precise language, use measurable descriptors, and avoid vague language.
5. Correct: Adhere to proper grammar, punctuation, and document structure.
6. Complete: Give all the important information and answer all relevant questions.
7. Courteous: Format so that the document is easy to read. Use appropriate and tactful language.

3.4 Writing To Persuade

Persuasion involves putting forth a compelling argument to reinforce or otherwise influence behavior, action, and motivation. Sometimes, you may want to persuade your reader to take a particular action or position on an issue. To be effective, you should consider how to make effective use of the following elements of persuasion, often referred to as Rhetorical Appeals. The ancient Greek words are *ethos, pathos, logos*, and *kairos* (see **Figure 3.4.1**). View the following video, the *Three Persuasive Appeals*, for an overview of each approach.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=75#oembed-1

(*Three Persuasive Appeals*, 2017)

A fuller explanation of each appeal follows.

- ***Ethos* – Appeal to Credibility/Authority:** This element of persuasion involves establishing your credibility, expertise, or authority to be making the argument. What experience or expertise do you have? What knowledge or skills do you possess? What's your role within the organization, and/or in relation to the reader? Why should the reader trust you as a reliable, knowledgeable, authoritative, and ethical source of information?
- ***Pathos* – Appeal to Emotion/Interest/Values:** This element involves appealing to the emotions, values, and/or interests of the reader. How does your proposal benefit them? Why should they care about it? How does it relate to the goals of the organization? How can you build "common ground" with your reader? What will make your reader feel "good" about your project? How can you evoke emotions such as pride or outrage?
- ***Logos* – Appeal to Reason/Logic:** This element involves grounding your argument in logic, reason, and evidence. What evidence supports your claims? On what facts and data is your reasoning based? Arguments grounded in reason and evidence are often considered the strongest. Government organizations and companies alike generally like to make "evidence-based decisions."
- ***Kairos* – Appeal to Timeliness/Appropriateness**: Using this appeal means being aware of what is appropriate and timely in a given rhetorical situation. Sometimes, a well-crafted argument can fail because it comes at the wrong time. *Kairos* involves knowing what is "in" or "hot" right now, what is an important topic or issue, and how best to discuss it; knowing when it is the "right time" to broach a topic or propose an idea; knowing how to use the appropriate tone,

level of formality and decorum for the specific situation.

Emotional appeal is used sparingly in technical communication. Regardless, finding the appropriate blend of appeals is critical to making a successful argument. Consider that when making your case, you often have to "win both hearts and minds"—so you'll need to appeal to both emotions and logic. Assess the context and audience to plan your approach. Do whatever you can to show the reader that you are a trustworthy source of information, and present your argument at the most opportune time. Also be mindful of the word choice and tone so that you are presenting a persuasive argument that is constructive and conveys the appropriate tone for your intended audience, message, and purpose.

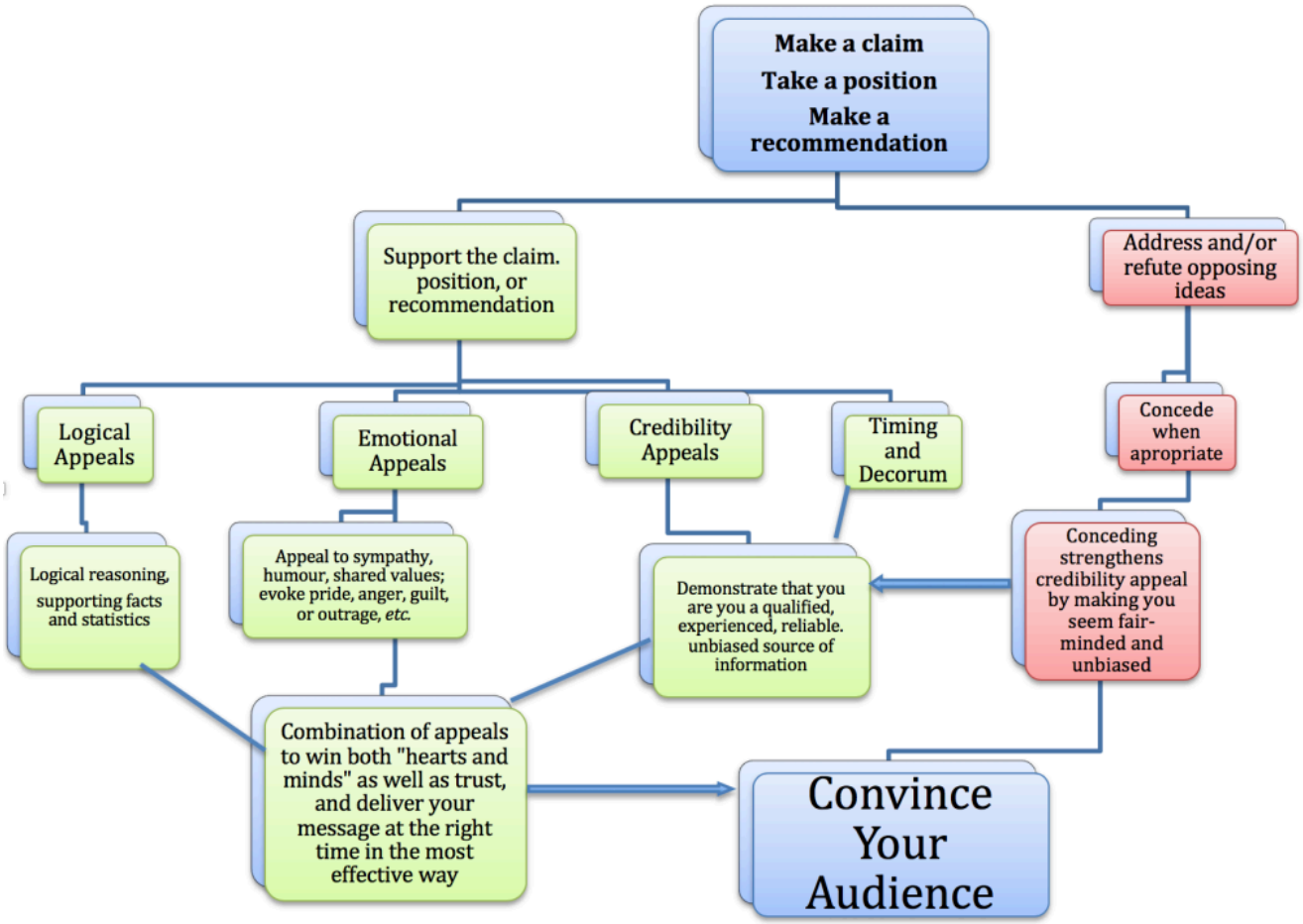

Figure 3.4.1 *Using the rhetorical appeals to convince an audience [Image description]*

Knowledge Check

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Avoiding Ad-Speak

"Ad-speak" refers to the kind of language often used in advertisements. Its aim is to convince consumers to buy something, whether they need it or not, hopefully without thinking too much about it. Because we hear this kind of rhetoric all the time, it easily becomes a habit to use it ourselves. We must break this habit when communicating in professional contexts.

Ad-Speak tends to use strategies such as

- emotional manipulation
- logical fallacies
- exaggeration or dishonesty
- vague claims
- incomplete or cherry-picked data
- biased viewpoints
- hired actors rather than professionals or experts as spokespeople

As a student in a professionalizing program learning the specialized skills and developing the sense of social obligation needed to become a trusted professional, you should avoid using "sensational" words characteristic of marketing language. Instead, when trying to persuade your reader, make sure you use **quantifiable, measurable descriptors** and objective language in your writing. You cannot determine how many units of "excellence" something has, or its quantifiable amount of "awesomeness," "fantastic-ness," or "extraordinariness." Describing something as "incredible" literally means it's unbelievable. So avoid using these kinds of words shown in **Figure 3.4.2**.

Figure 3.4.2 *Ad-Speak Word Cloud.*

Rather, find measurable terms like "efficiency" (in time or energy use), "effectiveness" at fulfilling a specific task, measurable benefits and/or costs, or even "popularity" as measured by a survey.

Communicating Ethically

In professional writing, communicating ethically is critically important. Ethical communication involves communicating from a place of accountability, responsibility, integrity, and values. If you are communicating ethically, you are demonstrating respect for your reader, the organizations you work for and with, and the culture and context within which you work. You also foster fairness and trust through honesty. Failure to maintain integrity and ethics can result in consequences ranging from damage to reputation, loss of work, lawsuits, criminal charges, and even tragic loss of life.

This is precisely why many professional associations have guidelines that govern the ethical behavior of their membership. Two such documents that may be relevant to you are the Canadian Information Processing Society's (CIPS) Code of Ethics and Standards of Conduct and the Ontario Association of Engineering Technicians and Technologists' (OACETT) Code of Ethics and Rules of Professional Conduct (pdf). For example, take note of the portions of the OACETT Code of Ethics that relate specifically to ethical communication.

Excerpt from OACETT Code of Ethics
"Members of the Association recognize the precepts of personal integrity and professional competence as fundamental ethics, and as such each Member shall:

- hold paramount the safety, health and welfare of the public, the protection of the environment and the promotion of health and safety within the workplace;
- undertake and accept responsibility of professional assignments only when qualified by training or experience;
- provide an opinion on a professional subject only when it is founded upon adequate knowledge and honest conviction;
- act with integrity towards clients or employers, maintain confidentiality and avoid a conflict of interest but, where such conflict arises, fully disclose the circumstances without delay to the employer or client;
- uphold the principle of appropriate and adequate compensation for the performance of their work;
- keep informed to maintain proficiency and competence, to advance the body of knowledge within their discipline and further opportunities for the professional development of their associates;
- conduct themselves with fairness, courtesy and good faith toward clients, colleagues and others, give credit where it is due and accept, as well as give, honest and fair professional comment;
- present clearly to employers and clients the possible consequences if professional decisions or judgements are overruled or disregarded;
- report to the appropriate agencies any hazardous, illegal or unethical professional decisions or practices by fellow members or others; and
- promote public knowledge and appreciation of engineering and applied science technology and protect the Association from misrepresentation and misunderstanding."

It is important to become familiar with these standards of practice, and to consider how they impact communication practices. Remember that you are communicating in a professional context, and that comes with responsibility. Consider the different rhetorical situations diagrammed in **Figure 3.4.3**, one for a marketer and one for an engineer.

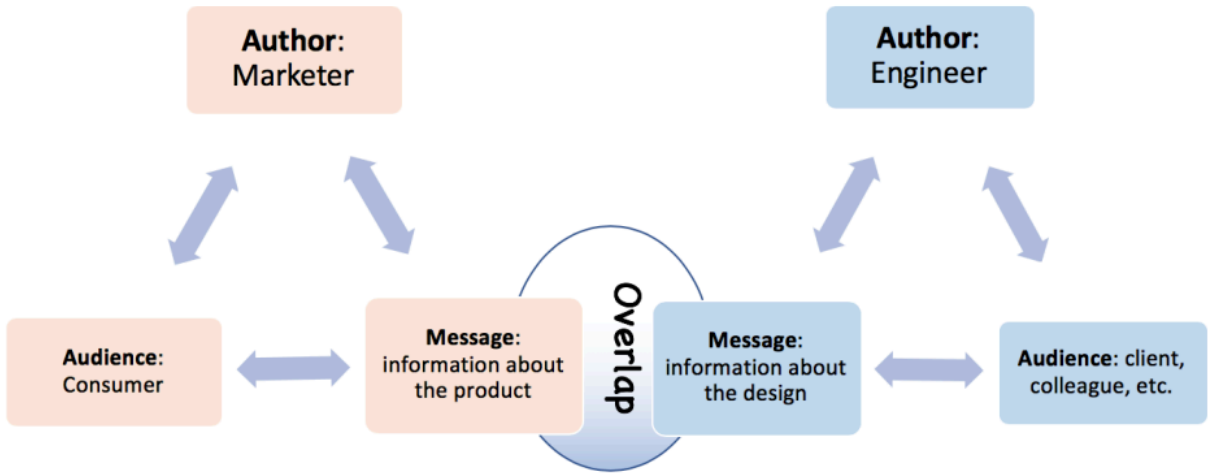

Figure 3.4.3 *Comparison of the rhetorical situation for a marketer vs. an engineer.* [Image Description]

Clearly, there may be some overlap, but there will also be significant differences based on the needs and expectations of the audience and the kind of message being delivered. We hear marketing language so often that it is easy to fall into the habit of using it, even when it's not appropriate. Make sure you are not using "ad-speak" when trying to persuade in a professional context.

Knowledge Check

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Knowledge Check: View the video below and answer each question presented.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=75#h5p-19

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CIPS. (2018, June). *CIPS code of ethics*. Official Website of CIPS. https://cipsresources.ca/ethics/

OACETT. (n.d.). *Code of ethics and rules of professional conduct*. Ontario Association of Certified Engineering Technicians and Technologists. PDF. https://documentcloud.adobe.com/link/track?uri=urn:aaid:scds:US:6ed24f48-2a81-482d-9015-3728dba3ab42#pageNum=1

Ulmer, K. (2017). The three persuasive appeals: Logos, ethos, and pathos [Video]. Youtube. https://www.youtube.com/watch?v=-oUfOh_CgHQ

Image descriptions

Figure 3.4.1 image description:

Use rhetorical appeals to convince your audience of a claim or recommendation you've made or a position you've taken. From there, you can support your claim using different types of appeals or address and refute opposing ideas.

To support the claim, position, or recommendation, you can use different types of appeals:

- Logical appeals: Use logical reasoning, supporting facts and statistics.
- Emotional appeals: Appeal to sympathy, humour, shared values, evoke pride, anger, guilt, or outrage, etc.
- Credibility appeals: Demonstrate that you are qualified, experienced, reliable, and an unbiased source of information.
- Timing and Decorum.
- Use a combination of appeals to win both "hearts and minds" as well as trust, and deliver your message at the time in the most effective way.

When addressing and/or refuting opposing ideas, it's okay to concede where appropriate. Conceding strengthens credibility appeal by making you seem fair-minded and unbiased. You may need to draw on credibility appeals to show that you are qualified, experienced, and a reliable, unbiased source of information.

Supporting your position using different types of appeals and addressing opposing ideas will allow you to convince your audience.

[Return to Figure 3.4.1]

Figure 3.4.3 image description:

When the marketer is the author, their audience is the consumer and their message is information about the product. When the engineer is the author, their audience could be a client or colleague, and their message is information about the design. There may be some overlap between the messages of the marketer and the engineer.

[Return to Figure 3.4.3]

3.5 The Importance of Verbs

Much of the style advice given so far revolves around the importance of verbs. Think of your sentence as a machine, and the verb as the engine that makes the machine work. Like machines, sentences can function efficiently or inefficiently, and the use of a strong verb is one way to make them work effectively. Here are some key principles regarding the effective use of verbs in your sentences. While effective sentences may occasionally deviate from the suggestions in this list, try to follow these guidelines as often as possible:

- Keep the subject and the verb close together; avoid separating them with words or phrases that could create confusion.
- Place the verb near the beginning of the sentence (and close to the subject).
- Maintain a high verb/word ratio in your sentence.
- Opt for active verb constructions over passive ones.
- Avoid “to be” verbs (am, is, are, was, were, being, been, be).
- Try to turn nominalizations (abstract nouns) back into verbs.

Use the verb strength chart in **Table 3.5.1** as a guide to “elevate” weaker verbs (or words with implied action) in a sentence to stronger forms.

Table 3.5.1 ***Verb strength chart***

[Skip Table]

Verb Forms	Verb Strength	Examples
Command/Imperative	**STRONG**	**Maintain** the machine properly! **Write** the report!
Active Indicative* (S → V)		He **maintains** the machine regularly. She **writes** reports frequently.
Active conditional		She **would maintain** the machine **if** he would let her. He **would write** reports if he had more training.
Gerunds (__ -ing) Infinitives (to ___) (*these do not function as verbs in your sentence; actual verbs are highlighted in yellow*)		While **maintaining** the machine, he gets quite dirty. Report **writing** takes skill. It takes a lot of time **to maintain** this machine. **To write** effectively, one must get a sense of the audience.
Passive (S ← V) Passive Conditional		The machine **is maintained** by him. It **would be maintained** by her if... The report **was written** by her. Reports **would be written** by him if...
Nominalizations (*verbs turned into abstract nouns)* Participles (*nouns or adjectives that used to be verbs*)	**WEAK**	Machine **maintenance** is dirty work. A well-**maintained** machine is a thing of beauty. **Written** work must be free of errors.

While you are not likely to use the command form very often, unless you are writing instructions, the second strongest form, **Active Indicative,** is the one you want to use most often (say, in about 80% of your sentences).

Knowledge Check

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Part of the skill of using active verbs lies in choosing the verbs that precisely describe the action you want to convey. English speakers have become somewhat lazy in choosing a small selection of verbs most of the time (*to be, to do, to get, to make, to have, to put*); as a result, these often-used verbs have come to have so many possible meanings that they are almost meaningless. Try looking up "make" or "have" in the dictionary; you will see pages and pages of possible meanings! Whenever possible, avoid these **bland** verbs and use more precise, descriptive verbs, as indicated in **Table 3.5.2**.

Table 3.5.2 ***Bland vs. descriptive verbs***

[Skip Table]

Bland Verbs	Descriptive Verbs
Signal Verbs: Says States Talks about Discusses Writes	Describe the rhetorical purpose behind what the author/speaker "says": Explains, clarifies Describes, illustrates Claims, argues, maintains Asserts, stresses, emphasizes Recommends, urges, suggests
Is, are, was, were being been Is *verb*-ing	Instead of indicating what or how something "**is**," describe what it **DOES**, by choosing a precise, active verb. Replace progressive form (*is ___ing*) with the indicative form *She is describing → She describes*
Get, gets	Usually too colloquial (or passive); instead you could use more specific verbs such as Become, acquire, obtain, receive, prepare, achieve, earn, contract, catch, understand, appreciate, *etc*.
Do, does	Avoid using the *emphatic* tense in formal writing: It *does* work → it **works**. I *do* crack when I see apostrophe errors → I **crack** when I see apostrophe errors. Instead: Perform, prepare, complete, *etc*.
Has, have Has to, have to	This verb has many potential meanings! Try to find a more specific verb that "have/has" or "has to": • She **owns** a car • They **consume/eat** a meal • The product **includes** many optional features • The process **entails** several steps Instead of "have to" try: Must, require, need, *etc*.
Make	Build, construct, erect, devise, create, design, manufacture, produce, prepare, earn, *etc*. Make a recommendation → recommend Make a promise → promise Make a plan → plan

For more detailed information on using signal verbs when introducing quotations, see Chapter 6.2: Integrating Source Evidence into Your Writing.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=79#h5p-21

EXERCISE 3.5.1 Improve the following sentences by elevating the verb and cutting clutter

1. An investiga**tion** of the issue **has been conducted** by her.
2. His task is **regional database systems troubleshooting handbook preparation.**
3. While a recommendat**ion has been made** by the committee, an agree**ment** to increase the budget will have **to be approved** by the committee.

EXERCISE 3.5.2 Revision practice

The following paragraph on **The Effects of Energy Drinks** does not conform to the 7Cs and contains far too many "to be" verbs. Revise this paragraph so that it has a clear topic sentence, coherent transitions, correct grammar, and concise phrasing. In particular, try to eliminate all "to be" verbs (am, is, are, was, were, being, been, be), and rephrase using strong, descriptive, active verbs. The first 7 are highlighted for you. Try to cut the word count (260) in half.

> Energy Drinks are able to be consumed in many varied and different ways by people all over the world. Moreover, drinking these energy drinks is able to provide people in today's society with the helpful benefits of increased awareness and energy. Besides, even though there are enhancements that may be present from drinking an energy drink, the negative side effects are posing more of a threat to a person than the energy boost that is able to be achieved. In a survey that was taken in the United States at an American university, it was reported that fifty one percent of participants were consuming greater than three energy drinks each month in

the semester [1]. Looking at this statistic, it can be seen that a majority of students in university are drinking energy a large amount of drinks on a very regular basis. Which can be the cause of some health problems experienced by students. In the same study, it was also shown that energy drinks are capable of helping to increase energy and athletic endurance; for those who drank it. Despite the fact that there are some benefits to be had from drinking energy drinks, there is the problem of the negative side affects that are caused by the drinking of these energy drinks. However, the side affects that were commonly reported in the study are: headaches, and "energy crashes" (Smith 5). Being a potentially more severe problem than the minor problems of headaches and "crashes;" there is definitely the possibility of people which are becoming addicted to caffeine.

After trying the exercise, click on the link below to compare your revision to effective revisions of this passage done by other students:

Sample Revisions of Exercise 3.5.2 (.docx)

Table 3.5.3 sums up many key characteristics of effective professional style that you should try to avoid (poor style) and implement (effective style) while writing technical documents.

Table 3.5.3 ***Key characteristics of effective professional style***

Poor Style	Effective Style
Low VERB/WORD ratio per sentence	High VERB/WORD ratio per sentence
Excessive 'is/are' verbs	Concrete, descriptive verbs
Excessive passive verb constructions	Active verb constructions
Abstract or vague nouns	Concrete and specific nouns
Many prepositional phrases	Few prepositional phrases
Subject and verb are separated by words or phrases	Subject and verb are close together
Verb is near the end of the sentence	Verb is near the beginning of the sentence
Main idea (subject-verb relationship) is difficult to find	Main idea is clear
Sentence must be read more than once to understand it	Meaning is clear the first time you read it
Long, rambling sentences	Precise, specific sentences

4. DOCUMENT DESIGN

Document design is the "nuts and bolts" of technical writing. It refers to not only how information is laid out on the page, but also the signals you use to make information easy to find and use. No matter how brilliant or important the content, if it is not formatted in a way that enhances readability and conforms to formatting conventions recognized by the company you work for and by the industry you work in, it will likely not receive the attention it deserves. This section includes information on how technical writers use formatting features to optimize the readability and usability of your documents.

Chapter 4 Learning Objectives

This chapter covers the following topics:

4.1 Understand the importance of readability to your technical audience and what that looks like in technical documents.

4.2 Understand how to use headings to organize information logically to enhance readers' comprehension.

4.3 Understand the rules for embedding various kinds of lists in your documents to emphasize key points and simplify the text.

4.4 Understand how to integrate various kinds of figures and tables into documents to effectively present visual data and images.

4.5 Apply revision strategies using style tips to enhance clarity and readability.

All documents have a purpose—to persuade, to inform, to instruct, to entertain—but the first and foremost purpose of any document is to be ***read***. Choosing effective document design enhances the ***readability*** of your document so that the target audience is more likely to get the message you want them to receive, and your document is more likely to achieve your intended purpose. Documents are also designed with ***usability*** in mind. That is, effectively designed documents are created from a user-experience perspective: if a reader can easily learn to use the document and find content, then you will have achieved a usable design.

Keep in mind that people do not read technical writing for pleasure; they read it because they have to; it's part of their job. And since "time is money," the longer it takes to read the document, the higher the "cost." Your job as the document designer is to make their reading process as easy, clear, useful and efficient as possible by using all the tools at your disposal. For example, choose document design elements, like a 12-point, sans serif font or headings and subheadings, that make your document "user friendly" for your target audience.

Designing a document is like designing anything else: you must define your purpose (the goals and objectives you hope your document achieves), as well as the constraints — such as word count and format — that you must abide by, understand your audience (who will read this document and why), and choose design features that will best achieve your purpose and best suit the target audience. In essence, you must understand the **Rhetorical Situation** (see Chapter 1.3) in which you find yourself: *Who is communicating with whom about what and why?* What kind of document design and formatting can help you most effectively convey the desired message to that audience? You want to use the most effective rhetorical strategies at your disposal; document design is one of those strategies.

Genres and Conventions

It's not only the content and rhetorical strategies that have differing conventions; documents also differ in how they are designed and formatted. All genres of writing adhere to certain conventions in terms of content, the style of language used to express that content, and how the content is presented visually. If you look at an online news article (or an article in an actual newspaper), you will often notice consistent formatting features.

As you learned in previous writing classes, readers in different contexts expect different textual features, depending on the type of document they are reading and their purpose. A reader of an online editorial can expect strongly worded arguments that may rely on inflammatory emotional language but not be backed up with much empirical evidence; we do not expect an online editorial to cite reliable sources in a scholarly format. In contrast, an academic reader expects the opposite: neutral, unemotional language, and plenty of empirical evidence to logically and validly support claims, with sources cited and documented in an appropriately academic bibliographical formats. In technical contexts, readers expect

- content that is fact-based and specialized

- language that is concise, clear, and precise
- information that is supported with graphs, charts, and other visual aids
- formatting that is functional

Typical Newspaper Formatting Conventions

- Large headlines, often using rhyme, alliteration, exaggeration or some other rhetorical device to grab attention
- Very short paragraphs (generally 1-3 sentences long)
- Pictures related to the article
- A cut-out box with a particularly attention-grabbing quotation from the article in larger, bolder print (to get readers interested in the article)
- Advertisements on the side

See below for a discussion of formatting conventions for technical documents.

It is important for writers to understand the conventions of the genre in which they are writing. Conventions are the "rules" or expectations that readers/viewers have for that particular genre or medium. If you do not follow the target readers' expectations, you run the risk of confusing them—or worse, damaging your credibility—and therefore not effectively conveying your message and fulfilling your purpose. Think of document design as "visual rhetoric." Make document design choices that best conform to the expectations of the genre and audience, and that most effectively convey the message you want to send.

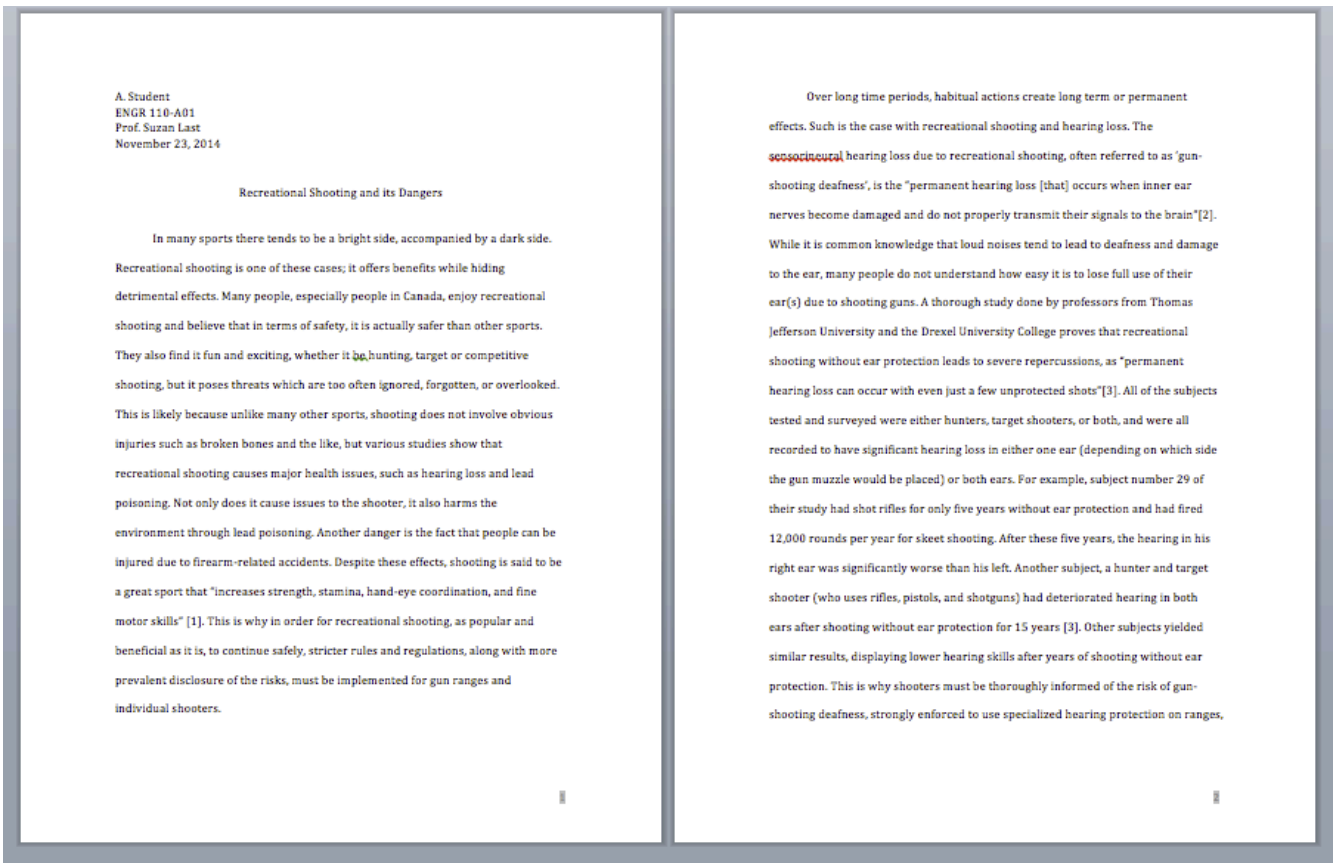
Style Guides and Templates

In many writing contexts, style guides and templates will be available. Style guides dictate the general rules and guidelines that should be followed; templates offer specific content and formatting requirements for specific kinds of documents. Academic publishers make style guides available to prospective authors so that they know how to properly write and format documents they submit for publication. Newspapers, academic journals, organizations, and businesses often have their own "in-house" style that must be followed by all writers within that organization. A company may have specific templates, for example, a memo template, that all employees must follow, in order to ensure consistency of messaging.

You likely had a style guide to help you format your written assignments for your introductory technology classes, and in science classes, you likely had a template to help you organize lab reports.

EXERCISE 4.1.1 List some conventions of academic formatting

Examine the formatting in **Figure 4.1.1** below and list some of the characteristics that adhere to academic writing format requirements that you are familiar with. It does not matter if you cannot read the text; simply examine the formatting.



A. Student
ENGR 110-A01
Prof. Suzan Last
November 23, 2014

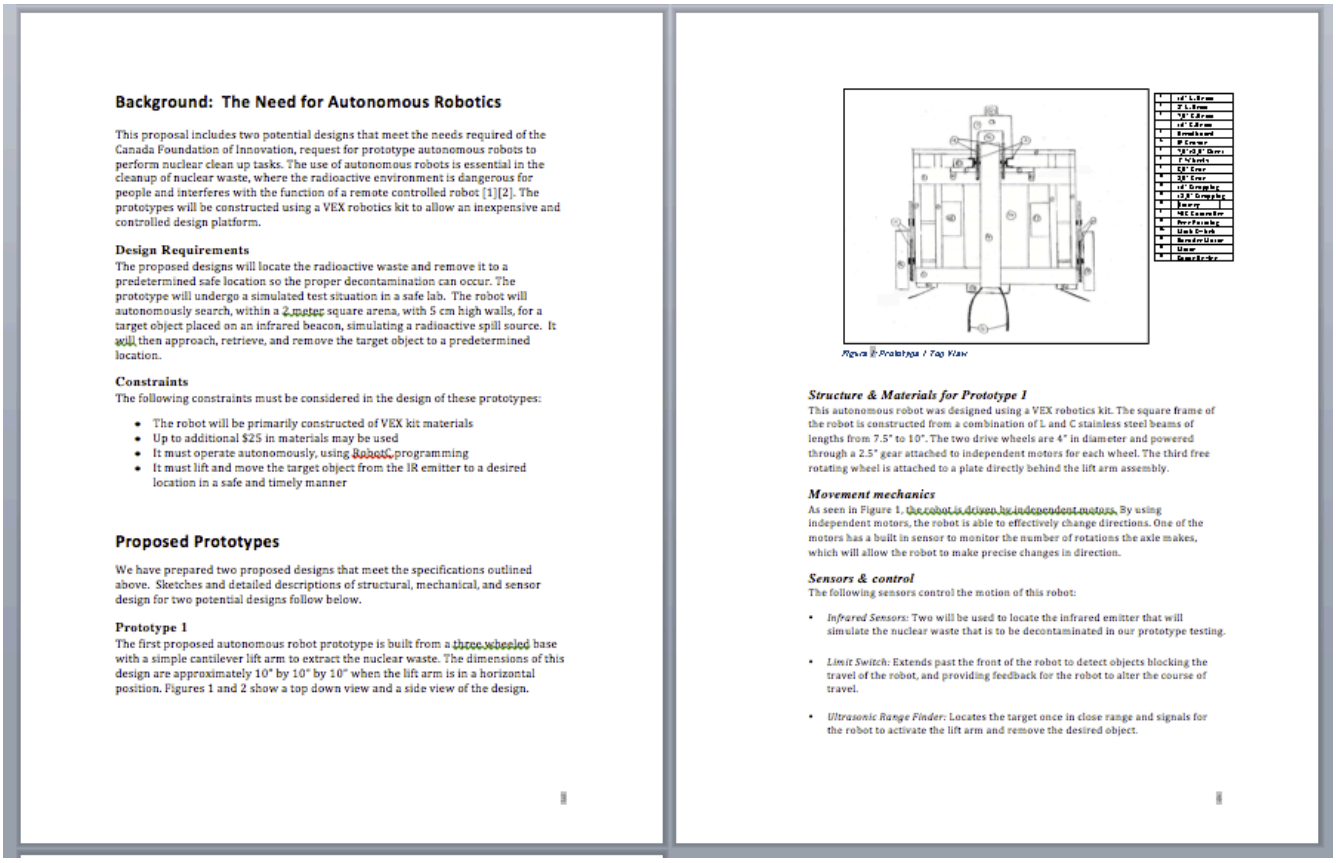
Recreational Shooting and its Dangers

In many sports there tends to be a bright side, accompanied by a dark side. Recreational shooting is one of these cases; it offers benefits while hiding detrimental effects. Many people, especially people in Canada, enjoy recreational shooting and believe that in terms of safety, it is actually safer than other sports. They also find it fun and exciting, whether it be hunting, target or competitive shooting, but it poses threats which are too often ignored, forgotten, or overlooked. This is likely because unlike many other sports, shooting does not involve obvious injuries such as broken bones and the like, but various studies show that recreational shooting causes major health issues, such as hearing loss and lead poisoning. Not only does it cause issues to the shooter, it also harms the environment through lead poisoning. Another danger is the fact that people can be injured due to firearm-related accidents. Despite these effects, shooting is said to be a great sport that "increases strength, stamina, hand-eye coordination, and fine motor skills" [1]. This is why in order for recreational shooting, as popular and beneficial as it is, to continue safely, stricter rules and regulations, along with more prevalent disclosure of the risks, must be implemented for gun ranges and individual shooters.

Over long time periods, habitual actions create long term or permanent effects. Such is the case with recreational shooting and hearing loss. The sensorineural hearing loss due to recreational shooting, often referred to as 'gun-shooting deafness', is the "permanent hearing loss [that] occurs when inner ear nerves become damaged and do not properly transmit their signals to the brain"[2]. While it is common knowledge that loud noises tend to lead to deafness and damage to the ear, many people do not understand how easy it is to lose full use of their ear(s) due to shooting guns. A thorough study done by professors from Thomas Jefferson University and the Drexel University College proves that recreational shooting without ear protection leads to severe repercussions, as "permanent hearing loss can occur with even just a few unprotected shots"[3]. All of the subjects tested and surveyed were either hunters, target shooters, or both, and were all recorded to have significant hearing loss in either one ear (depending on which side the gun muzzle would be placed) or both ears. For example, subject number 29 of their study had shot rifles for only five years without ear protection and had fired 12,000 rounds per year for skeet shooting. After these five years, the hearing in his right ear was significantly worse than his left. Another subject, a hunter and target shooter (who uses rifles, pistols, and shotguns) had deteriorated hearing in both ears after shooting without ear protection for 15 years [3]. Other subjects yielded similar results, displaying lower hearing skills after years of shooting without ear protection. This is why shooters must be thoroughly informed of the risk of gun-shooting deafness, strongly enforced to use specialized hearing protection on ranges,

Figure 4.1.1 *Page excerpt from an academic essay (Last, 2019).*

Now examine the document in **Figure 4.1.2**. What differences do you notice? List some of the features that differ from the academic writing sample above. Consider why typical readers of technical writing would find these features desirable. Which document would you rather read?



Background: The Need for Autonomous Robotics

This proposal includes two potential designs that meet the needs required of the Canada Foundation of Innovation, request for prototype autonomous robots to perform nuclear clean up tasks. The use of autonomous robots is essential in the cleanup of nuclear waste, where the radioactive environment is dangerous for people and interferes with the function of a remote controlled robot [1][2]. The prototypes will be constructed using a VEX robotics kit to allow an inexpensive and controlled design platform.

Design Requirements

The proposed designs will locate the radioactive waste and remove it to a predetermined safe location so the proper decontamination can occur. The prototype will undergo a simulated test situation in a safe lab. The robot will autonomously search, within a 2 meter square arena, with 5 cm high walls, for a target object placed on an infrared beacon, simulating a radioactive spill source. It will then approach, retrieve, and remove the target object to a predetermined location.

Constraints

The following constraints must be considered in the design of these prototypes:

- The robot will be primarily constructed of VEX kit materials
- Up to additional $25 in materials may be used
- It must operate autonomously, using RobotC programming
- It must lift and move the target object from the IR emitter to a desired location in a safe and timely manner

Proposed Prototypes

We have prepared two proposed designs that meet the specifications outlined above. Sketches and detailed descriptions of structural, mechanical, and sensor design for two potential designs follow below.

Prototype 1

The first proposed autonomous robot prototype is built from a three wheeled base with a simple cantilever lift arm to extract the nuclear waste. The dimensions of this design are approximately 10" by 10" by 10" when the lift arm is in a horizontal position. Figures 1 and 2 show a top down view and a side view of the design.

Structure & Materials for Prototype 1

This autonomous robot was designed using a VEX robotics kit. The square frame of the robot is constructed from a combination of L and C stainless steel beams of lengths from 7.5" to 10". The two drive wheels are 4" in diameter and powered through a 2.5" gear attached to independent motors for each wheel. The third free rotating wheel is attached to a plate directly behind the lift arm assembly.

Movement mechanics

As seen in Figure 1, the robot is driven by independent motors. By using independent motors, the robot is able to effectively change directions. One of the motors has a built in sensor to monitor the number of rotations the axle makes, which will allow the robot to make precise changes in direction.

Sensors & control

The following sensors control the motion of this robot:

- *Infrared Sensors:* Two will be used to locate the infrared emitter that will simulate the nuclear waste that is to be decontaminated in our prototype testing.
- *Limit Switch:* Extends past the front of the robot to detect objects blocking the travel of the robot, and providing feedback for the robot to alter the course of travel.
- *Ultrasonic Range Finder:* Locates the target once in close range and signals for the robot to activate the lift arm and remove the desired object.

Figure 4.1.2 *Excerpt from a technical report (Last, 2019).*

Technical writing makes use of several typical design features to organize information efficiently and enhance readability. These include headings, lists, figures, and tables, as well as strategic use of passive space around all of these features and text. Each company, publisher, or organization may have its own style guide to which all writers within that organization, or those wishing to contribute written material, must adhere. In BTC440, SES391, and TEC400, we use the APA Style Guide. To get you started on applying a style guide to your writing, all work written for BTC440, SES391, and TEC400 should adhere to the basic guidelines briefly described below.

Basic Style Guide for BTC440, SES391, and TEC400 Written Assignments

Most workplace documents are created using Microsoft Office products (Word, Excel, and PowerPoint) or using Google Drive tools such as Google Docs and Google Slides. This is generally

industry standard, so it is crucial that you learn how to use these programs effectively to create sophisticated workplace documents.

The general specifications of technical writing documents that you can format in MS Word are as follows:

Margins	1 inch on all sides; justify left margin only; leave the right margin ragged for easier reading If you are binding your report, leave a 2-inch left margin
Body Text Font	Use either a *serif or sans serif* font depending on the context. *Serif* fonts include typefaces like Times New Roman and Cambria. *Sans serif* fonts include typefaces like Arial, Calibri, Verdana, etc.**
Heading Font	The MS Word Styles tool formats headings using a *sans serif* font.
Font Size	11-12 point font (12 is preferred) for body text 12-20 point *sans serif* font for headings and subheadings.
Paragraphs	Single spaced; no indentation; extra space between paragraphs; no more than 10 lines in length, with no more than 15-20 words per line. Letters and memos are always single-spaced; reports may be single, 1.5 spaced. Drafts are often double-spaced to make room for comments.

For specific document elements such as title page, letter of transmittal, and table of contents, see SELS's *A Guide to Writing Formal Technical Reports: Content, Style, and Format* (University of Victoria, Last, & Potter, 2021).

The rest of this chapter offers specific and detailed information on how and why technical writers use the following document design features:

1. **Headings**: Headings and subheadings provide a clearly visible organization and structure that allows readers to read selectively and preview information. We include here several guidelines for font style, size and color to help you design headings effectively.
2. **Lists**: Lists provide a way to concisely and efficiently convey information and emphasize ideas. There are several kinds of lists, each used for specific purposes.
3. **Figures and Tables**: Visual representations of data and concepts serve to illustrate, clarify, and support ideas, while offering a reader a break from reading text-heavy pages.
4. **Passive Space:** Leaving blank spaces strategically on the page (around lists, figures, and headings, and between paragraphs) helps the reader to absorb the information in the "active" space more effectively, and helps writers create a visually appealing look.

**** NOTE:** While a common misconception holds that sans serif fonts make electronic documents easier to read, font preferences vary, and persons with specific disabilities require either the serif or sans serif font to improve their ability to read documents. For example, the CNIB Clear Print

guidelines recommend use of the sans serif font when creating documents for persons with visual impairments (n.d.). Assistive technologies can easily adapt documents for persons with disabilities by customizing the font (APA, 2020; WebAIM, 2020). When possible, check with the intended audience to see which is preferred. As a default, however, use your organization's style guide to create readable documents. For example, Seneca College's *A Guide for Creating Accessible Documents 2012* states: "San [sic] serif fonts, such as, Frutiger, Arial, and Verdana are preferable" (2012, p. 10). For more information on choosing font styles, see CNIB (n.d.), American Psychological Association (2020), and WebAIM (2020).

References

American Psychological Association (APA). (2020, June). *Accessible typography.* APA Style. https://apastyle.apa.org/style-grammar-guidelines/paper-format/accessibility/typography

CNIB. (n.d.) *Clear print accessibility guidelines*. PDF. https://documentcloud.adobe.com/link/track?uri=urn:aaid:scds:US:24b42b46-a3b4-4b67-93c6-3e58695e201b

Last, S. (2019). *Technical writing essentials*. BCcampus. https://pressbooks.bccampus.ca/technicalwriting/

Seneca College. (2012). *A guide for creating accessible documents 2012*. PDF. https://documentcloud.adobe.com/link/track?uri=urn:aaid:scds:US:47f00529-983f-4446-b1a5-bae9eca8c2a8

University of Victoria, Last, S., & Potter, R.L., 2021. (n.d., 2017, 2021). *A guide to writing formal technical reports: Content, style, format.*
Original document by University of Victoria (n.d.). *Engineering work term report guide: A guide to content, style and format requirements for University of Victoria engineering students writing co-op work term reports*. (Updated by Suzan Last, October, 2017 and adapted by Robin L. Potter (2021). OER.

WebAIM. (2020, October 27). Typefaces and fonts. https://webaim.org/techniques/fonts/

Headings are standard features of technical documents that serve several important functions:

- provide organizational overview of the document
- show logical development of ideas
- show hierarchical relationship of ideas (headings, sub-headings)
- enable the reader to scan and read selectively
- increase readability of the document by providing breaks and passive space

Effective headings use concrete, descriptive language to tell the reader what to expect from the content of each section. Avoid "functional" headings when writing technical reports. Functional headings are used in documents that have consistent structures, such as science lab reports, when each section must fulfill a particular function. For example,

1. Introduction
2. Materials
3. Procedure/Methodology
4. Data/Results
5. Discussion/Conclusions
6. References

Technical reports are usually not so strictly organized or predictable. Readers will find it much more helpful if headings concretely describe the **content** of each section rather than the **function**. Using descriptive headings will also result in an easily usable document; that is, the reader will easily be able to find information.

Note the differences in the two Tables of Contents in **Figure 4.2.1**, each generated automatically from headings within their respective documents. Which one gives a clear idea of the content of the report?

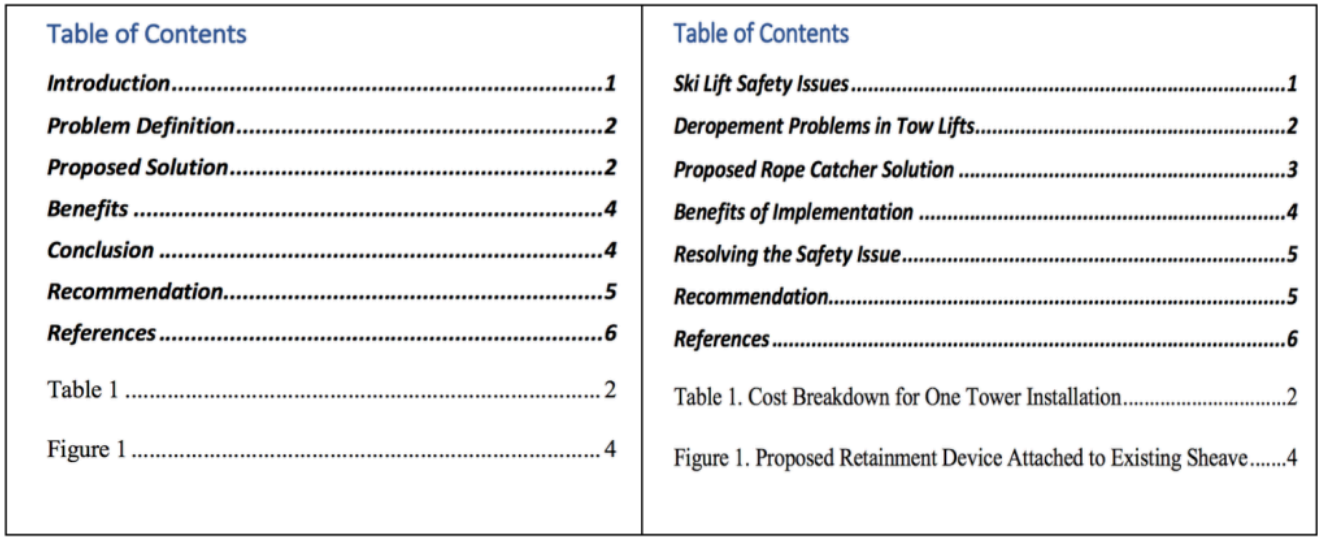


Table of Contents

Introduction 1
Problem Definition 2
Proposed Solution 2
Benefits 4
Conclusion 4
Recommendation 5
References 6
Table 1 2
Figure 1 4

Table of Contents

Ski Lift Safety Issues 1
Deropement Problems in Tow Lifts 2
Proposed Rope Catcher Solution 3
Benefits of Implementation 4
Resolving the Safety Issue 5
Recommendation 5
References 6
Table 1. Cost Breakdown for One Tower Installation 2
Figure 1. Proposed Retainment Device Attached to Existing Sheave 4

Figure 4.2.1 *Functional vs descriptive headings (Last, 2019). [Image description]*

General Principles for Designing Headings

When designing the headings in your document, keep in mind these general principles:

- **Hierarchical Relationship of Ideas**: Use font size, boldness, typography and color to indicate the relative importance of ideas and how they inter-connect. In general, first level headings are larger and bolder than second and subsequent level headings.
- **Consistency**: If you use headings, every section must have a heading. Make sure your headings at each level are consistent in design (font, size, color, indentation, etc.) Use consistent, parallel phrasing as well. Use the STYLES function in Word to help design and maintain effective and consistent headings throughout your document.
- **Readability**: Leave passive space above and below headings. Leave slightly more space above the heading than below it. As a general guideline, use two-to-four headings per page in short reports. Avoid overusing headings.
- **Specificity**: Use **descriptive** headings that inform the reader of the content of each section. Avoid vague headings, and avoid using too many headings. Headings may be formatted using an alpha or numeric system, if there are many sub-sections. Use the alpha system when writing for business purposes; use the numeric system (with Arabic numerals: 1, 2, 3 . . .) if writing for technical purposes. The Ontario Association of Certified Engineering Technicians and Technologists (OACETT), for example, requires that technical reports submitted for the certification process include numbered headings (n.d.). Also, see Seneca's *A Guide to Writing Formal Technical Reports* (University of Victoria, Last, & Potter, 2021) for additional guidance.

Review the following video to better understand how to integrate the different heading levels into an APA formatted document.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=89#oembed-1

(Using Headings and Subheadings, 2015)

***SUMMARY: DO** and **DON'T** rules when designing headings*

DO the following:

- Use a *sans serif* font for your headings.
- Use descriptive (rather than functional) headings.
- Make sure there is slightly more white space *above* a heading than below it.

- A heading **must** have a block of text below it. Remember to include a lead-in sentence below the heading when it is followed by a list, a figure, or table.

DON'T do the following:

- **Do not "stack" headings.** Avoid stacking one heading directly below another. A heading is like a chapter title; it must have *at least* a sentence of information below it. Stacked headings can indicate inefficient organization of information.
- **Do not overuse headings.** Keep in mind that every sentence does not require its own heading, nor does every paragraph. Overuse of headings indicates an inefficient organization of ideas that needs revision.
- **Do not use a heading to introduce a table, figure, or list.** You must have text below a heading that introduces and explains the figure or table.
- **Avoid creating "lone headings."** Ideally, a heading should have at least one, often several, paragraphs of text below it. A heading defines a SECTION of the document. In the example below, there are 2 first-level headings, 2 second-level headings, and 2 third-level headings. Having only one heading at a level is like having only one item in a list. Try to avoid it.
- **Avoid creating "widows and orphans"** by leaving a heading at the bottom of the page with no body text below it. Insert a hard page break before your heading to avoid this.
- **Don't refer to a heading as "this"** in the body text below it. Begin your sentence as if the heading were not there. Never start a new section with a pronoun that refers to a previous idea.

The examples below illustrate the use of heading sizes and font types, with numbered headings and without, to show the relationship of ideas within the report. The headings were created using the **Styles** option in MS Word.

Level One Headings

First level headings should be the largest, and should be bolded.

Level Two Headings

Second level headings should be slightly smaller or in some way distinguished from first level headings. You might consider indenting the heading and aligning the subsequent blocks of text.

Level Three Headings

Third level headings, if you use them should be further distinguished by smaller size, italicizing, and/or indenting them. And so on...

Using the **Styles** function in Word, as well as the **Document Elements**, allows you to auto-create a table of contents from the headings in your documents. These will automatically update as you revise your document and add sections, which will save you considerable time in the long run. Similarly, you can also create an automatic **Table of Figures** if you use the **Caption** function. Learning how to use these formatting tools will make your report writing much easier, and will allow you combine sections written by different team members easily and effectively. Use the tutorials in MS Word, or search for current online video tutorials showing how to use these tools.

---

1. Straw Bale Construction

Under this first level heading you will find text all about straw bale construction. It will go on for several lines. If there is a Section numbered "1", there will also be a "2" Section. Avoid lone headings.

1.1. Post and Beam with Straw Bale Infill

This section may align directly under the previous heading, or be indented.

This will not be a lone heading; this section will have more than one heading at this level (1.2 and maybe a 1.3).

1.1.1. Relevance

This third level heading is indented, and smaller or in italics to set it off from second level heading. Again, if you have a number 1.1.1 heading, you should have a number 1.1.2, etc.

1.1.2. Additional Third Level Heading

Text should be added below each heading. Avoid stacked headings.

1.2. Additional Second Level Heading

Text, text and text...

2. Cinder Block Construction

More text... Make sure that you do not stack headings one on top of the other.

EXERCISE 4.2.1 Review questions

Answer the following review questions:

1. As a guideline, how many headings should you use per page?
2. What is an acceptable size range and font style for headings?
3. What are "widows and orphans" in the context of document design?
4. What are several purposes that headings can have in a document?
5. What are "lone headings"? Should you use them?
6. What are "stacked headings?" Should you use them?
7. What is the difference between a "functional" heading and a concrete or "descriptive" heading?
8. True or False: You should have more white space above a heading than below it.

9. True or False: A heading can be used to introduce a figure or a list.

Further practice:

Review a document you have written, such as a research essay, and see if you can divide it into logical sections introduced by concrete, descriptive headings.

Review the Headings PowerPoint.

References

APA Assistant. (2015). *Using headings and subheadings*. Youtube. https://www.youtube.com/watch?v=gsMeXUyVaCg&list=RDLVJpVTo7bTnXU&index=5

Last, S. (2019). *Technical Writing Essentials*. BCcampus. https://pressbooks.bccampus.ca/technicalwriting/

Microsoft. (n.d.). *Add a heading*. https://support.microsoft.com/en-us/office/add-a-heading-3eb8b917-56dc-4a17-891a-a026b2c790f2

Microsoft. (n.d.). *Add, format, or delete captions in Word*. https://support.microsoft.com/en-us/office/add-format-or-delete-captions-in-word-82fa82a4-f0f3-438f-a422-34bb5cef9c81

The Ontario Association of Certified Engineering Technicians and Technologists (OACETT). (n.d.). *I need to complete a technology report*. OACETT. http://www.oacett.org/Membership/Certify/TR#Technology%20Report%20Guidelines

University of Victoria, Last, S., & Potter, R.L., 2021 (n.d., 2017, 2021). *A guide to writing formal technical reports: Content, style, format.*
Original document by University of Victoria (n.d.). *Engineering work term report guide: A guide to content, style and format requirements for University of Victoria engineering students writing co-op work term reports*. (Updated by Suzan Last, October, 2017 and adapted by Robin L. Potter (2021). OER.

Image descriptions

Figure 3.2.1 image description:

Function-based headings:

- Introduction
- Problem Definition

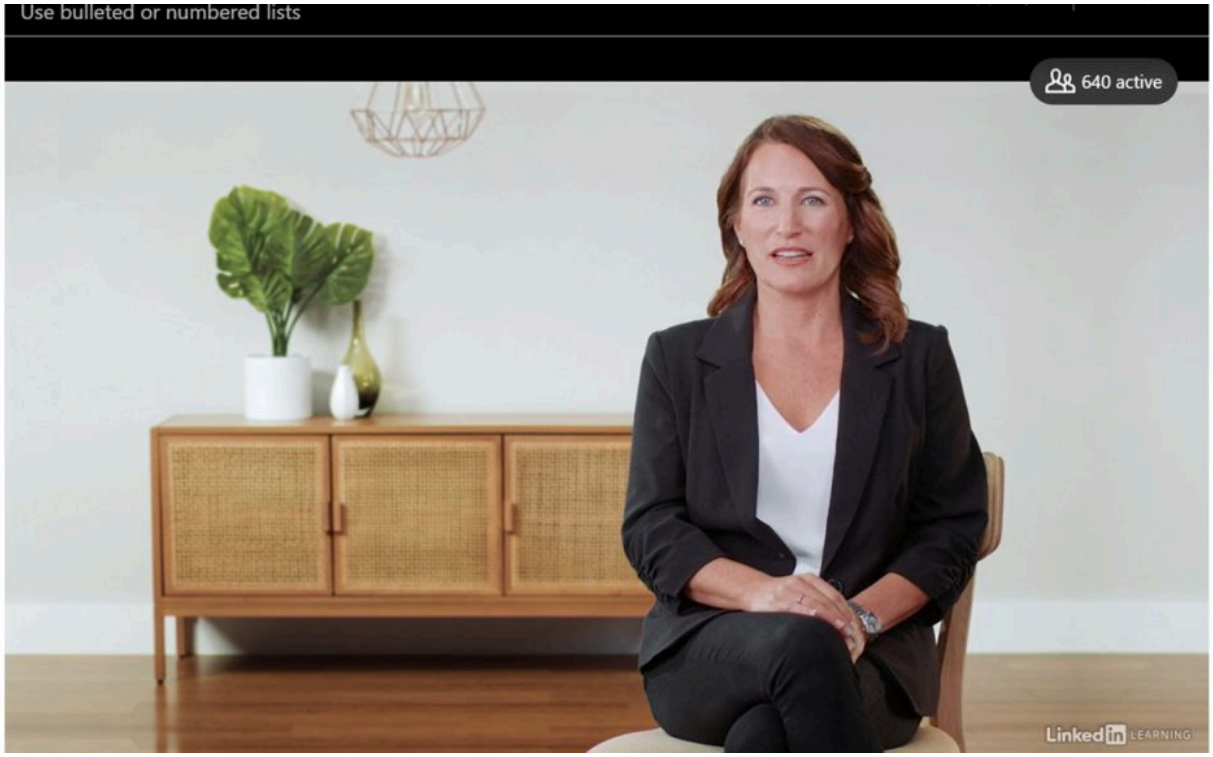
- Proposed Solution
- Benefits
- Conclusion
- Recommendation
- References
- Table 1
- Figure 1.

Descriptive headings:

- Ski Lift Safety Issues
- Deropement Problems in Tow Lifts
- Proposed Rope Catcher Solution
- Benefits of Implementation
- Resolving the Safety Issues
- Recommendation
- References.
- Table 1. Cost breakdown for one tower installation.
- Figure 1. Proposed Retainment Device

[Return to Figure 3.2.1]

Open the following link to watch the video Use Bulleted or Numbered Lists



Lists are created when items in a series are dropped into bulleted or itemized points. Lists, when used correctly, can be a technical writer's—and reader's—best friend. Lists allow you to emphasize important ideas. They also increase the readability of text by simplifying long sentences or paragraphs and adding aesthetic passive space to make reading more pleasant. However, using the wrong kind of list or poorly formatting a list can create confusion rather than enhance readability. Therefore, it is important to understand the various types of lists and how and why to use them.

Guidelines for Creating Lists

Adhere to the following guidelines when creating lists of any kind:

- **Include** between two to eight items in a list. You must have at least two items in a list (or it's not a list; it's just an item). Avoid having more than eight items in a list, as too many items can have the reverse effect. If you emphasize too many ideas, you end up emphasizing nothing. NASA recommends no more than eight steps in an emergency procedure; more than eight can be overwhelming in a crisis situation.
- **Try to avoid** splitting a list over two pages if possible.
- **Avoid overusing** lists. A list should always have explanatory text around it to identify the list and

why it is needed. A series of lists does not give a reader adequate information and context, so do not overuse listing.

- **Adjust** spacing before, after, and within lists to enhance readability. Avoid having a list of information all scrunched up into a dense block of text; this defeats the purpose of enhancing readability.
- **Use** parallel phrasing for each listed item (note that each item in this list starts with a verb that is bolded only to catch your attention, not as a style you must follow).
- **Never use** a heading to introduce a list. Always add a lead in sentence below a heading to create a context for the list.

Each kind of list is suited for specific purposes. All lists must conform to a set of rules of construction, punctuation, and formatting. You can use the **Paragraph** formatting tool in MS Word (see **Figure 4.3.1**) to format a ready list: simply highlight your list and click on either the bullet or number buttons in the top left of the image below. Alternatively, MS Word will auto-create a list when you drop to a new paragraph and type 1. along with some text, then hit return. For more information on how to create a list in MS Word, click here.

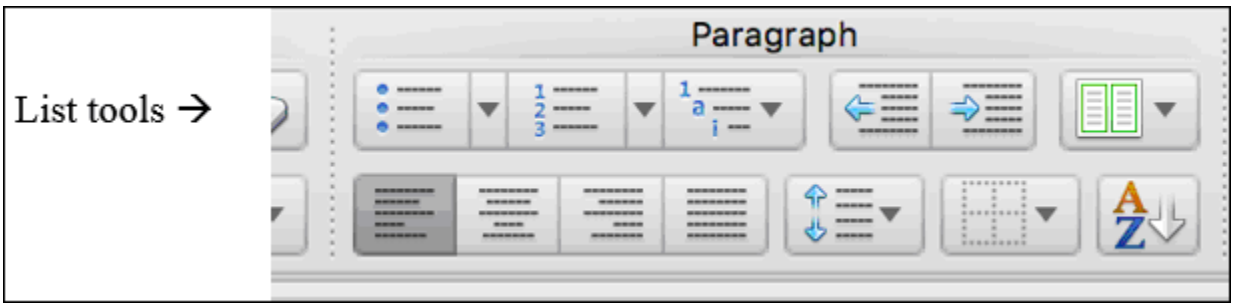


Figure 4.3.1 *Screenshot of* ***Paragraph*** *tools in Word 2010; you can auto-create lists using the top left buttons (Last, 2019).*

NOTE: If you are making lists by hitting ENTER then TAB and then a dash, you are doing it wrong, and this will make future editing and maintaining readability very difficult if not impossible. Especially when writing documents collaboratively that will need extensive revision and editing, you *must* make sure to use the correct formatting tools for consistency.

Common Types of Lists

Just as bar graphs serve a different purpose than pie charts, different kinds of lists also serve different purposes. This section will describe when and how to use the following five commonly used types of lists:

- **Bullet Lists**: Use when the order of listed items is not important.
- **Numbered Lists**: Use when the sequence of ideas is important, such as steps in instructions.
- **In-sentence Lists**: Use when you want to maintain sentence structure and paragraphing, and have a shortlist (two-to-four items).
- **Labeled Lists**: Use when the listed items require some explanation or amplification (like this list).
- **Nested Lists**: Use when listed items have sub-lists (a list within a list).

Figure 4.3.2 *The five types of lists used in technical writing.*

Bullet Lists

Bullet lists are the most commonly used kind of list. They are effective when

- you want to emphasize two or more items,
- you can place the items in any order (no particular order is required), and when
- you want to add passive space to your document to enhance readability.

Bullet list items should generally be short (a word or a phrase). If you find your bulleted items are longer than this, consider using another kind of list, such as a labeled list or a nested list.

Numbered Lists

Use numbered lists when the order of the listed items is important and ideas must be expressed in sequential order. For example, use a numbered list when you must enumerate a series of steps in instructions, or when you are introducing ideas that will be discussed in a certain order in the following text. If you have a list of more than eight items, consider breaking up the list in two or more stages or categories (Steps in Stage 1, Steps in Stage 2, etc.).

Sample Numbered List

Revision of your document should be undertaken in five stages done in the following order:

1. Check formatting for readability.
2. Review content to ensure the document contains all necessary information.

3. Edit sentences to ensure ideas are expressed clearly and correctly.
4. Proofread for grammar, spelling, punctuation and usage errors.
5. Check your use of sources: cite and document according to APA standards.

NOTE: The five steps in the sample numbered list is in parallel phrasing: each begins with a verb (*check, review, edit*, and *proofread*) in the present tense, emphasizing what the reader should do. This phrasing is otherwise known as the imperative mood. The numbers indicate the order in which these steps should be performed.

In-Sentence Lists

Use in-sentence lists when you want to (a) keep paragraph style, (b) avoid having too many lists on one page, and when (c) the list items are relatively short and can be expressed in a sentence clearly without creating a run-on. The previous sentence is an example of an in-sentence list. Note that a bracketed, lower-case letter introduces each listed item.

Typically, in-sentence lists have two-to-four items. Generally, avoid putting more than four items in this kind of list (unless they are very short), or your sentence might become difficult to read.

Labelled Lists

Use a labelled list when you are listing items that need further explanation. These can be bulleted or numbered. Start the list item with the word or term (the "label"), placed in bold and followed by a colon. After the colon, write the explanation or amplification of the term or concept in normal body text.

Sample Labeled Lists (two formats)

The course assessment plan includes three main written assignments given in the following order:

1. *Report One*: an internal proposal written in letter format
2. *Report Two*: an internal proposal written in memo format
3. *Report Three*: a comparative recommendation report written for an external client in long report format

The plan also includes two oral presentations:

- **Presentation 1**: individual or pair presentation on a technical writing topic (worth 5%)
- **Presentation 2**: team presentation giving a progress report on Report 3 (worth 10%)

Make sure the label portions (before the colon) are phrased consistently and either italicized or bolded for emphasis; try to make the explanations that follow roughly equal in length and detail.

Nested Lists

A "nested" list is a list-within-a-list or a list with sub-listed items. These are used to clarify relationships between items in categories and to avoid overly long bullet lists by categorizing items into sub-lists. Note the long bullet list on the left does not effectively categorize items, so the emphasis is lost. The nested list is more effective.

Sample Bullet List (too long)	Sample Nested List

Every restaurant should contain the following beverage containers:
 	
• Coffee cups/mugs
• Latte bowls
• Tea cups
• Travel mugs
• Water glasses
• Red Wine glasses
• White wine glasses
• Beer glasses
• Beer steins
• Cocktail glasses
• Shot glasses
• Reusable plastic cups.
 	
(12 items is too many for one list!)
	Every restaurant should contain the following kinds of beverage containers:
	
	• Hot beverage containers
	  ◦ Coffee mugs/cups
	  ◦ Latte bowls
	  ◦ Tea cups
	  ◦ Travel mugs
	• Cold beverage containers
	  ◦ Water glasses
	  ◦ Red wine glasses
	  ◦ White wine glasses
	  ◦ Beer glasses
	  ◦ Beer steins
	  ◦ Cocktail glasses
	  ◦ Shot glasses
	  ◦ Reusable plastic cups.

This is not an exhaustive list of the kinds of lists you may run across in your technical reading. These are simply the most common kinds of lists, and ones you should be able to identify and use effectively in your technical writing assignments to enhance readability.

Knowledge Check

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An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=95#h5p-22

Integrating and Punctuating Lists

Conventions for punctuating list items vary depending on the context. Legal writing tends to use more punctuation than technical writing (list items often end in semicolons and the final item is introduced by an "and"). In technical documents, punctuation will be guided by conventions set out by industry style guides like the IEEE and the APA, or by corporate style guides. Technical communication courses, like BTC440, SES391, and TEC400, use the APA Style.

EXERCISE 4.3.1 Identify the document design errors in the following example

Five Kinds of Listing:

1. Bullet lists
2. Numbered lists
3. In-sentence lists using bracketed letters to introduce the items
4. Nested list
   ~ Also called a "list within a list"
5. Labeled List

Just as there are rules for constructing lists, there are rules for how to incorporate them into your text. Most importantly, a list must be introduced by a lead-in sentence (or clause) that contains both a subject and a verb. Technical writers often use the expression "the following" somewhere in the lead-in sentence to clearly indicate that a list of items will follow.

GRAMMAR TIP:

If the lead-in is a complete sentence (i.e., it could end in a period), it should end in a colon that introduces the listed items. If the sentence is not a complete thought (i.e., you could *not* put a period there), the lead-in should not end in any punctuation, and each listed item must be able to grammatically complete the lead-in sentence. Don't use a colon before a list **unless** the introduction to the list is a complete thought, that is, an **independent clause**. Remember this rule: if you can't put a period there, then you can't put a colon there.

Example Lead-in Sentences for Lists

Complete lead-in sentence (*ends in a colon*)

The term design project must allow students to incorporate **the following** elements into their solution:

- Mechanical engineering principles
- Electrical engineering knowledge
- Software/programming basics

Partial lead-in sentence (*no punctuation after lead-in*)

The term design project must allow students to design a solution using

- mechanical engineering principles,
- electrical engineering knowledge, and
- software/programming basics.

One of the most common errors found in technical reports has to do with the introduction of lists and how these are punctuated. Here are some additional examples of how—and how NOT—to introduce lists.

Pandas have the following traits:☑ • Black and white fur • Vegetarian diet • Excellent problem-solving skills.	Pandas are: × • black and white, • vegetarian, and • intelligent.
Common characteristics of pandas include: × • black and white fur, • vegetarian diet, and • excellent problem-solving skills.	Pandas are ☑ • black and white, • vegetarian, and • intelligent. Pandas have black and white fur, eat a vegetarian diet, and can solve difficult problems. ☑

In some cases, a list might not be helpful and instead might just over-complicate your document. In such cases, list your ideas in sentence form, within the paragraph, as in the final panda example below. A page with too many lists looks like an outline instead of a coherently expressed series of ideas.

Knowledge Check

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EXERCISE 4.3.2

1. Create your own list, using the Paragraph Tools in Word. For example, make a list of as many kinds of vehicles as you can think of, being as creative as you can. If you can think of more than eight, consider what kind of list would be most suitable.
    1. Could you categorize them into nested lists? What kind of categories?
    2. Consider what text would introduce and follow your list.
    3. What kind of document would contain a list of vehicle types? Who would read it?
2. Read Farkas' article "Understanding and Using PowerPoint," and create a set of bullet-listed notes summarizing his ideas on "Criteria for Creating Bullet Points."

Review the Listing PowerPoint.

References

American Psychological Association (APA). (n.d.). *Bulleted lists*. APA Style: https://apastyle.apa.org/style-grammar-guidelines/lists/bulleted

Farkas, D. K. (2005, May). Understanding and using Powerpoint. *STC Annual Conference Proceedings*, pp. 313-320. PDF. https://documentcloud.adobe.com/link/track?uri=urn:aaid:scds:US:3779e4d4-6919-4ba8-a2f1-70319a0c78f6

Last, S. (2019). *Technical writing essentials*. BCcampus. https://pressbooks.bccampus.ca/technicalwriting/

Microsoft. (n.d.). *Create a bulleted or numbered list*. https://support.microsoft.com/en-us/office/create-a-bulleted-or-numbered-list-9ff81241-58a8-4d88-8d8c-acab3006a23e

Terk, N. (2019). Use bullets or numbered lists. *Tips for better business writing*. LinkedIn Learning. https://www.linkedin.com/learning/tips-for-better-business-writing/use-bulleted-or-numbered-lists?autoAdvance=true&autoSkip=false&autoplay=true&resume=true&u=2169170

Visual elements such as graphs, charts, tables, photographs, diagrams, and maps capture your readers' attention and help them to understand your ideas more fully. They are like illustrations that help tell the story. These visuals help to augment your written ideas and simplify complicated textual descriptions. They can help the reader understand a complicated process or visualize trends in the data. The key concept to remember here is that visuals *clarify*, *support, illustrate,* and *augment* your written text. In the current shift to visual narrative, they sometimes play an important role in conveying ideas and information in a concise and memorable visual format. Therefore, they can sometimes replace written text. Visuals may save you a hundred words or so of additional explanation and clarification when used effectively. If you have visual elements in your document, they must be based on and supplement your written content. Throwing in "gratuitous graphics" just to decorate or take up space can confuse your reader.

It is important to choose the right kind of visual to convey the story you want your reader to understand. If visuals are poorly chosen or poorly designed for the task, they can actually confuse the reader and have negative consequences. For example, it's very likely that the first thing you noticed when you opened this page was the image above. Did you wonder why is it there? What it is about? Has it distracted you? The fact that it contains no caption or labels deepens the mystery.

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(The Purpose of Visuals in Communication, 2019)

Conventions for Integrating Visuals in your Document

Each style of visual has its own conventions that you will recognize after you have seen enough of them. In addition, different publications have different style guides that dictate the specifics of how to format and integrate visual elements. In general, however, whenever you integrate any kind of visual, you should adhere to five key rules.

Five Rules for Integrating Graphics into your Document

1. Give each visual a numbered caption that includes a clear descriptive title (e.g., "Figure 1: Sales of Blue Corollas in 2021").
2. Refer to the caption number within the body text and discuss the visual aid's content.
3. Label all units (x and y axes, legends, column box heads, parts of diagrams, etc.).
4. Provide the source for the data and/or visual image if you did not create it yourself.
5. Avoid distorting the data or image. Review the video below for some tips on spotting misleading images.

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(How to Spot a Misleading Graph, 2017)

In addition, visual elements should also be surrounded with sufficient passive space to emphasize the image and enhance its readability. If copying and pasting an image, make sure all elements are clear and the print size is readable. A visual that has been shrunk down to an unreadable size does not help the reader understand your ideas. If at all possible, try to orient the visual image in the same direction as the body text.

Examine **Figure 4.4.1** below. Do you understand what information it conveys? What is missing?

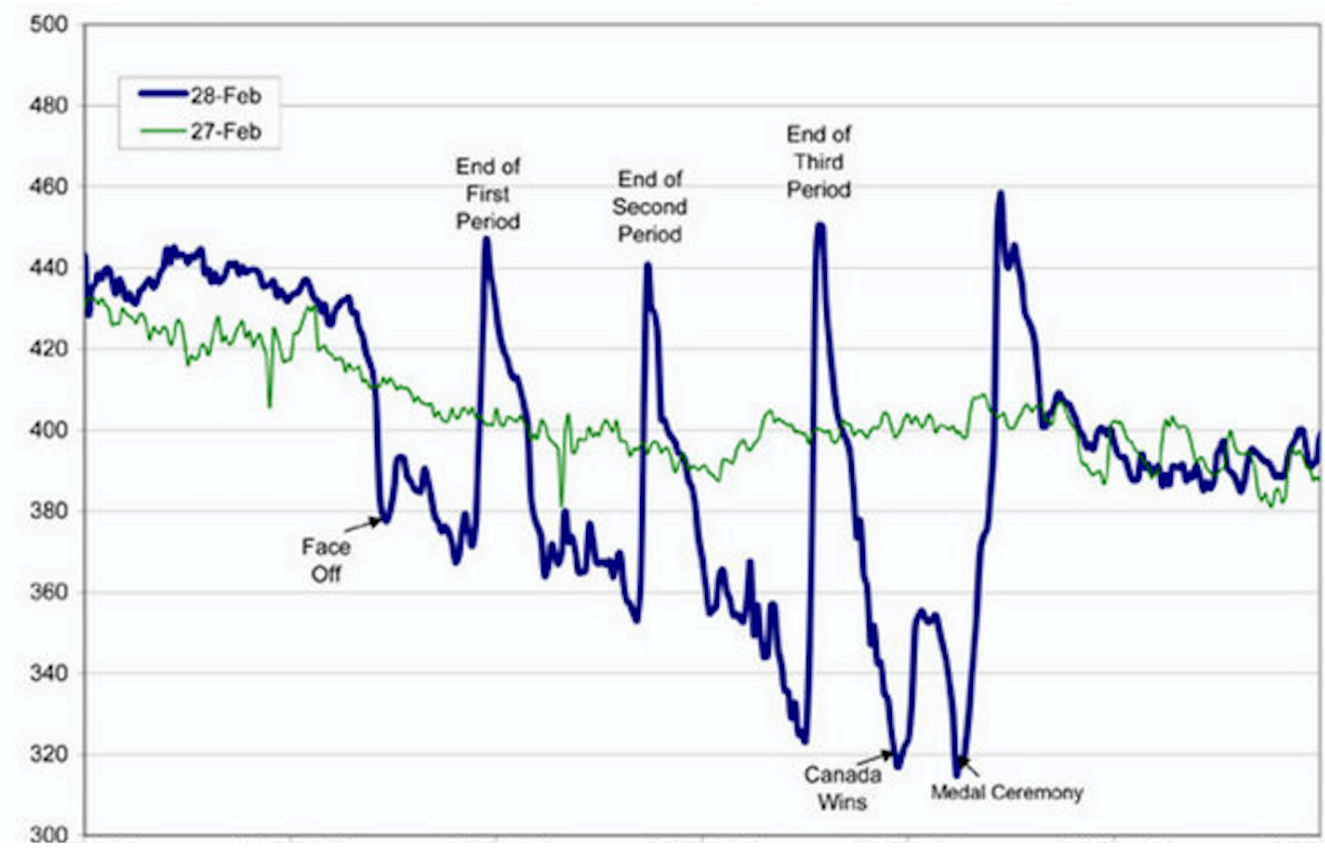

Figure 4.4.1 *[Image Description]*

If you look carefully, you might be able to guess what story this graph is telling. However, the lack of a descriptive caption and labeling of axes makes it impossible to know for sure. Compare it to **Figure 3.4.2** below.

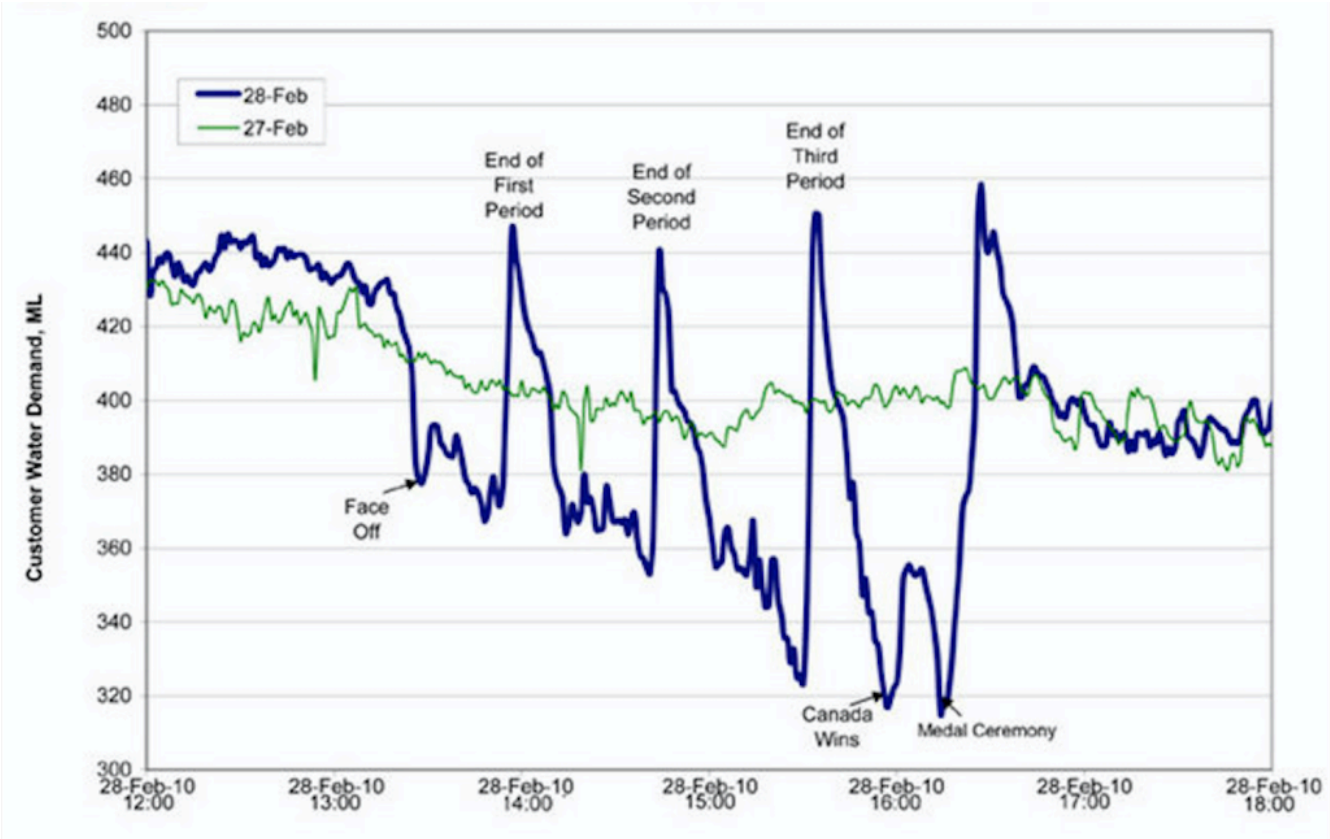

Figure 4.4.2 *Water Consumption in Edmonton during the 2010 Gold Medal Hockey Game (EPCOR, 2010).* [Image description]

Figure 4.4.2 has a numbered caption (which I have just referred to in my paragraph), a descriptive title, and it has properly labelled x and y axes and legends. It also cites the source for the graph in the caption using an in-text citation, which is included as a full reference below. The original image has not been distorted in any way. Thus, it follows the five key rules listed above.

In addition to those five general rules, there are specific guidelines for implementing them. These are outlined in detail in *A Guide to Writing Formal Technical Reports* (University of Victoria, Last, & Potter, 2021).

Knowledge Check

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Terminology

Visual elements are referred to as either **Tables** or **Figures**. **Tables** are made up of rows and columns and the cells usually have numbers in them (but may also have words or images). **Figures** refer to any visual elements—graphs, charts, diagrams, photos, etc.—that are not tables. They may be included in the main sections of the report, or if they contain supplemental material they may be contained in an appendix. Ensure that figures and tables are not broken over two pages. Consider placing tables that require a full page in an appendix.

Labeling Tables and Figures

Tables and figures must all be labeled consistently throughout your documents with numbered captions that clearly identify and describe them. In technical communication, figure captions are placed **below** the figures, while table titles must be placed **above** the tables. This is because we generally read tables from the top down, and therefore want to see the caption at the top. Figures are not always read top-down. When you open a page and see a figure, the first thing you want to know is "what is that?" The caption below it should immediately identify what the figure represents for the reader without the reading having to read the paragraph before it.

Use the following conventions to assist the reader in understanding your graphics:

- **Numbering**: Table and figures are numbered sequentially, but separately:

  E.g., Table 1, Table 2, Figure 1, Figure 2, Table 3, etc.

- **Captioning**: After the figure or table number, add a **descriptive caption** that clearly indicates what the figure or table illustrates without having to read anything else on the page.

There are two systems for numbering figures and tables within your document:

- ***Simple Consecutive Numbering***: All figures and tables are numbered consecutively (Figure 1, Figure 2, Figure 3, Table 1, Table 2, Table 3, etc.) throughout the document regardless of which section they are in.
- ***Section-based Numbering***: Within each section, figures and tables may be numbered sequentially through each section (e.g., Table 1.1 refers to the first table in section 1, Table 2.4 refers to the fourth table in section 2).

If a large number of illustrations are presented, the latter option is the better choice. This can become confusing, however, when using sub-sections.

If the table or figure that you present in your report was not created by you, but comes from other sources, you must include a citation for the original source in your caption; e.g., **Figure 1**. Network

Design (Grant, 2021). You must ensure that all figures and tables represent data accurately and ethically, and that they do not distort data to create bias.

Using the **Insert** → **Caption** ... function will allow MS Word to keep track of the figure and table numbering for you, and allow you to auto-create a **List of Figures and Tables** at the beginning of your document.

If you don't use the **Insert Caption** function, then you should manually change the font of your captions to distinguish them from body text. Caption font is usually slightly smaller than body font and is often italicized.

Referring to Tables and Figures in your Text

Any figures or tables you use in your document must be discussed in your text. Use the following guidelines when discussing and referring to tables and figures:

- Place the table/figure immediately below the paragraph where it is first mentioned in the text.
- Refer to tables and figures in your text by their numbers, not their placement in the text. E.g, "See **Figure 9** for a detailed schematic" (**not** "see the figure below"); "The test results are summarized in **Table 1**."
- Format the in-text reference to the tables and figures in **bold** (optional, but be consistent throughout your document).

Knowledge Check

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An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=100#h5p-26

Selecting the Right Visual

Every type of visual aid serves a different purpose. For example, a pie chart displays a comparison of parts to a whole, while a bar chart shows comparisons of various variables to each other. Below

is a description of visual and graphic aids commonly incorporated into technical reports adapted from *Stand Up, Speak Out: The Practice and Ethics of Public Speaking* (n.a., 2012). Note: APA Style recommends labeling for figures to be situated above the visual aid. **In technology, figures are typically labeled below.**

Charts

A chart is commonly defined as a graphical representation of data (often numerical) or a sketch representing an ordered process. Whether you create your charts or do research to find charts that already exist, it is important for them to exactly match the specific purpose in your document or presentation.

In the rest of this section, we're going to explore three common types of charts: statistical charts, sequence-of-steps chart, and decision trees.

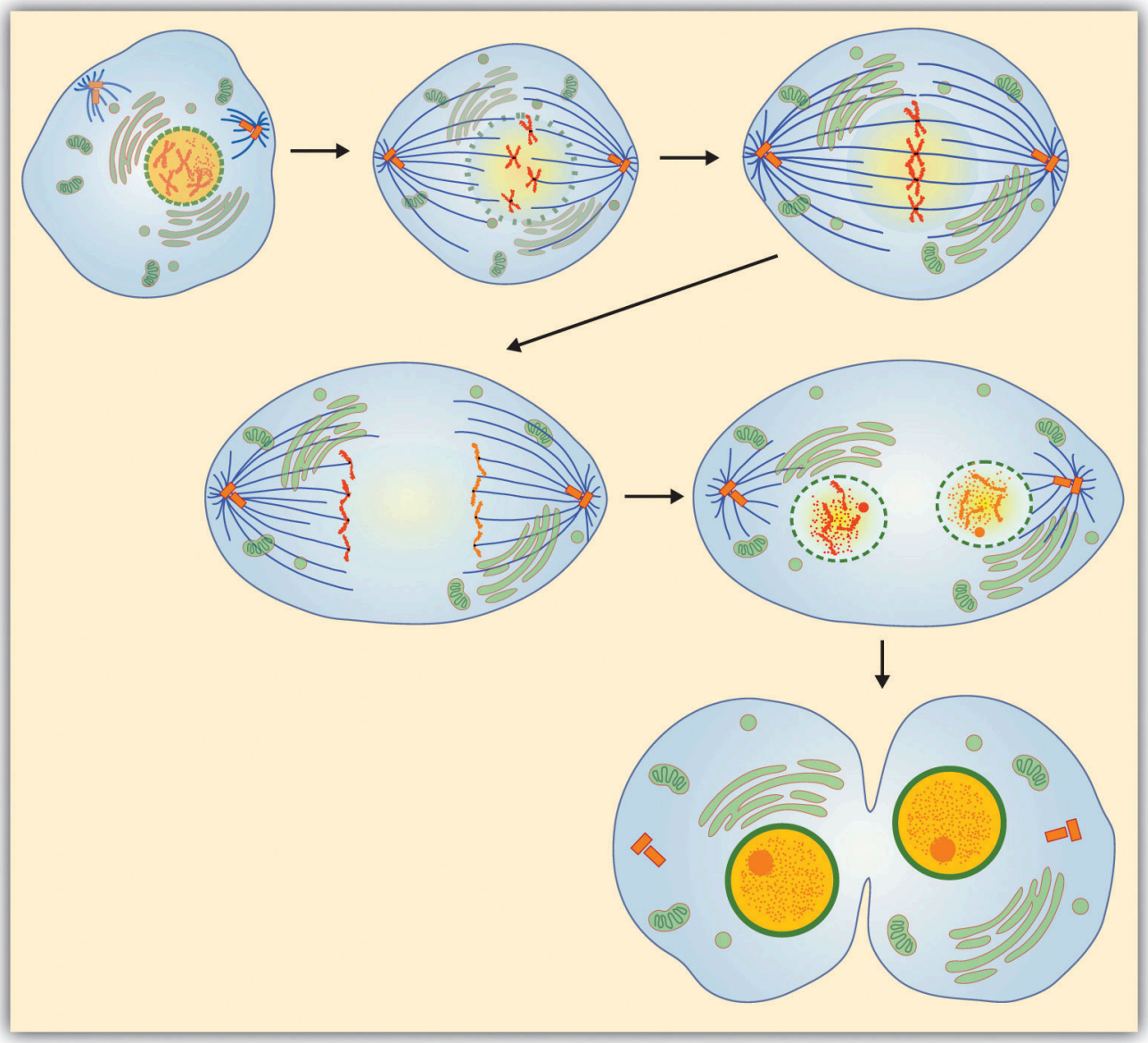
Statistical Charts

Congenital Anomalies	Relative Risk	Nunmber of Smokers N = 1,943	Number of Nonsmokers N = 16,073	95% CI	*p*-Value
Cardiovascular System	1.56	43	217	1.12–2.19	$p < .01$
Skeletal System	1.11	19	139	0.68–1.82	NS
Hematologic System	1.39	20	121	0.86–2.25	NS
Nervous System	1.30	4	25	0.91–1.86	NS
Pulmonary System	1.25	7	39	0.55–2.84	NS
Gastrointestinal System	0.54	1	17	0.07–4.11	NS

Figure 4.4.3 *Birth Weight Chi-Square*. Source: Woods, S. E., & Raju, U. (2001). Maternal smoking and the risk of congenital birth defects: A cohort study. *Journal of the American Board of Family Practitioners, 14*, 330–334.

For most audiences, statistical presentations must be kept as simple as possible, and they must be explained. When visually displaying information from a quantitative study, you need to make sure that you understand the material and can successfully and simply explain how one should interpret the data. If you are unsure about the data yourself, then you should probably not use this type of information. This is surely an example of a visual aid that, although it delivers a limited kind of information, does not speak for itself.

Sequence-of-Steps Charts



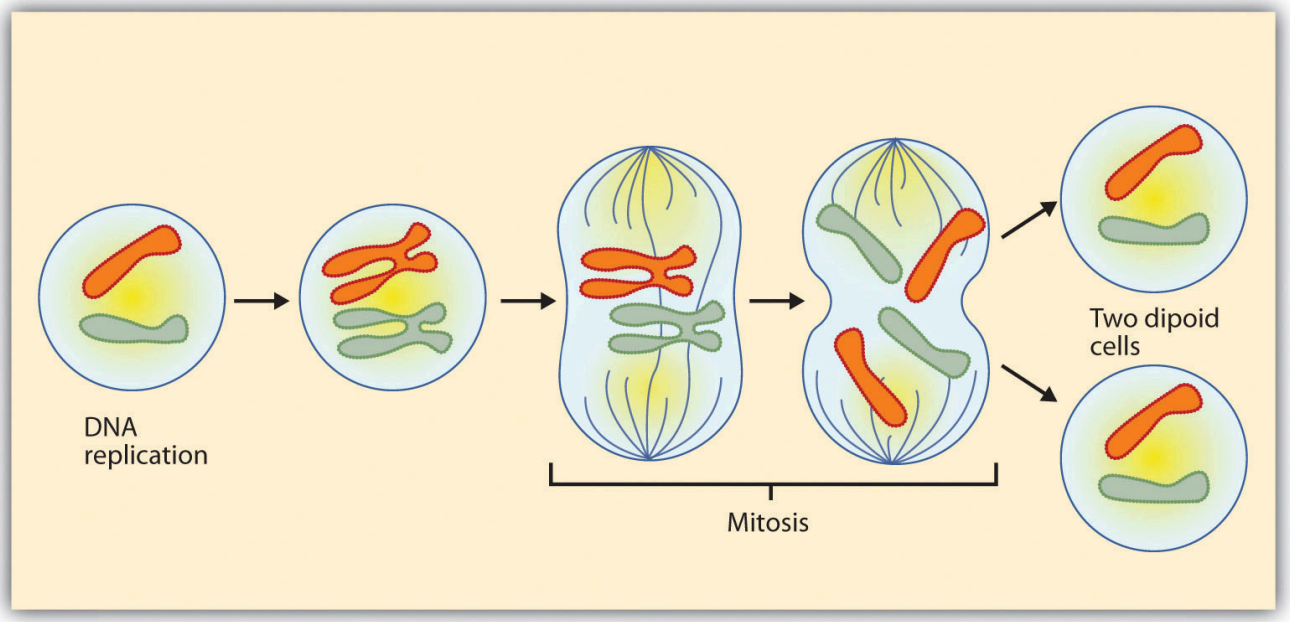

DNA
replication
Mitosis
Two dipoid
cells

Figure 4.4.4 *Steps in Cell Reproduction*. Source: Images courtesy of LadyofHats, http://commons.wikimedia.org/wiki/File:MITOSIS_cells_secuence.svg, and the National Institutes of Health, http://commons.wikimedia.org/wiki/File:MajorEventsInMitosis.jpg.

Charts are also useful when you are trying to explain a process that involves several steps. These two visual aids in **Figure 4.4.4** depict the process of cell division called mitosis using a sequence-of-steps chart, but they each deliver different information. The first chart lacks labels to indicate the different phases of cell division. Although the first chart may have more color and look more polished, the missing information may confuse the audience. In the second chart, each phase is labeled with a brief explanation of what is happening, which can help the audience understand the process.

Decision Trees

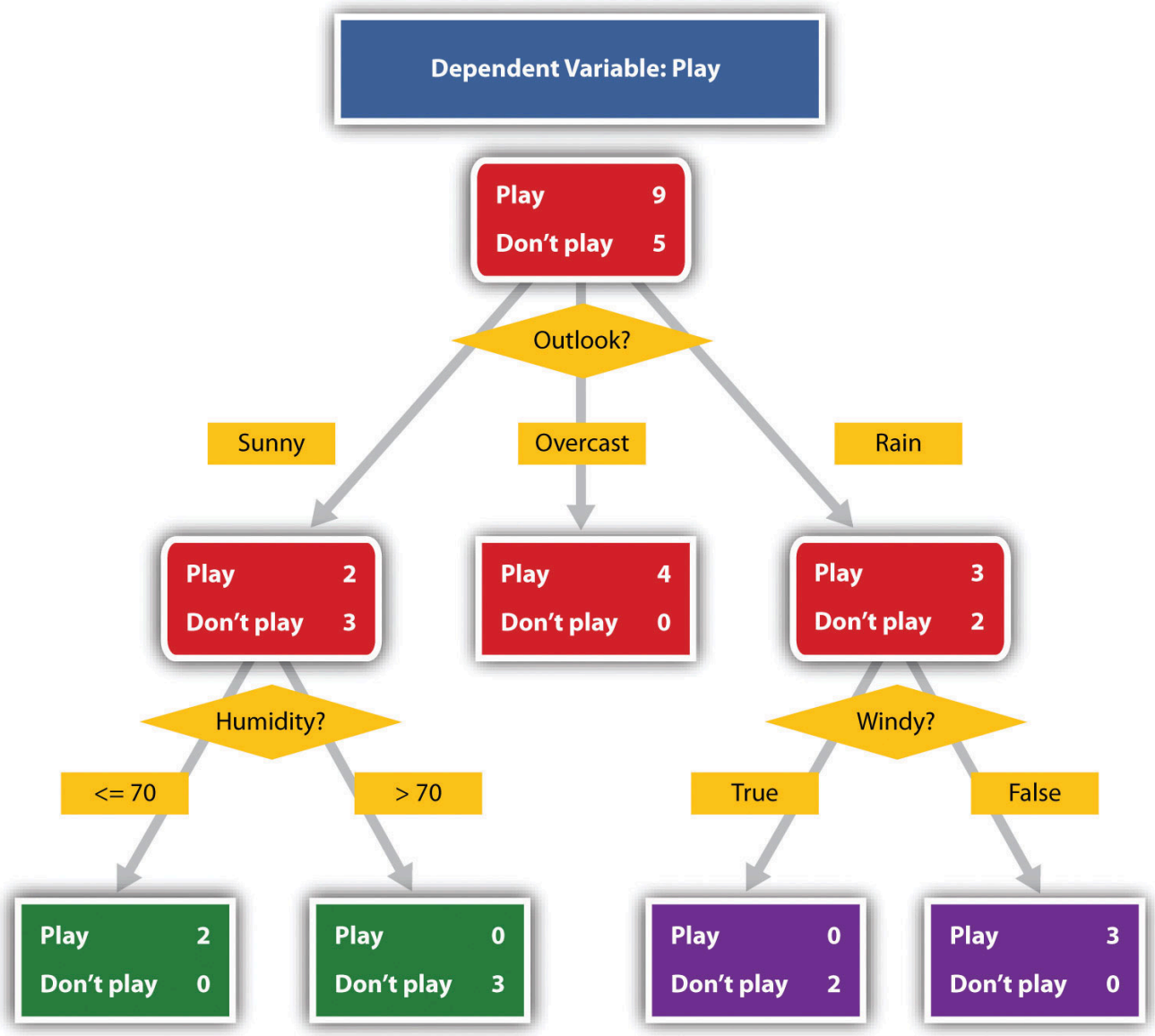


Figure 4.4.5 *To Play or Not to Play.* Source: Image courtesy of T-kita, http://commons.wikimedia.org/wiki/File:Decision_tree_model.png.

Decision trees are useful for showing the relationships between ideas. **Figure 4.4.5** shows how a decision tree could be used to determine the appropriate weather for playing baseball. As with the other types of charts, you want to be sure that the information in the chart is relevant to your purpose and that each question and decision is clearly labeled.

Graphs

Strictly speaking, a graph may be considered a type of chart, but graphs are so widely used that we will discuss them separately. A graph is a pictorial representation of the relationships of quantitative data using dots, lines, bars, pie slices, and the like. Graphs show the variation in one variable in comparison with that of one or more other variables. Where a statistical chart may report the mean ages of individuals entering college, a graph would show how the mean age changes over time. A statistical chart may report the number of computers sold in the United States, while a graph will show the breakdown of those computers by operating systems such as Windows, Macintosh, and Linux. Technical communicators can show graphs using a range of different formats. Some of those formats are specialized for various professional fields. Very complex graphs often contain too much information. If the graph is cluttered, it becomes difficult to comprehend.

In this section, we're going to analyze the most common graphs technical communicators use in their documents and presentations: line graphs, bar graphs, and pie graphs.

Line Graph

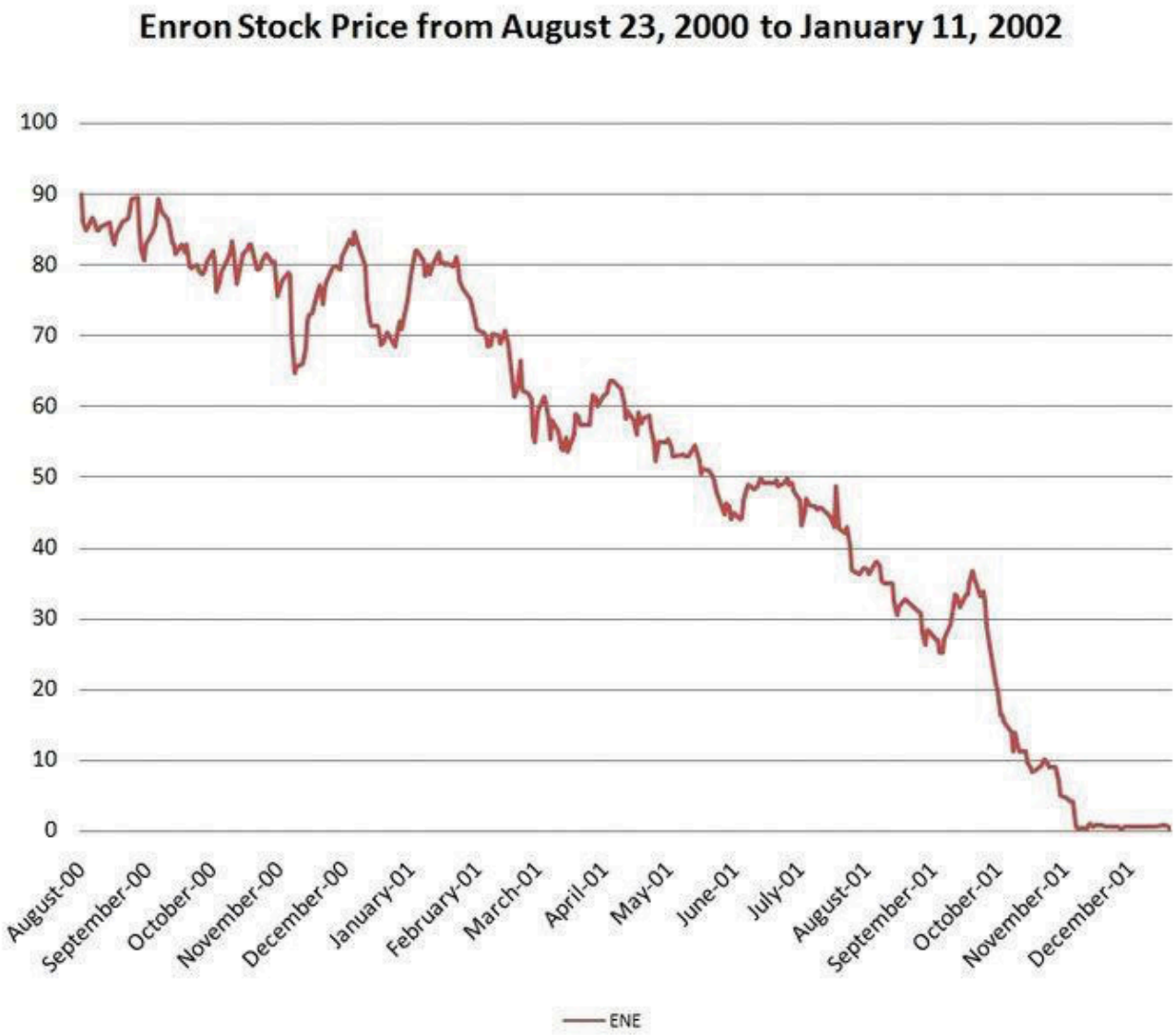


Figure 4.4.6 *Enron's Stock Price.* Source: Image courtesy of Nehrams 2020, http://commons.wikimedia.org/wiki/File:EnronStockPriceAug00Jan02.jpg.

A line graph is designed to show trends over time. In **Figure 4.4.6**, we see a line graph depicting the fall of Enron's stock price from August 2000 to January 2002. Notice that although it has some steep rises, the line has an overall downward trend clearly depicting the plummeting of Enron's stock price. Showing such a line graph helps the reader see the relationships between the numbers.

Bar Graph

Bar graphs are useful for showing the differences between quantities. They can be used for population demographics, fuel costs, math ability in different grades, and many other kinds of data.

The graph in **Figure 4.4.7** is well designed. It is relatively simple and is carefully labeled, making it easy for you to guide your reader through the quantities of each type of death. The bar graph is designed to show the difference between natural deaths and homicides across various age groups. When you look at the data, the first grouping clearly shows that eighteen- to twenty-four-year-olds are more likely to die because of a homicide than any of the other age groups.

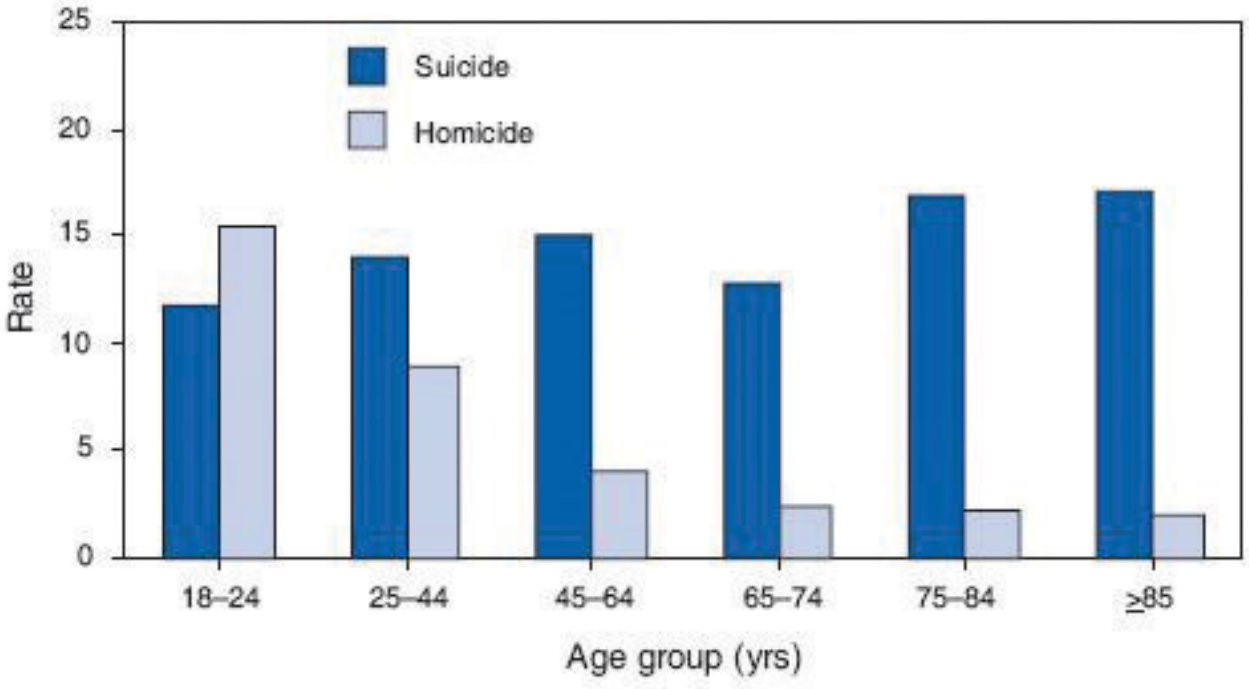


Figure 4.4.7 *Natural Death vs. Homicide*. Source: Image courtesy of Centers for Disease Control and Prevention, http://commons.wikimedia.org/wiki/File:Homicide_suicide_USA.gif.

The graph in **Figure 4.4.8** is a complicated bar graph depicting the disparity between the haves and the have nots within the United States. On the left hand side of the graph you can see that the top 20% of people within the United States account for 84.7% of all of the wealth and 50.1% of all of the income. On the other hand, those in the bottom 40% account for only 0.2% of the wealth and 12.1% of the actual income.

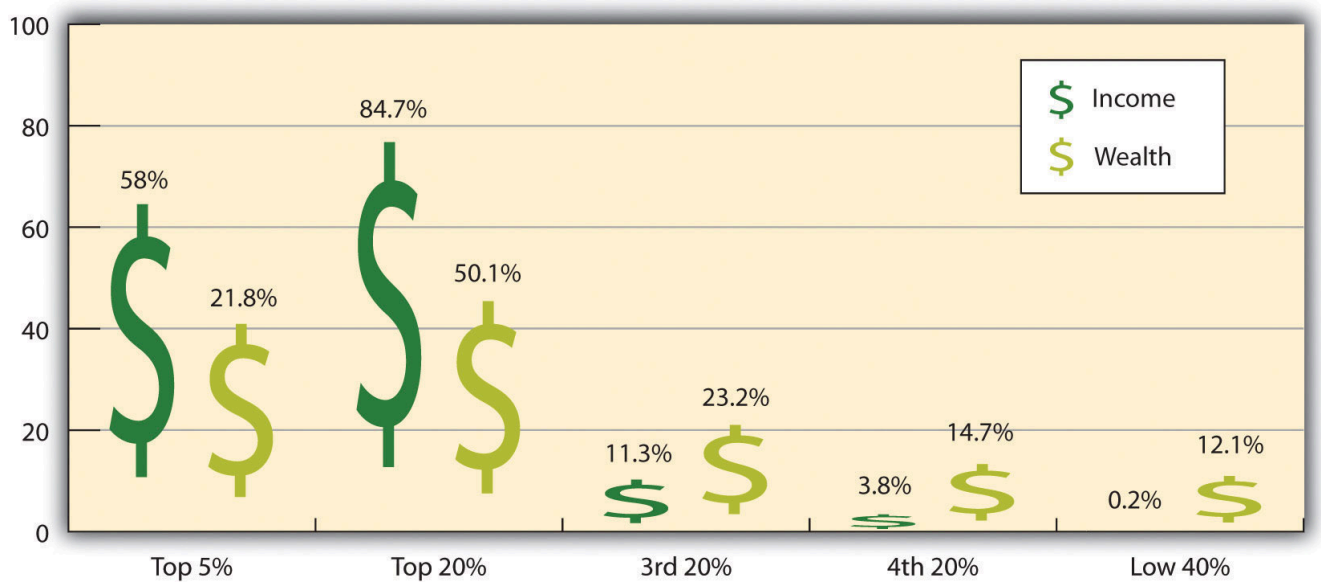


Figure 4.4.8 *Distribution of Income and Wealth in the United States*. Source: Wolff, E. N. (2007). Recent trends in household wealth in the United States: *Rising debt and the middle-class squeeze* (Working Paper No. 502). Retrieved from the Levy Economics Institute of Bard College website: http://www.levy.org/pubs/wp_502.pdf

While the graph is very well designed, it presents a great deal of information. In a document, readers will have time to sit and analyze the graph, but in a speaking situation, audience members need to be able to understand the information in a graph very quickly. For that reason, this graph is probably not as effective for speeches as the one in **Figure 4.4.7**.

Pie Graph

Pie graphs should be simplified as much as possible without eliminating important information. As with other graphs, the sections of the pie need to be plotted proportionally. In the pie graph shown in **Figure 4.4.9**, we see a clear and proportional chart that has been color-coded. Color-coding is useful when it's difficult to fit the explanations in the actual sections of the graph; in that case, you need to include a legend, or key, to indicate what the colors in the graph mean. In this graph, readers can see very quickly that falls are the primary reason children receive concussions.

Note that the information is organized from the greatest percentage to the smallest in a clockwise direction. Use this method to represent the information in a logical order.

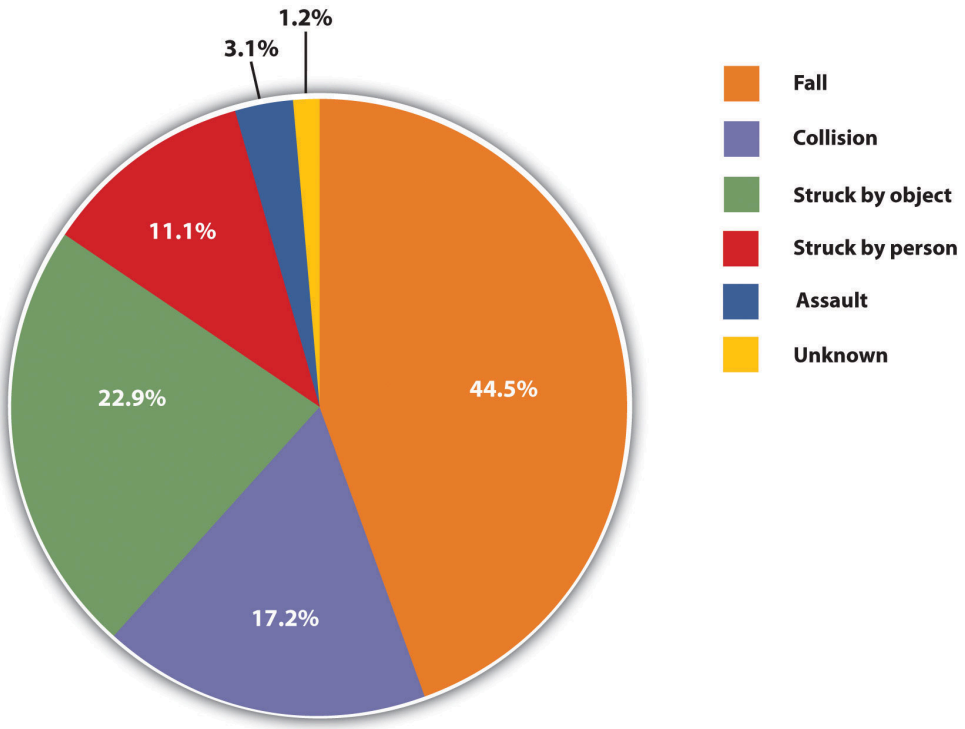


Figure 4.4.9 *Causes of Concussions in Children. Source: Stand Up, Speak Out: The Practice and Ethics of Public Speaking, 2012.*

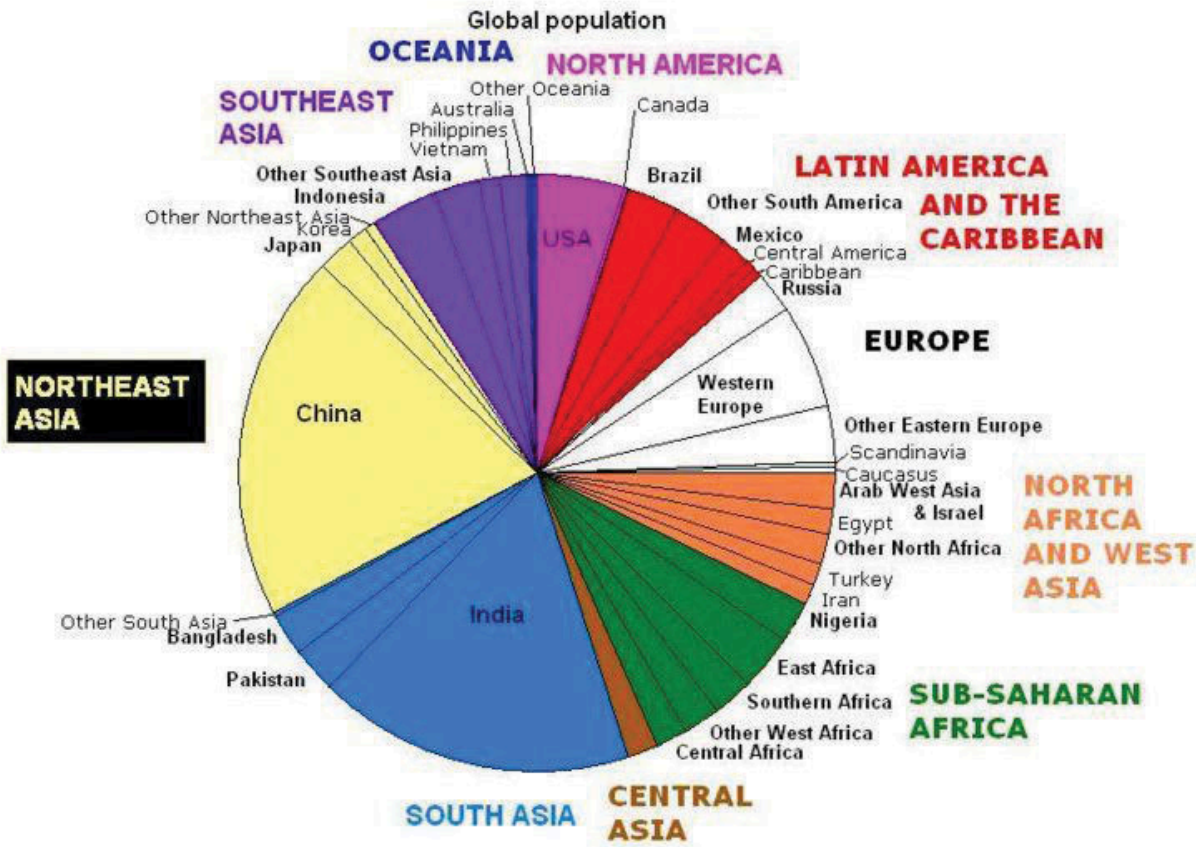


Figure 4.4.10 *World Populations. Source: Image courtesy of Brutannica, http://commons.wikimedia.org/wiki/File:World_population_pie_chart.JPG.*

The pie graph in **Figure 4.4.10** is jumbled, illegible, confusing, and overwhelming in every way. The use of color coding doesn't help. Overall, this graph simply contains too much information and is more likely to confuse an audience than help them understand something.

Knowledge Check

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Representations

In the world of visual aids, representations is the word used to classify a group of aids designed to represent real processes or objects. Often, technical communicators want to visually demonstrate something that they cannot physically bring with them to the speech. In this section, we're going to explore four common representations: diagrams, maps, photographs, and video or recordings.

Diagrams

Diagrams are drawings or sketches that outline and explain the parts of an object, process, or phenomenon that cannot be readily seen. Like graphs, diagrams can be considered a type of chart, as in the case of organization charts and process flow charts.

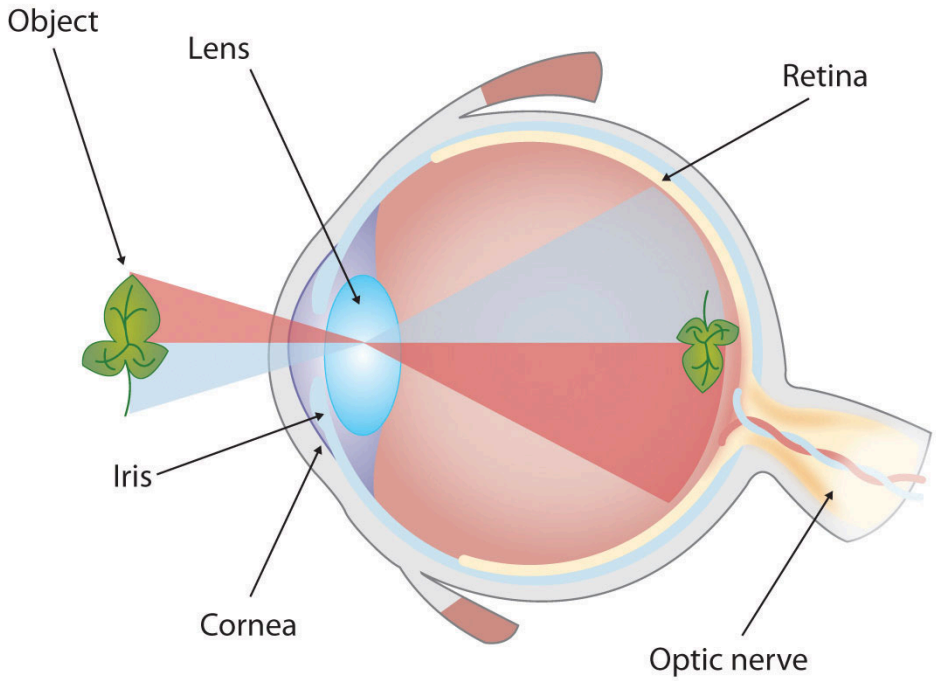

Figure 4.4.11 *The Human Eye*. Source: *Stand Up, Speak Out: The Practice and Ethics of Public Speaking*, 2012.

When you use a diagram, be sure to explain each part of the phenomenon, paying special attention to elements that are complicated or prone to misunderstanding. In the example shown in **Figure 4.4.11**, you might wish to highlight that the light stimulus is reversed when it is processed through the brain or that the optic nerve is not a single stalk as many people think.

Maps

Maps are extremely useful if the information is clear and limited. There are all kinds of maps, including population, weather, ocean current, political, and economic maps, so you should be able to find the right kind for the purpose of document. Choose a map that emphasizes the information you need to deliver.

The map shown in **Figure 4.4.12** is simple, showing clearly the geographic location of Nigeria. This can be extremely valuable for some audiences who might not be able to name and locate countries on the continent of Africa.

Figure 4.4.12 *African Map with Nigerian Emphasis. Source: Stand Up, Speak Out: The Practice and Ethics of Public Speaking, 2012.*

Figure 4.4.13 *Rhode Island Map. Source: Map courtesy of the National Atlas of the United States.*

Figure 4.4.13 is a map of the state of Rhode Island, and it emphasizes the complicated configuration of islands and waterways that characterize this state's geography. Although the map does not list the names of the islands, it is helpful in orienting the audience to the direction and distance of the islands to other geographic features, such as the city of Providence and the Atlantic Ocean.

Photographs and Drawings

Figure 4.4.14 *Ship's Rigging*. Source: Image courtesy of Mathieu Dréo, http://commons.wikimedia.org/wiki/File:Tall_ship_rigging_in_amsterdam_close.jpg.

Sometimes a photograph or a drawing is the best way to show an unfamiliar but important detail. **Figure 4.4.14** is a photograph of a ship's rigging. This photograph emphasizes the sheer amount and complexity of the ship's rigging.

Video or Audio Recordings

Another very useful type of visual aid is a video or audio recording. Whether it is a short video from a website such as YouTube or Vimeo, or a piece of a podcast, a well-chosen video or audio recording may be a good choice to enhance your document if it is distributed in an electronic form. For example, this text includes several links to outside visual support, which makes this document a dynamic and informative text.

TABLE 4.4.1 Common types of illustrative graphics–a summary

[Skip Table]

Type of Visual		Description and Purpose
Table		Places detailed data/information in categories formatted into rows and columns for comparison; used when exact figures are important. Label column headings (box heads) and/or rows (stubs).
Graphs	Bar Graph	Compares and contrasts two or more subjects at the same point in time, or compares change over time.
	Column Graph	Reveals change in a subject at regular intervals of time.
	Line Graph	Shows the degree and direction of change relative to two variables; compares items over time, shows frequency or distribution, or shows correlations.
Charts	Pie Chart	Displays the number and relative size of the divisions of a subject; shows the relation of parts to a whole (parts must sum to 100% to make sense).
	Org. Chart	Maps the divisions and levels of responsibility or hierarchy within an organization.
	Flow Chart	Shows the sequence of steps in a process or procedure.
	Gantt Chart	Indicates timelines for multi-stepped projects, especially used in proposals and progress reports.
	Diagram	Identifies the parts of a subject and their spatial or functional relationship; emphasizes detail or shows dimensions.
Representations	Illustration	Depicts information using pictorial detail.
	Photo	Shows what a subject looks like in realistic detail or shows it being used.
	Map	Shows the distribution of data using a geographic map.
	Animation	Simulates a process, operation, or incident.
	Film clip	Depicts a process, operation, or incident in realistic detail.

For more information on how to format content in a long report, see SELS's *A Guide to Writing Formal Technical Reports* (University of Victoria, Last, & Potter, 2021).

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(Types of Graphs and When to Use Them, 2018)

EXERCISE 4.4.1 Design a figure to match the data

Using what you have learned about figures and tables, create two different visual representations of the data described in the following paragraph. Explain why you chose those methods and list the pros and cons of each:

> We surveyed the students in 3 sections of TEC400 (total of 100 students) to gauge which aspect of the writing process they found most challenging: Pre-writing, Drafting, or Revising. The results among the 3 sections were consistent. Overall 50% of students said that they found the Pre-writing stage to be the most challenging, while 28% found the Drafting stage most difficult and 22% said the Revision stage was most challenging (see Figure 1**)**. These results suggest that we should place more emphasis on teaching and practicing pre-writing strategies during the course.
>
> [create a **Figure 1** and a descriptive caption that illustrates the data above]

Content on the type of visual aids was adapted from *Stand up, speak out: The practice and ethics of public speaking*, Saylor Academy, 2012. CC 3.0. The author of this first edition has chosen to remain anonymous. https://saylordotorg.github.io/text_stand-up-speak-out-the-practice-and-ethics-of-public-speaking/s18-02-types-of-presentation-aids.html

Additional Resources

For a look at how professionals can animate data, check out Hans Rosling's *The joy of stats* on YouTube [Online].

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Original document by University of Victoria (n.d.). *Engineering work term report guide: A guide to content, style and format requirements for University of Victoria engineering students writing co-op work term reports*. (Updated by Suzan Last, October, 2017 and adapted by Robin L. Potter (2021). OER.

Image descriptions

Figure 3.4.1 image description:

A graph with no figure number or caption and no x or y axis labels, so it is difficult to determine what point it is trying to make. It shows something rising and falling during a hockey game. This thing spikes at the end of each period and drops dramatically when Canada wins.

[Return to Figure 3.4.1]

Figure 3.4.2 image description:

A graph charting water consumption in Edmonton during the 2010 Gold Medal Hockey Game. The graphs shows spikes in water consumption at the end of each period, followed by very low usage

periods, especially near the end of the 3rd period, and between the end of the game and the medal ceremony. It also has a line depicting water usage the previous day, which was fairly steady throughout the day.

[Return to Figure 3.4.2]

Anything that you write in technical workplaces is designed to be read and used. As such the content must be designed so that it is usable. Thus, increasing usability means increasing the functionality of your document in terms of both content and document design—making it "user friendly." If your document is difficult to read because vocabulary, sentence structure, paragraphing, organization, or formatting is unclear, your reader will likely stop reading.

The **Revision Checklist** below offers a step-by-step process for revising your document to achieve a readable style. It incorporates key information fromChapter 3: Professional Style and Chapter 4: Document Design. Implementing this checklist means doing several "passes" over your document, looking at different aspects each time. For example, in your "first pass," review the entire document for overall formatting, content requirements, coherent flow of information, and appropriate tone. Before we get into the revision checklist, watch the following video for simple revision strategies you can use to improve your writing.

https://www.youtube.com/watch?v=UEnNR9j-QDw

(Revision Strategies, 2018)

Revision Checklist

1. First Pass: Document-level Review

- Review requirements to ensure that you have included all necessary content.
- Make sure your title, headings, subheading, and table/figure labels are clear and descriptive. Headings should clearly and efficiently indicate the content of that section; figure and table captions should clearly describe the content of the visual.
- Make sure visual elements have appropriate passive space around them.
- Make sure ideas flow in a logical order and explanations come in a timely manner. Make sure visuals illustrate your textual information.
- Write "reader-centred" prose: determine the relationship between your purpose in writing and your reader's purpose in reading. Give your readers the information they want and need to get from your document as efficiently as possible.
- Make sure you are using an appropriate tone (neutral, objective, constructive, formal).

2. Second Pass: Paragraph-level Review

- Make sure each paragraph begins with a topic sentence that previews and/or summarizes the content to come.
- Add coherent transitions to link one sentence logically to the next.
- Delete unnecessary or irrelevant information.
- Avoid overly long or short paragraphs (5-10 lines long is a reasonable guideline).

3. Third Pass: Sentence-level Review

- Watch sentence length; consider revising sentences longer than 25 words. Vary the length and structure of sentences.
- Look at the ratio of *verbs to* the *number of words per sentence*. Generally, the more verbs/words in the sentence, the better the sentence.
- Use concrete, strong, active verbs – avoid vague, passive, verbs and "is/are/was/were/being" whenever feasible (transform the *–tion* and *–ment* words into verbs).
- Create a clear actor/action relationship (subject-verb).
- Verbs like "make" "do" 'have" and "get" have many possible meanings. Try to find more precise ones.
- In general, keep subject and verb close together, and keep verb near the beginning of the sentence.

4. Fourth Pass: Word-level Review

- Use concrete, specific, precise words; avoid vague, abstract, generalizing words.
- Match your vocabulary to your audience: experts can tolerate complex information with a lot of terminology; general readers require simpler, less detailed descriptions/explanations.
- Use clear, plain language rather than pompous diction; write to **express**, not impress.
- Avoid "sound bite" phrases that have no real meaning; use a single word instead of a phrase whenever possible.
- Avoid clichés, colloquial expressions, and slang. Rather, use conversational language.
- Use second person (you) pronouns carefully and sparingly.
- Avoid "ad speak" — don't sound like you are "selling" something; use objective, measurable descriptors.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=102#h5p-28

If your document incorporates sources, you will want to do an additional "pass" to make sure that all sources are cited properly and in chronological order in the body text, and that they all cross-reference to your list of references at the end of the document. See Chapter 8: Citing and Documenting in APA Style for details.

References

Snhu. (2018). *Revision strategies* [Video]. Youtube. https://www.youtube.com/watch?v=UEnNR9j-QDw

5. INTERPERSONAL AND INTERCULTURAL COMMUNICATION

Learning Objectives

After reviewing this information, you will be able to

5.1 Define personal, social, and cultural identities

5.2 Understand equity, diversity, and inclusion

5.3 Build communication competence for Indigenous cultures

5.4 Understand important thinking on intercultural communication

Introduction

Humans have always been diverse in their cultural beliefs and practices. But as new technologies have led to the perception that our world has shrunk, and demographic and political changes have brought attention to cultural differences, people communicate across cultures more now than ever before. The oceans and continents that separate us can now be traversed instantly with an e-mail, phone call, tweet, or status update. Today, our workplaces are more integrated in terms of race, sexuality, age, physical and mental ability, and gender, increasing our interaction with domestic diversity. The Disability Rights Movement and Gay Rights Movement have increased the visibility of people with disabilities and sexual minorities. But just because we are exposed to more difference doesn't mean we understand it, can communicate across it, or appreciate it. This chapter will help you do all three by providing the terminology required to better understand and communicate issues of equity, diversity, and inclusion (EDI). Let's begin the process with the video: *What Do Equality, Diversity, Equity and Inclusion Mean* (2021).

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=104#oembed-1

5.1 Equity, Diversity, and Inclusion: Terminology

It's important to understand how EDI and communication relate. Discussing these issues is difficult for many reasons. One is due to uncertainty about language use. People may be frustrated by their perception that labels change too often or be afraid of using an "improper" term and being viewed as insensitive. It is important, however, that we not let political correctness get in the way of meaningful dialogues and learning opportunities related to difference. Exploring some of these very difficult issues can make us more competent communicators and open us up to more learning experiences.

Defining Identity

Ask yourself the question "Who am I?" Our parents, friends, teachers, and the media help shape our identities. While this happens from birth, most people reach a stage where increased social awareness led them to begin to reflect on who they are. This begins a lifelong process of thinking about who we are now, who we were before, and who we will become (Tatum, 2000). Our identities make up an important part of our self-concept and can be broken down into three main categories: personal, social, and cultural identities (see **Table 5.1.1**).

Table 5.1.1 ***Personal, social, and cultural identity***

Personal	Social	Cultural
Antique collector	Member of historical society	Irish American
Dog lover	Member of humane society	Male/female
Cyclist	Fraternity/sorority member	Greek American
Singer	High school music teacher	Multiracial
Shy	Book club member	Heterosexual
Athletic		Gay/lesbian

Identify can be broken down into three broad categories (Ahrndt, 2020).

Personal identities include the components of self that are primarily **intrapersonal** and connected to our life experiences. For example, some people may consider themselves puzzle lovers, while others may identify as fans of hip-hop music.

Our **social identities** include components that come derived from our involvement in social groups. For example, we may get aspects of our social identity from our family or from a sports team we are part of. Social identities differ from personal identities because they are externally organized through membership. Our membership may be voluntary (Greek organization on campus) or involuntary (family) and explicit (we pay dues to our labour union) or implicit (we purchase and listen to hip-hop music). There are many options for personal and social identities. While our personal identity choices express who we are, our social identities align us with particular groups. Through our social identities, we make statements about who we are and who we are not.

Cultural identities are based on categories developed by society that teach us how to behave (Yep, 2002). Since our cultural identities are a part of us since birth, cultural identities are the least changeable of the three identities. Our cultural identities can change over time, but what separates this category from the other two categories is their historical roots (Collier, 1996).

Dominant and Non-dominant identities have been established by social and cultural influences (Allen, 2011). **Dominant identities** historically had and currently have more resources and influence, while **non-dominant identities** historically had and currently have fewer resources and influence. It's important to remember that these distinctions are being made at the societal level, not the individual level. There are obviously exceptions, with people in groups considered non-dominant obtaining more resources and power than a person in a dominant group. However, the overall trend is that difference based on cultural groups has been institutionalized, and exceptions do not change this fact.

Because of this uneven distribution of resources and power, members of dominant groups are granted privileges while non-dominant groups are at a disadvantage. This means non-dominant groups will face various forms of institutionalized discrimination, including racism, sexism, heterosexism, and ableism. As we will discuss later, privilege and disadvantage are not "all or nothing." No two people are completely different or completely similar, and no one person is completely privileged or completely disadvantaged.

Cultural Identities

Culture is a complicated word to define, as there are many ways that the term culture is commonly used. For the purposes of exploring the communicative aspects of culture, we will define culture as the ongoing negotiation of learned and patterned beliefs, attitudes, values, and behaviours. The definition points out that culture is learned. Culture is also patterned in that there are recognizable widespread similarities among people within a cultural group. There is also deviation from and resistance to those patterns by individuals and subgroups within a culture, which is why cultural patterns change over time. Last, the definition acknowledges that culture influences our beliefs about what is true and false, our attitudes including our likes and dislikes, our values regarding what is right and wrong, and our behaviours. Some categories of culture are explored below.

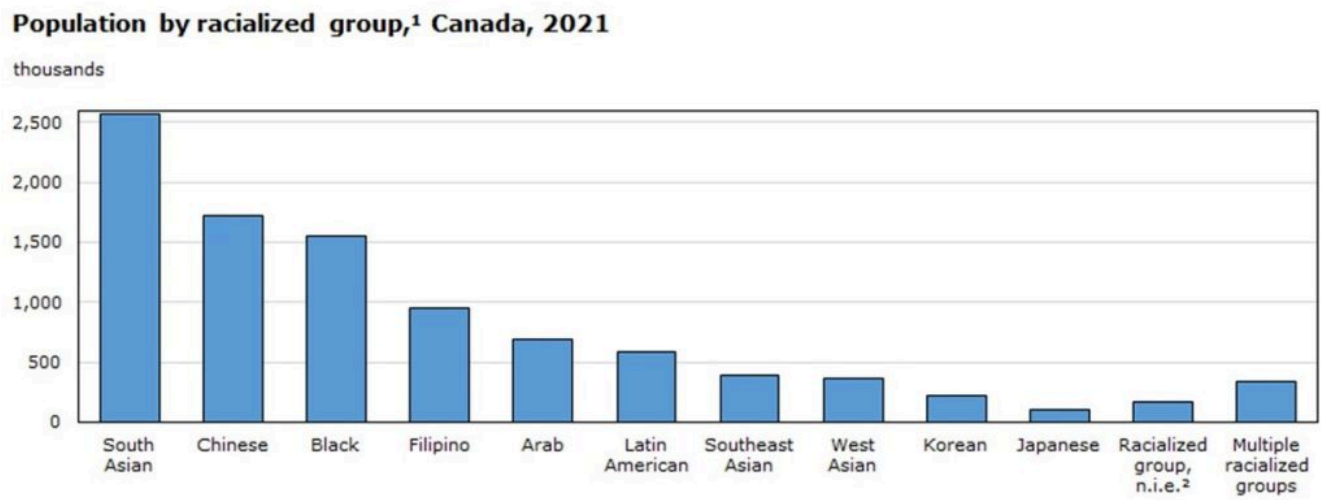
Race

Race is a socially constructed category based on differences in appearance that have been used to create a social order that gives privilege to some and disadvantage to others. Race didn't become a socially and culturally recognized marker until European colonial expansion in the 1500s. As Western Europeans travelled to parts of the world previously unknown to them and encountered people

who were different from them, a classification of races began to develop that placed lighter skinned Europeans above darker skinned people. Racial distinctions have been based largely on features such as skin colour, hair texture, and body/facial features. Even though there is a consensus among experts that race is social rather than biological, we can't deny that race still has meaning in our society and affects people as if it were "real."

The way we communicate about race in our regular interactions has also changed, and many people are still hesitant to discuss race for fear of using "the wrong" vocabulary. Given that race is one of the first things we notice about someone, it's important to explore how race and communication are connected (Allen, 2011).

Race and communication are related in various ways. Racism influences our communication about race and is not an easy topic for most people to discuss. Today, people tend to view racism as overt acts such as calling someone a derogatory name or discriminating against someone in thought or action. However, there is a difference between racist acts and other discriminatory behaviours that are much more subtle. As competent communicators and critical thinkers, we must challenge ourselves to be aware of how racism influences our communication at individual and societal levels. **Figure 5.1.1** presents a recent census on racial make-up confirming Canada's diversity and the need to develop inter-cultural communication competency.



1. In this document, the concept of "racialized group" is based and derived directly from the concept of "visible minority" in the census. The Employment Equity Act defines visible minorities as "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour." It consists mainly of the following groups: South Asian, Chinese, Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, Korean and Japanese.
2. The abbreviation "n.i.e." refers to "not included elsewhere".
Source: Statistics Canada, Census of Population, 2021.

Figure 5.1.1 *Canada is becoming an increasing diverse country with three racialized groups, South Asian, Chinese, and Blacks accounting for more than 16.1% of Canada's total population (StatsCan, 2021).*

Gender

When we first meet a newborn baby, we ask whether it's a boy or a girl. This question illustrates the importance of gender in organizing our social lives and our interpersonal relationships. While it is true that there are biological differences between who we label male and female, the meaning our society places on those differences is what actually matters in our day-to-day lives.

You may have noticed the word gender instead of sex is being used. That's because **gender** is an identity based on internalized cultural notions of masculinity and femininity that is constructed through communication and interaction. However, **sex** is based on biological characteristics, including external genitalia, internal sex organs, chromosomes, and hormones (Wood, 2005). A related concept**, gender roles**, refers to a society's expectations of people's behaviour and attitudes based on whether they are females or males. Understood in this way, gender, like race, is a social construction.

Sexuality

While race and gender are two of the first things we notice about others, sexuality is often something we view as personal and private. **Sexuality** relates to culture and identity in important ways that extend beyond sexual orientation, just as race is more than the colour of one's skin and gender is more than one's biological and physiological manifestations of masculinity and femininity.

The most obvious way sexuality relates to identity is through sexual orientation**. Sexual orientation** refers to a person's primary physical and emotional sexual attraction and activity. The terms we most often use to categorize sexual orientation are heterosexual, gay, lesbian, bisexual, and asexual. Gays, lesbians, and bisexuals are sometimes referred to as sexual minorities.

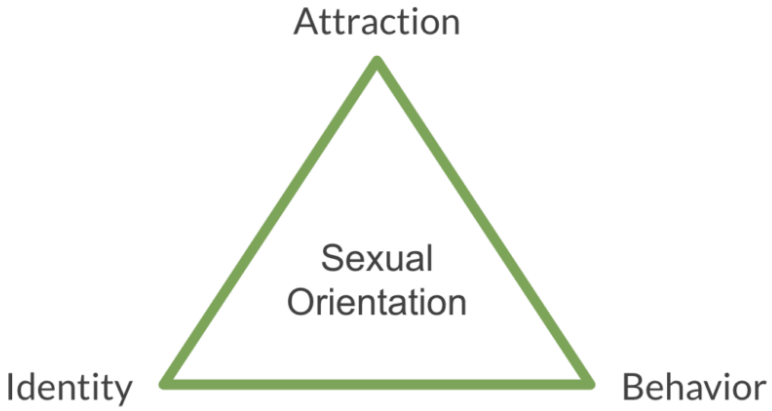


Figure 5.1.2 *The interaction of attraction, identity, and behaviour in the determination of sexual orientation (Gory, 2019).*

Homophobia is a range of negative attitudes and feelings towards homosexuality or people perceived as homosexual. Homophobia is observable in critical and hostile behaviour like discrimination and violence. Much like racism or sexism, homophobia involves the targeting of a specific population of individuals with certain traits. Homophobia, or the fear of lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals, is often the impetus for discrimination, which can be expressed through either institutional or informal means ("Homophobia", 2020).

Thus, cultivating the awareness to recognize and address institutional and informal means of discrimination based on sex, gender, sexuality, and sexual orientation are important aspect of developing communication competence.

Ability

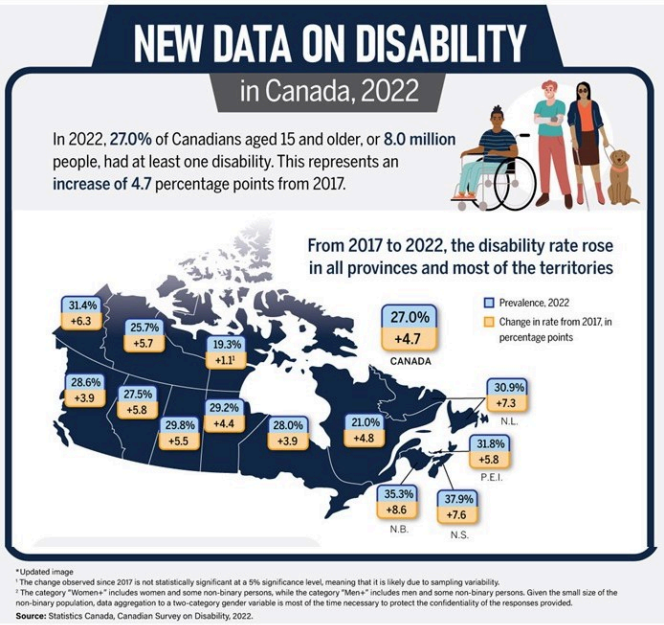


Figure 5.1.3 *A significant proportion of the Canadian population are living with at least one disability (StatsCan, 2023).*

There is resistance to classifying **ability** as a cultural identity. While much of what distinguishes physically and mentally abled persons from physically and mentally disabled persons is rooted in science, biology, and physiology, there are important sociocultural dimensions. The Accessible Canada Act defines **disability** as "any impairment, including a physical, mental, intellectual, cognitive, learning, communication or sensory impairment — or a functional limitation — whether permanent, temporary or episodic in nature, or evident or not, that, in interaction with a barrier, hinders a person's full and equal participation in society" (Minister of Justice, 2023). An impairment is defined as "any temporary or permanent loss or abnormality of a body structure or function, whether physiological or psychological" (Allen, 2011). These definitions are important because they note the social aspect of disability in that people's life activities are limited. In addition, the definitions also suggest the social aspect of disability because the perception of a disability by others can lead someone to be classified as such. Ability, just as the other cultural identities discussed, has institutionalized privileges and disadvantages associated with it.

Ableism is the system of beliefs and practices that produces a physical and mental standard that is projected as normal for a human being and labels deviations from it abnormal, resulting in unequal treatment and access to resources. Ability privilege refers to the unearned advantages that are provided for people who fit the cognitive and physical norms (Allen, 2011). According to Figure 1.3, "in 2022, 27% of Canadians aged 15 and older, or 8 million people, had at least one disability" (StatsCan, 2023). Canadians living with a disability make up a large portion of our society. Thus, as society slowly

begins to accommodate Canadians with disabilities, there is a need for inter-ability communication competence. **Inter-ability** communication is communication between people with differing ability levels; for example, a hearing person communicating with someone who is hearing impaired or a person who doesn't use a wheelchair communicating with someone who uses a wheelchair.

EDI Terminology

As stated a little earlier in this chapter, conversations around EDI can be difficult, even scary, for many because no-one wants to say the wrong thing or to offend someone else. In this section, you will find a few terms that will be used throughout our discussion of EDI in this textbook; terms, that once learned, you can use to have meaningful conversations about EDI.

Microaggression

According to Kevin Nadal (2014), **microaggressions** are brief and commonplace daily verbal, behavioural, or environmental actions (whether intentional or unintentional) that communicate hostile, derogatory, or negative racial slights and insults toward members of oppressed or targeted groups including: people of colour, women, Lesbian, Gay, Bisexual and Transgender (LGBT) persons, persons with disabilities, and religious minorities. Some scholars today argue that racism, sexism, homophobia, and other forms of discrimination are no longer as blatant as they may have been in the past. Instead, people may demonstrate their biases and prejudices in more subtle ways, otherwise known as microaggressions.

Microaggressions, as the following video, *What is the Definition of Microaggression* (2023), explains are not harmless. According to Nadal (2014), members of marginalized groups that experience microaggressions experience depression, anxiety, and trauma.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=112#oembed-1

Intersectionality

The privileges-disadvantages conflict captures the complex interrelation of unearned, systemic advantages and disadvantages that operate among our various identities. As was discussed earlier,

our society consists of dominant and nondominant groups. Accordingly, different cultures and identities have certain privileges and/or disadvantages.

To understand this interaction, we must view culture and identity through a lens of **intersectionality**, which asks us to acknowledge that we each have multiple cultures and identities that intersect with each other. Because our identities are complex, no one is completely privileged and no one is completely disadvantaged. For example, while we may think of a White, heterosexual male as being very privileged, he may also have a disability that leaves him without the able-bodied privilege that an abled body Latina woman has.

> "No one is completely privileged, and no one is completely disadvantaged."

This is often a difficult discussion for students to understand, because they are quick to point out exceptions that challenge this notion. For example, many people like to point out global media personality Oprah Winfrey as a powerful African American woman. While she is definitely now quite privileged despite her disadvantaged identities (black, woman, and born poor), her trajectory isn't the norm. When we view privilege and disadvantage at the cultural level, we cannot let individual exceptions distract from the systemic and institutionalized ways in which some people in our society are disadvantaged while others are privileged.

Systemic Racism

https://www.youtube.com/watch?v=rGY1EXgYD9g

Today, people tend to view acts of exclusion and discrimination as overt acts such as calling someone a derogatory name or discriminating against someone in thought or action. However, there is a difference between these types of individual acts, and **systemic racism**. Systemic racism is not as easily identifiable and is not attached to a person or a singular act. Instead, **systemic racism** occurs through patterns, practices, behaviours and ways of being established in societal institutions, laws, and policies that favour some and disadvantage others. Thus, racism, discrimination, and acts of exclusion exists and occur daily that are not committed by any one person but occur via the practices, policies, laws, and culture that exists in our societal institutions. **Figure 5.1.4** illustrates some of the societal institutions where systemic racism exists.

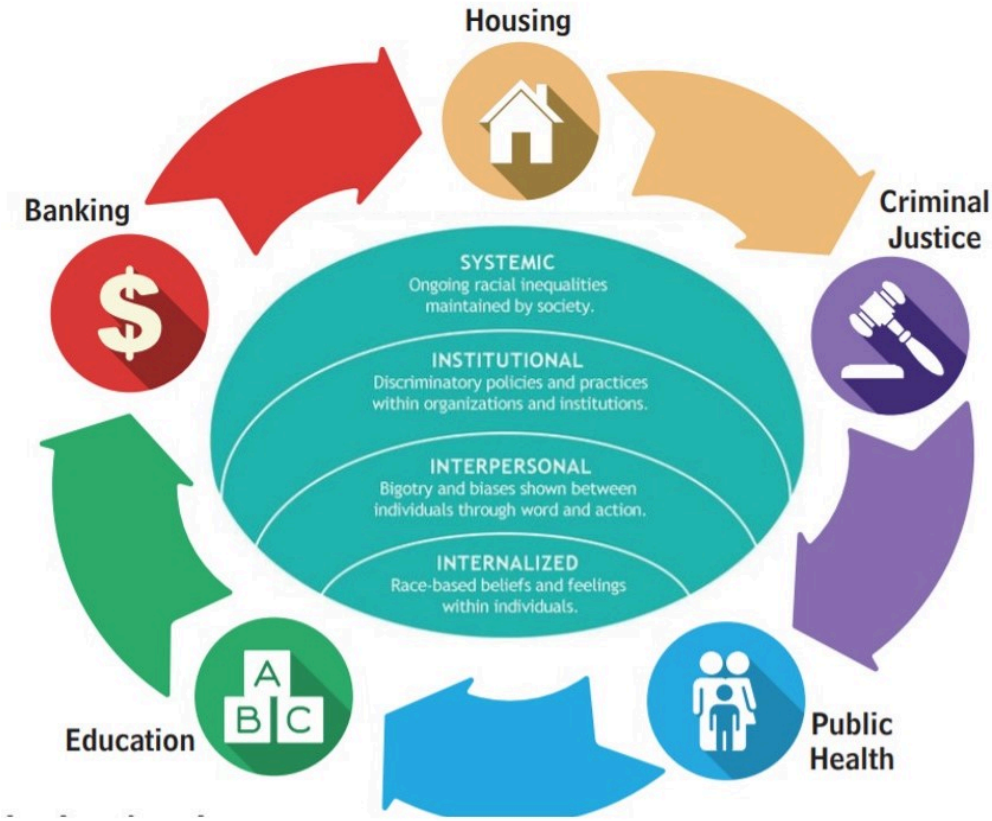


Figure 5.1.4 *Many of the institutions in society maintain and perpetuate the privilege of some to the detriment of others (Equinet, 2020).*

Unconscious Bias

Today, there is a greater appreciation of the fact that not all biases are overt hostility based on a personal animosity toward members of a group. **Unconscious bias** (also called "automatic" or "implicit" biases) are unexamined and sometimes subtle behaviours and/or thoughts, but are just as real in their consequences and impacts. An unconscious bias can be considered automatic, ambiguous, and ambivalent, but it is nonetheless biased, unfair, and disrespectful to a belief in equality.

> **Unconscious bias** are unexamined and sometimes subtle behaviours and/or thoughts [that are]... disrespectful to a belief in equality.

Most people have a positive view of themselves. They believe they have good values, rational thoughts, and strengths. Most people also identify as members of certain groups but not others. They are Canadian, or fans of Manchester United, or are doctors. Logic suggests, then, that because we like ourselves, we also like the groups in which we are members. We might feel affinity toward people from our home town, a connection with those who attend our university, or commiserate with the experience of people who share our gender identity, religion, or ethnicity. Liking yourself and the groups to which you belong is natural. The larger issue, however, is that own-

group preference often results in liking other groups less. And whether you recognize this "favouritism" as wrong, this trade-off is relatively unintended, immediate, and irresistible.

Figure 5.1.5 *Numerous biases affect your opinion about and behaviour towards others (Tucker, 2021).*

Social psychologists have developed several ways to measure this automatic preference, the most famous being the Implicit Association Test (IAT) which measures relatively automatic biases that favour own group relative to other groups (IAT; Greenwald, Banaji, Rudman, Farnham, Nosek, & Mellott, 2002; Greenwald, McGhee, & Schwartz, 1998). The test itself is rather simple (and you can experience it yourself here). The IAT is an especially useful way to measure potential biases because it does not simply ask people to openly report on the extent to which they discriminate against others. Instead, it measures how quickly people make judgments about the goodness or badness of various groups. The IAT is sensitive to very slight hesitations that result from having automatic or unconscious biases.

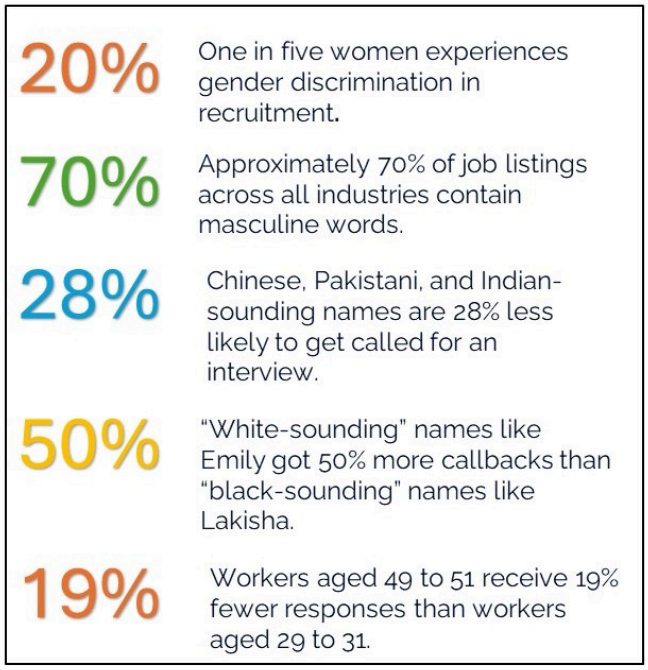


Figure 5.1.6 *Some startling statistics of how unconscious bias can impact the hiring process (Mrkonjic, 2022).*

People are generally faster at pairing their own group with "good" categories. In fact, this finding generally holds regardless of whether one's group is measured according to race, age, religion, nationality, and even temporary, insignificant memberships.

It turns out, that people's reaction time on the IAT predicts actual feelings about out-group members, decisions about them, and behaviour toward them, especially nonverbal behaviour (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). For example, a job interviewer might have two qualified applicants; a man and a woman. Although the interviewer may not be "blatantly biased," their "automatic or unconscious biases" may be harmful to one of the applicants. For example, the interviewer might hold a negative view of women and, without even realizing it, act distant and withdrawn while interviewing the female candidate. This sends subtle cues to the applicant that she is not being taken seriously, is not a good fit for the job, or is not likely to get hired. These small interactions can have devastating effects on the hopeful interviewee's ability to perform well (Word, Zanna, & Cooper, 1974).

Although this is unfair, sometimes the unconscious associations—often driven by society's stereotypes—trump our own explicit values (Devine, 1989). Sadly, this can result in consequential discrimination, such as allocating fewer resources to disliked outgroups (Rudman & Ashmore, 2009).

Ally or Allyship

Merriam-Webster defines "ally" as "one that is associated with another as a helper; a person or group that provides assistance and support in an ongoing effort, activity or struggle" (TCU, 2022, para 1). In recent years, the term has been adopted specifically to a person supporting a marginalized group. In this respect, being an ally means disrupting oppressive spaces and places. It is understanding the struggle of oppressed and marginalized people and how that oppression operates in order to end it through action. For someone in a dominant group, being an ally requires self-reflection on their own privilege as well as accepting their role in oppression.

Being or becoming an ally is a process rather than a destination; the process requires continual learning and self-awareness. Being an ally requires action: telling colleagues that their jokes are

inappropriate; advocating for the health, wellness and acceptance of people from underrepresented or marginalized groups. Ultimately, an ally is someone who is willing to use their privilege as a member of a dominant group and the power that comes with that privilege to advocate and work on behalf of the interests of marginalized and oppressed groups.

Privilege

The Oxford Language dictionary defines privilege as "a special right, advantage, or immunity granted or available only to a particular person or group". In the context of EDI, "privilege refers to the social, economic and political advantages or rights held by people from dominant groups on the basis of gender, race, sexual orientation, social class, etc. [Privilege is] unearned social power (set of advantages, entitlements, and benefits) accorded by the formal and informal institutions of society to the members of a dominant group (e.g., white/Caucasian people with respect to people of colour, men with respect to women, heterosexuals with respect to homosexuals, adults with respect to children, and rich people with respect to poor people)" (EDI Glossary, n.d.).

Privilege is often difficult to recognize for members of dominant groups because while many are willing to admit that those in marginalized groups live with a set of disadvantages, very few are willing to acknowledge the benefits they receive from being a member of the dominant group. "In other words, men are less likely to notice/acknowledge a difference in advantage because they do not live the life of a woman; white people are less likely to notice/acknowledge racism because they do not live the life of a person of colour; straight people are less likely to notice/acknowledge heterosexism because they do not live the life of a gay/lesbian/bisexual person" (EDI Glossary, n.d.). The following TedTalk video, *Understanding My Privilege,* explores the benefits of recognizing and unpacking privilege.

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Decolonization

Colonization is not an event. It is a structure. It is not something that happened in the past. Colonization is a complex system that is currently working to negatively impact each and every one of us. Colonization has led to the environmental destruction of the land, the attack on human lives, and the economic inequities experienced predominately by racialized people. It has caused, enforced, and protected acts of slavery and genocide. It is a local phenomenon and a global phenomenon. Colonization can be found on street names that honour white colonizers, in textbooks

that wipe out Indigenous history, and in the dominating European powers that have planted themselves around the world. To deconstruct colonization, we must collectively engage in a process of decolonization.

Decolonization requires a dismantling of power imbalances that uphold white superiority and dominance "and a shifting of power towards political, economic, educational, and cultural independence and power that originate from a colonized nation['s] own indigenous culture" (EDI Glossary, n.d.). Decolonization involves the dismantling of the social, political, and institutional structures that perpetuate systems deeming one group superior to another. Review the follow video, *Decolonial Thinking*, for a further explanation of what decolonization means.

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Conclusion

Transformative learning takes place at the highest levels and occurs when we encounter situations that challenge our accumulated knowledge and our ability to accommodate that knowledge. Thus, developing communication competence in the area of equity, diversity, and inclusion will entail a degree of discomfort as we challenge our accumulated knowledge. Some of the skills important to developing this communication competence are the ability to empathize, accumulate cultural information, listen, resolve conflict, manage anxiety (Bennett, 2009) and to use the correct terminology to communicate our thoughts. You are already developing a foundation for these skills by reading this unit. In our next chapter, we examine EDI in the Canadian Workforce.

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5.2 EDI in the Canadian Workplace

Equity, diversity, and inclusion (EDI) should be a welcomed concept in all parts of life, including the workplace. EDI is not simply a feel good concept; instead, EDI "is a mindset and approach that unites ethical management and high performance" (Bearman, n.d., para. 3) that results in many tangible benefits for organizations. Today, Canada is a multi-cultural society with businesses that operate in a multicultural world serving multicultural customers and audiences. Businesses that are not integrating practices, policies, and initiatives dedicated to promoting EDI have missed the train. In the workplace of today and tomorrow, EDI is ubiquitous with good business.

> Unchecked bias can literally jeopardize a company's goals and objectives.
>
> **(Williams, 2020)**

In this unit we will look at the make-up of the Canadian work environment, attitudes towards EDI, and strategies that promote the adoption of EDI practices.

An Overview of the Canadian Workforce

Ethnicity and Race

Let's begin with an overview of diversity in Canada and the Canadian workplace. Canada is known to be a multicultural country primarily because of its immigration system. Accordingly, in 2021 "more than 450 ethnic or cultural origins" ("The Canadian Census", 2022, para. 9) were present in Canada. Among these, three specific ethnic groups: South Asian, Chinese, and Blacks made-up 16.9% of Canada's population ("The Canadian Census", 2022, para. 12). This diversity in Canada's general population is also reflected in its workforce from coast to coast to coast. Figure 1.1 presents a picture of Canada's immigrant population in major metropolitan cities across the country. Edmonton, Calgary, Vancouver, Abbotsford-Mission, and Toronto being the cities that have the largest percentage of immigrant workers in their workforce. More than one-half of Toronto's labour force, 51.8%, is composed of immigrants (Jobs in Canada, 2022).

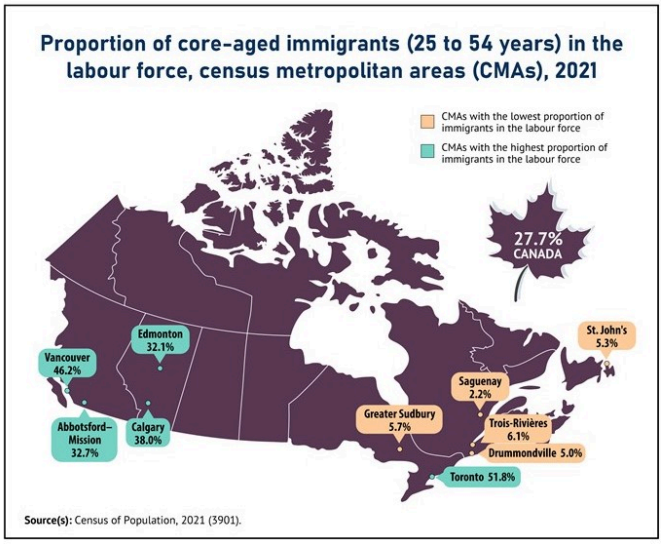

Figure 5.2.1 *The immigrant population in some of Canada's major metropolitan cities (Jobs in Canada, 2022).*

Additional research tells us that the percentage of this population in the workforce is not a fleeting phenomenon. Instead, the percentage of Canada's ethnic population is projected to grow to approximately 35% by 2036 (Martel, 2019).

Gender, Sexuality, Age, and Ability

As we've discussed in the previous chapter (see Unit 47), diversity is not simply about ethnicity or race. Diversity also includes considerations of gender, sexuality, age, and ability among other groups. A workplace that is committed to EDI should employ a workforce that reflects the wider umbrella of the Canadian population. The following statistics will provide insight into the broader spectrum of Canada's workforce diversity umbrella.

- Approximately 28% or 5.9 million workers in the Canadian workforce are from racialized communities.
- Almost 70% of women were employed full-time.
- Approximately 47% of the Canadian workforce are racialized women.
- Approximately 59% of indigenous people aged 15+ are part of Canada's workforce.
- Approximately 80% of gay males and 83% of lesbians between the ages of 25 – 64 are employed.
- Approximately 77% of bisexual males and 68% of bisexual females between the age of 25 – 64 are employed.
- Almost 16% of the Canadian workforce is composed of people with disabilities.
- Almost 20% of the Canadian workforce is between 50 – 64 years old.
- Approximately 82% of 25 – 30 year olds and 84% of 31 – 44 year olds are employed full time.

(A Salute to Canadian Workers, 2022; Morisette, 2021); StatsCan, 2022b).

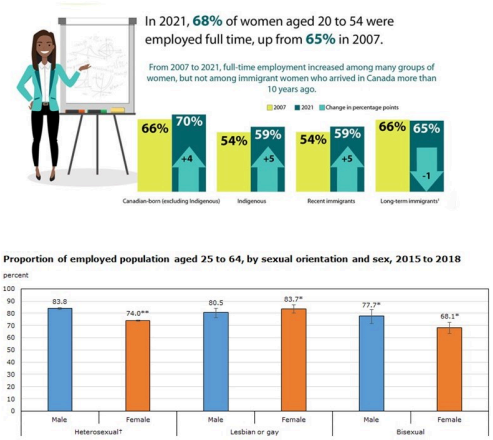

Figure 5.2.2 *Two images connected to Canada's workplace diversity on women and sexual identity (Women's Full-Time Employment in Canada, 2022; StatsCan, 2022b).*

Figure 5.2.2 tells a story of a Canadian workforce that is diverse and inclusive of a broad spectrum of Canadians. However, despite the many positive effects diversity and inclusion has on businesses (see **Figure 5.2.3**), the workplace continues to struggle with welcoming diversity and treating its workforce equally. In a recent study, 20% of women reported experiencing some form of gender discrimination in the hiring process, while 61% of all employees in the same study said they witnessed or were the recipient of discriminatory behaviour at work (Mrkonjik, 2022). Moreover, in Unit 47 we already discussed the findings that candidates with ethnic and racially identifiable names (e.g. Yusuf or Dequan) and candidates 50 years old and older (Mrkonjik, 2022) are less likely to be given the opportunity to even interview for a position. Clearly there is much work to be done to achieve true inclusivity in the workplace.

EDI and Power in the Workplace

A final and important area in helping to understand the Canadian work environment is to review the management and leadership structures within organizations. Who are the decision makers? Who sets and influences policies and practices? Who establishes organizational culture? According to Singh (2021), in the Canadian and the American context, "businesses still struggle to achieve diverse representation at all internal management levels".

In Canada, white males were twice as likely as both men and women in racialized groups and white women to hold decision making positions and positions of power within organizations (Statistics Canada, 2022d). Moreover, a recent LinkedIn Learning (n.d.) study reported that approximately 93% of Fortune 500 companies do not have women CEOs, and of the top 50 most valuable public companies in the United States, only 8% of top executives are Black. In fact, according to the same report, a minimum of eight companies had no Black employee in a management position (LinkedIn Learning, n.d.). Thus, despite the push by many companies in Canada and the U.S. to implement EDI initiatives, the established power structure continues.

The real power to influence and shape the business environment remains in the hands of white males. **Figure 5.2.3** offers similar findings on the distribution of power and influence on the boards of major Canadian businesses.

Figure 5.2.3 *The likelihood of a member of a diverse population being included on a board in the Canadian context (Diversity Among Board Directors and Officers, 2019).*

An overview of the Canadian workforce strongly indicates that interacting with people from diverse groups is no longer optional. However, understanding how to create work environments that embrace and foster EDI is not automatic. Making the situation more complicated is the tendency of members from dominant groups to be less willing to do the work and make the changes necessary to embrace EDI. A recent report, noted that only 27% of white workers believe that EDI initiatives are important in the work environment (Mrkonjic, 2022).

> “the resistance may be unconscious but is nonetheless damaging”

Further, according to Ahrndt (2020), this resistance to EDI initiatives often creates work environments where individuals from nondominant groups are expected to comply or adapt to the behaviours and attitudes of the dominant group. For example, “women in corporate environments may adapt masculine communication patterns, people who are gay or lesbian may self-censor and avoid discussing their same-gender

partners with coworkers, and people with nonvisible disabilities may not disclose them in order to avoid judgment" (Ahrndt, 2019, p. 22).

For many in dominant groups, the resistance may be unconscious but nonetheless damaging. Review the following video, *Equality, Diversity, and Inclusion: Open Your Minds* (2018), for an overview of the many damaging effects created by the resistance to EDI in the work environment.

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Implementing EDI in the Workplace

Despite the many positive impacts EDI has on workplace culture, productivity, and profits, there remains resistance to implementing EDI policies in many work environments. This resistance is one of the many puzzling attitudes against the overwhelming evidence that EDI works. Below are just a few of the many benefits companies experience from implementing EDI policies and initiatives.

- Diverse companies earn 2.5x higher cash flow per employee.
- Organizations in the top quartile for ethnic diversity have a +36% likelihood of financial outperformance.
- Inclusive teams are over 35% more productive.
- Diverse teams make better decisions 87% of the time.
- Organizations in the top quartile for gender diversity have a +25% likelihood of financially outperforming their peers.
- Companies with a EDI team were 22% more likely to be seen as "an industry-leading company with high-caliber talent".
- Seventy-one percent of employers say diversity practices have a positive impact on their company.
- Seventy-six percent of employees and job seekers said diversity was important when considering job offers.
- Eighty percent of survey respondents said they want to work for a company that values EDI issues.
- The younger generations—millennials and older Gen Z—prefer diverse companies to buy from and work for.

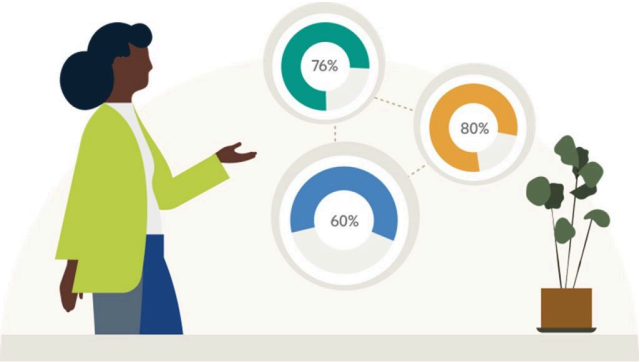

Figure 5.2.4 *The number of employees who think diversity is important (Linkedin Learning, n.d.).*

(Linkedin Learning, n.d.)

So, what do the numbers tell us? Companies with EDI initiatives receive financial benefits and create environments that employees want to work in, are more productive in, and are more innovative in. The good news is that more and more companies seem to be waking up to these benefits. A recent report noted that "45% of learning & development professionals planned to implement DEI programs in 2022" (Linkedin Learning, n.d.), an increase of 11% from the previous year, and between 2015 – 2017, 23 % more CEOs were implementing hiring practices targeting 'talent diversity and inclusiveness" (Mrkonjic, 2022).

Figure 5.2.5 *Some of the benefits of implementing EDI policies in the workplace.*

Some of the more effective policies that CEOs, hiring managers, and human resource departments are implementing to create diverse, equitable, and inclusive work environments are discussed briefly below (Linkedin Learning, n.d.; Mrkonjic, 2022).

Strategies for Workplace Inclusivity

> "To address structural racism, you [must] change structures."
> (Williams, 2020)

Changing a behaviour we don't like or establishing a new behaviour we want is a difficult process. It takes weeks, months, and sometimes many years to permanently change or establish a new pattern of behaviour. The same principle holds true for changing organizational culture and structures. In fact, such systemic changes in organizations are often more challenging to implement and sustain (Williams, 2020). Research suggests that changes can be made to three organizational systems: recruitment, retention, and promotion, to foster work environments reflective of EDI. (*Diversity in Canadian Workplaces*, n.d; Williams, 2020).

Recruitment

Recruiting and hiring the right talent is crucial to the survival of every business. Without the right talent and knowledge base, an organization cannot fulfil its objective. Many of the statistics shared earlier in this chapter indicate that a diverse workforce supports the primary aim of organizations to be successful. A few recruitment strategies that will allow organizations to attract and hire a diverse workforce are discussed below.

- Ensure job descriptions focus on the skills required, use inclusive language, and omit unnecessary jargon that may not be understood by a diverse audience.
- Utilize AI to screen out information from applicant resumes that may suggest an applicant is part of a particular group (e.g. screen out names).
- Ensure everyone on the interview committee has undergone unconscious bias training. According to the report, *Diversity in Canadian Workplaces Initiative* (n.d.), the need to ensure those responsible for hiring had "unconscious bias raining emerged as consistent areas of focus" (p. 3) in discussions with a wide group of employers and employees.
- Widen the pool of potential job applicants by establishing relationships with community organizations that services underrepresented and diverse groups.
- Implement evidence and metrics-based tracking system to keep track of who survives the interview process. Knowing this information can help an organization make changes to ensure its recruiting process achieves the goal of inclusion.

(Diversity in Canadian Workplaces Initiative, n.d; Williams, 2020).

Figure 5.2.6 *The importance of tracking the results of an organizations recruitment and hiring process. A process that always ends with the same result should be tweaked if a different result is desired (Williams, 2020).*

Retention

Retaining talented, trained, and experienced employees is a major concern for all business. Once hired, companies can utilize the following strategies to retain a diverse workforce.

- Change must start from the top. Therefore, provide management with the tools and training to develop a genuine understanding of the importance of diversity and inclusion.
- Depending on the size of the company, establish a position or a department dedicated to implementing, maintaining, and monitoring the progress of EDI initiatives and programs.
- Establish Employee Resource Groups dedicated to advocating for and responding to the needs of diverse groups.
- Encourage a culture of safe and open conversations about EDI to foster greater understanding and sense of inclusion among employees.
- Establish a baseline, then collect evidence and use metrics to track the effectiveness of EDI initiatives and policies.

(Diversity in Canadian Workplaces Initiative, n.d; Williams, 2020).

Promotion

Research tells us that power and influence in organizations continue to remain in the hands of white males and that the structures and processes that perpetuate this power imbalance are resistant to change (Diversity Among Board Directors and Officers, 2019; Singh, 2021; Statistics Canada, 2022d; Linkedin Learning, n.d.). Resistant to change though it may be, to achieve true inclusivity, board, management, and leadership positions must include representatives from diverse communities. The following are just a few strategies that may begin to shift this management and leadership power imbalance.

- Establish mentorship and coaching opportunities between senior management and underrepresented employee groups to facilitate a pathway to leadership and management positions.
- Use search firms that are run by and cater to underserved communities to widen the candidate pool and identify possible leadership, management, and board candidates.
- Implement a clear and transparent talent development plan and process.
- Use metrics to track the composition of boards, leadership, and management overtime.

(Diversity in Canadian Workplaces Initiative, n.d; Williams, 2020; Singh, 2021).

The following video, *Why Corporate Diversity Programs Fail and Why Small Tweaks can Have Big Impacts (2020),* provides a concise overview of barriers preventing companies from achieving true inclusion and strategies to overcome those barriers.

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Conclusion

The Canadian workforce is diverse and getting more diverse as Canada continues to be a country that welcomes citizens from every part of the world. "Diversity if our strength" is not simply a phrase, but a fact backed up by statistics on all segments of the Canadian workforce. In this chapter, we discussed some strategies that organizations and businesses can implement to create truly diverse and inclusive work environments. However, on an individual level, what can you do? What role and responsibility do you have in transforming the Canadian workforce? Our next chapter on Decolonializing the Work Environment explores these very important questions.

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5.3 Indigenous Peoples: Building Communication Competence

Understanding how to effectively communicate with Indigenous peoples deserves special consideration and focus. Considering the deep, rich, important, and long history of Indigenous peoples, learning how to communicate effectively with this segment of the Canadian diaspora is an opportunity to understand a set of perspectives and values fundamental to Canadian culture. What's more, these perspectives and values can help all of us communicate in a more effective and inclusive manner.

The Importance of Terminology

Deciding what terminology to use to identify Indigenous people is important, especially considering the historical and present context in which terminology is used to marginalize and oppress the original inhabitants of this land. The word Indigenous is itself a good place to start. Those who are considered Indigenous today, are descendants of people who were living on this land prior to colonization by Europeans.

In what is now known as Canada, there are three distinct groups of Indigenous people — First Nations, Métis, and Inuit. According to their own traditions and teachings, the Inuit and First Nations people have been on this land since time immemorial (forever). People who identify as Métis are descendants of First Nations and European parentage.

Indigenous people identify themselves in many different ways. A term that one person embraces could offend another. It is important to be respectful of how Indigenous people themselves want or choose to be identified.

To get started, watch the video below, *How to Talk About Indigenous People*, that clearly explains use of the terms Indigenous, Aboriginal, First Nations, Métis, and Inuit.

Consider as you view the video:

- What is your own level of comfort or awareness about what terms to use in relation to the people Indigenous to Turtle Island?
- What terms did you learn growing up?
- If you are not Canadian born, what terms might you have heard used to refer to people who are First Nations, Métis, and Inuit?

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Select the information icons to learn more about each group.

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To continue learning the terminology around communicating with Indigenous peoples, click each term to learn its meaning.

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Increasing communication competence with our Indigenous brothers and sisters requires the effort to ensure that we use correct terminology in our interactions. Doing so, is important for clear dialogue and building a sense of inclusion. It is our responsibility to "recognize the potential these words may hold…how identity is created and defined,… and their impacts on the day-to-day experiences of [Indigenous] peoples" (Kesler, 2020, para. 21).

The following are suggestions for using terminology in a respectful manner when communicating with and about Indigenous peoples.

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Visit the chapter on Inclusive Language for additional suggestions on the correct use of terminology.

The Medicine Wheel

The Medicine Wheel is a concept of how to live life in balance. The Medicine Wheel considers four aspects of the self — your emotions, your body, your intellect, and your spiritual self interconnected to land and in relationship to others (family, communities, nations). This **worldview** is a way of thinking or living by a person, a group, or a society. In general, a worldview is a set of values and beliefs that are upheld and respected by individuals. An individual or group's worldview affects how they relate to the people, animals, and other elements of their environment. Developing communication competence involves acknowledging this worldview to ensure that indigenous peoples have their cultural integrity not only valued by honoured (Tierney & Jun, 2011).

The Medicine Wheel is depicted below . Open each quadrant to reveal its meaning.

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Our world view is fundamental to how we communicate with each other. The following video, *In Our Voices: Indigenous Worldview,* further explores the connection between communication and a worldview.

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Principles to Develop Communication Competence

The following information presents principles to develop inclusive, safe, and successful communication with Indigenous peoples.

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Although the principles presented are not exhaustive, they do offer a starting point to begin developing communication competence with Indigenous peoples.

Conclusion

Successful relationships depend on effective communication. As you have already learned in this course, communication is successful when the sender and receiver have a mutual understanding of information. For some of us, continuous, ongoing, and intentional efforts will be necessary to learn and use correct terminology relevant to Indigenous peoples, understand the Indigenous worldview, and utilize Indigenous principles of communication. However, the potential impact of these new understandings is well worth the effort. Developing these skills will not only add to your ability to communicate effectively in your interactions with Indigenous peoples, but in all interactions in other aspects of your life

Attributions

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College Libraries Ontario. (n.d.). *Maamwi*. The Learning Portal. https://tlp-lpa.ca/maamwi

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5.4 Intercultural Communication

Intercultural communication is communication between people with differing cultural identities. Culture and identity are created, understood, and transformed through intercultural communication. Given the almost "border-less" nature of business, it is essential to become adept at communicating effectively and respectfully with others from different cultures. Another reason you should study intercultural communication is to foster greater self-awareness (Martin & Nakayama, 2010). Your thought process regarding culture is often "other focused," meaning that the culture of the other person or group is what stands out in your perception. However, the old adage "know thyself" is appropriate, as you become more aware of your own culture by better understanding other cultures and perspectives. Intercultural communication can allow you to step outside of your comfortable, usual frame of reference and see your culture through a different lens. Additionally, as you become more self-aware, you may also become more ethical communicators as you challenge your ethnocentrism, or your tendency to view your own culture as superior to other cultures. The video below explains cultural competence and offers strategies on how to develop this very important skill.

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(Cultural Competence, 2021)

Defining Culture

Culture is the term used to describe this dimension of meaningful collective existence. Culture refers to the shared symbols that people create to solve real-life problems. Within this context, we understand that human experience is essentially meaningful or cultural. Human social life is necessarily conducted through the meanings humans attribute to things, actions, others, and themselves. In a sense, people do not live in direct, immediate contact with the world and each other; instead, they live only indirectly through the medium of the shared meanings provided by culture. This mediated experience is the experience of culture.

Culture can be defined as patterns of learned and shared behavior that are cumulative and transmitted across generations. We see patterns in the systematic and predictable ways of behavior or thinking across members of a culture. Patterns reflect how people think and feel, as well as what they believe. These patterns emerge from adapting, sharing, and storing cultural information.

Patterns can be both similar and different across cultures. For example, in both Canada and India it is considered polite to bring a small gift to a host's home. In Canada, it is more common to bring a bottle of wine and for the gift to be opened right away. In India, by contrast, it is more common to bring sweets, and often the gift is set aside to be opened later.

Culture is the product of people sharing with one another. Humans cooperate and share knowledge and skills with other members of their networks. The ways they share, and the content of what they share, helps make up culture. Older adults, for instance, remember a time when long-distance friendships were maintained through letters that arrived in the mail every few months. Contemporary youth culture accomplishes the same goal through the use of instant text messages on smartphones.

Behaviors, values, norms are acquired through a process known as **enculturation** that begins with parents and caregivers, because they are the primary influence on young children. Caregivers teach kids, both directly and by example, about how to behave and how the world works. They encourage children to be polite, reminding them, for instance, to say "Thank you." They teach kids how to dress in a way that is appropriate for the culture.

Culture can be easily mistaken for the superficial signs that offer some indications of cultural expression. However, culture is much deeper than the eye can see, as shown in the culture iceberg of **Figure 5.4.1**, which is an adaptation of Edward Hall's original version and which is commonly used to help visualize the hidden depths of culture.

Adapted from Edward T. Hall's Cultural Iceberg Model (1976)
© Copyright Multicultural Council of Saskatchewan (2017)

Figure 5.4.1 *The Cultural Iceberg, adapted from Edward T. Hall's Cultural Iceberg Model* (Multicultural Council of Saskatchewan, 2017)

Many misunderstandings can be avoided by remembering that in whatever context you find yourself, factors that may not be readily evident may be at play in your interactions with others. Using this empathetic understanding will allow you to seek a deeper understanding while developing a mindful approach or response. **Ethnocentrism,** however, may make you far less likely to be able to bridge the gap with others and often increases intolerance of difference. Business and industry are no longer regional, and in your career, you will necessarily cross borders, languages, and cultures. You will need tolerance, understanding, patience, and openness to difference. A skilled business communicator knows that the process of learning is never complete, and being open to new ideas is a key strategy for success.

Exercise 5.4.1

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Clarifying Terms

Although they are often used interchangeably, it is important to note the distinctions between the terms referring to culture.

First, communication with yourself is called **intrapersonal** communication, which may also be intracultural, as you may only represent one culture. But most people belong to multiple groups, each with their own culture. For example, consider a person who resides in Ontario and visits Quebec on business. She begins to communicate verbally in French. She may then often find herself thinking and speaking to herself not in English but in French if she is fluent in that language. Surely the language in this case brings back lived experience and informs how thinking occurs and which expressions are used that reflect the culture around. Sometimes a conversation with yourself reveals competing goals, objectives, needs, wants, or values. How did you learn of those goals, or values? Similarly, you may struggle with the demands of various groups and their expectations and could consider this struggle intercultural conflict.

Multiculturalism refers to both the existence of a diversity of cultures within one territory and to a way of conceptualizing and managing cultural diversity. As a policy, multiculturalism seeks to both promote and recognize cultural differences while addressing the inevitability of cultural tensions. Critics of multiculturalism identify four related problems:

- Multiculturalism only superficially accepts the equality of all cultures; e.g., there are only two official languages in Canada.
- Multiculturalism obliges minority individuals to assume the limited cultural identities of their ethnic group of origin, which leads to stereotyping.
- The ideal of multiculturalism isolates minorities who do not integrate into existing Canadian society.
- Multiculturalism is based on recognizing group rights which undermines constitutional protections of individual rights.

According to Olds College, "**Cross-cultural** approaches typically go a bit deeper, the goal being to be more diplomatic or sensitive. They account for some interaction and recognition of difference through trade and cooperation, which builds some limited understanding—such as, for instance, bowing instead of shaking hands, or giving small but meaningful gifts. . . . Sadly, they are not always nuanced comparisons; a common drawback of cross-cultural comparisons is that we can wade into stereotyping and ethnocentric attitudes—judging other cultures by our own cultural standards—if we aren't mindful" (2020).

Intercultural societies, on the other hand, show deep comprehension and respect for differences. Members of an intercultural society learn and grow from one another. Interactions within the society are based not on tolerance but on acceptance and lead to the mutual exchange of ideas and norms to build deeper relationships. For businesses to succeed in the global economy, intercultural relationships must be developed for sustained growth and cooperation. This can be achieved through mindful intercultural communication, which will be discussed below.

Understanding Intercultural Communication

The American anthropologist Edward T. Hall is often cited as a pioneer in the field of intercultural communication (Leeds-Hurwitz, 1990; Chen & Starosta, 2000). Born in 1914, Hall spent much of his early adulthood in the multicultural setting of the American Southwest, where Native Americans, Spanish-speakers, and descendants of pioneers came together from diverse cultural perspectives. He then traveled the globe during World War II and later served as a U.S. State Department official. Whereas culture had once been viewed by anthropologists as a single, distinct way of living, Hall saw how individual perspective influences interaction.

By focusing on interactions rather than cultures as separate from individuals, he asked people to evaluate the many cultures they belong to or are influenced by, as well as those with whom they interacted. While his view makes the study of intercultural communication far more complex, it also

brings a healthy dose of reality to the discussion. Hall is generally credited with eight contributions to the study of intercultural communication as follows:

1. **Focus on the interactions:** Avoid focusing on the generalities of culture; rather, focus on the interactions versus general observations.
2. **Shift to a local perspective:** A global perspective greatly widens the context within which interactions occur. Shift to a local perspective rather than focusing on a global perspective to make the analysis of interactions understandable and manageable.
3. **Strive to understand local signs:** Time, space, gestures, and gender roles can be studied, even if we lack a larger understanding of the entire culture.
4. **Learn the rules:** People create rules for themselves in each community that we can learn from, compare, and contrast.
5. **Honor personal experience:** Personal experience has value in addition to more comprehensive studies of interaction and culture.
6. **Use linguistics as a model:** Descriptive linguistics serves as a model to understand cultures, and the U.S. Foreign Service adopted it as a basis for training
7. **Apply understanding to trade and commerce:** Intercultural communication can be applied to international business. U.S. Foreign Service training yielded applications for trade and commerce and became a point of study for business majors
8. **Recognize the interconnectivity of culture and communication:** Culture and communication are intertwined and bring together many academic disciplines (Chen & Starosta, 2000; Leeds-Hurwitz, 1990; McLean, 2005).

Hall indicated that emphasis on a culture as a whole, and how it operated, might lead people to neglect individual differences. Individuals may hold beliefs or practice customs that do not follow their own cultural norm. When you resort to the mental shortcut of a stereotype, you lose these unique differences. **Stereotypes** can be defined as a generalization about a group of people that oversimplifies their culture (Rogers & Steinfatt, 1999). Similarly, the American psychologist Gordon Allport explored how, when, and why people formulate or use stereotypes to characterize distinct groups. When you do not have enough contact with people or their cultures to understand them well, you tend to resort to stereotypes (Allport, 1958).

In addition, **prejudice** involves a negative preconceived judgment or opinion that guides conduct or social behaviour (McLean., 2005). As an example, imagine two people walking into a room for a job interview. You are tasked to interview both; Allport (1958) rings true when he says we rely on stereotypes when encountering people or cultures with which we have had little contact. Will the candidates' dress, age, or gender influence your opinion of them? Will their race or ethnicity be a conscious or subconscious factor in your thinking process? Allport's work would indicate that those factors and more will make you likely to use stereotypes to guide your expectations of them and your subsequent interactions with them. Sometimes prejudices also assume similarity, thinking that people are all basically similar. This denies cultural, racial, ethnic, socioeconomic, and many other valuable, insightful differences. In summary, ethnocentric tendencies, stereotyping, and assumptions of similarity can make it difficult to learn about cultural uniqueness.

Exercise 5.4.2

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Exploring Cultural Characteristics: The Business Context

Figure 5.4.2 *Culture Characteristics [Image Description]*

Groups come together, form cultures, and grow apart across time. How do you become a member of a community, and how do you know when you are full member? What aspects of culture do people have in common, and how do they relate to business communication? Researchers who have studied cultures around the world have identified certain characteristics that define a culture. These characteristics are expressed in different ways, but they tend to be present in nearly all cultures.

Initiations

Across the course of your life, you have undoubtedly passed several rites of initiation but may not have taken notice of them. Did you earn a driver's license, register to vote, or acquire the permission to purchase alcohol? In North American culture, these three common markers indicate the passing from a previous stage of life to a new one, with new rights and responsibilities.

Cultures tend to have rituals for becoming a new member. A newcomer starts out as a nonentity, a stranger, an unaffiliated person with no connection or even possibly awareness of the community. Newcomers who stay around and learn about the culture become members. Most cultures have a rite of initiation that marks the passage of the individual into the community; some of these rituals may be so informal as to be hardly noticed (e.g., the first time a coworker asks you to join the group to eat lunch together), while others may be highly formalized (e.g., the ordination of clergy in a religion). The nonmember becomes a member, the new member becomes a full member, and individuals rise in terms of responsibility and influence.

Rites of initiation mark the transition of the role or status of the individual within the group. Your first day on the job may have been a challenge as you learned your way around the physical space, but the true challenge was to learn how the group members in your department communicate with each other. In every business, there are groups, power struggles, and unspoken ways that members earn their way from the role of a "newbie" to that of a full member. The newbie may get the tough account, the office without a window, or the cubicle next to the bathroom, denoting low status. As new members learn to navigate through the community—establishing their reputation and being promoted—they pass the rite of initiation and acquire new rights and responsibilities.

Over time, the person comes to be an important part of the business, a "keeper of the flame." The "flame" may not exist in physical space or time, but it does exist in the minds of those members in the community who have invested time and effort in the business. It is not a flame to be trusted to a new person, as it can only be transferred as the person develops trust with the group. Along the way, there may be personality conflicts and power struggles over resources and perceived scarcity (e.g., there is only one promotion and everyone wants it). All these challenges are to be expected in any culture.

Shared History and Traditions

Think for a moment about the history of a business like Tim Hortons—what are your associations with Tim Horton, the relationship between hockey, coffee, and donuts? Traditions form as the organization grows and expands, and stories are told and retold to educate new members on how business should be conducted. The history of every culture, of every corporation, influences the present to the point that the phrase "we've tried that before" can become a stumbling block for members of the organization, for example, as it grows and adapts to new market forces. Struggles between members who have weathered many storms and new members, who come armed with new educational perspectives, technological tools, or experiences that may contribute to growth, may slow progress.

Cultures celebrate heroes, denigrate villains, and have specific ways of completing jobs and tasks. In business and industry, the emphasis may be on effectiveness and efficiency, but the practice can often be "because that is the way we have always done it." Traditions serve to guide our performance and behaviour and may be limited to small groups or celebrated across the entire company.

Traditions can serve to bind a group together or to constrain it. Institutions tend to formalize processes and then have a hard time adapting to new circumstances. While the core values or mission statement may hold true, the method of doing things that worked in the past may not be as successful as it once was. Adaptation and change can be difficult for individuals and companies, and yet all communities, cultures, and communication contexts are dynamic, or always changing. As much as we might like things to stay the same, they will always change—and we will change with (and be changed by) them.

Shared Values and Principles

Cultures all hold values and principles that are commonly shared and communicated from older members to younger (or newer) ones. In organizations, these are often communicated through action, attitude, and goals, and new employees learn of these through those around them. Established organizations may explicitly describe the values and principles; however, often they are not so clearly evident and would require time for "newbies" to learn with guidance from experienced employees.

Shared Purpose and Mission

Cultures share a common sense of purpose and mission. Why are we here and whom do we serve? In business, the answers to these questions often can be found in mission and vision statements of almost every organization. Individual members will be expected to acknowledge and share the mission and vision and make them real through action. Without action, the mission and vision statements are simply an arrangement of words. As a guide to individual and group behavioural norms, they can serve as a powerful motivator and a call to action. For example, Boeing Canada's Purpose and Mission, and Aspiration statements are as follows:

Purpose and Mission: Connect, Protect, Explore and Inspire the World through Aerospace Innovation

Aspiration: Best in Aerospace and Enduring Global Industrial Champion

Based on these two statements, employees might expect a culture of innovation, quality, and safety as core to their work. What might those concepts mean in your everyday work if you were part of Boeing "culture?"

Employees at the administrative level and those who aspire to leadership roles would also find mission and values explained more fully in the organization's strategic plans, which often set out key goals for a specific period, say 2-5 years. These plans are important documents that serve to guide administrators in designing their departmental-level goals and projects such that they align with the overall purpose and goals of the organization as a whole.

Shared Symbols, Boundaries, Status, and Language

Many people learn early in life what a stop sign represents, but not everyone knows what a ten-year service pin on a lapel, or a corner office with two windows means. Cultures have common symbols that mark them as a group; the knowledge of what a symbol stands for helps to reinforce who is a group member and who is not. Cultural symbols include dress, such as the Western business suit and tie in North America. Symbols also include slogans or sayings, such as "Mr. Christie you make

good cookies" or "Noooobody". The slogan may serve a marketing purpose but may also embrace a mission or purpose within the culture. Family crests and clan tartan patterns serve as symbols of affiliation. Symbols can also be used to communicate rank and status within a group.

Space and status are other common cultural characteristics; space may be a nonverbal symbol that represents status and power. In most of the world's cultures, a person occupying superior status is entitled to a physically elevated position—a throne, a dais, a podium from which to address subordinates. Subordinates may be expected to bow, curtsy, or lower their eyes as a sign of respect. In business, the corner office may offer the best view with the most space. Movement from a cubicle to a private office may also be a symbol of transition within an organization, involving increased responsibility as well as power. Parking spaces, the kind of vehicle you drive, and the transportation allowance you have may also serve to communicate symbolic meaning within an organization.

The office serves our discussion on the point concerning boundaries. Would you sit on your boss's desk or sit in his chair with your feet up on the desk in his presence? Most people indicate they would not, because doing so would communicate a lack of respect, violate normative space expectations, and invite retaliation. Still, subtle challenges to authority may arise in the workplace. A less than flattering photograph of the boss at the office party posted to the recreational room bulletin board communicates more than a lack of respect for authority. By placing the image anonymously in a public place, the prankster clearly communicates a challenge, even if it is a juvenile one. Again, there are no words used to communicate meaning, only symbols, but those symbols represent significant issues.

Communities have their own vocabulary and way in which they communicate. Consider the person who uses a sewing machine to create a dress and the accountant behind the desk who uses software to create a spreadsheet; both are professionals and both have specialized jargon used in their field. If they were to change places, the lack of skills would present an obstacle, but the lack of understanding of terms, how they are used, and what they mean would also severely limit their effectiveness. Those terms and how they are used are learned over time and through interaction. While a textbook can help, it cannot demonstrate use in live interactions.

Read the following web article: Culture at Work: The Tyranny of 'Unwritten Rules'

Exercise 5.4.3

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=129#h5p-34

Understanding Divergent Cultural Characteristics

People have viewpoints, and they are shaped by their interactions with communities. Cultures reflect inequality, diversity, and the divergent range of values, symbols, and meanings across communities. Let's examine several points of divergence across cultures.

Figure 5.4.3 *Image of teamwork.* Source: Pixabay.com

Individualistic versus Collectivist Cultures

The Dutch researcher Geert Hofstede explored the concepts of individualism and collectivism across diverse cultures (Hofstede, 2005). He found that in individualistic cultures like the United States and Canada, people value individual freedom and personal independence, and perceive their world primarily from their own viewpoint. They perceive themselves as empowered individuals, capable of making their own decisions, and able to make an impact on their own lives.

Cultural viewpoint is not an either/or dichotomy, but rather a continuum or range. You may belong to some communities that express individualistic cultural values, while others place the focus on a collective viewpoint. Collectivist cultures (Hofstede, 1982), including many in Asia and South America, and many Indigenous cultures, focus on the needs of the nation, community, family, or group of workers. Ownership and private property is one way to examine this difference. In some cultures,

property is almost exclusively private, while others tend toward community ownership. The collectively owned resource returns benefits to the community. Water, for example, has long been viewed as a community resource, much like air, but that has been changing as business and organizations have purchased water rights and gained control over resources. How does someone raised in a culture that emphasizes the community interact with someone raised in a primarily individualistic culture? How could tensions be expressed and how might interactions be influenced by this point of divergence?

Trompenaar's research (1998) suggested cultures may change more quickly than we realize and showed Mexico and the former communist countries of Czechoslovakia and the Soviet Union have high levels of individualism. Mexico's involvement in NAFTA and the global economy could explain the shift from a communitarian culture. This contrasts with Hofstede's earlier research, which found these countries to be collectivist and shows the dynamic and complex nature of culture. Countries with high communitarianism include Germany, China, France, Japan, and Singapore.

Explicit-Rule Cultures versus Implicit-Rule Cultures

Do you know the rules of your business or organization? Did you learn them from an employee manual or by observing the conduct of others? Your response may include both options, but not all cultures communicate rules in the same way. In an explicit-rule culture, where rules are clearly communicated so that everyone is aware of them, the guidelines and agenda for a meeting are announced prior to the gathering. In an implicit-rule culture, where rules are often understood and communicated non-verbally, there may be no agenda. Everyone knows why they are gathered and what role each member plays, even though the expectations may not be clearly stated. Power, status, and behavioural expectations may all be understood, and to the person from outside this culture, it may prove a challenge to understand the rules of the context.

Outsiders often communicate their "otherness" by not knowing where to stand, when to sit, or how to initiate a conversation if the rules are not clearly stated. While it may help to know that implicit-rule cultures are often more tolerant of deviation from the understood rules, the newcomer will be wise to learn by observing quietly—and to do as much research ahead of the event as possible.

High context and low context cultures

High context cultures are replete with implied meanings beyond the words on the surface and even body language that may not be obvious to people unfamiliar with the context. Low context cultures are typically more direct and tend to use words to attempt to convey precise meaning.

For example, an agreement in a high context culture might be verbal because the parties know each other's families, histories, and social position. This knowledge is sufficient for the agreement to be enforced. No one actually has to say, "I know where you live. If you don't hold up your

end of the bargain, ...” because the shared understanding is implied and highly contextual. A low context culture usually requires highly detailed, written agreements that are signed by both parties, sometimes mediated through specialists like lawyers, as a way to enforce the agreement. This is low context because the written agreement spells out all the details so that not much is left to the imagination or “context.”

Watch the video below for an illustration of how communication can be altered when two different cultures communicate.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=129#oembed-2

Uncertainty-Accepting Cultures versus Uncertainty-Rejecting Cultures

When people meet each other for the first time, they often use what they have previously learned to understand their current context. People also do this to reduce uncertainty. Some cultures, such as the United States and Britain, are highly tolerant of uncertainty, while others go to great lengths to reduce the element of surprise. Whereas a U.S. business negotiator might enthusiastically agree to try a new procedure, the Egyptian counterpart would likely refuse to get involved until all the details are worked out.

Charles Berger and Richard Calabrese (1975) developed **Uncertainty Reduction theory** to examine this dynamic aspect of communication. Here are seven axioms of uncertainty:

1. There is a high level of uncertainty at first. As we get to know one another, our verbal communication increases and our uncertainty begins to decrease.

2. Following verbal communication, nonverbal communication increases, uncertainty continues to decrease, and more nonverbal displays of affiliation, like nodding one’s head to indicate agreement, will start to be expressed.

3. When experiencing high levels of uncertainty, we tend to increase our information-seeking behaviour, perhaps asking questions to gain more insight. As our understanding increases, uncertainty decreases, as does the information-seeking behaviour.

4. When experiencing high levels of uncertainty, the communication interaction is not as personal or intimate. As uncertainty is reduced, intimacy increases.

5. When experiencing high levels of uncertainty, communication will feature more reciprocity, or displays of respect. As uncertainty decreases, reciprocity may diminish.

6. Differences between people increase uncertainty, while similarities decrease it.

7. Higher levels of uncertainty are associated with a decrease in the indication of liking the other person, while reductions in uncertainty are associated with liking the other person more.

Time Orientation

Edward T. Hall and Mildred Reed Hall (1987) state that monochronic cultures consider one thing at a time, whereas polychronic cultures schedule many things at one time, and time is considered in a more fluid sense. In monochromatic time, interruptions are to be avoided, and everything has its own specific time. Even the multi-tasker from a monochromatic culture will, for example, recognize the value of work first before play or personal time. Canada, Germany, and Switzerland are often noted as countries that value a monochromatic time orientation.

Polychromatic time looks a little more complicated, with business and family mixing with dinner and dancing. Greece, Italy, Chile, and Saudi Arabia are countries where one can observe this perception of time; business meetings may be scheduled at a fixed time, but when they actually begin may be another story. Also note that the dinner invitation for 8 p.m. may in reality be more like 9 p.m. If you were to show up on time, you might be the first person to arrive and find that the hosts are not quite ready to receive you.

When in doubt, always ask before the event; many people from polychromatic cultures will be used to foreigner's tendency to be punctual, even compulsive, about respecting established times for events. The skilled business communicator is aware of this difference and takes steps to anticipate it. The value of time in different cultures is expressed in many ways, and your understanding can help you communicate and do business more effectively.

Short-Term versus Long-Term Orientation

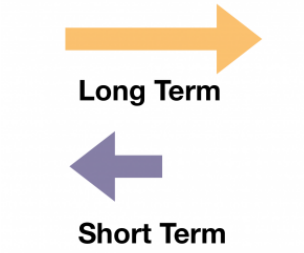

Figure 4.4.4 Short-Term/ Long-Term. [Image Description] Source: ecampusontario

Do you want your reward right now or can you dedicate yourself to a long-term goal? You may work in a culture whose people value immediate results and grow impatient when those results do not materialize. Geert Hofstede (2001) discusses this relationship of time orientation to a culture as a "time horizon," and it underscores the perspective of the individual within a cultural context. Many countries in Asia, influenced by the teachings of Confucius, value a long-term orientation, whereas other countries, including Canada, have a more short-term approach to life and results. Indigenous peoples are known for holding a long-term orientation driven by values of deep, long-term reflection and community consultation.

If you work within a culture that has a short-term orientation, you may need to place greater emphasis on reciprocation of greetings, gifts, and rewards. For example, if you send a thank-you note the morning after being treated to a business dinner, your host will appreciate your promptness. While there may be a respect for tradition, there is also an emphasis on personal representation and honour, a reflection of identity and integrity. Personal stability and consistency are also valued in a short-term oriented culture, contributing to an overall sense of predictability and familiarity.

Long-term orientation is often marked by persistence, thrift and frugality, and an order to relationships based on age and status. A sense of shame for the family and community is also observed across generations. What an individual does reflects on the family and is carried by immediate and extended family members.

Direct versus Indirect

In Canada, business correspondence is expected to be short and to the point. "What can I do for you?" is a common question when a business person receives a call from a stranger; it is an accepted way of asking the caller to state his or her business. In some cultures it is quite appropriate to make direct personal observation, such as "You've changed your hairstyle," while for others it may be observed, but never spoken of in polite company. In indirect cultures, such as those in Latin America, business conversations may start with discussions of the weather, or family, or topics other than business as the partners gain a sense of each other, long before the topic of business is raised. Again, the skilled business communicator researches the new environment before entering it, as a social faux pas, or error, can have a significant impact.

Materialism versus Relationships

Members of a materialistic culture place emphasis on external goods and services as a representation of self, power, and social rank. If you consider the plate of food before you, and consider the labour required to harvest the grain, butcher the animal, and cook the meal, you are focusing more on the relationships involved with its production than the foods themselves. Caviar may be a luxury, and it may communicate your ability to acquire and offer a delicacy, but it also represents an effort. Cultures differ in how they view material objects and their relationship to them, and some value people and relationships more than the objects themselves. The United States and Japan are often noted as materialistic cultures, while many Scandinavian nations feature cultures that place more emphasis on relationships.

Low-Power versus High-Power Distance

In low-power distance cultures, according to Hofstede (2009), people relate to one another more as equals and less as a reflection of dominant or subordinate roles, regardless of their actual formal roles as employee and manager, for example. In a high-power distance culture, you would probably be much less likely to challenge the decision, to provide an alternative, or to give input. If you are working with people from a high-power distance culture, you may need to take extra care to elicit feedback and involve them in the discussion because their cultural framework may preclude their participation. They may have learned that less powerful people must accept decisions without comment, even if they have a concern or know there is a significant problem. Unless you are sensitive to cultural orientation and power distance, you may lose valuable information.

While these previous points have quite commonly been used to improve our understanding of divergence, we can also consider Trompenaars' Model of National Culture Differences as an additional framework for understanding intercultural communication. Fons Trompenaars and Charles Hampden-Turner (1998) created the following description specifically for general business and management by conducting a large-scale survey of 8,841 managers and organization employees from 43 countries. Their model of national culture differences has seven dimensions: five orientations refer to how we deal with each other, one refers to time, and one addresses the environment.

Universalism vs. Particularism

Universalism is the belief that we can apply ideas and practices everywhere without modification. Particularism is the belief that circumstances dictate how we should apply ideas and practices. It asks, "What is more important, rules or relationships?" Cultures with high universalism see one reality and focus on formal rules. Business meetings are characterized by rational, professional arguments with a "get down to business" attitude.

Trompenaars' research found high universalism in the United States, Canada, UK, Australia, Germany, and Sweden. Cultures with high particularism view reality more subjectively and place a greater emphasis on relationships. It is important to get to know the people you are doing business with during meetings in a particularist environment. Someone from a universalist culture is wise not to dismiss personal meanderings as irrelevant or mere small talk during business meetings. Countries that have high particularism include Venezuela, Indonesia, China, South Korea, and Russia.

Neutral vs. Emotional

People from a neutral culture hold their emotions in check, while those in an emotional culture express their feelings openly. The Japanese and British cultures are neutral cultures. Examples of high emotional cultures include the Netherlands, Mexico, Italy, Israel, and Spain. In emotional cultures, people often smile, talk loudly, and greet each other with enthusiasm. When people from a neutral culture do business in an emotional culture, they should be ready for an animated and boisterous meeting and try to respond warmly. Those from an emotional culture doing business in a neutral culture should not be put off by a lack of emotion.

Specific vs. Diffuse

This category examines how individuals separate their personal and public lives. In a "specific" culture, individuals readily share their large public space and lives with others. They guard a small private space closely, which they only share with close friends and associates. In a "diffuse" culture, public and private space have less defined boundaries. Individuals guard their public space carefully because those who enter their public space can easily also enter their private space. Fred Luthans and Jonathan Doh (2021) gives the following example:

American students address their university professor as "Doctor Smith" in a university setting, but others often call the professor by their first name when shopping at a store and other public settings. His status changes because, according to American cultural values, people have large public spaces and often conduct themselves differently depending on their public role. Bob has a private space that is off-limits to students who must call him "Doctor Smith" in class.

In highly-diffuse cultures, people have a similar public and private life. In Germany, people will address a university professor formally, as Herr Professor Doktor Schmidt, at the university, local market, and bowling alley. People maintain a great deal of formality.

Achievement vs. Ascription

In an achievement culture, people are accorded status based on how well they perform. In an ascription culture, status is based on who or what a person is. Great attention is paid to one's

title and societal status. Do you have to prove yourself to obtain status, or does a person receive it? Achievement cultures include the United States, Austria, Israel, Switzerland, and the United Kingdom. Some ascription cultures are Venezuela, Indonesia, and China.

When people from an achievement culture do business in an ascription culture, it is important to have older, senior members with formal titles, and respect should be shown to their counterparts. However, for an ascription culture doing business in an achievement culture, it is important to bring knowledgeable members who can prove to be proficient to other groups, and respect should be shown for the knowledge and information of their counterparts.

Sequential versus synchronous time

As the Halls had discovered, time can be experienced differently by various cultures. Trompenaars discovered that a more literal and specific experience and measure of time is the sequential one: minutes, hours, days, weeks, months, years. Cultures that experience time sequentially are very time-conscious, valuing time as a scarce commodity. However, other cultures may experience time more synchronously. As suggested by this term, lots can happen at the same time, so the experience of time can be multi-dimensional as the past, present, and future are experienced in an interconnected flow (MindTools, n.d.).

Internal direction versus outer direction

The environment also plays an important part in how we experience culture: either in an internal-directed or outer-directed manner. How you perceive the environment will determine how you proceed in decision-making and in your actions. Internal-directed cultures believe that they can control their world; whereas outer-directed cultures believe that forces outside of their control affect their work (MindTools, n.d.). This belief system will affect how work is completed in teams.

Read the following Harvard Business Review article: Research: The Biggest Culture Gaps Are Within Countries, Not Between Them

Improving Your Intercultural Competence

As Edward Hall notes, experience has value. If you do not know a culture, you should consider learning more about it firsthand if possible. The people you interact with may not be representative of the culture as a whole, but that is not to say that what you learn from them lacks validity. Quite

the contrary; Hall asserts that you can, in fact, learn something without understanding everything, and given the dynamic nature of communication and culture, who is to say that your lessons will not serve you well? Consider a study abroad experience if that is an option for you, or learn from a classmate who comes from a foreign country or an unfamiliar culture. Be open to new ideas and experiences, and start investigating. Many have gone before you, and today, unlike in generations past, much of the information is accessible. Your experiences will allow you to learn about another culture and yourself, and help you to avoid prejudice.

OpenMed (n.d.) suggests: "for an individual to handle intercultural relationships well, it is necessary to have (a) adequate knowledge of the cultures of contact, (b) cognitive skills to develop positive interpersonal relationships, and (c) problem solving and relationship building skills (Maya Jariego, 2002; Maya Jariego, Holgado & Santolaya, 2006)." See **Table 5.4.1** for an overview of eight intercultural competencies that facilitate communication.

Table 5.4.1 ***8 Skills for effective intercultural communication (partially adapted from OpenMed, n.d.)***

Skills	Definition
Understanding of the other culture	Strive to have a good knowledge of the values, beliefs and ideology of the other culture, which will lead to understanding the behaviour of its members. Knowledge of other cultures in general may also be useful in navigating workplace expectations.
Understanding of one's culture	Understanding your own culture will help to better face the process of acculturation into another culture for either yourself or others joining a culture.
Empathy	Adopt the viewpoint of all communicators to optimize understanding during cultural exchanges. Cognitive decentralisation and the ability to recognise differences allow adaptation to culturally diverse groups.
Tolerance for ambiguity	Develop your ability to cope with complex, unclear, and uncertain situations that may arise in intercultural communication. Intercultural relationships tend to carry a high degree of uncertainty and unpredictability.
Cognitive Flexibility	Develop your ability to easily accommodate to the circumstances or opinions of others.
Delay the evaluation of the behaviour of others	Avoid evaluating in advance the behaviour of the other. This is known as 'respect for cultural differences'. Doing so emphasizes the affective component of relationship building.
Problem solving skills	Apply with consideration your managerial skills, problem solving, planning, etcetera, in ways that adapt to different contexts.
Relationship building skills	Initiate contacts, sustain relationships, adjust to the required social distance, and make appropriate use of social networks when developing relationships.

How can you prepare to work with people from cultures different than your own? Start by doing your homework. Let's assume that you have a group of Japanese colleagues visiting your office next week. How could you prepare for their visit? If you're not already familiar with the history and culture of Japan, this is a good time to do some reading or a little bit of research online. If you can find a few English-language publications from Japan (such as newspapers and magazines), you may wish to

read through them to become familiar with current events and gain some insight into the written communication style used.

Preparing this way will help you to avoid mentioning sensitive topics and to show correct etiquette to your guests. For example, Japanese culture values modesty, politeness, and punctuality, so with this information, you can make sure you are early for appointments and do not monopolize conversations by talking about yourself and your achievements. You should also find out what *faux pas* to avoid. For example, in company of Japanese people, it is customary to pour others' drinks (another person at the table will pour yours). Also, make sure you do not put your chopsticks vertically in a bowl of rice, as this is considered rude. If you have not used chopsticks before and you expect to eat Japanese food with your colleagues, it would be a nice gesture to make an effort to learn. Similarly, learning a few words of the language (e.g., hello, nice to meet you, thank you, and goodbye) will show your guests that you are interested in their culture and are willing to make the effort to communicate.

If you have a colleague who has travelled to Japan or has spent time in the company of Japanese colleagues before, ask them about their experience so that you can prepare. What mistakes should you avoid? How should you address and greet your colleagues? Knowing the answers to these questions will make you feel more confident when the time comes. But most of all, remember that a little goes a long way. Your guests will appreciate your efforts to make them feel welcome and comfortable.

People are, for the most part, kind and understanding, so if you make some mistakes along the way, be kind to yourself. Reflect on what happened, learn from it, and move on. Most people are keen to share their culture with others, so your guests will be happy to explain various practices to you.

Content for this chapter has been remixed and partially adapted from a variety of OER sources including but not limited to the following texts:

- *Business Writing for Everyone,* Cruthers, (2020).
- *Communication in the Real World,* University of Minnesota (2016).
- *Introduction to Professional Communication,* Ashman, (2018).

Other texts are included in the References.

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Image Descriptions

Figure 5.4.1 image description: This diagram is showing a large circle with the words Global Village in it and four surrounding circles with the words political, ethical, legal, and economic in them. [Return to Figure 5.4.1]

Figure 5.4.3 image description: This diagram shows a long arrow pointing to the right and the words long term underneath, short arrow pointing to the left with the words short term underneath. [Return to Figure 5.4.3]

6. TEAMWORK AND COMMUNICATION

Teams are created in college and university as well as in workplaces to address the increasing degree of complexity of the projects that are assigned. The Conference Board of Canada includes teamwork skills as important skills to "enter, stay in, and progress in the world of work." Teams are formed for many purposes; however, one important reason is to gather people with diverse experiences and expertise to solve problems and pursue opportunities. A project will only be as good as the team that completes it; as a result, creating a friendly, collaborative, efficient, and communicative team will go a long way to achieving success.

Chapter 6 Learning Objectives

This section contains chapters with the following learning objectives:

6.1 Understand how to use team project management tools and strategies, such as team charters, agendas, minutes, and work logs to facilitate collaboration.

6.2 Understand various models for understanding team dynamics, and reflect on how you might apply them to help you and your teammates resolve conflicts and work productively.

6.3 Understand collaborative writing processes and strategies, and reflect on what works for your team.

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6.1 Team Project Management Tools and Strategies

SUZAN LAST AND CANDICE NEVEU

Teamwork is a key component of almost any workplace, but it is essential in engineering and software development environments where you often find yourself working as part of a team on large projects. Imagine for a moment how many people must work together to design a product like *Skyrim* (*Skyrim* development team).

It is is widely accepted that team synergy and team intelligence lead to greater efficiency and better results in most situations. Why, then, are some people reluctant to engage in teamwork? Perhaps this reluctance stems from ineffective or dysfunctional teamwork experiences in the past. Often the culprit in these situations is not a "poor team player" or an "inability to get along with others." More likely it was caused by one of two things: misaligned goals or confusion over roles. For teamwork to be effective, all members of the team must understand and share the goals of the project, and all members must fully understand their roles—what is expected of them, and how they will be held accountable. An effective team leader will make sure that goals and roles are fully understood by all team members.

"Introduction to Teamwork," in *Designing Engineers* by McCahan, et al. (2015) provides a detailed description of the stages of the Tuckman Team Formation model and the need for effective communications at each stage. You may already be familiar with the Tuckman model, which was first developed by Bruce Tuckman and involves Forming, Storming, Norming, Performing, Adjourning (Bruton & Lumen Learning, n.d.). At each phase, important interpersonal and project-related work is achieved. The activity ranges from getting to know the team members and brainstorming ideas, to weathering interpersonal and project challenges, to developing consensus and optimizing team performance, to meeting project deadlines and requirements and sharing in a sense of accomplishment (Bruton & Lumen Learning, n.d.). Review the following video to learn more about the Tuckman model.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=132#oembed-1

Further information on the Tuckman Model can be found in Chapter 6.2 Models for Understanding Team Dynamics or by opening the follow link Five Stages.

A team, according to McCahan et al., "is a group of people who come together to work in an interrelated manner towards a common goal." They go on to differentiate a team from a group by noting that a team is connected by "a common purpose or goal and the reliance on the skills of all the members to meet the goal" (McCahan et al., 2015, p. 220). They establish norms according to which all members must function so as to enable the team to achieve its goal (Bruton & Lumen Learning, n.d.). In order to work effectively, team members need to communicate clearly and constructively, and learn how to deal with crises and conflicts that will inevitably arise.

EXERCISE 6.1.1 Reflect on your previous team work experience

Think of a time when you had to work with others to produce something – a poster, presentation, document, etc. Briefly describe what the task was and then consider the following questions:

1. What was the team's overall goal?
2. What was your job within the group?
3. How were the jobs distributed?
4. How well did your group function? Did anyone on the team behave in ways that McCahan et al. characterize as "hitchhikers, hijackers, isolationists, and enablers"? (McCahan, 2015, p. 243).
5. Was the outcome successful?
6. Would you happily work with those team mates again on another project? Why or why not?
7. How would you rate your overall experience and why?

Some common benefits of working in teams include increased productivity, innovation, and efficiency. Excellent teams have synergy that makes them more than simply the sum of their parts. The term "team intelligence" refers to the fact that collectively, teams have more knowledge and skill than the single individuals working separately. However, challenges can also arise when working in a team. Conflicts within a team do occur and often they begin as a result of poor communication and weak focus. Some ways to handle these challenges include the following:

- **Elect a team leader:** The team leader will act as the hub for communication and tasks. This person helps provide direction and guidance for the team. This should be someone who has earned the team's respect and who can be persuasive and tactful. This role can be rotated among team members.
- **Ensure the goal is clear:** A team is governed by the goal that everyone works to achieve. It is important that the goal is clearly understood and agreed upon by everyone on the team.
- **Establish milestones:** Establish milestones that will help the team achieve the goal. These milestones will be measurable and actionable steps that team members will easily be able to accomplish while feeling that they are making progress on the project.
- **Establish team rules:** As a team, determine the rules by which the team will operate. These should include expectations around time, meetings, attendance, communication, decision-making, contribution, and mechanisms to warn and/or fire a team member or quit a team.

- **Assign responsibilities:** As part of the breakdown of tasks, members should be assigned responsibility for certain tasks, which means that they are the primary leads in preventing and addressing issues that come up in those areas.
- **Set agendas for meetings and keep minutes:** To ensure that team meeting time is useful and achieves its purpose, plan an agenda for each meeting to help keep everyone on task. In addition, have someone take minutes to record decisions that are made. This record helps prevent repetition and ensures work actually gets done.
- **Determine the timing for tasks:** Task timing involves two aspects: the duration for completing the task and the timing of the task in relation to the other tasks. Typically, tasks take longer than you think they will so it is often better to add 25% to your duration estimate. The timing of the tasks are important to figure out because some tasks can be completed concurrently, but others may have to be sequenced. Professionals often use **Gantt Charts** to outline these tasks and the time they will take within the overall project scale.
- **Manage communications:** If a problem arises with someone on the team, the team leader should speak privately to the person and clearly indicate what needs to change and why. The focus should be on the behaviour, not on the person's character. Issues should be dealt with quickly rather than left to deteriorate further. If this does not solve the problem, then try other approaches (See McCahan et al. "Management Strategies" for more information).

Several tools and strategies can be used by teams to improve their functioning and productivity. Some examples include using the following documents:

- **Team Charter**: outlines the rules and expectations agreed upon by the team
- **Meeting Agenda**: outlines the main points for discussion at a meeting
- **Meeting Minutes:** records the decisions and relevant discussion points for a meeting
- **Work Logs**: records the tasks and time spent for each team member
- **Status Reports**: records the completed tasks and work left to complete (for information about status reports, go to Chapter 10.5).
- **Gantt Chart:** breaks down tasks and their estimated duration over the work period

Many software programs and apps can help teams manage projects. Students often use Google Docs to work collaboratively on a document or project. The most common one used in the workplace is Microsoft Project. Whatever tool you choose to use, it should be something that all members can access and understand.

Knowledge Check

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Team Charters

Team charters can take many forms and can serve a variety of functions depending on the context. In the business world, they often define the purpose, duration, scope and goals of team projects in terms of the desired output. They might also list team members, resources, deliverables, reporting systems, and so on. In the working world, a team charter may have an audience that extends beyond the team members. Often, in an educational setting, a Team Charter is a way for each team to define their own values, expectations, goals and procedures.

The main purpose of the Team Charter in this context is to help team members ensure that they on "on the same page" so to speak; that you all have the same expectations of one another for how you will conduct yourselves, contribute equitably, and produce effectively. A team charter, then, can act as a set of "by laws" or guidelines, and can help to prevent misunderstandings and conflicts from arising in the future. It is a negotiated set of behaviours that you all agree will govern your interactions. It can also set you up for having the tools and procedures in place to successfully managing conflict when it does inevitably arise. Here are some questions to consider when negotiating and creating your team charter:

- **Team meeting schedule**: When, how, and how often will you meet?
- **Team meeting procedures**: Will you use agendas and minutes? Who will be responsible for these? How will you conduct meetings to ensure work gets done? How will you make decisions? Avoid getting distracted or off-task?
- **Communications Strategies**: How will you communicate about the team project outside of team meeting times? Email? Social media? MS Teams or other online tools?
- **Project Management:** How will you keep track of documents and resources? Deliverables? Due dates? Who is responsible for which tasks? Etc.
- **Behavioural Expectations:** What are your shared expectations/values around punctuality? Courtesy? Respectful interactions and disagreements? Dealing with problems and disagreements?
- **Equitable Workloads:** How will you ensure that each team member is doing an equitable/ reasonable share of the work? How will you deal with emergent issues?
- **Quality of work:** What are the expectations for quality of work? How will you ensure quality control?
- **Penalties:** How will you ensure accountability to the team and the charter? What sort of consequences might you impose that will improve overall team performance?
- **Irreconcilable Differences**: At what point should someone leave the team? What are the

protocols for quitting a team or firing a team member if problems cannot be resolved?

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: *https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=132#h5p-36*

Meeting Documents: Agendas and Minutes

What happens at team meetings should be planned and recorded for future reference. **Agendas** and **Minutes** are documents that do this. A meeting also should have a chair (the person who keeps things on track) and a recorder (who records what happened and what decisions were made). The Agenda is the plan for what you want to discuss and accomplish at the meeting. It is usually made up of a list of items, sometimes with a time frame for each item.

Sample Agenda

TEC400 Team Meeting Agenda

Date:

Place and time:

Members:

_____-

- Updates from each team member (progress) (5 min each)
- Develop work plan for upcoming week (15 min)
- Determine next meeting time (5 min)
- Work on Milestone 3 together (45 min)
- Matters arising

Minutes follow up on the agenda by recording topics discussed and decisions made at a meeting. One person is responsible for recording the events of the meeting and distributing the minutes to each member (via email usually). That way, no one should forget the tasks they agreed to complete and their deadlines.

Sample Minutes

TEC400 Team Meeting Minutes

Thursday, Feb. 15, 20XX

B3089, 3:30-4:45

Present: Jaime, Chris, Renee

Regrets: Joe (has the flu)

- All team members have completed last week's work plan (Joe emailed a report, as she is sick)
- In the coming week, we plan to complete the following:

Task	Who will do it?
1. Interview Facilities Management contact	Renee
2. Research bike share programs	(Joe?)
3. Design a survey/questionnaire	Chris
4. Do a site visit	Jaime

- Next meeting: next Thursday, Feb. 21, after class
- Excellent progress during meeting; Joe confirmed via text that he will follow up on researching bike share programs.
- Meeting adjourned 4:50 p.m.

Work Logs

Work logs are common documents used in the workplace to keep track of what work is done, by whom, and how long it took. These can be very helpful for keeping a team on track and ensuring equitable workloads. To ensure accountability, have each team member sign off on the work log.

Sample Work Log

Date	Task Description	Assigned to	Status / Date Completed	Total Time Spent

Team signatures:

Name: _____

Name: _____

Name: _____

Name: _____

Gantt Charts

When planning a team project over a significant time span, teams often use Gantt Charts to help map out the work schedule in a clear and detailed way. Gantt charts are typically used in proposals to show the target audience that the proposers have a well-thought out and feasible plan for completing the project. They can also be used in progress reports to update the reader on what tasks are complete, which are in progress, and which are yet to be completed.

Gantt charts can take many forms, and you can download software (from a simple Google search) to make complex and detailed charts (see the Wikipedia page on Gantt Charts, for examples). However, using a simple table for the Gantt Charts you will create for course assignments will be sufficient. See the sample chart in **Table 6.1.1** for an overview of some of the tasks that are included in projects that involve clients. Of course, the tasks will be different for every project you plan.

Table 6.1.1 ***Sample Gantt Chart outlining a project timeline***

Tasks	Team Member	Week 1	Week 2	Week 3	Week 4	Week 5
Research existing designs	Dav					
Conduct Client Research	Team					
Conduct User Research	Sam					
Create and conduct survey	Jo					
Complete literature review of...	Tai					
Plan report structure/format	Team					
Draft the Introduction	Tai & Dav					
Analyze and write up survey results	Jo & Sam					
Complete draft of report	Team					
Research and Insert additional content as needed	Team					
Review and Revise	Team					
Prepare Progress Report	Team					
Final Editing and Proofreading; ensure research is cited properly; review figure and table formatting	Jo & Sam Dav Tai					
Submit Report	Jo					

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: *https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=132#h5p-37*

The next section reviews several **Models for Understanding Team Dynamics**.

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6.2 Five Models for Understanding Team Dynamics

An important aspect of effective teamwork entails understanding group dynamics in terms of both team situation and individual temperament. This section reviews a variety of models often applied in workplaces that can help a team perform optimally and manage crises effectively.

The Tuckman Team Model

"Tuckman's Stages of Group Development," proposed by psychologist Bruce Tuckman in 1965, is one of the most famous theories of team development. It describes four stages that teams may progress through: **forming, storming, norming**, and **performing,** with a fifth stage that was added later: **adjourning**. According to McCahan et al., the stages move from organizing to producing, and although the stages appear linear, in fact teams may move backwards depending on events that may influence the team and the communications strategies that they use. Some teams can also stall on a stage and never fully realize their potential. **Figure 6.2.1** outlines these stages. Please refer to the McCahan et al. text (2015) or to Bruton & Lumen Learning (n.d.) for a more complete discussion.

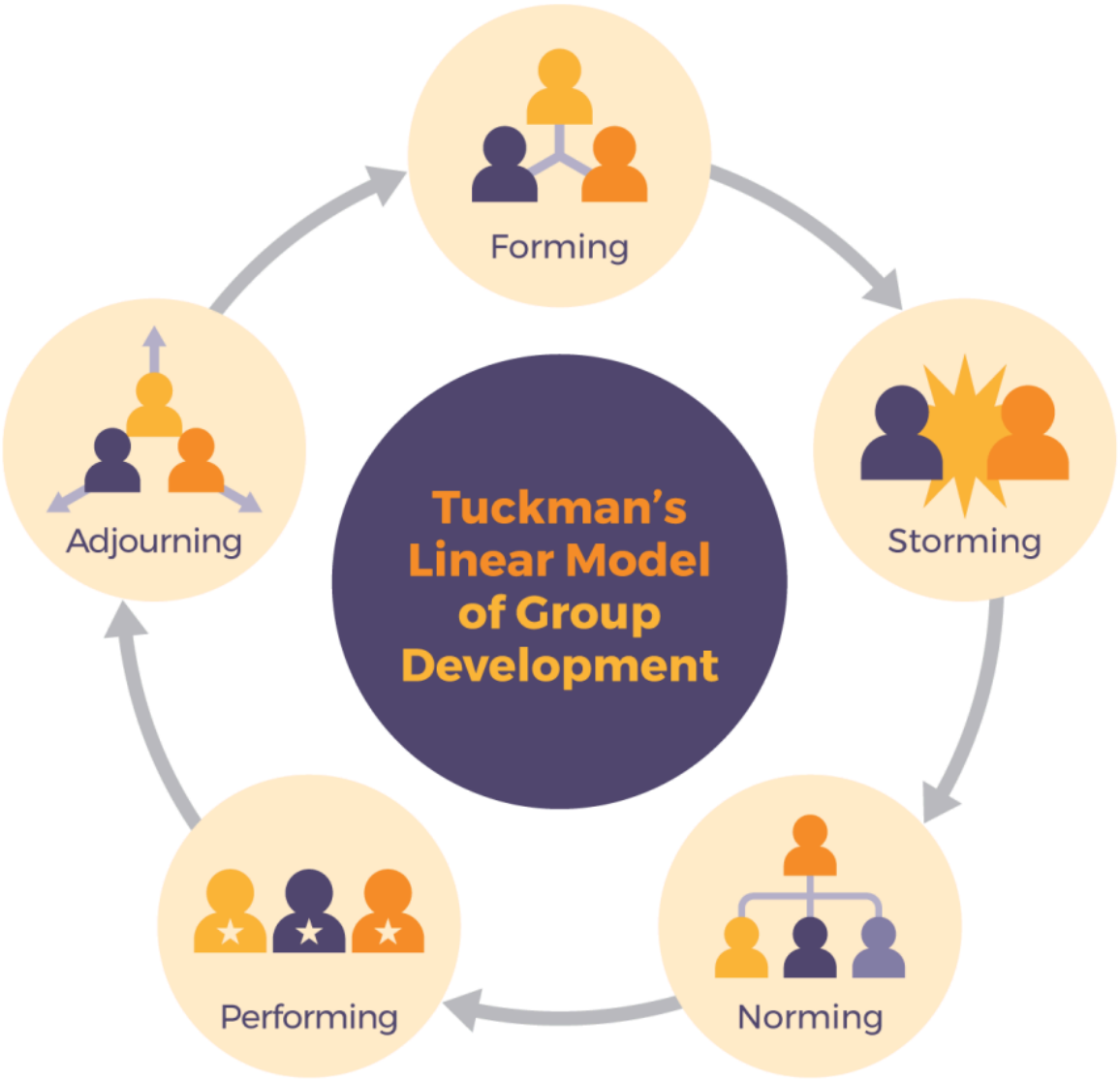

Figure 6.2.1 *The Stages of the Tuckman Model (eCampus Ontario, 2018).*

Note that at each stage, communication is a critical component of successfully moving to the next stage. The **forming** stage, when everyone is getting to know each other and are trying to make a good impression, is a good time to create a set of shared expectations, guidelines, or a team charter. A team forming activity is also a good idea to help build trust and get to know the various strengths and weaknesses of the team members. This is an orientation stage, on both interpersonal and professional levels, when preliminary boundaries and expectations are established.

The **storming** stage is the one most often characterized by group conflict and dysfunction. It is often when the preliminary expectations and boundaries are challenged as individuals learn more about each other's motivations. This coincides with the "brainstorming" stage of the design process, in which each member contributes ideas that could potentially become the focus of the project.

It is also the stage where teammates learn about each others' strengths and weaknesses and try to determine what their roles will be in the project. Learning to harness the constructive potential of conflict and compromise in this stage is important to progressing to the next stage. The key is differentiating between constructive conflict, characterize by disagreement over ideas, and destructive conflict, characterized by personal attacks. Avoiding the latter will create the momentum teams need to move to the next stage.

During the **norming** stage, if conflicts have been resolved and teammates have proved flexible, all is going well, each team member knows their role and works on their part of the project. Sometimes, people work independently in this stage, but check in with teammates frequently to make sure workflow is efficient and effective. Group cohesion ensures that everyone is responsible to the task and to each other. Problems might arise at this stage if teammates do not fully understand their role, the team expectations, or the overall goal; revisiting the forming or storming stage may be required. In practical terms, checking in with team members will help resolve any questions regarding roles and goals.

Few first-time teams reach the **performing** stage, as this happens when teams have worked together well on several projects, have established a synergy, and have developed systems that make projects go smoothly and efficiently. Less time is needed to form, storm and learn to norm; performing teams can move quickly and interdependently to tackle the task at hand. **Adjourning** and going their separate ways can often be somewhat emotional for these teams. **Figure 6.2.2** from Nicoleti (n.d.) depicts the trajectory of each team member during each stage.

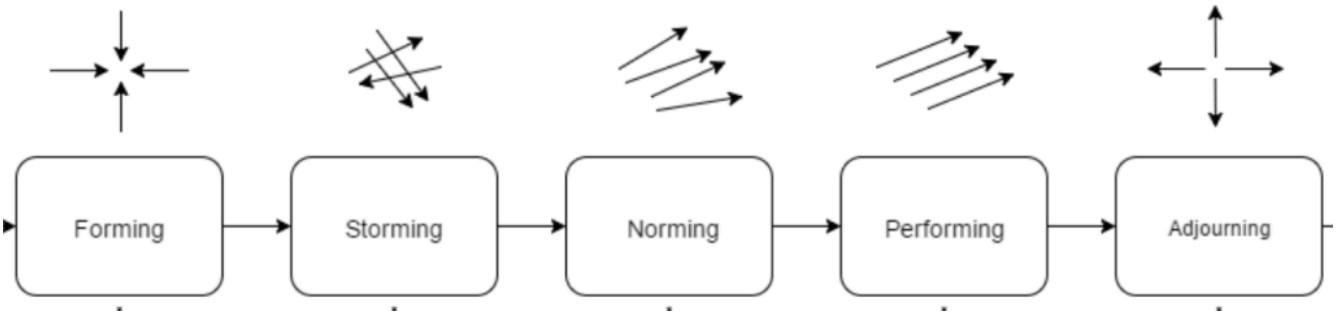

Figure 6.2.2 *Trajectory of teammates during each stage of the Tuckman team formation model (Nicoleti, n.d.).*

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DISC Model

DISC theory, developed in 1928 by Dr. William Moulton Marston (who also, as it happens, created the *Wonder Woman* comic series!), has evolved into a useful model for conflict management as it predicts behaviours based on four key personality traits he originally described as Dominance, Inducement, Submission, and Compliance (1928/2002). The names of these four traits have been variously revised by others over the decades, so you might find different terms used in different contexts. The four general traits are now often described as (1) Dominance, (2) Influence/Inspiring (3) Steadiness/Supportive, and (4) Compliance/Conscientiousness (see **Figure 6.2.3**).

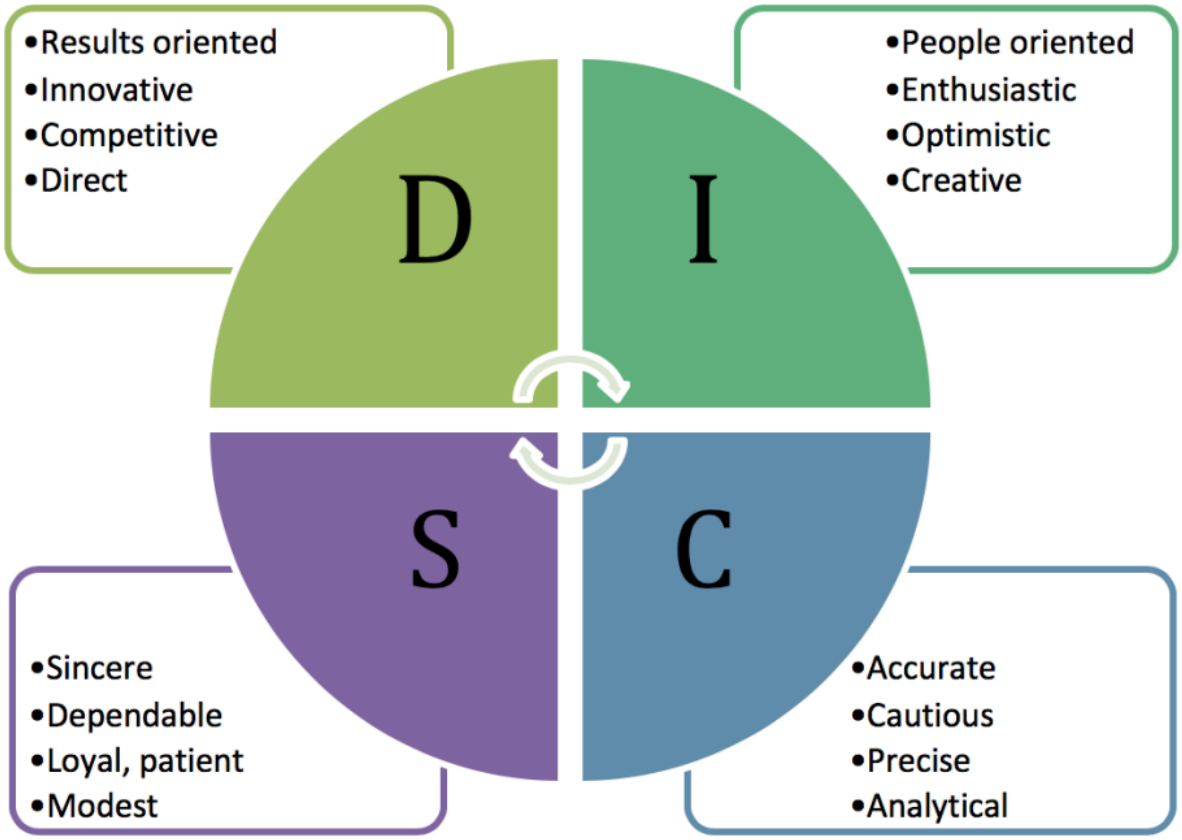

Figure 6.2.3 *DISC Profile (Marston, 1928/2002).*

Industries often use DISC assessments in professional contexts. Having some insight into your teammates' personality traits can help when trying to resolve conflicts. General characteristics of each trait are as follows:

- **Dominance**
  - *Characteristics*: direct, decisive, ego-driven, problem-solver, and risk-taker; likes new challenges and freedom from routine; driven to overcome obstacles.
  - *Strengths*: great organizer and time manager; challenges the status quo; innovative.

- *Weaknesses*: can be argumentative, disrespectful of authority, and overly ambitious (taking on too much); can be blunt, stubborn, and aggressive.

- **Inspiring/Influential**
  - *Characteristics*: enthusiastic, persuasive, optimistic, trusting, impulsive, charismatic, and emotional.
  - *Strengths*: creative problem solver; great cheer-leader, negotiator, and peace-maker; a real "people person".
  - *Weaknesses*: more concerned with popularity than tangible results; lacks attention to detail.

- **Steady/Supportive**
  - *Characteristics*: reliable, predictable, friendly, good listener, team player, empathetic, easy-going, and altruistic.
  - *Strengths*: dependable, loyal; respects authority; has patience and empathy; good at conflict resolution; willing to compromise.
  - *Weaknesses*: resistant to change; sensitive to criticism; difficulty prioritizing.

- **Cautious/Conscientious/Compliant**
  - *Characteristics:* has high standards*;* values precision and accuracy; analytical and systematic; even-tempered, realistic, and logical; methodical; respect for authority.
  - *Strengths*: great information gatherer/researcher; able to define situations precisely and accurately; offers realistic perspective.
  - *Weaknesses*: can get bogged down in details; needs clear boundaries, procedures, and methods; difficulty accepting criticism; may avoid conflict or just "give in." May be overly timid.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: *https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=139#h5p-39*

GRIP Model

Richard Beckhard's GRPI model, originally developed in 1972, has been widely adapted in sports contexts as the **GRIP** model (see **Figure 6.2.4**), outlining four interrelated components of highly effective teamwork:

- **Goals**: Everyone must fully understand and be committed to the goals of the team, and of the organization. Everyone's goals must be aligned in order to establish trust, make progress, and achieve desired outcome.
- **Roles**: All team members must know what part they play, what is expected, and how they are held accountable and responsible.
- **Interpersonal**: Quality communication and collaboration require and foster trust among team members; sensitivity and flexibility needed to deal with conflict and make progress.
- **Processes**: Creating a defined system for how decisions are made, how the team solves problems and addresses conflict helps to specify workflow and procedures to be followed in completing the project.

Figure 6.2.4 *GRIP Model of teamwork dynamics.*

Thomas-Kilmann Conflict Mode Model

Thomas and Kilmann's model (1974) for handling team conflict outlines five main approaches to managing team conflict (*Competing, Accommodating, Compromising, Avoiding, and Collaborating*), placed in a matrix of two scales: ***Assertiveness***—the degree to which one tries to meet one's own needs and ***Cooperativeness***—degree to which one tries to satisfy the needs of other team members (See **illustration**).

Each approach can have both positive and negative impacts:

1. **Competing:** A highly assertive, but uncooperative behaviour, characterized by the urge to "win at all costs," dominate, and engage in power struggles; can result in animosity, but it can also spur teammates to compete constructively, which can lead to interesting innovations if well

managed.

2. **Accommodating**: A highly cooperative but unassertive behaviour may seem like a good way to avoid conflict, but it can also lead to self-silencing of good ideas in order to appease others, which may lead to feelings of resentment.
3. **Compromising**: Compromising is most moderate in both scales; while it might seem constructive, it can lead to dissatisfaction and mediocre progress or results. Sometimes compromise is necessary, but often, the best solution comes from a single inspirational source.
4. **Avoiding**: Being unassertive and uncooperative is generally the least effective way to deal with conflict, as this simply avoids the problem and neglects the need for a solution. However, when a feasible solution to a problem seems impossible, sometimes ignoring it and focusing on what is positive can be more productive.
5. **Collaborating**: Being highly assertive and cooperative is the best way to find solutions that benefit the whole team and build respect.

Knowledge Check

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Lencioni Model

In his book, *The Five Dysfunctions of a Team,* Lencioni (2002), outlines five common problems teams experience that impact their effectiveness:

1. **Lack of trust**: If team members do not trust each other, they are unlikely to take risks or ask for help. A lack of trust means a low level of comfort that makes it difficult to communicate and perform effectively as a team
2. **Fear of conflict**: Avoiding conflict can lead to an artificial "peace" at the expense of progress and innovation. Conflict is a normal part of teamwork and can be very productive if managed effectively.
3. **Lack of commitment**: Team members do not commit to doing the work, do not follow through on decisions or tasks, do not meet deadlines, and let their teammates down, ultimately affecting the success of the whole project.
4. **Avoidance of accountability**: Team members who do not see themselves as being accountable will produce work that is below the standard of excellence set by the team.

5. **Inattention to results**: When team members focus on their own personal goals instead of project goals, they lose sight of the expected results that actually measure the success of the project. Not focusing on the results during the process means that no one is planning how to improve those results.

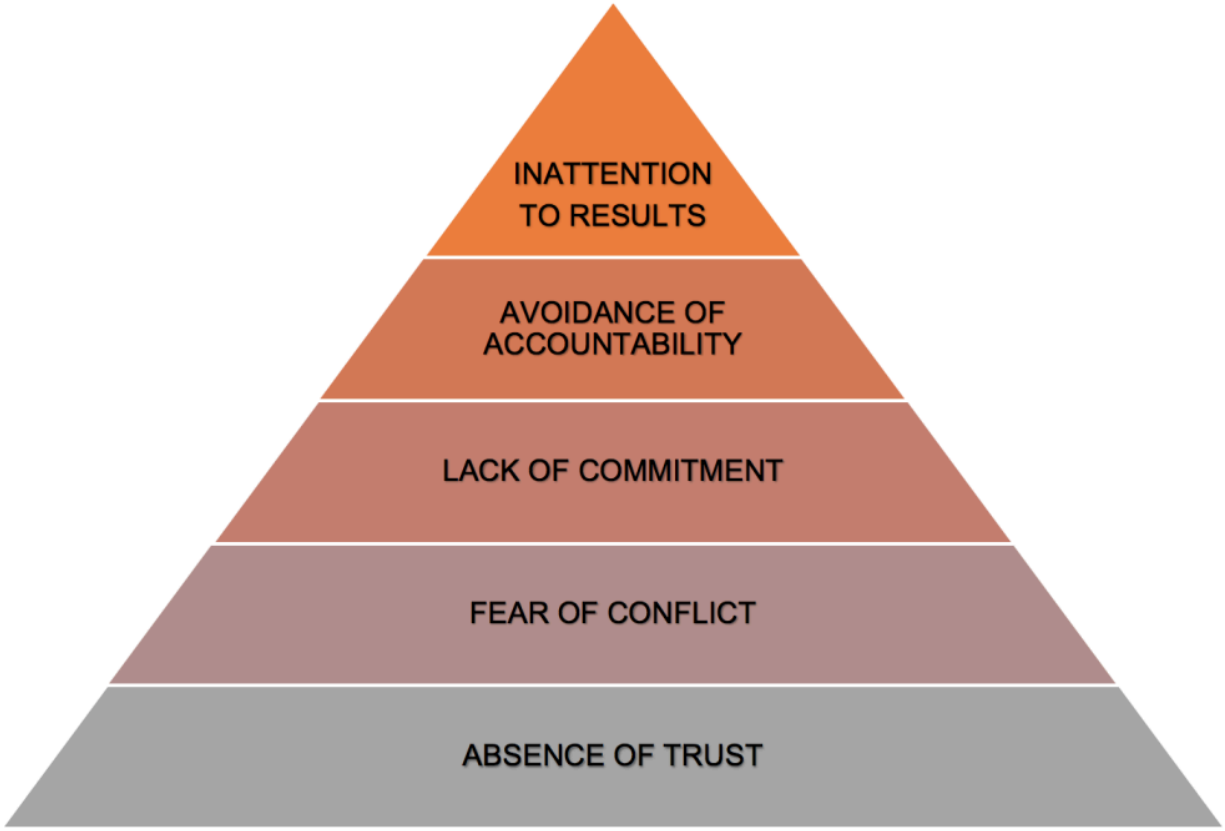

Figure 6.2.5 *Lencioni Model: Five Dysfunctions of a Team (2002).*

Lencioni advises tackling each dysfunction, displayed in the pyramid in **Figure 6.2.5**, from the bottom up. Establishing trust is a crucial first step to being able to manage conflict, achieve commitment, create accountability and focus on results. This following video, The 5 Dysfunctions of a Team, explains Lencioni's process of building a functional team.

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EXERCISE 6.2.1 Apply these models to your experience

Apply one or more of these models to your past or current experience of teamwork:

1. Have you engaged in the Tuckman team formation steps?
2. Can you determine which of the DISC characteristics most closely matches your personality traits?
3. Have you experienced a team project where misaligned goals or unclear roles had a negative impact?
4. Do you think learning about the conflict modes or typical dysfunctions can help make your future team experiences more productive?
5. Could you propose an alternative model for effective teamwork?

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6.3 Collaborative Writing

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You have likely had at least one opportunity to work and write collaboratively with others, as this is an increasingly common way to work, both in school and in the workplace. The engineering design process, for example, at least in part, entails working collaboratively to gather, organize, manage and disseminate information (McCahan, et al., 2015). This information is often carefully analyzed and used to make important decisions, so it is critical that team members collaborate effectively in managing these communications tasks.

Engineers report spending a considerable amount of their time writing, and they frequently engage in collaborative writing. A recent survey asked various professionals what portion of their work week was devoted to writing, collaborative writing, and international communications (Swartz, et al., 2018). The results shown in **Table 6.3.1** indicate that collaborative writing makes up a significant portion of overall writing tasks.

Table 6.3.1 ***Percentage of total work week that engineers and programmers report spending on communications tasks***

	Engineers	Programmers
Time spent writing	35 %	25 %
Time spent planning and writing documents collaboratively	19 %	12 %
Time spent communicating internationally (across national borders)	14 %	18 %

Research has also shown that "writing in general and collaborative writing, in particular, has been recognized to be fundamental to most professional and academic practices in engineering" (Gimenez & Thondhlana, 2012). **Figure 6.3.1** shows that engineers rate writing skills as extremely important to career advancement (Swartz, et al., 2018).

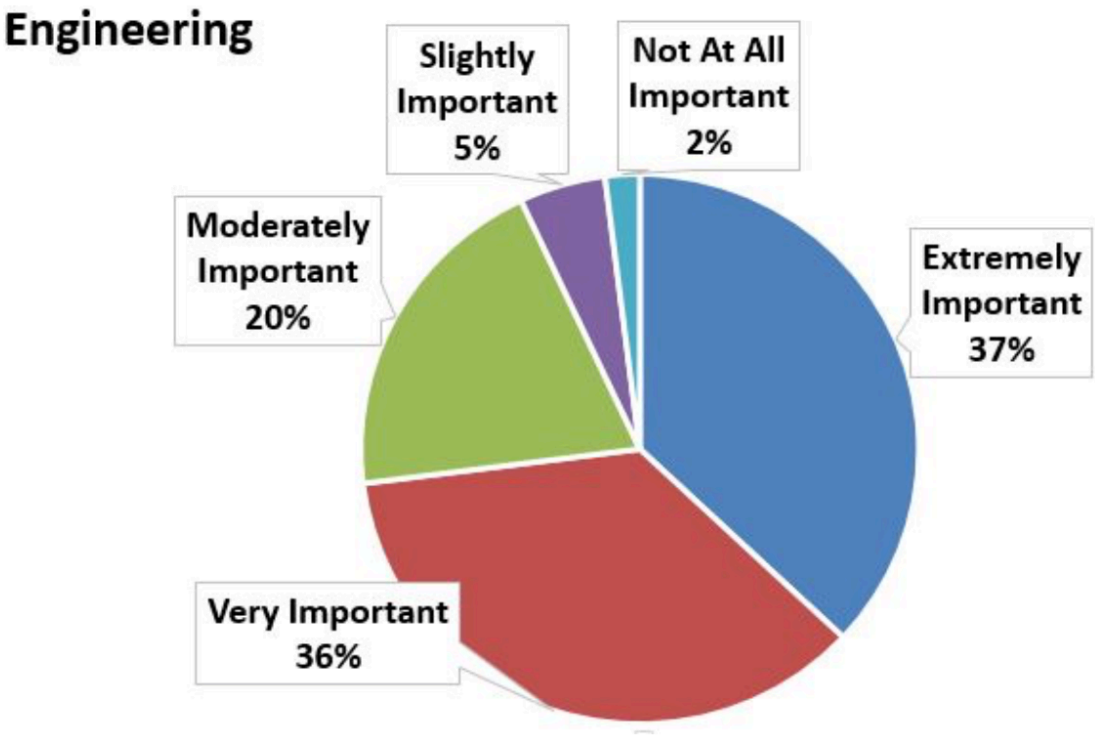

Figure 6.3.1 *The importance of writing for career advancement for surveyed engineers. (Swartz, et al., 2018. CC-BY 4.0).*

Like any kind of teamwork, collaborative writing requires the entire team to be focused on a common objective; according to Lowry et al., an effective team "negotiates, coordinates, and communicates during the creation of a common document" (2004). The collaborative writing process, like the Tuckman team formation model, is iterative and social, meaning the team works together and moves back and forth throughout the process.

Knowledge Check

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Successful collaborative writing is made easier when you understand the different strategies you can apply, how best to control the document, and the different roles people can assume. **Figure 6.3.2** outlines the various activities involved at various stages of the collaborative writing process.

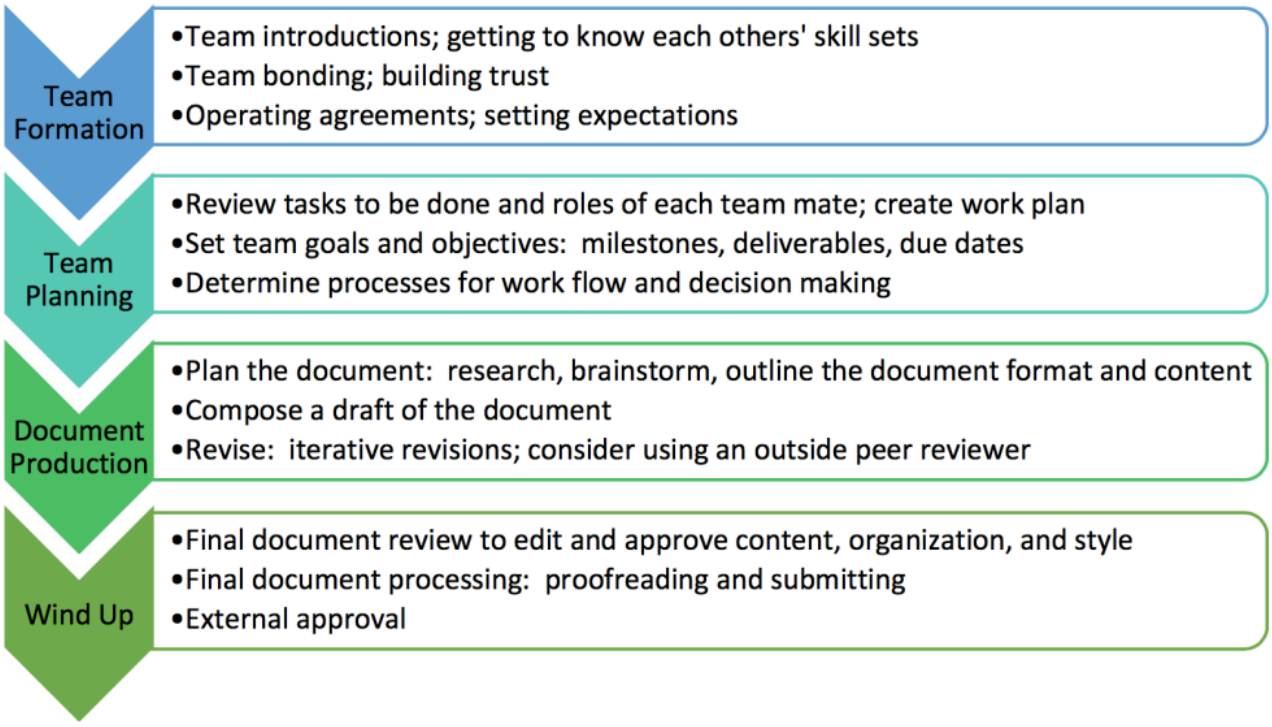

Figure 6.3.2 *Collaborative writing stages (Last, 2019). [Image description]*

Collaborative writing strategies are methods a team uses to coordinate the writing of a collaborative document. There are five main strategies (see **Table 6.3.2**), each with their advantages and disadvantages. Can you think of any other benefits or limitations?

Table 6.3.2 ***Collaborative writing strategies (adapted from Lowry et al., 2004; in Last, 2019)***

[Skip Table]

Writing Strategy	When to Use	Pros	Cons
Single-author One member writes for the entire group.	For simple tasks; when little buy-in is needed; for small groups.	Efficient; consistent style.	May not clearly represent the group's intentions; less consensus produced
Sequential Each member is in charge of writing a specific part and write in sequence.	For asynchronous work with poor coordination; when it's hard to meet often; for straightforward writing tasks; small groups.	Easy to organize; simplifies planning.	Can lose sense of group; subsequent writers may invalidate previous work; lack of consensus; version control issues
Parallel Writing: Horizontal Division Members are in charge of writing a specific part but write in parallel. Segments are distributed randomly.	When high volume of rapid output is needed; when software can support this strategy; for easily segmented, mildly complex writing tasks; for groups with good structure and coordination; small to large groups.	Efficient; high volume of output.	Redundant work can be produced; writers can be blind to each other's work; stylistic differences; doesn't recognize individual talents well.
Parallel Writing: Stratified Division Members are in charge of writing a specific part but write in parallel. Segments are distributed based on talents or skills.	For high volume rapid output; with supporting software; for complicated, difficult-to-segment tasks; when people have different talents/skills; for groups with good structure and coordination; small to large groups.	Efficient; high volume of quality output; better use of individual talent.	Redundant work can be produced; writers can be blind to each other's work; stylistic differences; potential information overload.
Reactive Writing Members create a document in real time, while others review, react, and adjust to each other's changes and addition without much pre-planning or explicit coordination.	Small groups; high levels of creativity; high levels of consensus on process and content.	Can build creativity and consensus.	Very hard to coordinate; version control issues.

Document management reflects the approaches used to maintain version control of the document and describes who is responsible for it. Four main control modes are listed in **Table 6.3.3**, along with their pros and cons. Can you think of any more, based on your experience?

Table 6.3.3 ***Document control modes (Last, 2019)***

Mode	Description	Pros	Cons
Centralized	When one person controls the document throughout the process.	Can be useful for maintaining group focus and when working toward a strict deadline.	Non-controlling members may feel a lack of ownership or control of what goes into the document.
Relay	When one person at a time is in charge but the control changes in the group.	Democratic	Less efficient
Independent	When one person maintains control of his/her assigned portion.	Useful for remote teams working on distinct parts.	Often requires an editor to pull it together; can reflect a group that lacks agreement.
Shared	When everyone has simultaneous and equal privileges.	Can be highly effective; non-threatening; good for groups working F2F, who meet frequently, who have high levels of trust.	Can lead to conflict, especially in remote or less functional groups.

Roles refer to the different hats participants might wear, depending on the activity. **Table 6.3.4** describes several roles within a collaborative writing team. Which role(s) have you had in a group project? Are there ones you always seem to do? Ones that you prefer, dislike, or would like to try?

Table 6.3.4 ***Collaborative writing roles (Last, 2019)***

Role	Description
Writer	A person who is responsible for writing a portion of the content
Consultant	A person who is external to the project and has no ownership or responsibility for producing content but who offers content and process-related feedback (peer reviewers outside the team; instructor)
Editor	A person who is responsible for the overall content production of the writers, and can make both style and content changes; typically has ownership of the content production
Reviewer	A person, internal or external, who provides specific content feedback but is not responsible for making changes
Team Leader	A person who is part of the team and may fully participate in authoring and reviewing the content, but who also leads the team through the processes, planning, rewarding, and motivating.
Facilitator	A person external to the team who leads the team through processes but doesn't give content-related feedback.

Knowledge Check

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Digital Collaboration Tools: A Sample List

Collaborative writing is made easier through the use of digital tools. Below is a shortlist of some Seneca-approved collaboration tools.

- **Adobe Spark:** Collaboratively create videos, infographics, slide decks, and more using the Adobe Spark suite of tools.
- **Canva:** Use Canva to collaboratively create, edit, and share infographics and other types of documents. Use free templates and images to create your own infographics, slide decks, and more.
- **Google Drive:** Create collaboratively using Google Drive tools, which consist of a suite of free document creation software, including Google Docs, Google Slides, Google Forms, which you can share with team members for real-time document creation and editing.
- **Learn@Seneca:** Use Blackboard Group tools to stay connected with your team. Group tools include email, wiki, file sharing, and other features that facilitate collaborative work.
- **OneDrive:** Store and share your documents using this cloud-based tool.
- **Padlet:** Brainstorm ideas with your team members using this bulletin-board style tool.
- **Wakelet:** Curate and share your research materials, including links, videos, and images, with your team members using Wakelet.
- **Zoom:** Use Zoom to hold virtual meetings, share document links, display your work on screen, and conduct face-to-face or text chats.

The following video reviews a few online collaboration tools.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=143#oembed-1

EXERCISE 6.3.1 Follow up and reflect

Refer back to the warm-up in Exercise 4.1 at the start of this section. Using the tables above, analyze your example to determine the writing strategy and mode that best describes your experience, and what role(s) you took on.

How effective was the strategy that you used? Would another strategy have been more effective?

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Image description

Figure 6.3.2 image description:

Four stages of collaborative writing

1. Team Formation
    - Team introductions, getting to know each others' skill sets
    - Team bonding, building trust
    - Operating agreements, setting expectations
2. Team Planning
    - Review tasks to be done and roles of each team mate, create a work plan
    - Set team goals and objectives: milestones, deliverables, due dates
    - Determine processes for workflow and decision making
3. Document Production

- Plan the document: research, brainstorm, outline the document format and content
- Compose a draft of the document
- Revise: iterative revisions, consider using an outside peer reviewer

4. Wind Up

- Final document review to edit and approve content, organization, and style
- Final document processing (proofreading and submitting)
- External approval

[Return to Figure 6.3.2]

7. CONDUCTING RESEARCH

Most projects you work on—whether you are developing innovative new products, planning or implementing ideas, proposing ideas, or recommending solutions—will require research. Research can save you time by determining what other similar designs/solutions have already been proposed, what has been tried and tested in the past and what the results were, what patents are already in place, and so forth. It also helps you to understand the background of your project and how it fits into a larger context. Research helps you to find out about previous studies on your topic and what those researchers have concluded. Finally, research is necessary to help you to develop and validate your ideas by showing how similar projects have had beneficial outcomes. Researching is one of the key steps in any number of projects you may be working on once you enter the workplace.

Chapter 7 Learning Objectives

This chapter contains the following sections that will help you develop your research skills and meet the following learning objectives:

7.1 Understand basic research terminology related to conducting and disseminating various kinds of research.

7.2 Find and evaluate research sources to determine their reliability, authority, and relevance.

7.3 Understand how to use various methods to define the scope of your project and narrow your research question for a problem-based project.

7.4 Understand the human research ethics requirements and protocols when humans are involved (e.g., surveys, interviews, focus groups, etc.)

7.5 Understand what stakeholders are, how to map the stakeholders related to your project, and the general types of stakeholder engagement and consultation strategies commonly used in public engagement plans.

7.1 Research Terminology

Nicholas Walliman, in his handbook *Research Methods: The Basics*, defines research methods as "the tools and techniques for doing research" (2011). These techniques include collecting, sorting, and analyzing the information and data you find. The better the tools and more comprehensive the techniques you employ, the more effective your research will be. By extension, the more effective your research is, the more credible and persuasive your argument will be.

Here are some basic terms and definitions you should be familiar with:

Research: the systematic process of finding out more about something than you already know, ideally so that you can prove a hypothesis, produce new knowledge and understanding, and make evidence-based decisions

Research Methods: techniques of collecting, sorting, and analyzing information/data

Data: bits of information.

The typical kinds of research sources you will use can be grouped into three broad categories:

- **Primary Sources:** research you might conduct yourself in lab experiments and product testing, through surveys, observations, measurements, interviews, site visits, prototype testing, beta testing, etc. These can also include published statistical data, historical records, legal documents, firsthand historical accounts, and original creative works.
- **Secondary Sources**: written sources that discuss, analyze, and interpret primary data, such as published research and studies, reviews of these studies, meta-analyses, and formal critiques.
- **Tertiary Sources**: reference sources such as dictionaries, encyclopedias, and handbooks that provide a consolidation of primary and secondary information. They are useful to gain a general understanding of your topic and major concepts, lines of inquiry, or schools of thought in the field.

Data can be categorized in several ways:

Primary data	Secondary Data
Data that have been directly observed, experienced and recorded close to the event. These are data that you might create yourself by • **Measurement**: collecting numbers indicating amounts (temperature, size, etc.) • **Observation**: with your own senses or with instruments (camera, microscope) • **Interrogation**: conducting interviews, focus groups, surveys, polls, or questionnaires • **Participation**: experience of doing or seeing something (visit the site, tour the facility, manipulate models or simulations, Beta test, etc.) **Note**: Primary research done in an academic setting that includes gathering information from human subjects requires strict protocols and will likely require ethics approval. Ask your instructor for guidance and see Chapter 5.4 Human Research Ethics.	Comes from sources that record, analyze, and interpret primary data. It is critical to evaluate the credibility of these sources. You might find such data in • **Academic research**: refereed academic studies published in academic journals • **Print sources**: books, trade magazines, newspapers, popular media, etc. • **Online research**: popular media sources, industry websites, government websites, non-profit organizations • **Non-written Material**: TV, radio, film, such as documentaries, news, podcasts, etc. • **Professional Documents**: annual reports, production records, committee reports, survey results, etc.
Quantitative Data	**Qualitative Data**
Use numbers to describe information that can be measured quantitatively. These data are used to measure, make comparisons, examine relationships, test hypotheses, explain, predict, or even control.	Use words to record and describe the data collected; often describe people's feelings, judgments, emotions, customs, and beliefs that can only be expressed in descriptive words, not in numbers. These include "anecdotal data" or personal experiences.

Research methods are often categorized as quantitative, qualitative, or "mixed methods." Some projects, like a science project, require the use of the scientific method of inquiry, observation, quantitative data collection, analysis, and conclusions to test a hypothesis. Other kinds of projects take a more deductive approach and gather both quantitative and qualitative evidence to support a position or recommendation. The research methods you choose will be determined by the goals and scope of your project, and by your intended audience's expectations.

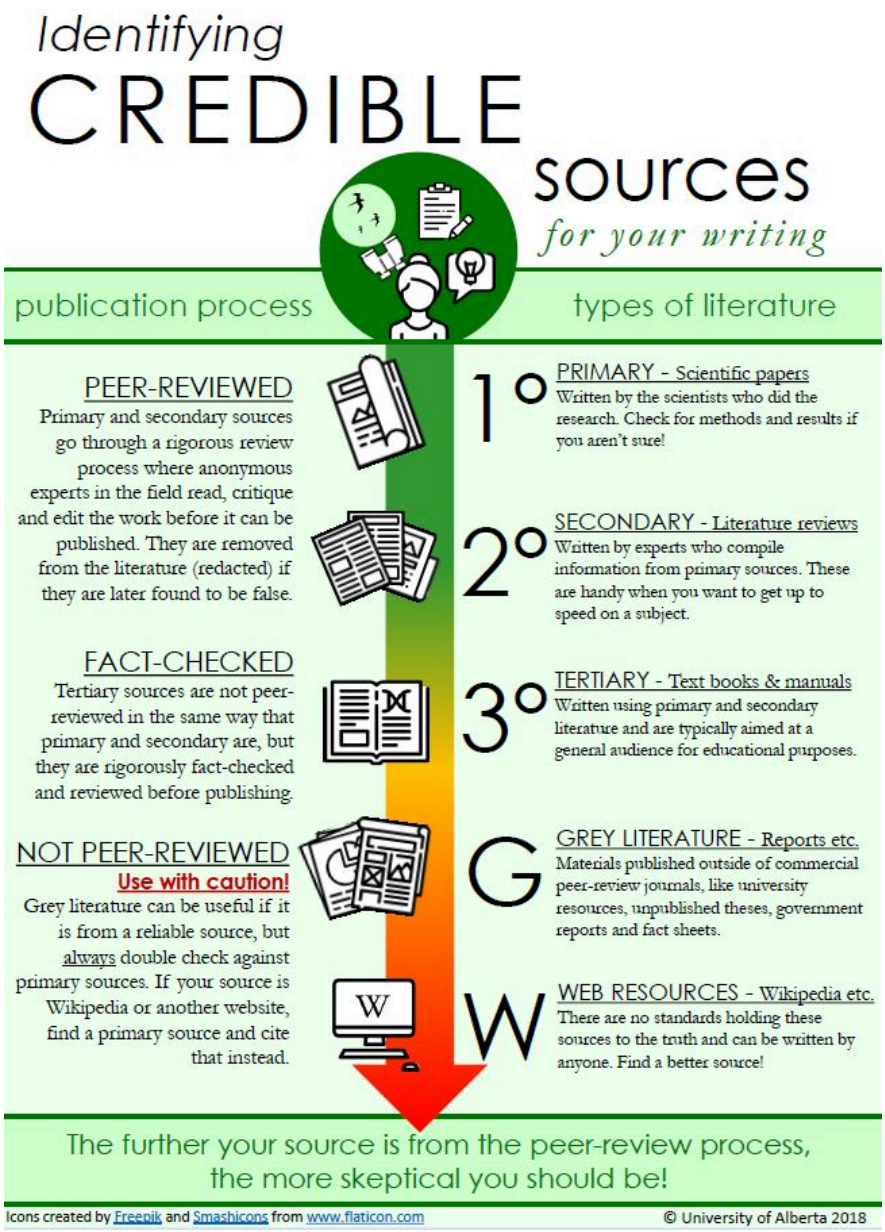

Figure 7.1.1 *An overview of the reliability of research depending on its source (Nylund, 2018).*

Knowledge Check

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More specific methodologies, such as ways to structure the analysis of your data, include the following:

- **Cost/benefit Analysis**: determines how much something will cost vs what measurable benefits it will create.
- **Life-cycle Analysis**: determines overall sustainability of a product or process, from manufacturing, through lifetime use, to disposal. (You can also perform comparative life-cycle analyses, or specific life cycle *stage* analysis.)
- **Comparative Analysis**: compares two or more options to determine which is the "best" solution (given specific problem criteria such as goals, objectives, and constraints).
- **Process Analysis**: studies each aspect of a process to determine if all parts and steps work efficiently together to create the desired outcome.
- **Sustainability Analysis**: uses concepts such as the "triple bottom line" or "three pillars of sustainability" to analyze whether a product or process is environmentally, economically, and socially sustainable.

In all cases, the way you collect, analyze, and use data must be ethical and consistent with professional standards of honesty and integrity. Lapses in integrity can not only lead to poor quality reports in an academic context (poor grades and academic dishonesty penalties), but in the workplace, these lapses can also lead to lawsuits, loss of job, and even criminal charges. Some examples of these lapses include

- fabricating your own data (making it up to suit your purpose),
- ignoring data that disproves or contradicts your ideas,
- misrepresenting someone else's data or ideas, and/or
- using data or ideas from another source without acknowledgment or citation of the source.

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(Plagiarism and You, 2020)

Failing to cite quoted, paraphrased or summarized sources properly is one of the most common lapses in academic integrity, which is why your college writing subjects, COM101 and COM111, spent considerable time and effort to give you a sophisticated understanding of how and why to avoid plagiarizing, as well as the consequences of doing so. If you would like to review this information, see Chapter 8.2: Integrating Source Evidence into Your Writing, and consult Seneca College's Policy on Academic Integrity and Seneca's Student Resources on Academic Integrity.

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7.2 Finding and Evaluating Research Sources

In this "information age" when so much information is available at our fingertips on the Internet, it is crucial to be able to critically search through the reams of information in order to select *credible* sources that can provide *reliable and useful* data to support your ideas and convince your audience. In the era of "fake news," deliberate misinformation, and "alternative facts," developing the skill to evaluate the credibility of sources is critical.

Figure 7.2.1 *Examples of Popular vs Scholarly Sources (Last, 2019).*

Since you have completed COM101 and COM111, you are familiar with academic journals and how they differ from popular sources, as in **Figure 7.2.1**. These contain peer-reviewed articles written by scholars, often presenting their original research, reviewing the original research of others, or performing a "meta-analysis" (an analysis of multiple studies that analyze a given topic). If you would like to refresh your memory on this, watch this Seneca Libraries video: *Popular and Scholarly Resources*.

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Scholarly articles published in academic journals are usually required sources in academic research essays; they are also an integral part of engineering projects and technical reports. Many technical projects require a literature review, which collects, summarizes and sometimes evaluates the work of researchers in a field whose work has been recognized as a valuable contribution to the "state of the art." However, they are not the only kind of research you will find useful. Since you are researching in a professional field and preparing for the workplace, you will draw upon many credible kinds of sources in a professional context.

Table 7.2.1 lists several types of sources you may find useful in researching your projects. You should also consult Seneca Libraries *Writing and Communicating Technical Information: Key Resources,* where you will find key databases for technical research.

Table 7.2.1 ***Typical research sources for technical projects***

[Skip Table]

Source Type	Description
Academic Journals, Conference Papers, Dissertations, etc.	Scholarly (peer-reviewed) academic sources publish primary research done by professional researchers and scholars in specialized fields, as well as reviews of that research by other specialists in the same field. For example, the *Journal of Computer and System Sciences* publishes original research papers in computer science and related subjects in system science; the *International Journal of Robotics and Animation* is one of the most highly ranked journals in the field.
Reference Works	Specialized encyclopedias, handbooks, and dictionaries can provide useful terminology and background information. For example, the *Kirk-Othmer Encyclopedia of Chemical Technology* is a widely recognized authoritative source. You may cite *Wikipedia* or *dictionary.com* in a technical report, but be sure to compare the information to other reliable sources before use.
Books **Chapters in Books**	Books written by specialists in a given field usually contain a References section that can be very helpful in providing in-depth context for your ideas. For example, *Designing Engineers* by Susan McCahan et al. has an excellent chapter on effective teamwork
Trade Magazines and Popular Science Magazines	Reputable trade magazines contain articles relating to current issues and innovations; therefore, they can be useful in determining what is "cutting edge," or finding out what current issues or controversies are affecting the industry. Examples include *Computerworld*, *Wired*, and *Popular Mechanics*.
Newspapers (Journalism)	Newspaper articles and media releases offer a sense of what journalists and people in industry think the general public should know about a given topic. Journalists report on current events and recent innovations; more in-depth "investigative journalism" explores a current issue in greater detail. Newspapers also contain editorial sections that provide personal opinions on these events and issues. Choose well-known, reputable newspapers such as *The New York Times*.
Industry Websites (.com)	Commercial websites are generally intended to "sell," so you have to select information carefully, but these websites can give you insights into a company's "mission statement," organization, strategic plan, current or planned projects, archived information, white papers, technical reports, product details, costs estimates, etc.
Organization Websites (.org)	A vast array of .org sites can be very helpful in supplying data and information. These are often **public service** sites and are designed to share information with the public.

Government Publications and Public Sector Websites (.gov/.edu/.ca)	Government departments often publish reports and other documents that can be very helpful in determining public policy, regulations, and guidelines that should be followed. *Statistics Canada*, for example, publishes a wide range of data. University websites also offer a wide array of non-academic information, such as strategic plans, facilities information, etc.
Patents	You may have to distinguish your innovative idea from previously patented ideas; you can look these up and get detailed information on patented or patent-pending ideas.
Public Presentations	Public consultation meetings and representatives from industry and government speak to various audiences about current issues and proposed projects. These can be live presentations or video presentations available on **YouTube** or **TED talks**.
Other	Can you think of some more? (Radio programs, podcasts, social media, etc.)

The importance of critically evaluating your sources for authority, relevance, timeliness, and credibility cannot be overstated. *Anyone can put anything on the internet*; and people with strong web and document design skills can make this information look very professional and credible—even if it isn't. Since much research is currently done online, and many sources are available electronically, developing your critical evaluation skills is crucial to finding valid, credible evidence to support and develop your ideas. In fact, this has become such a challenging issue that there are sites like this List of Predatory Journals that regularly update its online list of journals that subvert the peer review process and simply publish for profit.

Knowledge Check

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Mark Twain, supposedly quoting British Prime Minister Benjamin Disraeli, famously said, "There are three kinds of lies: lies, damned lies, and statistics." On the other hand, H.G. Wells has been (mis)quoted as stating, "statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write" (Quora, n.d.). The fact that the actual sources of both of these "quotations" are unverifiable makes their sentiments no less true. The effective use of statistics can play a critical role in influencing public opinion as well as persuading in the workplace. However, as

the fame of the first quotation indicates, statistics can be used to mislead rather than accurately inform—whether intentionally or unintentionally.

When evaluating research sources, be careful to critically evaluate the **authority**, **content**, and **purpose** of the material, using questions in **Table 7.2.2**. You may also want to view the brief Seneca Libraries video, *Evaluating Websites.*

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Table 7.2.2 ***Evaluate the authority, content, and purpose of information***

[Skip Table]

Authority **Researchers** **Authors** **Creators**	Who are the researchers/authors/creators? Who is their intended audience? What are their credentials/qualifications? What else has this author written? Is this research funded? By whom? Who benefits? Who has intellectual ownership of this idea? How do I cite it? Where is this source published? What kind of publication is it? **Authoritative Sources:** written by experts for a specialized audience, published in peer-reviewed journals or by respected publishers, and containing well-supported, evidence-based arguments. **Popular Sources:** written for a general (or possibly niche) public audience, often in an informal or journalistic style, published in newspapers, magazines, and websites with a purpose of entertaining or promoting a product; evidence is often "soft" rather than hard.
Content	**Methodology** What is the methodology of their study? Or how has evidence been collected? Is the methodology sound? Can you find obvious flaws? What is its scope? Does it apply to your project? How? How recent and relevant is it? What is the publication date or last update? **Data** Is there sufficient data here to support their claims or hypotheses? Do they offer quantitative and/or qualitative data? Are visual representations of the data misleading or distorted in some way?
Purpose Intended Use and Intended Audience	Why has this author presented this information to this audience? Why am I using this source? Will using this source bolster my credibility or undermine it? Am I "**cherry-picking**" – using inadequate or unrepresentative data that only supports my position, while ignoring substantial amount of data that contradicts it? Could "**cognitive bias**" be at work here? Have I only consulted the kinds of sources I know will support my idea? Have I failed to consider alternative kinds of sources? Am I representing the data I have collected accurately? Are the data statistically relevant or significant?

Given the pie chart in **Figure 7.2.2**, if you only consulted articles that rejected global warming in a project related to that topic, you would be guilty of cherry-picking and cognitive bias.

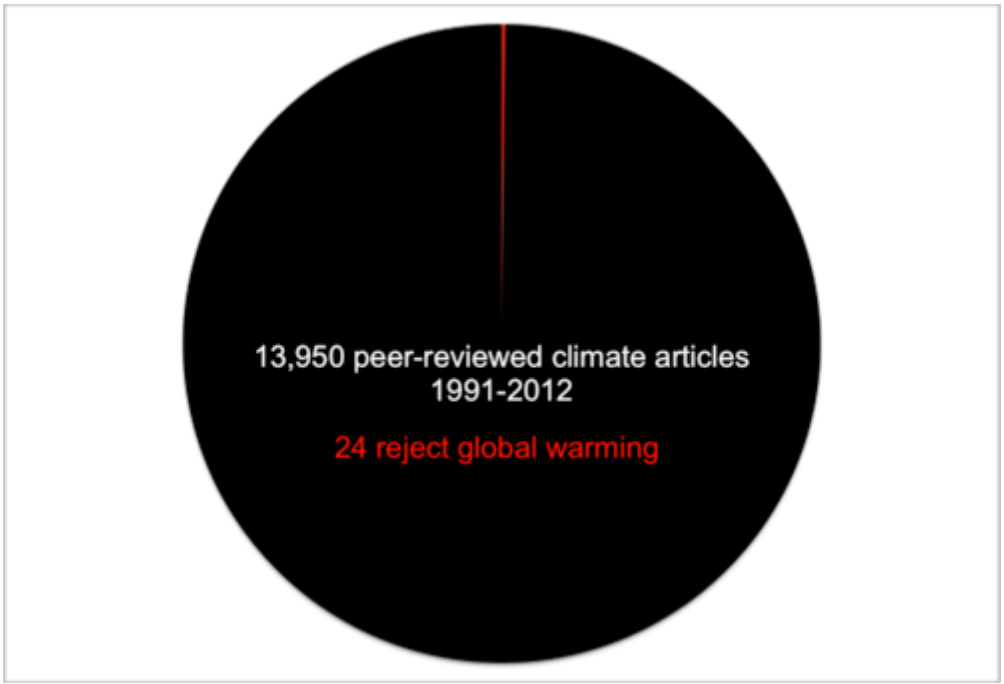

Figure 7.2.2 *The number of articles that reject global warming out of all peer-reviewed climate articles within a 21 year time period (DeSmog Blog, n.d.).*

Beware of Logical Fallacies

We all have biases when we write or argue; however, when evaluating sources, you want to be on the lookout for bias that is unfair, one-sided, or slanted. Consider whether the author has acknowledged and addressed opposing ideas, potential gaps in the research, or limits of the data. Look at the kind of language the author uses: is it slanted, strongly connotative, or emotionally manipulative? Is the supporting evidence presented logically, credibly, and ethically? Has the author cherry-picked or misrepresented sources or ideas? Does the author rely heavily on emotional appeal? There are many logical fallacies that both writers and readers can fall prey to (see **Table 7.2.3**). It is important to use data ethically and accurately, and to apply logic correctly and validly to support your ideas.

Table 7.2.3 *Common logical fallacies*

[Skip Table]

Bandwagon Fallacy	Argument from popularity – "E*veryone else is doing it, so we should too!"*
Hasty Generalization	Using insufficient data to come to a general conclusion. E.g., An *Australian stole my wallet; therefore, all Australians are thieves!*
Unrepresentative Sample	Using data from a particular subset and generalizing to a larger set that may not share similar characteristics. E.g., *giving a survey to only female students under 20 and generalizing results to all students*.
False Dilemma	"Either/or fallacy" – presenting only two options when there are usually more possibilities to consider E.g., *You're either with us or against us.*
Slippery Slope	Claiming that a single cause will lead, eventually, to exaggerated catastrophic results.
Slanted Language	Using language loaded with emotional appeal and either positive or negative connotation to manipulate the reader
False Analogy	Comparing your idea to another that is familiar to the audience but which may not have sufficient similarity to make an accurate comparison E.g., *Governing a country is like running a business.*
Post hoc, ergo prompter hoc	"After this; therefore, because of this" E.g., *A happened, then B happened; therefore, A caused B*. Just because one thing happened first, does not necessarily mean that the first thing caused the second thing.
Circular Reasoning	Circular argument – assuming the truth of the conclusion by its premises. E.g., *I never lie; therefore, I must be telling the truth*.
Ad hominem	An attack on the person making an argument does not really invalidate that person's argument. It might make them seem a bit less credible, but it does not dismantle the actual argument or invalidate the data.
Straw Man Argument	Restating the opposing idea in an inaccurately absurd or simplistic manner to more easily refute or undermine it.
Others?	There are many more… can you think of some? For a bit of fun, check out Spurious Correlations.

Knowledge Check

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Critical thinking lies at the heart of evaluating sources. You want to be rigorous in your selection of evidence because, once you use it in your paper, it will either bolster your own credibility or undermine it.

Notes

1. Cover images from journals are used to illustrate the difference between popular and scholarly journals, and are for noncommercial, educational use only.

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Why climate deniers have no credibility — in one pie chart. DeSmog Blog. https://www.desmogblog.com/2012/11/15/why-climate-deniers-have-no-credibility-science-one-pie-chart

7.3 Defining the Scope of your Project

Often, when you are first given a project, the problem is fairly general and open-ended. This allows you to approach the problem in a variety of ways, but also requires you to do some work to decide which particular approach you will take. Most projects will require careful consideration of **scope**.

Who is your audience? What is your purpose? What are the limitations placed on what can be expected or achieved? What are the constraints you have to work within? Clearly, no project will be relevant to *all* people in *all* places at *all* times. **Figure 7.3.1** provides an overview of five reasons improper scoping happens.

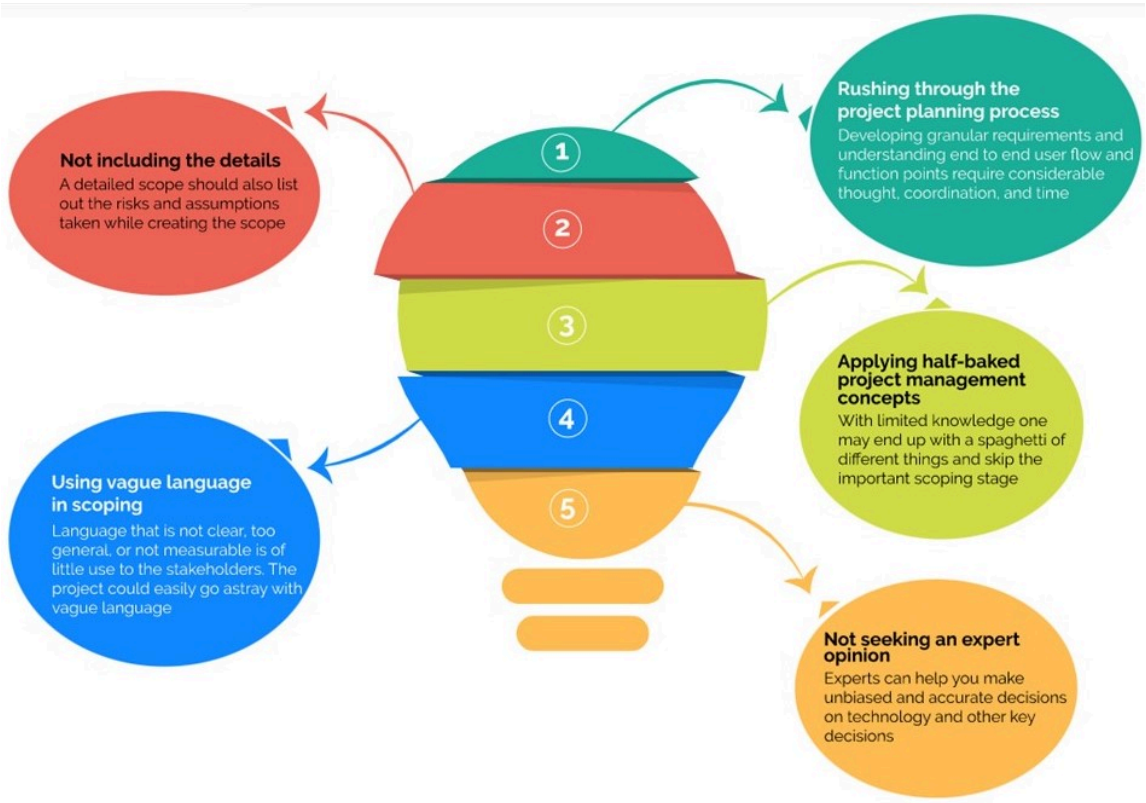

Figure 7.3.1 *An overview of five reasons project scopes are improperly defined (Founder's Blog, n.d.).*

.In order to correctly structure your scope, consider:

- Who is your primary audience? Who else might read this?
- What is the best format to use to present this project to these readers? (What format or specific information have they requested?)

- What is the specific outcome you want this document or project to achieve? What do you want your readers to do, think, or decide after reading it?
- Who are the people who will be affected by this project? Who are the stakeholders?
- Are there limitations (or a potential to apply limits) in terms of geography, demographics, or available technology? Could you consider a pilot project or beta-test?
- Is there a time frame? A budget?
- Are there legal considerations, regulations, policies, and guidelines that must be taken into account?

Your project will first require background research to clearly define the problem you are tackling. How do you know there is a problem? What measurable impacts can you point to? What will you need to prove that this is a significant problem that needs to be addressed? Can you provide data to show the extent of the "unsatisfactory situation" and how it negatively affects people? Is there an expected goal or target that any proposed solution is expected to meet?

The process of coming up with a focused idea for your research can take many forms. Strategies for narrowing and focusing include the following:

- **Free–writing**: Write for 10 minutes straight without stopping or self-editing.
- **Mind-mapping or Concept-mapping**: Create a graphic organizer listing ideas and indicating how they are connected.
- **Questioning**: What do I already know? What do I need to find out? Use the who, what, where, when, why, how questions to brainstorm.
- **Brainstorming**: List all ideas without censoring or rejecting any, no matter how ridiculous they might seem at first.

In engineering fields, projects most often take a problem-solution approach. This entails clearly defining the problem in as open-ended a way as is feasible, possibly considering its causes and effects, and potentially coming up with or evaluating ideas for a solution.

In presenting your solution, you will have to find research to provide support for the basic premise of your research question (is this idea feasible?) and prove your hypothesis (will it be effective/beneficial?). You might do this by showing that similar ideas have been implemented and/or researched in other areas, or that the ideas you are presenting are based on sound evidence. Collecting your own primary data (such as a questionnaire or site visit) may also help show how your ideas are feasible in the local community context.

Using appropriate methods and finding the right sort of research allows you to convince people that your ideas have validity and merit, and that the knowledge you have acquired or created is evidence-based. Research gives you the tools to inform and persuade by doing the following:

- Categorize, Classify
- Describe, Document
- Explain, Analyze, Evaluate
- Compare, Correlate

- Predict

Knowledge Check

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The first step in most projects is figuring out what you don't know and what you need to know. Without this basic context work, it's difficult to work your way to finding relevant sources that can help you apply and analyze information and data from sources, and synthesize them into your own argument or recommendation.

A problem-solving approach offers many ways to narrow your focus. Try creating a concept map like in **Figure 7.3.2** to get a sense of the many ways you might approach your topic, and then narrow down your focus to **one** of those approaches. This will help you think of keywords to use in your search for sources. The more you brainstorm, the more potential keywords and synonyms you can come up with. The "mind map" below shows various ways to consider the larger context of your problem and find a specific area to focus on.

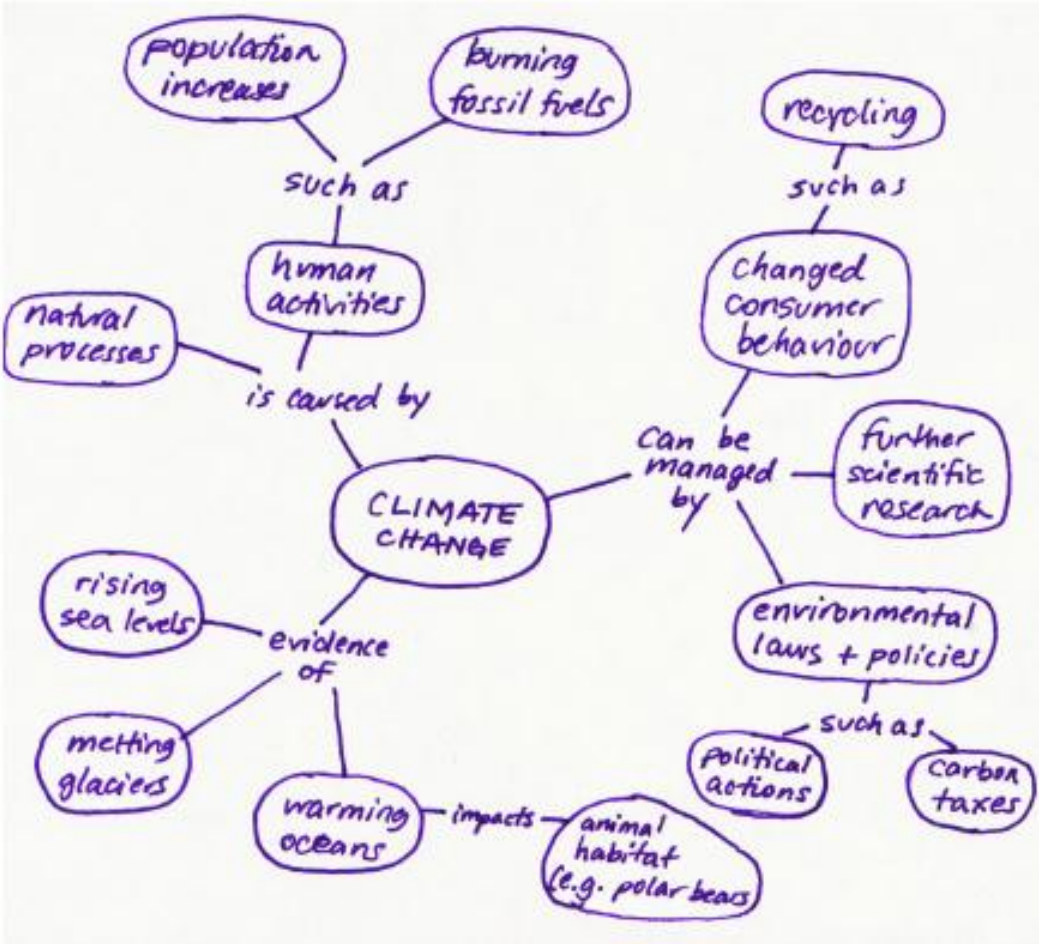

Figure 7.3.2 *Concept map for refining a topic on climate change* (University of Victoria Libraries, n.d.). *[Image description]*

This kind of "graphic brainstorming" can help you consider many different ways your topic can be approached. You can ask questions such as how? why? who? to further extend this exploration. Your goal here is to narrow down your focus to one "bubble" (that is perhaps 3 or 4 nodes away from your central topic node) that can afford a promising topic while limiting the scope to something you can accomplish in the given time frame and assignment specifications (word count, research requirement, goal, etc.). For brief instructions on how to use a concept map, view the following video found through The Learning Portal: *How to use concept mapping* (2016).

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Clearly, you can't solve the problem of climate change in one paper or project, and no reasonable instructor or employer would expect you to do so. However, you might be asked to explore effective ways to reduce carbon emissions in a specific industry in a given period of time and/or geographical region. Or you might investigate whether a particular form of alternative energy would be effective in a particular situation. Even then, you would have to consider approaches. Would you recommend changing a policy or law to try to address the causes of the problem? Providing incentives to industry or consumers? Innovating a current technology or process? Creating a new technology or process? Evaluating a currently proposed solution?

Researching what other people working in this field have studied and written about can help you refine your focus and choose how you want to "participate in this conversation." The ultimate aim is to narrow your topic enough to provide a specific question to guide your research and identify keywords and terminology related to your topic. A good research question should be somewhat open-ended; that is, the answer should not be a simple "yes" or "no." The focus of your research question should allow you to provide a comprehensive answer that takes context into careful consideration.

Figure 7.3.2 shows a more specifically problem-based approach to concept mapping the general idea and finding areas of potential focus. A good focus for a paper or project will likely be 3-4 nodes away from the central problem box.

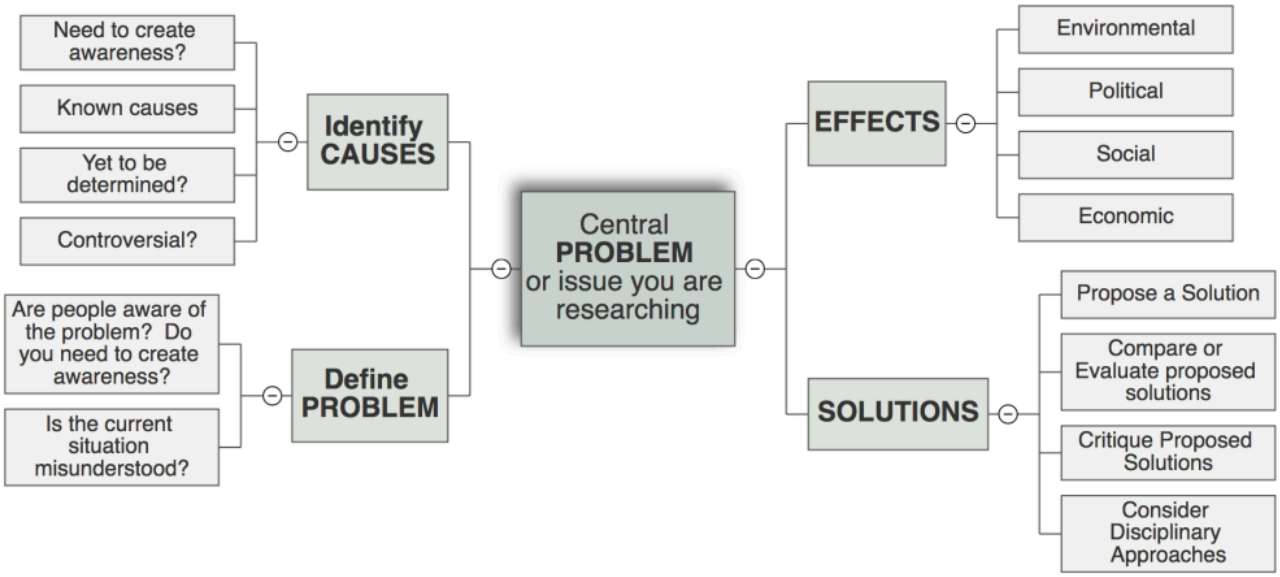

Figure 7.3.2 *Refining your project scope using a problem-based approach to concept mapping (Last, 2019).* *[Image description]*

You generally cannot cover **all** of these issues in one paper or project. Try to narrow your focus so that you can research a specific aspect of the topic in-depth. Choose **one** specific focus (proposing a solution), and consider what other aspects must be included (defining the problem; choosing a specific demographic or geographical area to focus on).

As an example, consider the issue of **Climate Change** and how it might fit into each of these "narrowing your focus" categories.

Examples of Narrowing the Focus on Climate Change Topics

Define the Problem

Several years ago, research focused on defining the problem of climate change, and convincing the general public and government officials that a problem exists and is serious enough that we must start working on solutions immediately. Now, the vast majority of scientists and researchers accept that a problem exists: The climate is indeed warming and this is a problem. Ongoing research might determine ways to convince people who are not yet convinced and ways to motivate people to take the problem seriously enough to consider changing their behaviour or policies.

Identify Causes

In the last few years, there has been controversy over what the CAUSES of this problem are. Is climate change a naturally occurring, cyclical phenomenon or "anthropogenic" (human-caused)? Research has convinced most people that climate change is anthropogenic: that human consumption of fossil fuels is the main cause of climate change.

Research is ongoing about what kinds of activities (fracking, building dams, etc.) might contribute more or less to climate change. Research might also consider effective ways to modify human behaviour in order to slow down those causes.

Identify Effects

Much research currently explores the effects of climate change, and even how we can determine what specific effects can be the direct effect of climate change. This can be done from many different disciplinary approaches. For example:

- Social justice research explores how certain groups of people (based on geography or socio-economic status) are impacted more severely than others.
- Political theorists may explore how different government types create different kinds of policies in response to the problem.
- In economics, researchers might try to predict how climate change may affect certain aspects of the global or local markets.
- In psychology, researchers might explore how people respond to the idea of climate change (e.g., stress, depression, motivation, etc.).
- Environmental researchers have numerous possible topics! For example, how is climate change affecting a particular species in a particular region? What impact might this have on the local ecology or human society? How should building standards in coastal areas be adapted for climate change?

Explore Solutions

Research questions—such as "Are Carbon Taxes and Caps an Effective Way to Reduce GHS Emissions?" and "Will Developed Nations' Taxes Help Developing Countries Create Low Carbon Technologies?"—analyze the effectiveness of proposed or currently implemented solutions. Some research compares the effectiveness of two possible solutions. Some propose new solutions (Tidal Power or AI controlled systems to enhance efficiency). Some might propose implementation of previous solutions in new contexts.

As you can see, research will be needed in all stages and sections of your project.

Knowledge Check

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EXERCISE 7.3.1 Background research

Think of a problem you have recently encountered on campus – something that caused inconvenience, unnecessary cost, or some other "unsatisfactory situation" for you. What kind of research would you have to do to prove

1. That this is a significant problem that needs solving?
2. That it affects a large number of people, not just you?
3. That this situation has tangible, measurable, negative consequences?

How would you convince someone in a position of authority (i.e., "decision-makers") that they should apply time and resources to remedy this situation?

Use Seneca College Libraries library guide for technical communication to help you determine where you can find appropriate sources to research this problem in more depth. Here is the link: *Writing and Communicating Technical Information* (2021, updated).

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University of Victoria Libraries. (n.d.). [Concept Map]. http://libguides.uvic.ca/c.php?g=256802&p=3906769

Image descriptions

Figure 7.3.1 image description:

A concept map to brainstorm topics related to climate change.

Climate change

- is caused by
  - natural processes
  - human activities, such as
    - population increases
    - burning fossil fuels
- evidence
  - rising sea levels
  - melting glaciers
  - warming oceans
    - which impact animal habitat (e.g., polar bears)
- can be managed by
  - changed consumer behaviour, such as
    - recycling
  - further scientific research
  - environmental laws and policies, such as
    - political action
    - carbon taxes

[Return to Figure 7.3.1]

Figure 7.3.2 image description:

A problem-based approach to concept mapping.

What is the central problem or issue you are researching?

1. Define the problem.
    1. Are people aware of the problem? Do you need to create awareness?
    2. Is the current situation misunderstood?
2. Identify causes.
    1. Need to create awareness?
    2. Known causes
    3. Yet to be determined?
    4. Controversial?
3. Identify effects.
    1. Environmental
    2. Political
    3. Social
    4. Economic
4. Look at solutions.
    1. Propose a solution
    2. Compare or evaluate proposed solutions
    3. Critique proposed solutions
    4. Consider disciplinary approaches

[Return to Figure 7.3.2]

7.4 Human Research Ethics

"Primary research" is any research that you do yourself in which you collect raw data directly from the "real world" rather than from articles, books, or internet sources that have already collected and analyzed the data. If you are collecting data from human participants, you are engaging in "human research" and you must be aware of and follow strict ethical guidelines of your academic institution. Doing this is part of your responsibility to maintain academic integrity.

In Canada, any post-secondary educational institution that receives funding from one of the three federal granting bodies must ensure that all research involving humans conducted at that institution complies with the *Tri-Council Policy Statement* (2018). These rules are in place to protect people and communities from potential risk or harm and to ensure ethical conduct while doing research. In some cases, your program instructors may have applied for "course-based ethics approval" for students in their classes to conduct certain kinds of carefully limited research (such as surveys or interviews) for a class project or assignment. Ethics approval is generally required for research that collects data from human subjects in the following ways:

- **Interviews**: one-on-one or small group question and answer sessions. Interviews will provide detailed information from a small number of people and are useful when you want to get an expert opinion on your topic. For such interviews, you may need to have the participants sign an informed consent form before you begin.
- **Surveys/Questionnaires**: a form of questioning that is less flexible than interviews, as the questions are set ahead of time and cannot be changed. These involve much larger groups of people than interviews, but result in fewer detailed responses. Informed consent is made a condition of survey completion: the purpose of the survey/questionnaire and how data will be treated are explained in the introductory. Participants then choose to proceed or not.
- **Naturalistic observation in non-public venues**: involves taking organized notes about occurrences related to your research. Observations allow you to gain objective information without the potentially biased viewpoint of an interview or survey. In naturalistic observations, the goal is to be as unobtrusive as possible, so that your presence does not influence or disturb the normal activities you want to observe. If you want to observe activities in a specific workplace, classroom, or other non-public places, you must first seek permission from the manager of that place and let participants know the nature of the observation. Observations in public places do not normally require approval. However, you may ***not*** photograph or video your observations without first getting the participants' informed voluntary consent and permission.

These are the most common methods used in undergraduate courses. There are many other methods, including engaging with people and their information via social media, organizing focus groups, engaging in beta-testing or prototype trials, etc. But for the purposes of your writing course, these other methods are generally not recommended because they involve additional ethical considerations for you and your instructor.

Guidelines for Students Conducting Human Research

At Seneca College, it will be unlikely that you conduct research using human subjects. Should the opportunity arise, you must first check-in with your professor who will determine if an application must be submitted to the college Research Ethics Board (REB). In order to adhere to the ethical requirements involved in conducting human research, avoid the behaviour in **Figure 7.4.1.**

Figure 7.4.1 *A display of 14 unethical activities to avoid when conducting research involving human subjects (Enago Academy, 2021).*

Instead, when conducting human research, you must abide by the guidelines in the chart below, including gaining informed consent and managing the data you collect. For more detailed information, see Seneca College's *Ethical Conduct for Research Involving Human Subjects Policy* (2007).

Ethics Guidelines for Conducting Course-Based Human Research–The Basics (Last, 2019)

Recruiting Participants

When recruiting potential participants, you must give them the following information before you begin:

- ***Student researcher(s) name(s):*** Inform them of your name and contact information
- ***Affiliation***: Provide a) the name of your institution, b) your course name and number, and c) your instructor's name and contact information
- ***Purpose***: Describe the purpose of your research (objectives), and the benefits you hope will come from this research (overall goal). Your research should not involve any deception (e.g., claiming to be gathering one kind of information, such as "do you prefer blue or green widgets?", but actually gathering another kind, such as "what percentage of the population is blue/green color blind?").

Informed Consent

You must gain the informed consent of the people you will be surveying, interviewing, or observing in non-public venues. This can be done using a consent form they can sign in person, or an "implied consent" statement on an electronic survey. The consent form should include all the information in the "recruiting" section above; in addition, you should

- inform participants that their participation is voluntary and that they may withdraw at any time without consequence, even if they have not completed the survey or interview,
- disclose any and all risks or discomfort that participation in the study may involve, and how these risks or discomfort will be addressed, and
- ensure that all participants are adults (19 years of age or older) and fully capable of giving consent; do not recruit from vulnerable or at-risk groups, and do not collect demographic data regarding age, gender, or any other information not relevant to the study (e.g., phone numbers, medications they are taking, whether they have a criminal records, etc.).

Managing the Data

Participants should be told what will happen to the data you gather:

- In the case of surveys, the data is anonymous if you will not track who submitted responses. In anonymous surveys, let participants know that once they submit their survey, it cannot be retrieved and removed from the overall results.
- Let survey participants know a) that your research results will be reported without their names and identifiers, b) where the data will be stored, c) how it will be "published", and d) what will happen to the raw data once your project is complete
- Let interview participants know how their information will be used and if their names will be included or cited.

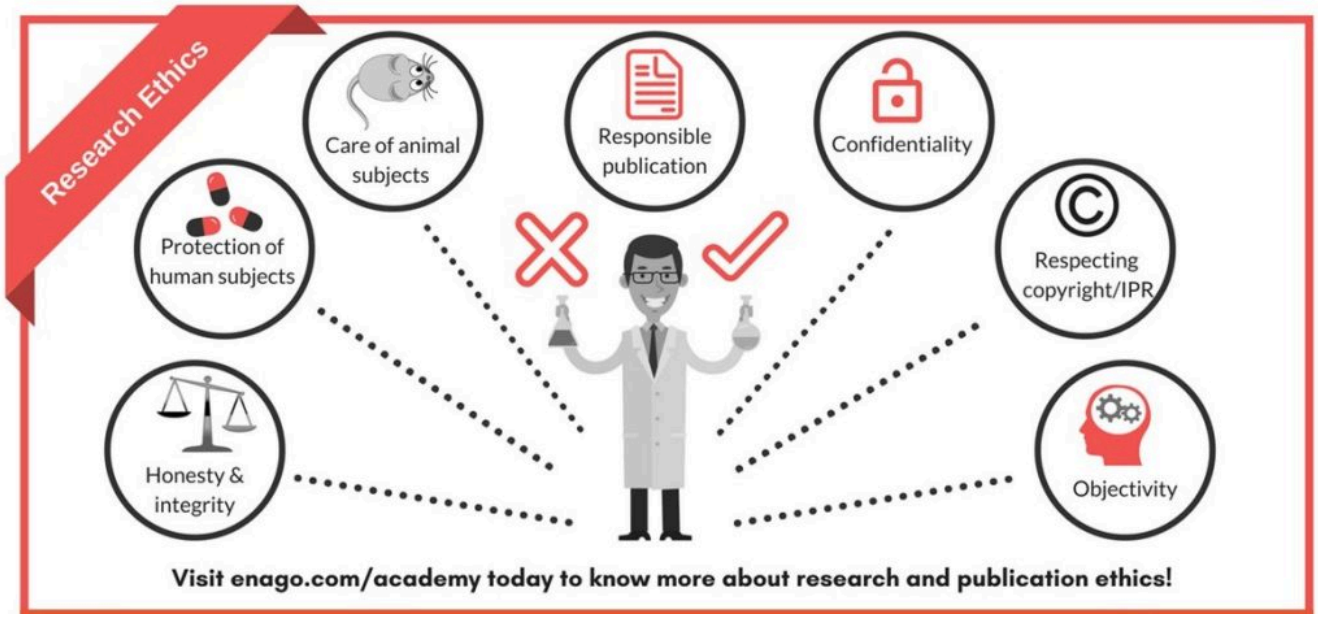

Figure 7.4.2 *an overview of 7 activities to ensure your research meets ethical guidelines. "Research Ethics" by Enago Academy, 2018, https://www.enago.com/academy/research-ethics/*

There may be additional issues that must addressed, such as accessibility and cultural considerations, but those listed above are the most essential. If you are unsure whether a particular line of inquiry or method of data collection requires ethics approval, you should ask your instructor, and your instructor should contact Seneca's Office of Research and Innovation. Most importantly, you should always be completely up front and honest about what and how you are researching.

It may seem like "a lot of fuss" to go through simply to ask people whether they prefer blue widgets or green widgets, but there are important reasons for these guidelines. In the past, people posing as students have conducted "surveys" on campus for unethical reasons, asking students questions that were inappropriate and even harassing. People participating in your research need to be reassured that you are doing this for a legitimate reason, and must be able to contact the relevant faculty member or the campus research ethics office to verify that you have authority to do this research.

For larger scale research projects, such as for a capstone course, an honour's or master's thesis, or a dissertation, students must apply for ethics approval with their academic supervisor before doing any research involving human subjects. Failure to obtain ethics approval before conducting research may result in the data not being accepted as part of the project, thesis or program. It may prevent work from being accepted for publication, and can result in a university audit or academic integrity investigation.

Knowledge Check: Review the video below and respond to questions as they appear.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=162#h5p-49

Designing a Survey

When designing a questionnaire to give to the public, you must avoid doing anything that would cause physical or emotional harm to your participants. For example, be careful how you word sensitive or controversial questions in surveys and during interviews. Be careful to avoid inserting unintended bias or asking leading questions. You want to design questions to get meaningful and accurate responses rather than ambiguous information that is impossible to quantify or analyze. For more detailed information on how to design effective and ethical questionnaires, see Purdue University's OWL site for information on Creating Good Interview and Survey Questions.

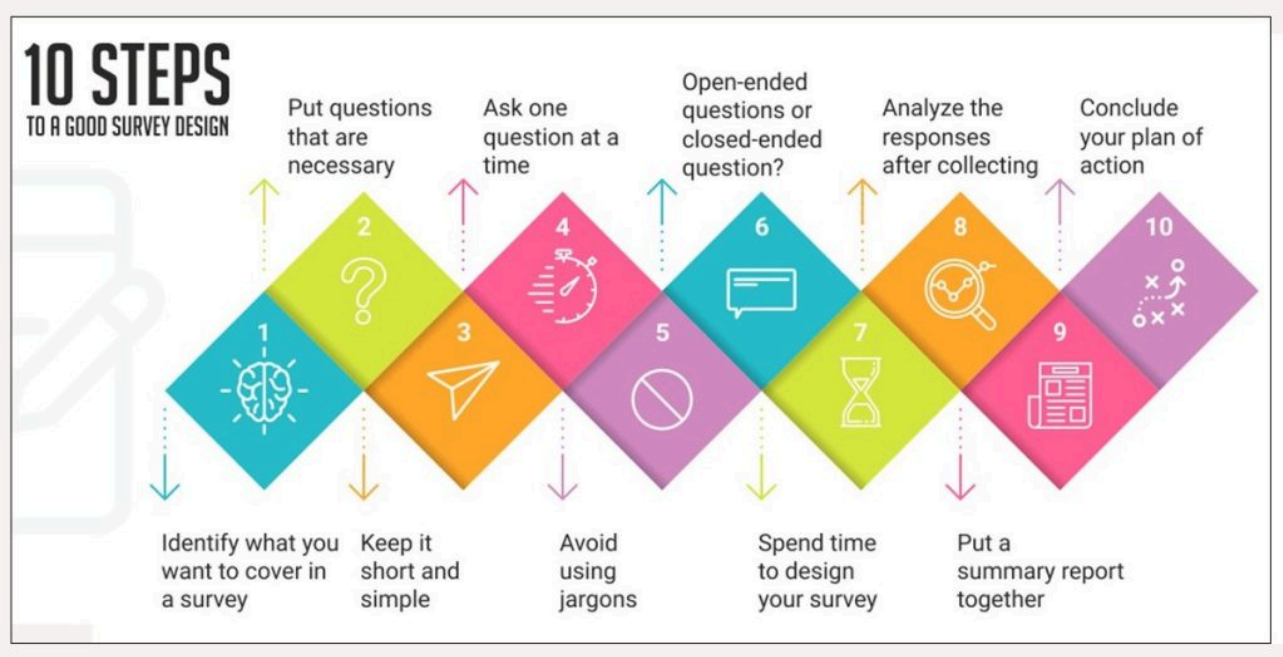

Figure 7.4.3 *Provides the steps to take to design effective an effective survey for a research project (Question Pro, n.d.).*

If you plan to conduct a survey as part of your research project, you may be asked to provide your instructor with detailed information regarding your research methodology. Commonly requested details are in the checklist below.

Course-Based Human Research Checklist (Last, 2019)

Students wishing to do human research to collect data for a class project may be asked to provide their instructor the following information:

- A brief description of the project in lay language that can be understood by the participants and clearly identifies that this is a course-based project; this must include the course name and number, the instructor's name and contact information, and the names of all persons involved in collecting data for the project
- A full description of all data collection methods, procedures, and instruments, as well as expectations regarding the amount of time required for participation; copies of any questionnaires must be provided for the instructor's approval
- A copy of the informed consent form that will be read and signed by the participants
- A sample script you will use to explain to participants that their participation is entirely voluntary and that they can withdraw at any time, without explanation or consequences
- The means by which participants' anonymity will be protected and data will be kept confidential
- How the raw data, including tapes, notes and other types of data will be disposed of at the end of the project
- The way in which the results will be presented and/or disseminated.

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7.5 Stakeholder Engagement and Consultation

One important area of primary research undertaken when embarking on any large scale project entails "public engagement," or stakeholder consultation. Public engagement is the broadest term used to describe the increasingly necessary process that companies, organizations, and governments must undertake to achieve a "social license to operate." Stakeholder engagement can range from simply informing the public about plans for a project, to engaging in more consultative practices like getting input and feedback from various groups, and even to empowering key community stakeholders in the final decision-making process.

For projects that have social, economic, and environmental impacts, stakeholder consultation is an increasingly critical part of the planning stage. Creating an understanding of how projects will affect a wide variety of stakeholders is beneficial for both the company instigating the project and the people who will be affected by it. Listening to stakeholder feedback and concerns can be helpful in identifying and mitigating risks that could otherwise slow down or even derail a project. For stakeholders, the consultation process creates an opportunity to be informed, as well as to inform the company about local contexts that may not be obvious, to raise issues and concerns, and to help shape the objectives and outcomes of the project.

What is a Stakeholder?

Stakeholders include any individual or group who may have a direct or indirect "stake" in the project – anyone who can be affected by it, or who can have an effect on the actions or decisions of the company, organization or government. They can also be people who are simply interested in the matter, but more often they are potential beneficiaries or risk-bearers. They can be internal – people from within the company or organization (owners, managers, employees, shareholders, volunteers, interns, students, etc.) – and external, such as community members or groups, investors, suppliers, consumers, policy makers, etc. Increasingly, arguments are being made for considering non-human stakeholders such as the natural environment (Driscoll & Starik, 2004). The following video, *Identifying Stakeholders* (2018) further explains the process of identifying stakeholders.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=168#oembed-1

Stakeholders can contribute significantly to the decision-making and problem-solving processes. People most affected by the problem and most directly impacted by its effects can help you

- understand the context, issues and potential impacts,
- determine your focus, scope, and objectives for solutions, and
- establish whether further research is needed into the problem.

People who are attempting to solve the problem can help you

- refine, refocus, prioritize solution ideas,
- define necessary steps to achieving them, and
- implement solutions, provide key data, resources, etc.

There are also people who could help solve the problem, but lack awareness of the problem or their potential role. Consultation processes help create the awareness of the project to potentially get these people involved during the early stages of the project.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=168#h5p-50

Stakeholder Mapping

The more a stakeholder group will be materially affected by the proposed project, the more important it is for them to be identified, properly informed, and encouraged to participate in the consultation process. It is therefore critical to determine who the various stakeholders are, as well as their level of interest in the project, the potential impact it will have on them, and the power they have to shape the process and outcome. You might start by brainstorming or mind-mapping all the stakeholders you can think of. See **Figure 7.5.1** as an example.

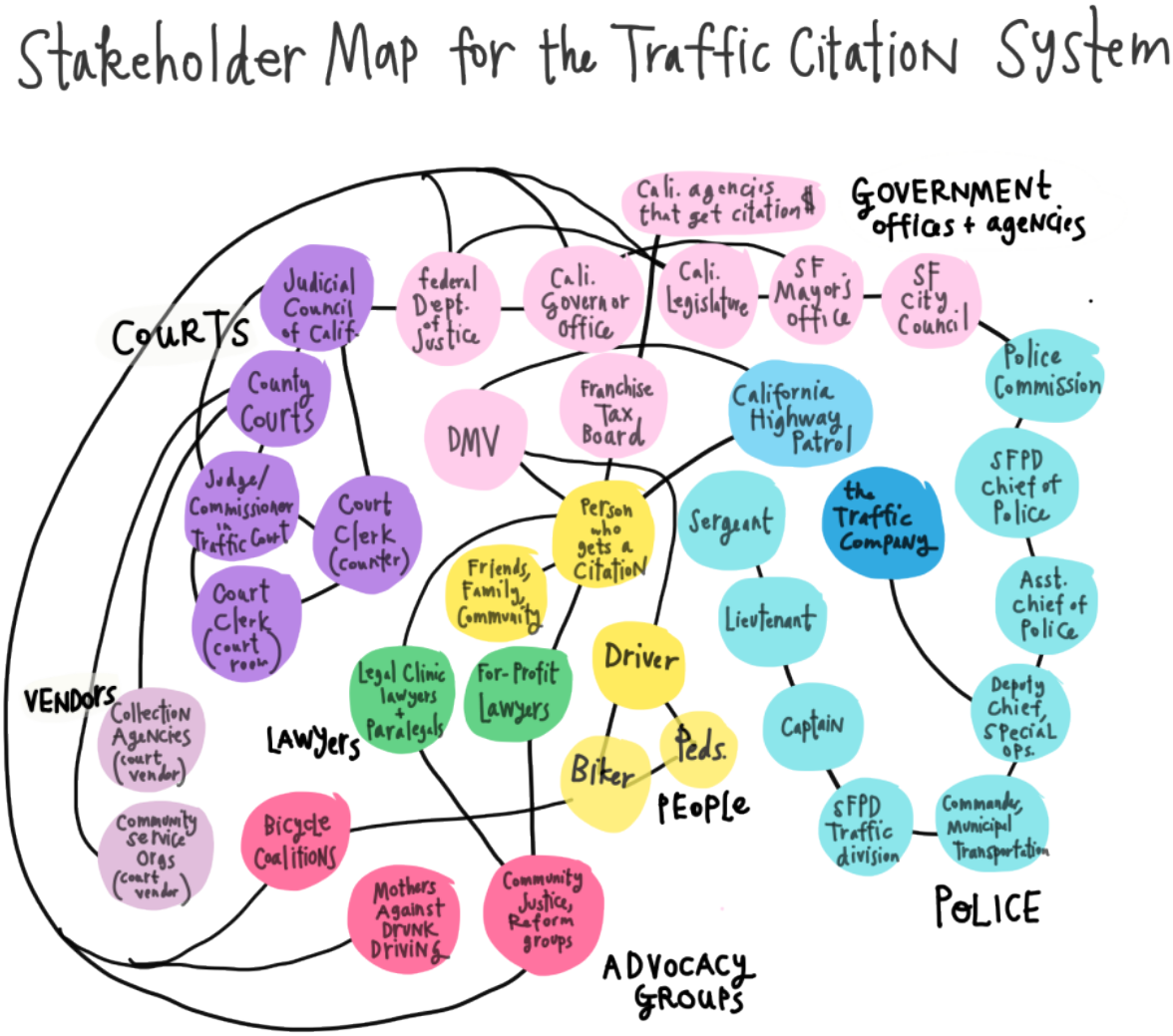

Figure 7.5.1 *Sample Brainstorm Stakeholder Map (Hagan, 2017, CC-BY-NC-SA 4.0).*

Once you have identified stakeholders who may be impacted, organize them into categories or a matrix. One standard method of organizing stakeholders is to determine which are likely to be in support of the project and which are likely to oppose it, and then determine how much power or influence each of those groups has (see **Figure 7.5.2**). For example, a mayor of a community has a strong level of influence. If the mayor is in full support of the project, this stakeholder would go in the top right corner of the matrix. Someone who is deeply opposed to the project, but has little influence or power, would go at the bottom left corner.

Level of Influence	Level of Support for the Project		
	In opposition ←	Somewhere in the middle/undecided	→ In full support
Strong → ← Low			

Figure 7.5.2 *Sample stakeholder mapping matrix*

A matrix like this can help you determine what level of engagement is warranted: where efforts to "consult and involve" might be most needed and most effective, or where more efforts to simply "inform" might be most useful. You might also consider the stakeholders' level of knowledge on the issue, level of commitment (whether in support or opposed), and resources available.

Levels of Stakeholder Engagement

There are various levels of engagement, ranging from simply informing people about what you plan to do to actively seeking consent and placing the final decision in their hands. This range, presented in **Figure 7.5.3**, is typically presented as a "spectrum" or continuum of engagement from the least to most amount of engagement with stakeholders.

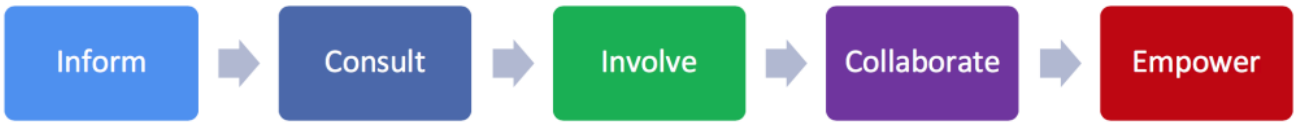

Figure 7.5.3 *Spectrum of public engagement.*

Review the following video, *What is Stakeholder Engagement* (2020), for an additional overview of this process.

> *One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=168#oembed-2*

Depending on the type of project, the potential impacts and the types and needs of stakeholders, you may engage in a number of levels and strategies of engagement across this spectrum using a variety of different tools (see **Table 7.5.1**):

1. ***Inform***: Provide stakeholders with balanced and objective information to help them understand the project, the problem, and the solution alternatives. (There is no opportunity for stakeholder input or decision-making.)
2. ***Consult***: Gather feedback on the information given. The level of input can range from minimal interaction (online surveys, etc.) to extensive. Can be a one-time contribution or ongoing/iterative opportunities to give feedback to be considered in the decision-making process.
3. ***Involve***: Work directly with stakeholders during the process to ensure that their concerns and desired outcomes are fully understood and taken into account. Final decisions are still made by the consulting organization, but with well-considered input from stakeholders.
4. ***Collaborate***: Partner with stakeholders at each stage of decision-making, including developing alternative solution ideas and choosing the preferred solution together. The goal is to achieve consensus regarding decisions.
5. ***Empower***: Place final decision-making power in the hands of stakeholders. Voting ballots and referenda are common examples. This level of stakeholder engagement is rare and usually includes a small number of people who represent important stakeholder groups.

Table 7.5.1 ***Typical tools for public engagement***

Inform	Consult	Involve / Collaborate / Empower
• Public meetings • Briefings • News media • Public presentations • Info kiosks • Hotlines • Newsletters • Bulletins • Social media • Websites • Fact sheets • Arts and entertainment • Blog posts	• Public meetings, hearings, workshops, town halls • Focus groups • Study circles • Interviews • Surveys • Opinion polls • Questionnaires • Social media • Suggestion boxes • Comment forms	• Consensus workshops • Charrettes • "World Cafes" • Study groups • Focus groups • Task force • Think tanks • Advisory boards, committees • Citizen panels or juries • Polling • Votes, referenda • Social media

Knowledge Check

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Basic Steps for a Consultation Process

There is no single "right" way of consulting with stakeholders. Each situation will be different so each consultation process will be context-specific and will require a detailed plan. A poorly planned consultation process can backfire as it can lead to a lack of trust between stakeholders and the company. Therefore, it is critical that the process be carefully mapped out in advance, and that preliminary work is done to determine the needs and goals of the process and the stakeholders involved, see **Figure 7.5.4**. In particular, make sure that whatever tools you choose to use are fully accessible to all the stakeholders you plan to consult; an online survey is not of much use to a community that lacks robust wifi infrastructure. Consider the following steps:

1. ***Situation Assessment***: *Who needs to be consulted about what and why*? Define internal and external stakeholders, determine their level of involvement, interest level, and potential impact, their needs and conditions for effective engagement.
2. ***Goal-setting***: *What is your strategic purpose for consulting with stakeholders at this phase of the project?* Define clear understandable goals and objectives for the role of stakeholders in the decision-making process. Determine what questions, concerns, and goals the stakeholders will have and how these can be integrated into the process.
3. ***Planning/Requirements***: Based on situation assessment and goals, determine what engagement strategies to use and how to implement them to best achieve these goals. Ensure that strategies consider issues of accessibility and inclusivity and consider vulnerable populations. Consider legal or regulatory requirements, policies, or conditions that need to be met. Determine how you will collect, record, track, analyze and disseminate the data.
4. ***Process and Event Management***: Keep the planned activities moving forward and on-track, and adjust strategies as needed. Keep track of documentation.
5. ***Evaluation***: Design an evaluation metric to gauge the success of the engagement strategies; collect, analyze, and act on the data collected throughout the process. Determine how will you report the results of the engagement process back to the stakeholders.

Figure 7.5.4 *A step by step stakeholder consultation process (Forman & Discenza, 2012).*

Stakeholder Consultation: Communication Skills

Effective communication is the foundation of stakeholder consultation. The ability to create and distribute effective information, develop meaningful relationships, build trust, and listen to public input is essential. The basic communication skills required for any successful stakeholder engagement project include:

- ***Effective Writing***: the ability to create clear and concise written messages using plain language and structural conventions.
- ***Visual Rhetoric***: the ability to combine words, images, and graphics to support, clarify, and illustrate ideas and make complex issues understandable to a general audience.
- ***Public Speaking/Presenting***: the ability to present information to large audiences in a comfortable and understandable way. The ability to create effective visual information that increases the audience's understanding.
- ***Interpersonal and Intercultural Skills***: the ability to relate to people in face-to-face situations, to make them feel comfortable and secure, and to be mindful of cultural factors that may affect interest level, accessibility, impact, values, or opinions.
- ***Active Listening****:* the ability to focus on the speaker and portray the behaviors that provide them with the time and safety needed to be heard and understood. The ability to report back accurately and fully what you have heard from participants.

Additional Resources

For information on developing stakeholder consultation with indigenous communities, read Part I: Stakeholder Consultation. The US Environmental Protection Agency (EPA) also has an online "Public Participation Guide (EPA, n.d.). For a recent and local example of a stakeholder engagement plan, see the University of Victoria's "Campus Greenway Engagement Plan (University of Victoria Campus Planning and Sustainability, n.d.). A significant step in this plan — a Design Charrette — was implemented in the fall of 2018; the results of that engagement activity, presented in a Summary Report (.pdf) (University of Victoria Campus Planning and Sustainability, 2018), and it resulted in changes and augmentation of the original plan based on stakeholder feedback.

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8. CITING AND DOCUMENTING SOURCES (APA STYLE)

Citing and documenting your sources is a critical component of using research in your writing and presentations. It gives credit to the experts upon whom you have relied to build your argument. From an ethical standpoint, citing correctly, accurately, and thoroughly strengthens your credibility and the validity of your ideas.

Chapter 8 Learning Objectives

This chapter will help you understand how to use APA style to

- cite summarized, paraphrased, and quoted information
- create in-text citations that alert the reader to your use of a source,
- effectively place in-text citations within your sentences,
- create an informative and usable References section, and
- document various kinds of sources you may use in your documents.

It contains the following sections:

8.1 Writing Summaries

8.2 Integrating Evidence into Your Writing

8.3. Referring to Authors and Titles

8.4 Creating a References List: Sample Entries

8.5 Frequently Asked Questions

8.1 Writing a Summary

Knowing how to summarize is the first step in being able to use research information in your document ethically. A summary provides an objective, condensed (shortened) description of the content of a piece of writing or presentation. Unlike a review, it does NOT analyze, evaluate, or critique; your opinion of the work is not typically part of the summary (unless you have been asked to *add* your thoughts afterward). Since summaries usually occur within a context (e.g., part of your report), your thoughts about what you have summarized will probably be relevant to your subsequent analysis. But when writing the actual summary of someone else's ideas, you must neutrally and accurately describe what you take to be the important ideas in the author's or presenter's work in as few words as possible. Occasionally, if the work you are summarizing has an unusual form, style, or tone that affects the content, your summary might describe HOW the author presents those ideas.

What is the purpose of a summary?

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=171#oembed-1

(How to Write a Summary, 2012)

A summary is meant to **inform** your reader—who **has not read** the text or seen the presentation—of what the text or speech is about. It describes its purpose or main idea, and summarizes the supporting arguments that develop that idea. The summary often forms the foundation upon which a critique or new ideas rely. Following a good summary, a reader will then know if he or she will find the information useful and if reading or viewing the original is worthwhile.

In technical contexts, you will find the following types of summaries, which serve different purposes:

- A **technical summary** of someone else's ideas, in the context of a report, helps you to support and develop your ideas. You may summarize someone's ideas because they support your own, or because they differ from yours and allow you to introduce the idea you want to argue. Someone else's theory may provide a framework for your analysis, so you might summarize the theory before beginning your argument. A summary can act as a springboard to launch your ideas
- An **executive summary** of a long or formal report that you have created informs the reader of the key points of the report. In this case, you will summarize all the main ideas, including the conclusion (and recommendations), of your report. Executive summaries are written by the

report authors, and thus do not use signal phrases.

- An **abstract**, written by the author(s) of a technical paper, describes the content and purpose of the report and is included at the beginning of the document. An abstract is pretty formulaic and consists of the following types of statements: problem, purpose, methods, findings, next steps or implications. Abstracts are written by the authors, and thus do not use signal phrases.
- **Conclusions:** Appears at the end of a report; reiterates key ideas discussed and draws inferences based on the discussion or findings.
- **Briefing notes** are often written by government workers to give the busy minister a summary of important information needed for a meeting or for a decision.

Being able to write a clear and useful summary is a valuable skill both in academic and professional contexts.

Knowledge Check

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How do you write an effective academic summary?

Before you can summarize anything, you must understand the original text and do some pre-writing. Some of the most common flaws in summaries come from not completing these pre-writing steps. For example, some summary writers get bogged down in the small details and neglect to present the main idea; or they present a series of unconnected thoughts that come directly from the source, but do not coherently indicate what that source was about or how ideas were developed; occasionally, a writer may summarize the structure of a text instead of the ideas in that text. These errors occur because the pre-writing work was done poorly.

A Note About Online Paraphrasing Tools: Online paraphrasing tools are being used by many students to switch up the language of an original text in order to avoid plagiarism. It is highly ill-advised to use such a tool. The text that the machine creates is often nonsensical due to a haphazard use of vocabulary that is devoid of context. You are strongly advised not to use such tools.

Pre-writing Stage

1. **Actively read the article or pay attention to the presentation.** Make notes. Make sure you

understand what you are summarizing: What is its main purpose? What is the "thesis"? What are the main points that support the thesis? Explain it verbally to someone else or in free writing. Use your own words to make sure you really understand what you have read or seen.
2. **Reread** the article (or your notes on the presentation, or the slides if they have been provided) and break it up into sections or "stages of thought." Briefly summarize each section and indicate how it relates to the main idea. Again, paraphrase. Omit the finer details.
3. Keep your **purpose and intended audience** in mind when you design your summary; remember, your intended reader has not read the article or seen the presentation. Why are you summarizing it? Why is your audience reading your summary?

Writing Stage

Now you are ready to begin writing your summary. Follow these steps:

1. **Provide the author's name and title** of the text being summarized. If you are summarizing a speaker's presentation, give the presenter's name, the title or topic of the presentation. If the context is important to your summary, give some details about the intended audience, etc.

    - In "Can Ethics be Technologized?" Peter Dombrowski (1995) critiques the idea that ...

2. **Paraphrase** (write in YOUR OWN WORDS) the author's THESIS or main idea:

    - *... the idea that ethics can be reduced to an objective formula or algorithm that can be implemented in any given situation*.

3. **Describe,** in a neutral and objective manner, how the author supports and develops the main idea. Do not editorialize (evaluate, critique, analyze, etc.); simply describe. Keep the following in mind:

    - Summarize the key points used to develop the main idea.
    - Leave out details and examples that are not important to the main idea.
    - Do not quote from the article, or limit quotations to a single keyword or important phrase. Padding your summary with quotations is not an accepted method for summarizing.
    - Use signal phrases, such as "Dombrowski explains" and "Dombrowski asserts" to show that the ideas are not yours, but that they come from the article you are summarizing. **Do not accidentally plagiarize**. *Do not inadvertently present the author's ideas as your own*.
    - Cite and document your source using the APA method; e.g., (Dombrowski, 1995).
    - Keep your summary at about 1/3 the length of the original.

4. Pay attention to **verb tense**: summaries of *ideas* are generally given in the present tense, while results and findings are often given in the past tense.

- Dombrowski *explains* ... (present tense)
- Hollander's study *found* that ... (past tense)

Summaries of presentations are generally given in the past tense since the presentation happened only once in the past, while a text can be read and reread several times, making it more "present." However, a video presentation, such as a TED Talk, would likely be summarized in the present tense, much like an article, because it can be reviewed over and over again. The verb tense you should use is not subject to absolute rules; you will have to use some judgment to determine what sounds best (and what sounds awkward).

Example Reference

Dombrowski, P. M. (1995, September). Can Ethics be Technologized? Lessons from Challenger, Philosophy, and Rhetoric. In *IEEE Transactions of Professional Communication, 38.3*, pp. 146-50 . DOI: 10.1109/47.406727

Rewriting Stage

Review and revise your draft using the following steps:

1. **Revise content and organization:** Is it complete? Should you add any key ideas? Is it well organized? Is the content accurate? Does it follow the order of ideas of the original text? Can you get rid of any unnecessary content? Have you used your own words and phrasing?
2. **Edit for flow:** Do ideas flow smoothly together? Are sentences clear, concise, correct and coherent? Or do they require effort to decode? Do transitions effectively indicate the relationships between ideas? Have you effectively introduced, developed and concluded?
3. **Proofread:** Look for mechanical errors (typos, spelling, punctuation), and for grammar and usage errors that may have crept in during revision and editing.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=171#h5p-53

Signal Phrases

Signal phrases allow you to clearly indicate when words, phrases and ideas you include in your writing come from someone else. These include verbs that introduce summaries, paraphrases, and quotations. In general, it is best to avoid verbs like

- says (too vague)
- writes (too vague)
- talks about (too informal)

Instead, use a verb that more precisely and accurately describes the author's rhetorical intention — describe what the author is DOING in this quotation, or what rhetorical purpose the author is trying to achieve. Chapter 6.2 contains a useful table of Signal Verbs for various purposes.

"I Can't See the Forest for the Trees"

A summary should move from a statement of the **general purpose** to the **specific ideas** used to develop that purpose; it should be neither too vague nor too specific. There is an expression: "you can't see the forest for the trees." It means you get too focused on the details so you miss the "big picture." You don't want to be too general or too detailed. You want to give an accurate description of the forest as a whole, and quickly go over the main characteristics of the types of trees that comprise it (the key examples used to illustrate the main idea). Don't let your summary get bogged down in the details, specific examples, and precise data (the species of fungus on the leaves of the trees).

See examples of paraphrases and summaries on the website for the Online Writing Lab at the University of Purdue.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=171#h5p-54

References

Online Writing Lab (OWL). *Paraphrase and summary exercises.* University of Purdue. https://owl.purdue.edu/owl_exercises/esl_exercises/paraphrase_and_summary_exercises/index.html

Smrt English. (2012). How to write a summary [Video]. Youtube. https://www.youtube.com/watch?v=eGWO1ldEhtQ

8.2 Integrating Evidence into Your Writing

SUZAN LAST AND CANDICE NEVEU

Writing in both academic and professional technical contexts often entails being able to correctly and fluently incorporate and engage with other writers' words and ideas in your own writing. The three main ways to integrate evidence from sources into your writing include quoting, paraphrasing, and summarizing. Each method requires a citation because you are using another person's words and/or ideas. Even if you do not quote directly, but paraphrase source content and express it in your own words, you still must give credit to the original authors for their ideas. Similarly, if you quote someone who says something that is "common knowledge," you still must cite this quotation, as you are using their sentences structure, organizational logic, and/or syntax.

Integrating Quotations

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(Integrating Research into Your Paper, 2013)

WHY: Using direct quotations in your argument has several benefits:

- Integrating quotations provides direct evidence from reliable sources to support your argument.
- Using the words of credible sources conveys your credibility by showing you have done research into the area you are writing about and have consulted relevant and authoritative sources.
- Selecting effective quotations illustrates that you can extract the important aspects of information and use them effectively in your own argument.

WHEN: Be careful not to over-quote. Quotations should be **used sparingly** because too many quotations can interfere with the flow of ideas and make it seem like you don't have ideas of your own. Typically, no more than a brief paragraph is quoted. Paraphrasing can be more effective in some cases.

So when should you use quotations?

- If the language of the original source uses the best possible phrasing or imagery, and no paraphrase or summary could be as effective; or
- If the use of language in the quotation is itself the focus of your analysis (e.g., if you are analyzing the author's use of a particular image, metaphor, or other rhetorical strategies).

Knowledge Check

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How to Integrate Quotations Correctly

Integrating quotations into your writing happens on two levels: argumentative and grammatical. At the argument level, the quotation is being used to illustrate or support a point that you have made, and you will follow it with some analysis, explanation, comment, or interpretation that ties that quote to your argument. ***Never quote and run***: don't leave your reader to determine the relevance of the quotation. A quotation, statistic, or bit of data cannot speak for itself; you must provide context and an explanation for quotations you use. Essentially, you should create a "quotation sandwich" (see **Figure 8.2.1**). Remember the acronym I.C.E. → Introduce – Cite – Explain.

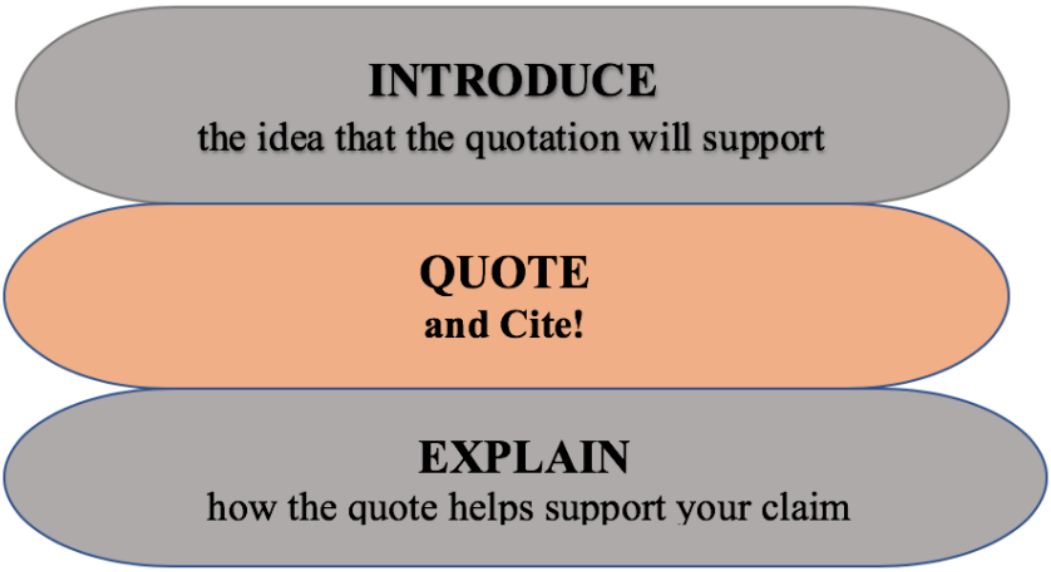

Figure 8.2.1 *Quotation sandwich (Last, 2019).*

The second level of integration is grammatical. This involves integrating the quotation into your own sentences so that it flows smoothly and fits logically and syntactically. The three main methods to integrate quotations grammatically include the following:

1. **Seamless Integration Method:** Embed the quoted words as if they were an organic part of your sentence (if you read the sentence aloud, your listeners would not know there was a quotation).
2. **Signal Phrase Method:** Use a signal phrase (Author + Verb) to introduce the quotation, clearly indicating that the quotation comes from a specific source
3. **Colon Method:** Introduce the quotation with a complete sentence ending in a colon.

Consider the following opening sentence (and famous comma splice) from *A Tale of Two Cities* (1859) by Charles Dickens, as an example:

"It was the best of times, it was the worst of times. . ."

1. Seamless Integration: Embed the quotation, or excerpts from the quotation, as a seamless part of your sentence:

> Charles Dickens begins his novel with the paradoxical observation that the eighteenth century was both "the best of times" and "the worst of times" (Dickens, 1859).

2. Signal Phrase: Introduce the author and then the quote using a signal verb (scroll down to see a list of common verbs that signal you are about to quote someone):

> Describing the eighteenth century, Charles Dickens observes, "It was the best of times, it was the worst of times" (Dickens, 1859).

3. Colon: If you use your own introductory words form a complete sentence, you can use a colon to introduce and set off the quotation. This can give the quotation added emphasis.

> Dickens defines the eighteenth century as a time of paradox: "It was the best of times, it was the worst of times" (Dickens, 1859).

> The eighteenth century was a time of paradox: "It was the best of times, it was the worst of times" (Dickens, 1859).

Reference:

Dickens, Charles. (1859). *A Tale of Two Cities.* Serialized. Discovering Dickens: A Community Reading Project. Stanford University. https://dickens.stanford.edu/dickens/archive/tale/cities_issue1.html

Knowledge Check

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Editing Quotations

When you use quotation marks around the material, this indicates that you have used the ***exact*** words of the original author. See the example below.

Sample Quotation, Citation, and Reference

"Engineers are always striving for success, but failure is seldom far from their minds. In the case of Canadian engineers, this focus on potentially catastrophic flaws in a design is rooted in a failure that occurred over a century ago. In 1907 a bridge of enormous proportions collapsed while still under construction in Quebec. Planners expected that when completed, the 1,800-foot main span of the cantilever bridge would set a world record for long-span bridges of all types, many of which had come to be realized at a great price. According to one superstition, a bridge would claim one life for every million dollars spent on it. In fact, by the time the Quebec Bridge would finally be completed, in 1917, almost ninety construction workers would have been killed in the course of building the $25 million structure" (Petroski, 2014, p. 175).

Petroski, H. (2014). The Obligation of an Engineer. In *To Forgive Design*. Boston: Belknap, p. 175.

Sometimes the text you want to quote will not fit grammatically or clearly into your sentence without making some changes. Perhaps you need to replace a pronoun in the quote with the actual noun to make the context clear, or perhaps the verb tense does not fit. There are two key ways to edit a quotation to make it fit grammatically with your own sentence:

- **Use square brackets:** To reflect changes or additions to a quote, place square brackets around any words that have been changed or added.
- **Use ellipses** (3 dots): To show that some text has been removed, use the ellipses. Three dots indicate that some words have been removed from the sentence; 4 dots indicate that a substantial amount of text has been deleted, including the period at the end of a sentence.

You are allowed to change the original words, to shorten the quoted material or integrate material grammatically, but only if you signal those changes appropriately with square brackets or ellipses:

> **Example 1:** Petroski observed that "[e]ngineers are always striving for success, but failure is seldom far from their minds" (Petroski, 2014, p. 175).
>
> **Example 2:** Petroski recounts the story of a large bridge that was constructed at the beginning of the twentieth century in Quebec, saying that "by the time [it was done], in 1917, almost ninety construction workers [were] killed in the course of building the $25 million structure" (Petroski, 2014, p. 175).
>
> **Example 3:** "Planners expected that when completed the ... bridge would set a world record for long-span bridges of all types" (Petroski, 2014, p. 175).

Integrating Paraphrases and Summaries

Instead of using direct quotations, you can paraphrase and summarize evidence to integrate it into your argument more succinctly. Both paraphrase and summary requires you to read the source carefully, understand it, and then rewrite the idea in your own words. Using these forms of integration demonstrates your understanding of the source, because rephrasing requires a good grasp of the core ideas.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=175#oembed-2

(Comparing Paraphrasing and Quoting, 2020)

Paraphrase and summary differ in that paraphrases focus on a smaller, specific section of text that when paraphrased may be close to the length of the original. Summaries, on the other hand, are condensations of large chunks of text, so they are much shorter (about 1/3 of the original length) than the original and capture only the main ideas. For more information on how to write a summary, see Chapter 6.1: Writing Summaries.

Sample Paraphrase

At the end of its construction, the large cantilever bridge cost $25 million dollars, but the cost in lives

lost far exceeded the prediction of one death for each million spent. While the planners hoped that the bridge would set a global record, in fact, its claim to fame was much more grim (Petroski, 2014).

Sample Summary

According to Petroski (2014), a large bridge built in Quebec during the early part of the twentieth century claimed the lives of dozens of workers during its construction. The collapse of the bridge early in its construction represented a pivotal design failure for Canadian engineers that shaped the profession.

Regardless of whether you are quoting, paraphrasing or summarizing, you must cite your source any time you use someone else's intellectual property—whether in the form of words, ideas, language structures, images, statistics, data, or formulas—in your document.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=175#oembed-3

(Paraphrasing Process Demonstrated, 2020)

Using Signal Verbs

Use signal verbs to introduce summaries and paraphrased content. Verbs like "says," "writes" or "discusses" tend to be commonly over-used to signal a quotation and are rather vague. In very informal situations, people use "talks about" (avoid "talks about" in technical communications). All these verbs do not provide much information about the rhetorical purpose of the author.

The list of signal verbs below offers suggestions for introducing quoted, paraphrased, and summarized material that convey more information than verbs like "says" or "writes" or "discusses." When choosing a signal verb, try to indicate the author's rhetorical purpose: What is the author ***doing*** in the quoted passage? Is the author *describing* something? *Explaining* something? *Arguing*? *Giving examples? Estimating? Recommending? Warning*? *Urging?* Be sure the verb you choose accurately represents the intention of the source text. For example, don't use "concedes" if the writer isn't actually conceding a point. Look up any words you don't know and add ones that you like to use.

Table 6.2.1 ***Commonly used signal verbs (Last, 2019)***

Making a claim	Recommending	Disagreeing or Questioning	Showing	Expressing Agreement	Additional Signal Verbs
argue	advocate	challenge	illustrates	agree	responds
assert	call for	complicate	conveys	admire	assumes
believe	demand	criticize	reveals	endorse	speculates
claim	encourage	qualify	demonstrates	support	debates
emphasize	exhort	counter	proposes	affirm	estimates
insist	implore	contradict	points out	corroborate	explains
remind	plead	refute	exemplifies	verify	implies
suggest	recommend	reject	indicates	reaffirm	uses
hypothesize	urge	deny			
maintains	warn	question			

Be careful with the phrasing after your signal verb. In some cases, you will use "that" to join the signal phrase to the summarized or paraphrased text:

*Smith argues **that** bottled water should not be allowed on college campuses (Smith, 20XX).*

But not all signal verbs can be followed by "that."

It would be **incorrect** to write the following:

- The author persuades that ...x
- The writers convince that ... x
- The speaker expressed that ...x
- He analyzes that ...x
- She informs that ... x
- They described that ...x
- I support that ... x

We can use clauses with ***that*** after these verbs related to thinking:

Think I think ***that*** you have an excellent point.

Believe He believes ***that*** unicorns exist.

Expect She expects ***that*** things will get better.

Decide He decided ***that*** it would be best to buy the red car.

Hope I hope ***that*** you know what you are doing.

Know I know ***that*** you will listen carefully

Understand	She understood ***that*** this would be complicated.

And after verbs related to saying:

Say	She said ***that*** she would be here by 6 pm.
Admit	He admits ***that*** the study had limitations.
Argue	She argues ***that*** bottled water should be banned on campus.
Agree	He agrees ***that*** carbon taxes are effective.
Claim	They claim ***that*** their methods are valid.
Explain	He explained ***that*** the rules are complicated.
Suggest	They suggest ***that*** you follow instructions carefully.

But some verbs require an ***object*** (a person or thing) before you can use "that":

Tell	tell ***a person*** that... tell ***as story***... tell ***the truth***
Describe	describe ***the mechanism***
Convince	convince ***an audience*** that you are credible
Persuade	persuade ***a reader*** that this is a worthwhile idea
Inform	inform ***a colleague*** that their proposal has been accepted
Remind	remind ***the client*** that ...
Analyze	analyze ***a process***; analyze ***a text***; analyze***the problem***
Summarize	summarize ***a text***; summarize ***an idea***
Support	I support ***the idea*** that all people are created equal

PRACTICE EXERCISE 6.2.1

Download the linked Word document containing a practice exercise for integrating quotations:

Integrating Quotations Exercise

References

Seneca Libraries. (2013). *Integrating research into your paper* [Video]. Youtube. https://www.youtube.com/watch?v=LVew23RFBSk

WUWritingCenter. (2020). *Comparing paraphrasing and quoting* [Video]. Youtube. https://www.youtube.com/watch?v=_mMSReRhqqw&t=15s

WUWritingCenter. (2020). Paraphrasing process demonstrated [Video]. Youtube. https://www.youtube.com/watch?v=pZJXWaOWqT0

8.3 Referring to Authors and Titles

Writing in academic and professional contexts often entails writing about or responding to the words and ideas of other authors and speakers. College writing is often a "dialogue" or conversation between students and their professors, so it is a good way to practice skills you will use in the workplace. Research conducted for courses generally builds on or reacts to the work of previous scholars. As student writers, you often use the works of published authors to support your arguments or provide a framework for your analysis. When you do this, you must cite and document your sources; you may also need to identify the author and title that you are referring to in the text. Here below are some basic conventions (rules) to follow when you refer to sources in the text. For examples of References entries, please go to Citing and Documenting Sources.

Referring to Authors

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(Citing Sources with More than One Author, 2021)

The first time that you mention the author, use the full name (but no titles, such as Mr. Ms, or Dr.). If there are more than three authors, use the Latin abbreviated term "et al." to refer to additional authors. APA Style requires that you also include the publication date:

- William Shakespeare wrote *Hamlet* in 1601.
- Sean Petty and Justin Trudeau (2008) argue that ...
- Ross Phillips et al. (2011) recommend that....

Every time you refer to the author after the first time, use the **last** name only. Never refer to the author by the first name (William or Will) only. Always use the last name:

- *Hamlet* is one of Shakespeare's most studied plays.
- Petty and Trudeau (2008) go on to describe the effects of ...
- Phillips et al. (2011) suggest that....

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=177#h5p-57

Referring to Titles

When referring to titles, there are two distinct methods to indicate two types of works:

1. APA Style requires that the titles of **shorter work**s that are published within a larger work (an article in a newspaper, an academic article in a periodical, a chapter in a book) be noted using capitalization *without* quotation marks or italics in a list of References, but *with* quotation marks or italics when mentioned in the text. A larger, stand-alone work, like a book, is italicized in both cases. Titles of webpages are italicized. See examples below:

    - "The Case Against Bottled Water" is an editorial written by Justin Trudeau and Sean Petty, published in *The Star,* a Toronto newspaper (2008).
    - "People For Sale," a magazine article published in *The Utne Reader,* is written by E. Benjamin Skinner (2008).
    - "Bottled Water: The Pure Commodity in the Age of Branding" is an academic journal article by Richard Wilk, published in the *Journal of Consumer Culture* (2006).
    - *Reference Examples* (2020) can be found on the APA Style website.

Tip: Remember to **always** include the year of publication.

2. When referring to titles of **larger works**, or works that have smaller articles published within them (books, newspapers, magazines, periodicals, movies, novels, etc.), use *italics** except for website titles, which are capitalized only:

- Trudeau and Petty's 2008 article was published in *The Star*, a Toronto newspaper.
- Skinner published his article in *The Utne Reader*, an alternative magazine.
- Phillips et al. published their academic article, "Risk compensation and bicycle helmets," in the academic journal, *Risk Analysis* (2011).
- The APA offers examples of various formats for references on its APA Style website (2020).

* **Note**: Before computers, people underlined these kinds of italicized titles, as this was the only option available on a typewriter; however, underlining is "so 20th century" and is no longer done unless you are writing by hand.

Using these conventions helps the reader to know what kind of text you are writing about without you having to specify it. Like most specialized terminology or conventions, it offers a kind of short hand to avoid wordiness. If you do this incorrectly, you mislead and confuse the reader.

For example, if you are writing about William Blake's poem, "The Lamb," you must use quotation marks around the title. If you don't use them, and simply write — the lamb — then you are referring to the animal, not the poem. If you italicize *The Lamb*, you are telling the reader that this is the title of a book (which is incorrect).

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=177#h5p-58

Question for Review

Why is the following incorrect? What mistaken ideas does it give to the reader?

> In *The Case Against Bottled Water*, Sean and Justin explain why bottled water is not as safe as tap water.

References

American Psychological Association (APA). (2020). *References examples*. APA Style. https://apastyle.apa.org/style-grammar-guidelines/references/examples

Petty, S. & Trudeau, J. (2008, August 11). The case against bottled water. *The Star*. https://www.thestar.com/life/health_wellness/2008/08/11/the_case_against_bottled_water.html

Phillips, R. W., Fyhyri, A., & Sagberg, F. (2011, August). "Risk compensation and bicycle helmets," *Risk Analysis*, *31*(8), pp. 1187-1195 https://doi.org/10.1111/j.1539-6924.2011.01589.x

Skinner, B. (2008, July/August). People for sale. *Utne Reader*. https://www.utne.com/politics/people-for-sale

Wilk, R. (2006, November). Bottled water: The pure commodity in the age of branding. *Journal of Consumer Culture*. https://doi.org/10.1177/1469540506068681

Writing Rescue. (2021). *Citing sources with more than one author in APA style, 7th edition* [Video]. Youtube. https://www.youtube.com/watch?v=v9bSjEkmN3w

8.4 Creating a References List

A list of references is where detailed information about the various research sources mentioned in your document are itemized. This list allows readers to learn more about your sources and use the information to validate your research. A list of references contains the author(s), year of publication, title, publication information, along with the URL for each source.

How do I set up my References list?

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=180#oembed-1

(Seneca Libraries, 2020)

Different citation styles use various terms to introduce their list of references, for example, **Bibliography** or **Works Cited**. APA style uses the term **References**.

At the end of your reports, add a list of all the sources you have cited **in alphabetical order according to the author's last name.** Each reference must provide thorough and complete documentation so that readers can identify the kind of source, and retrieve it if they want to read it. It is important to use the correct conventions for each type of source, as readers familiar with academic conventions will expect this, and they will be able to tell what kinds of sources you are referencing based on what information is included and how it is formatted. If you use conventions incorrectly (such as failing to italicize or use quotation marks around titles to indicate what kind of source it is), you can confuse and mislead your readers.

Format Guidelines for Setting up a REFERENCES List

Here are some general formatting guidelines for setting up your references list:

- Create a bold heading called **References**, aligned with the **left** margin. If you are using headings, make this heading consistent with other first level headings in your document.
- The author's last name should be flush with the left margin, and the second and other lines of the entry must be formatted using the "hanging indent" function.
- Give all authors' names (up to five), but only use the first initial. The last name of each author is written first, followed by the author's initials. Separate names with commas, and include the

ampersand (&) before the last author.

- Capitalize only the first word (and the first word after a colon, as well as proper nouns) in titles of **articles** within journals, magazines and newspapers**, chapters** in books**, conference papers**, and **reports**. Only use ALL CAPS for acronyms.
- Capitalize the first letter of all main words in the titles of **books, journals, magazines** and **newspapers**.
- Add a space between references if you single space each reference.

If you use citation software (such as Zotero, Endnote, or Mendeley) to generate a list of references, be sure to review the references it generates for any errors. These programs are not foolproof, and it is up to you to make sure your references conform to APA conventions. For example, sometimes the auto-generator will give a title in ALL CAPS or the author's full first name. You will have to revise this. They usually do not give DOIs; you may have to add these.

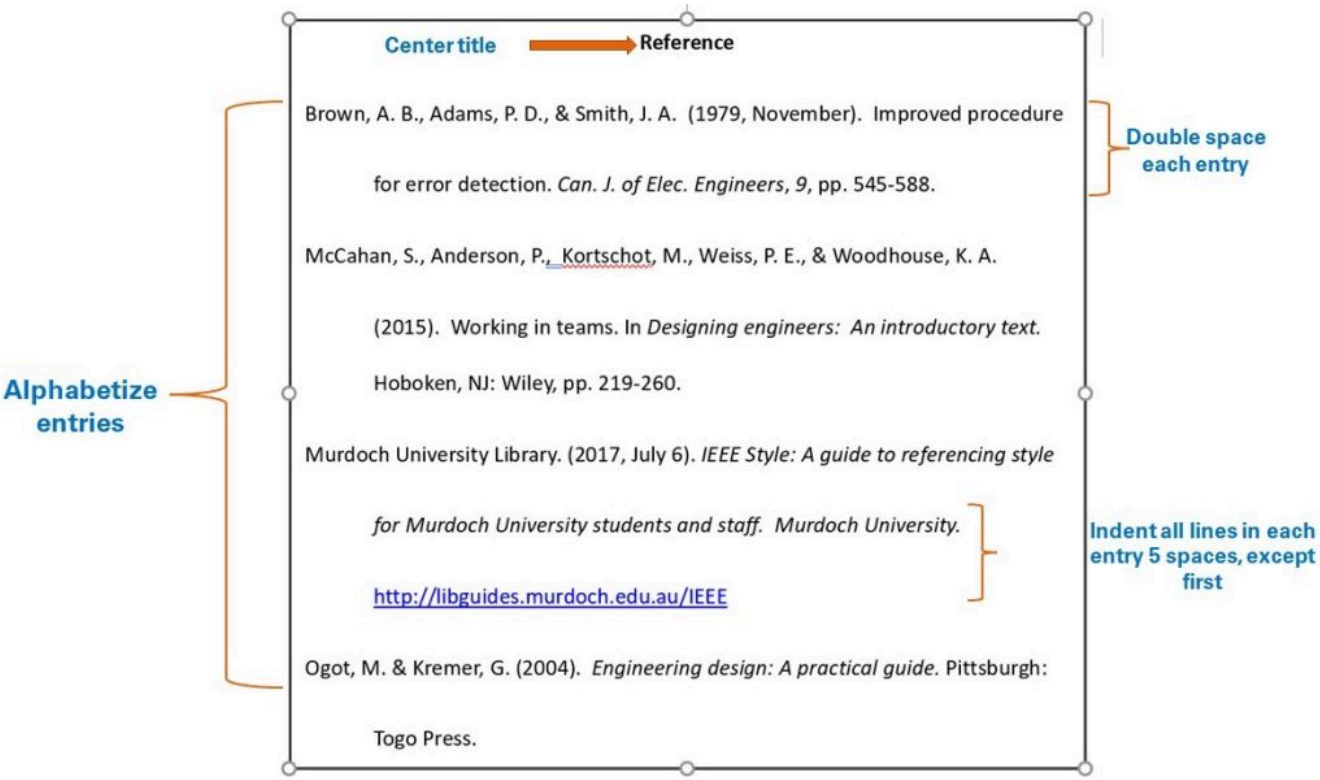

Figure 8.4.1 *An example of an APA Reference list.*

Referencing Different Kinds of Sources–Examples

For detailed examples on creating References using APA style, visit the References Examples page on the APA Style website.

APA Style (2020) requires that the basic guideline for referencing online sources is to follow the standard citation for the print source given previously and add the electronic location (URL) or the Digital Object Identifier (DOI) at the end of the citation. Add a URL at the end of the reference if the source is available on the World Wide Web. If both a URL and a DOI are available, place the DOI last.

Articles from Journals and Magazines (items that are published periodically)

Author(s). (date). Article title. *Journal or Magazine Title*, *volume # only*(issue #), pp. DOI [If available online, add URL and/or DOI link]

Print

Zhou, H. Y. & Hou, K. M. (2012, August). Intelligent urban public transportation for accessibility dedicated to people with disabilities. *Sensors*, *12*(8), xx-xx.

Note that the volume number is italicized and the issue number is not.

Online

Sakals, M. (2015, September-October). Eyes in the sky: Unmanned aerial vehicles in the natural resources sector. *Innovation Magazine* [Online],*19*(5), 17-19. http://www.digitalityworks.com/Viewers/ViewIssue.aspx?IssueID=140&PageNo=1

Conference Paper

Author(s). (date). *Title of paper.* Presented at Name of Conf., City of Conf., Abbrev. State/Prov., pp. xxx-xxx. Paper number [If available online, give URL or DOI].

Ibrahim, M. (2003). *Creative design dynamics and creative systems.* Presented at the 2003 IEEE Int. Systems Conference, Vancouver, BC.

Same paper published in conference proceedings:

Ibrahim, M. (2003). Creative design dynamics and creative systems. In *Proc. 2003 IEEE Int. Systems Conf.*, Vancouver, BC, pp. 273-278. DOI: 10.1109/SYSTEMS.2009.4815811.

Newspaper Articles

Author(s). (year, month, day). Title of article. *Title of Newspaper.* URL.

Online

Wilson-Clark, C. (2004, March 29). Computers ranked as key literacy. *The West Australian*. http://www.thewest.com.au.

Print

Bart, B. (2002, October 14). Going faster. *Globe and Mail.* A p.1.

Webpage or Website (WWW) (material *only* available online such as blogs, etc.)

Author(s). (date). *Webpage title*. Website Name. URL.

Fogarty, M. (n.d.). *Which versus that*. Grammar Girl, Quick and Dirty Tips https://www.quickanddirtytips.com/education/grammar/which-versus-that-0

Murdoch University Library. (n.d.). *IEEE Style: A guide to referencing style for Murdoch University students and staff*. Murdoch University. http://libguides.murdoch.edu.au/IEEE

Book

Author(s). (year). *Title of book*. City: Publisher.

Ogot, M. & Kremer, G. (2004). *Engineering design: A practical guide*. Pittsburgh: Togo Press.

Chapter in a book

Author(s). (year). Title of chapter. In *Title of book*. City: Publisher, pp.

McCahan, S., Anderson, P., Kortschot, M., Weiss, P. E., & Woodhouse, K. A. (2015). Introduction to teamwork. In *Designing engineers: An introductory text*. Hoboken: Wiley, pp. 219-260.

Technical Report (Government, Industry, Organizations)

Author(s). (date). *Title of the report*. Name of Company/Organization, City, Report. #. URL or DOI

Delcan. (2019). *Johnson Street Bridge Condition Assessment Report*. Delcan and City of Victoria, Victoria, B.C. https://www.johnsonstreetbridge.com/wp-content/uploads/2018/01/johnson-street-bridge-condition-assessment-delcan-engineering.pdf

University of Victoria Campus Planning and Sustainability. (2018). *The Grand Promenade: Design Charrette*. Campus Greenway, Summary Report 11.2018. https://www.uvic.ca/campusplanning/current-projects/campusgreenway/index.php

Personal Communication (interview, telephone, email, *etc.*)

Author. (year, month, day). Private communication.

Gates, B. (2021, January 27). Private communication.

Patent

Author. (year, month, day). *Title of patent*. U.S. Patent x xxx xxx.

Wilkinson, J. P. (1990, July 16). *Nonlinear resonant circuit devices*. U.S. Patent 3 624 125.

Lecture or Presentation

Speaker. (Date). *Title of Presentation/Lecture*. Occasion and location of presentation. [Type of medium: URL if available online].

Potter, R.L. (2020, October 22). *Team dynamics*. TEC400 Lecture. Seneca College.

Lecture Notes

Author. (date). *Title of class notes.* Class notes for Course Number. Department, University.

Smith, J. (2015, Winter). *Maxwell's equations and time-varying electromagnetic fields.* Class notes for ECE359. Department of Electrical and Computer Engineering, University of Victoria.

Reference Work (Encyclopedia, Dictionary, Handbook, etc.)

Author(s). (year). Chapter title. In *Book title*, xth ed. [Type of medium]. Editor(s) name(s), Ed(s). Location: Publisher, *volume* or chapter number (if available), pp. URL. Add the date access if you expect the source information to change.

With an author

Hart , D. & Bauen, A. (2002). Fuel cell fuel cycles. In *Fuel cell technology handbook*. G. Hoogers, Ed. Boca Raton, FL: CRC Press. ENGnetBASE [Accessed: Sept. 22, 2008].

French, A. D., Bertoniere, N. R., Brown, R. M., Chanzy, H., Gray, D., Hattori, K., & Glasser, W. (2003). Cellulose. In *Kirk-Othmer* encyclopedia *of chemical technology.* John Wiley & Sons, Inc. DOI: 10.1002/0471238961.0305121206180514.a01.pub2.

No author

Composite material. (2008, May 18). In *Wikipedia*. http://en.wikipedia.org/w/index.php?title=Composite_material [Accessed: May 24, 2008].

Image from a print source

Similar to a chapter in a book or article in a print journal:

Creator of image. (date). Title of image. In Title of article or *Title of book*, and the rest of the required publication information for an article or book.

Coutenay, B. (2021). Image of sunflower. In *Flowers for all seasons*. Toronto: Pearly Publishers.

Images from an online source

Creator of image. (date). Title of the image. *Web Site name*, the URL.

Coutenay, B. (2021). Image of a sunflower. *Flowers Almanac*. http://flowersalmanac.com

Podcast

Artist. (Credit). (date). *Title of episode*.Title of Program: Subtitle. Publisher. Available: URL.

Gary, S. (Presenter). (2019, June 12). *Mars Insight's drill fails*. SpaceTime with Stuart Gary. Sydney: SpaceTime. [Podcast episode]. https://megaphone.link/BIT3581656190.

Knowledge Check: Touch the symbols below for an explanation of each area of the Reference page below.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=180#h5p-59

EXERCISE 8.4.1

Find a variety of sources (at least 5 different types) on a specific topic related to your current course project. Set up a **References** list for them in APA Style.

References

American Psychological Association (APA). (2020). *References examples*. APA Style. https://apastyle.apa.org/style-grammar-guidelines/references/examples

Seneca College Libraries. (2021, February 9, updated). *APA citation guide (APA 7th edition): Welcome*. Seneca College. https://library.senecacollege.ca/apa

Seneca Libraries. (2020). APA: *Building a reference list (7th edition)* [Video]. Youtube. https://www.youtube.com/watch?v=E45hW7ebU2Q

8.5 Frequently Asked Questions

1. In-Text Citations – Where do they go?

It can be tricky to know exactly where to place the in-text citation in your sentence. Generally, the default position for a citation is at the end of the sentence, unless placing it there would create confusion. For example, where should the citation go in the following sentence?

> Smith claims that "insert a quotation here," but other scientists argue that her conclusions are flawed.

If you place the citation for Smith at the end of the sentence, you are saying that Smith acknowledges that many scientists think her conclusions are flawed. That wouldn't make sense. You would have to cite like this:

> Smith claims that "insert a quotation here" (2021), but other scientists (Jones, 2019; Blake, 2020; and Singh, 2021) argue that her conclusions are flawed.

The citation can be placed at several places:

- At the end of the sentence, if the entire sentence is a quotation, paraphrase, or summary of the source's idea: Chan asserts ideas X and Y, and he gives additional examples to illustrate them (2021).
- Directly after the name of the source: Chan (2021) claims...
- Directly after the quotation: Chan asserts that "insert quotation here" (2021), and carry on with *your* idea (your analysis of Chan's assertion).
- After referring to a source or an idea from a source:
  - This theory was first put forward in a 1996 study (Smith 2019).
  - Several recent studies (Jones, 2019; Blake, 2020; and Singh, 2021) have suggested that...

Occasionally, some writers use APA citations like this:

As Jones (2019) and Blake (2020) have shown, quantum theory has many practical applications in real-world settings. Singh (2021) disagrees, however, and argues that ....

NOTE: Your citation should NOT go inside the quotation marks; it is not part of the quotation. However, **punctuation** must be placed AFTER the citation, as that citation is part of that sentence (or clause), not part of the next sentence. For example

> Author X claims "this idea is a quotation" (2021). The next sentence starts here...

> Author X claims "this idea is a quotation" (2021), and I add my interpretation after.

This is why you must put the period AFTER the citation when a sentence ends with a citation. A citation that comes AFTER the period technically belongs to the next sentence, as in the preceding example.

For detailed information on creating citations, please visit the APA Style In-text Citations page.

2. Do I need to keep citing the source every time I refer to it?

If you are discussing the ideas in a source at length (for example, in a summary), you do not need to cite every consecutive sentence. Cite the first time you mention the source. As long as the following sentences clearly indicate that the ideas come from the same source—for example, you are using **signal phrases**, such as "the author further clarifies the problem by…"—you do not need to keep citing.

If you stop using signal phrases, be sure to include a citation. If you introduce material from another source or add your own analysis between references to that source, you will have to re-cite the source when you refer to it again. Always make sure your reader knows which ideas come from a source, and which come from you, and when you shift from one to the other. If in doubt, cite.

3. What if a source has more than one author?

If the source you are citing has one or two authors, use their names in your signal phrase:

- Brady (2019) argues that ….
- Mehta and Barth's study (2020) demonstrates that ….

If the source has three or more authors, use the name of the lead author, followed by "et al."– the Latin term meaning "and the others." In APA style, "et al." does not have to be italicized:

- Isaacson et al., in their study on fluid dynamics, found that ….

NOTE: In your Reference at the end of your paper, it is a courtesy to list the names of ALL the authors who contributed to the source (rather than using "et al."). However, if there are 6 or more authors, it is acceptable to use "et al." in your reference list.

4. How do I find the title of an academic journal?

Figure 8.5.1 shows a typical .pdf file of a journal article. It will help you determine the various elements of an academic article that must be included in your reference. Note the difference between the database (such as Elsevier, EbscoHost, JSTOR, etc.) and the name of the journal.

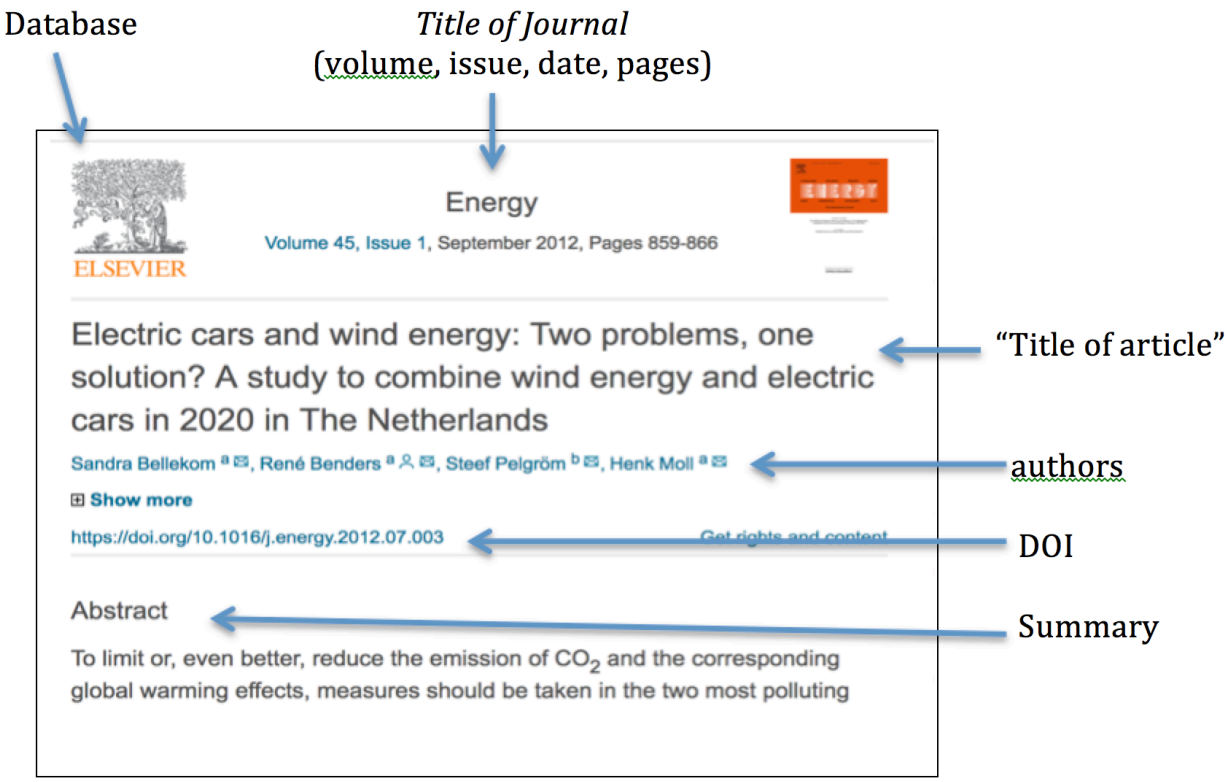

Figure 8.5.1 *Elements of an Academic Article.*

References

American Psychological Association (APA). (2020). *APA Style*. https://apastyle.apa.org/

American Psychological Association (APA). (2020). *In-text citations*. APA Style. https://apastyle.apa.org/style-grammar-guidelines/citations

Seneca College Libraries. (n.d.). *APA citation guide (APA 7th edition): Welcome*. Seneca College. https://library.senecacollege.ca/apa

9. COMMUNICATING TECHNICAL INFORMATION

Technical communication involves the routine transmission of information that enables technical personnel to perform their routine tasks. Just as the literary genre of poetry contains many forms — such as sonnets, haiku, epics, limericks, etc., — each with its own set of rules and conventions, technical writing also contains many forms, and each form has some conventions that must be observed. These forms and conventions include

- Formats, which refer to the overall document type
- Conventions, which include the standard components and content for each of the document types

This chapter discusses the formatting of technical documents, including reports, using recognized conventions. It also introduces routine correspondence along with technical information types.

Chapter 9 Learning Objectives

In the following sections, you will learn about general format, structure, and content expectations. You will learn to

9.1 Format Documents using recognized conventions for document design

9.2 Create effective Correspondence: Text Messages, E-mails, Letters, and Memos that help you achieve your goals

9.3 Apply principles of organization, parallelism, and enumeration to create Instructions

9.4 Create Standard Operating Procedures using standardized methods

9.5 Convey understandable technical information using Technical Descriptions and Definitions

9.1 Formatting Technical Documents

ROBIN L. POTTER

Technical documents are typically created using conventional formats that are recognized in professional contexts. For example, letters have a familiar look because of the standard components that are used to format such documents. These formats serve to signal the level of formality and the purpose of the documents. They also help to create a degree of standardization in the documentation that circulates within and outside of organizations. Formats also inform readers on how to read the documents. When you create a document in the workplace, it is expected that you will use formats and styles customarily used within the organization.

The chapter on Correspondence includes information on formatting email, memos, and letters. This chapter will focus on formatting various types of reports:

1. Infographics
2. Short reports
3. Long reports
4. Slide reports

More detailed information about these can be found in the Seneca Libraries' technical communication library guide: Writing and Communicating Technical Information: Home. Below is an overview of basic formats for the documents.

Infographics

Infographics are reports that look like posters. They are created with digital templates or slide deck software to report information using visual narratives or stories. Infographics combine visual elements like icons, graphs, images, and/or charts, along with concise text, to promote an idea or to convey information in an engaging way. Software, such as PowerPoint, Adobe Spark, or Canva can be used to create infographics.

If you are seeking one specific type of format for infographics, you will be disappointed. Here, you can let your creative side flourish as you customize backgrounds, fonts, and formats to suit your subject and purpose. Some software, like Canva, offers free and premium ready-made templates that you can adapt to your own content. The key is to have done your research, mapped or sketched out your ideas, and planned the visuals you will be using to support them. Once you have done this, go into the software and design your document using a variety of background, font, and chart options.

When creating an infographic choose a template that aligns with your content. For example, if you are showing data related to geographic areas, choose a map template; if you are making a comparison, choose a two-column format.

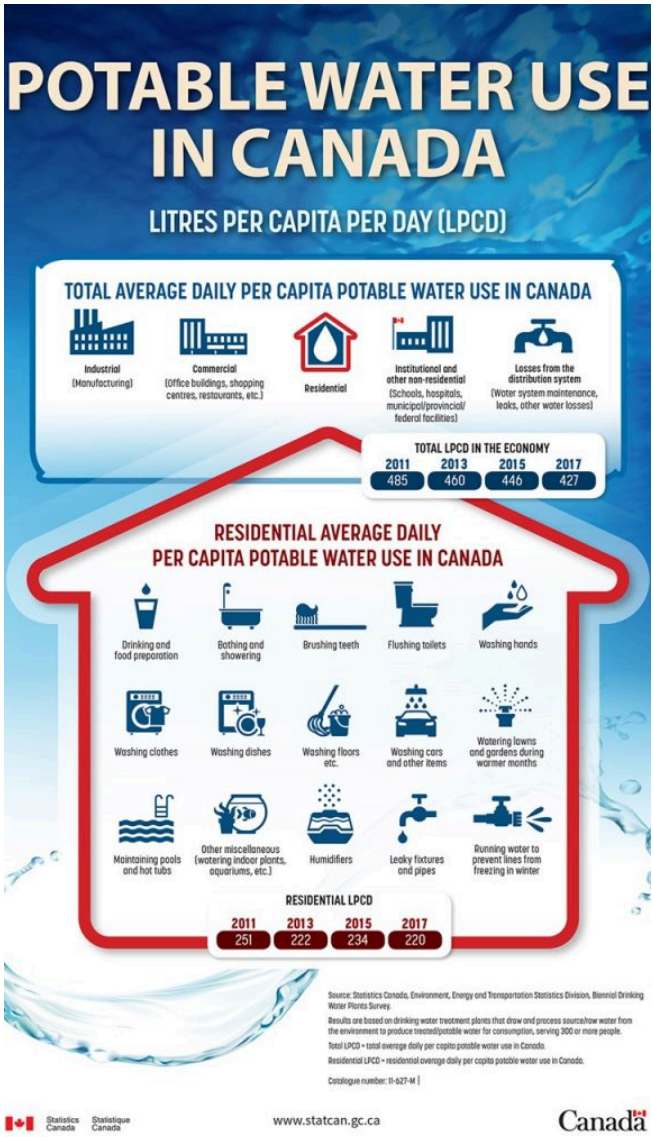

Figure 7.1.1 *image of pictorial infographic: Potable Water Use in Canada (Statistics Canada, 2019).*

Below are three examples of infographics. Note the sparse use of text, which offers only key information, and relevant images to highlight key ideas.

Pictorial infographic example: Potable Water Use in Canada (Statistics Canada, 2019).

Map infographic example: An Overview of Canada's Forest Sector (Statistics Canada, 2018).

Text-based infographic example: What is radioactive waste? (Canadian Nuclear Safety Commission, 2017)

Seneca College offers many resources for learning about infographics. You might want to consider completing the Seneca Sandbox's *Creating Infographics* tutorial or signing up for a webinar to learn more about how to create effective infographics.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=192#oembed-1

(What Makes and Effective Infographic, 2018)

Knowledge Check

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Report Formats

The previous sections of this text discuss the different types of technical reports and their typical usage and contents. Here we will discuss their various formats—that is, how they are prepared to conform to workplace conventions.

Informal Reports

Informal reports, also known as short reports, are routine documents of two to five pages in length that focus on one specific topic–such as a recommendation, brief proposal, progress, or inspection. Such reports can be formatted either as memos or email reports for internal purposes. They can also be formatted as letter reports when conveyed outside the organization. An email report consists of a report that is composed inside the email message box. Both memo and letter reports are usually attached to transmittal email messages for rapid electronic delivery. See the chapter on Correspondence for information on how to format these documents.

You will find more detailed information about writing proposals, progress and recommendation reports in Chapter 10. Each of these reports can be written as short or long reports. You can view

examples of several types of short reports, including conference, progress, summary, and recommendation reports, by visiting Venecia Williams' Chapter 12: Report Writing Situations in *The Fundamentals of Business Communication*.

Formal Reports

Formal reports, also known as long reports, are documents that consist of about five or more pages in length. These reports not only offer a detailed discussion of research findings but are also used to make complex decisions within technical contexts. Examples of these reports include proposal, recommendation, problem-solving, feasibility, and compliance reports. Such documents can be circulated inside or outside an organization, with the transmittal document being formatted as a memo or letter to signal the document's internal or external destination.

Since formal reports are lengthy documents, they are accompanied by additional components consisting of the front and back matter that serve to aid the reader in understanding the document and locating information. The components of a formal report are listed below. For information on how to create and paginate the front and back matter and how to format the contents to achieve optimum readability, please refer to *A Guide to Writing Formal Technical Reports* (University of Victoria, Last, & Potter, 2021).

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=192#oembed-2

(Formal and Informal Reports, 2020)

Typical Components of Formal Reports

Front Matter

Cover page

Transmittal document (either a memo or a letter)

Abstract or summary

Table of contents

List of tables and figures

Glossary

Report

Introduction

Background, methodology

Findings, discussion

Conclusion (and recommendations)

Back Matter

References

Appendix

Slide Reports

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=192#oembed-3

(Why Slidedocs, 2022)

Slide reports are visual documents created using PowerPoint or other slide deck software and are a genre of slide documents (or slidedocs). Nancy Duarte, a leader in presentation skills education and author of Slidedocs (2016), coined the term after noticing how PowerPoint was being used to create documents other than presentation slide decks. In technology, slide reports have been used for the following purposes: definitions and descriptions, explanations, guides, instructions, tutorials, and report previews or summaries (Potter, 2020).

"OK, I'm now going to read out loud every single slide to you, word for word, until you all wish you'd just die."

Figure 9.1.2 *Slidedocs help to reduce the amount of text in reports (Triggs, 2017).*

Slide reports are full reports meant to be read and not presented. As such, these documents include a title page, table of contents and list of tables and figures, a glossary (if needed), section or chapter guides, a list of references, and appendices (if required). While they offer full-text development of ideas, they bridge genres by resembling presentations in the ample use of visual content to amplify ideas, set context and atmosphere, and support and clarify ideas. These are typically visually engaging documents, with content developed in "bite-sized" segments for quick reading on the go. See the example of page design options in **Figure 9.1.2.**

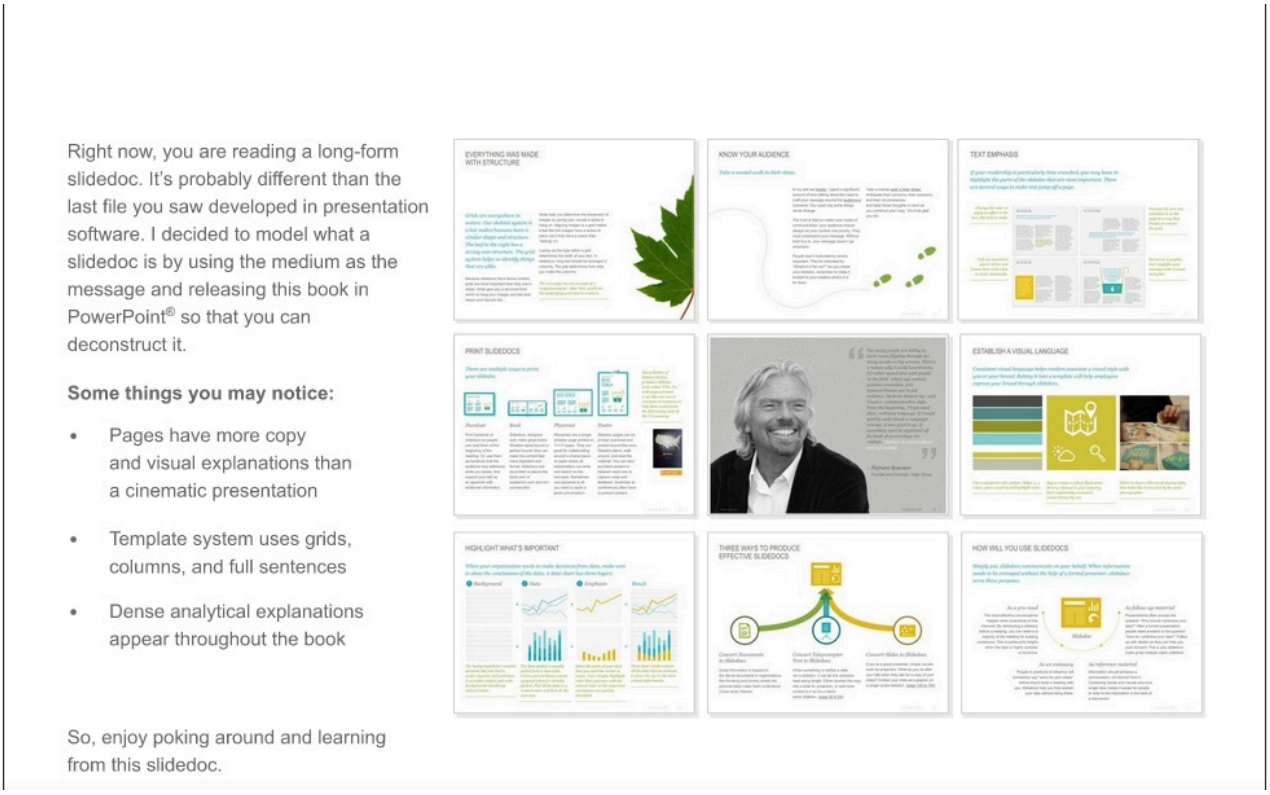


Figure 9.1.2 *Page design examples suggested by Duarte (2016).*

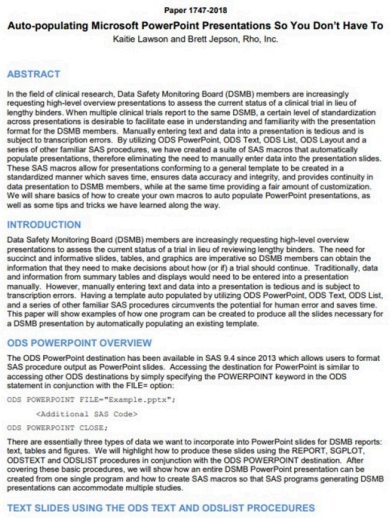
Characteristics of Technical Slide Report Design

- Headings, subheadings
- Enhanced appearance through the use of color and font styles
- Generous use of purposeful visual aids and visual information
- Full paragraph development using short paragraphs
- Information chunking into short sections
- One idea per slide (recommended)
- Parallel listing for items in a series

- Pull quotes to highlight key points
- Section guides for longer reports
- Section overviews set below headings

To view an example of a technical slide report, see Elite Electronics Inc.'s [Guide to FCC Certification for Part 15C Wireless Transmitters](#).

Knowledge Check



Paper 1747-2018

Auto-populating Microsoft PowerPoint Presentations So You Don't Have To

Kaitie Lawson and Brett Jepson, Rho, Inc.

ABSTRACT

In the field of clinical research, Data Safety Monitoring Board (DSMB) members are increasingly requesting high-level overview presentations to assess the current status of a clinical trial in lieu of lengthy binders. When multiple clinical trials report to the same DSMB, a certain level of standardization across presentations is desirable to facilitate ease in understanding and familiarity with the presentation format for the DSMB members. Manually entering text and data into a presentation is tedious and is subject to transcription errors. By utilizing ODS PowerPoint, ODS Text, ODS List, ODS Layout and a series of other familiar SAS procedures, we have created a suite of SAS macros that automatically populate presentations, therefore eliminating the need to manually enter data into the presentation slides. These SAS macros allow for presentations conforming to a general template to be created in a standardized manner which saves time, ensures data accuracy and integrity, and provides continuity in data presentation to DSMB members, while at the same time providing a fair amount of customization. We will share basics of how to create your own macros to auto populate PowerPoint presentations, as well as some tips and tricks we have learned along the way.

INTRODUCTION

Data Safety Monitoring Board (DSMB) members are increasingly requesting high-level overview presentations to assess the current status of a trial in lieu of reviewing lengthy binders. The need for succinct and informative slides, tables, and graphics are imperative so DSMB members can obtain the information that they need to make decisions about how (or if) a trial should continue. Traditionally, data and information from summary tables and displays would need to be entered into a presentation manually. However, manually entering text and data into a presentation is tedious and is subject to transcription errors. Having a template auto populated by utilizing ODS PowerPoint, ODS Text, ODS List, and a series of other familiar SAS procedures circumvents the potential for human error and saves time. This paper will show examples of how one program can be created to produce all the slides necessary for a DSMB presentation by automatically populating an existing template.

ODS POWERPOINT OVERVIEW

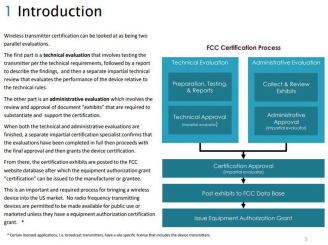
The ODS PowerPoint destination has been available in SAS 9.4 since 2013 which allows users to format SAS procedure output as PowerPoint slides. Accessing the destination for PowerPoint is similar to accessing other ODS destinations by simply specifying the POWERPOINT keyword in the ODS statement in conjunction with the FILE= option:

```
ODS POWERPOINT FILE="Example.pptx";
      <Additional SAS Code>
ODS POWERPOINT CLOSE;
```

There are essentially three types of data we want to incorporate into PowerPoint slides for DSMB reports: text, tables and figures. We will highlight how to produce these slides using the REPORT, SGPLOT, ODSTEXT and ODSLIST procedures in conjunction with the ODS POWERPOINT destination. After covering these basic procedures, we will show how an entire DSMB PowerPoint presentation can be created from one single program and how to create SAS macros so that SAS programs generating DSMB presentations can accommodate multiple studies.

TEXT SLIDES USING THE ODS TEXT AND ODSLIST PROCEDURES

Example A



1 Introduction

Wireless transmitter certification can be looked at as being two parallel evaluations.

The first part is a **technical evaluation** that involves testing the transmitter per the technical requirements, followed by a report to describe the findings, and then a separate impartial technical review that evaluates the performance of the device relative to the technical rules.

The other part is an **administrative evaluation** which involves the review and approval of document "exhibits" that are required to substantiate and support the certification.

When both the technical and administrative evaluations are finished, a separate impartial certification specialist confirms that the evaluations have been completed in full then proceeds with the final approval and then grants the device certification.

From there, the certification exhibits are posted to the FCC website database after which the equipment authorization grant "certification" can be issued to the manufacturer or grantee.

This is an important and required process for bringing a wireless device into the US market. No radio frequency transmitting devices are permitted to be made available for public use or marketed unless they have a equipment authorization certification grant. *

* Certain licensed applications, i.e. broadcast transmitters, have a site specific license that includes the device transmitters.

FCC Certification Process

Technical Evaluation: Preparation, Testing, & Reports; Technical Approval (impartial evaluator)

Administrative Evaluation: Collect & Review Exhibits; Administrative Approval (impartial evaluator)

Certification Approval (impartial evaluator)

Post exhibits to FCC Data Base

Issue Equipment Authorization Grant

Example B

MEMO REPORT

- Used to communicate to internal audiences
- Less formal in tone
- 1 – 8 pages
- Report is divided into distinct sections using section headings.
  - Background/Introduction
  - Discussion/analysis
  - Conclusion
  - Recommendation
  - Reference

Example C

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=192#h5p-61

References

An overview of Canada's forest sector. (2018, May 8). Statistics Canada. https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2018008-eng.htm

Canva. [Sample Infographic Templates]. (n.d.). https://www.canva.com/

Canadian Nuclear Safety Commission.(2017, December 8). *What is radioactive waste?* Government of Canada. https://www.cnsc-ccsn.gc.ca/eng/resources/infographics/waste/index.cfm

Duarte, N. (2016). *Slidedocs*. https://www.duarte.com/slidedocs/

Duarte, Inc. (2022). *Why Slidedocs* [Video]. Youtube. https://www.youtube.com/watch?v=cML-hxWOe5w

Easelly. (2008). *What makes and effective infographic* [Video]. Youtube. https://www.youtube.com/watch?v=rl9ZcfKt8sY

Elite Electronics Engineering, Inc. (2015, March). *Guide to FCC certification for Part 15C wireless transmitters*. http://www.elitetest.com/sites/default/files/downloads/guide_to_fcc_certification_for_part_15c_wireless_transmitters.pdf

McKinney, M. (2020). *Formal and informal reports* [Video]. Youtube. https://www.youtube.com/watch?v=1dIStGBff3A

Potable *water use in Canada*. (2019, June 11). Statistics Canada. https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2019022-eng.htm

Potter, R.L. (2020). *Slide reports*. Robin L. Potter: Artwork and Writing. robinlpotter.com/writing

Seneca Libraries. (n.d.). *Library & information technician: Create websites and infographics*. Seneca College. https://library.senecacollege.ca/lit/websites_infographics

Seneca Libraries. (n.d.). *Writing and Communicating Technical Information: Home*. Seneca College. https://library.senecacollege.ca/technical

Seneca Sandbox. (n.d.). *Creating infographics*. Seneca College. https://sites.google.com/view/creating-infographics/creating-infographics

Statistics Canada. (2018, May 8). An Overview of Canada's Forest Sector. Infographic. https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2018008-eng.htm

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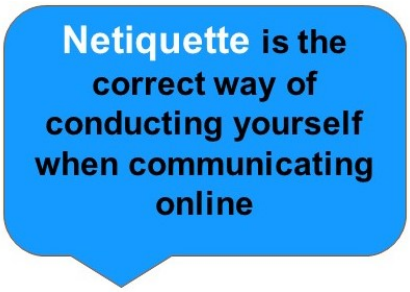
9.2 Correspondence: Text Messages, Emails, Memos, and Letters

Netiquette

Text messaging, emailing, and posting on social media in a professional context requires that you be familiar with "netiquette," or proper etiquette for using the internet. We have all heard the news stories about people who have been fired and companies that have been boycotted for making offensive or inappropriate social media posts. People have even gone to prison for illegal use of private messaging. The digital world may *seem* like a free-for-all, "wild wild west" with no clear rules or regulations; however, this is clearly a dangerous perspective for a professional to take, as the consequences for breaking tacit rules, expectations, and guidelines for professional communications can be very costly.



(10 Online Rules to Maintain a Good Online Reputation, n.d.)

The way you represent yourself in writing carries significant weight. Writing in an online environment requires tact, skill, and an awareness that what you write may be there for a very long time and maybe seen by people you never considered as your intended audience. From text messages to memos to letters, from business proposals to press releases, your written business communication represents you and your company: Your goal is to make your messages clear, concise, constructive, and professional.

We create personal pages, post messages, and interact via online technologies as a normal part of our careers, but how we conduct ourselves can leave a lasting image, literally. The photograph you posted on your Instagram page or Twitter feed may have been seen by your potential employer, or that insensitive remark in a Facebook post may come back to haunt you later.

Guidelines for Communicating Online

Following several guidelines for online postings, as detailed below, can help you avoid embarrassment later:

- **Know your context**
  - Carefully analyze the communication situation: audience, purpose, and environment.
  - Adapt the language and tone of the message accordingly.

    - Avoid assumptions about your readers; remember that culture influences communication style and practices.
    - Familiarize yourself with the Acceptable Use of IT Resources policy at your organization.

- **Remember the human aspect**

    - Introduce yourself.
    - Remember there is a person behind the words; ask for clarification before making a judgment.
    - Check your tone before you publish; avoid jokes, sarcasm, and irony as these can often be misinterpreted and get "lost in translation" in the online environment.
    - Respond to people using their names.
    - Remember that culture, age, and gender can play a part in how people communicate.
    - Remain authentic and expect the same of others.
    - Remember that people may not reply immediately. People participate in different ways, some just by reading the communication rather than jumping into it.

- **Recognize that text is permanent**

    - Be judicious and diplomatic; what you say online may be difficult or even impossible to retract later.
    - Think in terms of how you are representing your organization.
    - Agree on ground rules for text communication (formal or informal; seek clarification whenever needed) if you are working collaboratively.

- **Avoid flaming: Research before you react**

    - Accept and forgive mistakes.
    - Consider your responsibility to the group and to the working environment.
    - Seek clarification before reacting; what you heard is not always what was said.
    - Ask your supervisor for guidance.*

- **Respect privacy and original ideas**

    - Quote the original author if you are responding with a specific point made by someone else.
    - Ask the author of an email for permission before forwarding the communication or otherwise using their message content.
    - Familiarize yourself with the Copyright and Privacy policies at your organization.

** Sometimes, online behavior can appear so disrespectful and even hostile that it requires attention and follow-up. In this case, let your supervisor know right away so that the right resources can be called upon to help.*

Figure 9.2.1 *Poor netiquette does little to build your professional reputation (Johansen, n.d.).*

For further information on netiquette, check out the following links:

- Business Insider: Email etiquette rules every professional needs to know
- LinkedIn: Email Etiquette

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=201#h5p-62

Texting

Whatever digital device you use, written communication in the form of brief messages or notes has become a common way to connect using short messaging service (SMS) also known as texting. It is useful for short exchanges and is a convenient way to stay connected with others when talking on the phone would be cumbersome. Texting is not useful for long or complicated messages, and careful consideration should be given to the audience. However, it has become a method for employees to keep in frequent communication regarding dynamic situations and ongoing projects.

[Texting Image] Source: https://www.flickr.com/photos/13604571@N02/2094946972. CC BY-NC 2.0.

When texting, always consider your audience and your company, and choose words, terms, or abbreviations that will deliver your message appropriately and effectively. Since not all employees are familiar with abbreviations and acronyms used in texting or comfortable with texting overall, always ask before beginning interactions using this method.

Guidelines for Effective Workplace Texting

If your work situation allows or requires you to communicate via text messages, keep the following tips in mind:

- **Know your recipient:** "? % dsct" may be an understandable way to ask a close associate the correct discount amount that should be offered a certain customer, but if you are writing a text to your boss, it might be wiser to write, "what % discount does Murray get on $1K order?"
- **Anticipate unintentional misinterpretation:** Texting often uses symbols, abbreviations, and acronyms to represent thoughts, ideas, and emotions. Given the complexity of communication, and the useful but limited capacity of texting, be aware of its limitation and prevent misinterpretation. Spell it out when in doubt.
- **Use appropriately:** Contacting someone too frequently can border on harassment. Texting is a tool. Use it when appropriate, but don't abuse it.
- **Don't text and drive:** Research shows that the likelihood of an accident increases dramatically if the driver is texting behind the wheel (Shapely, 2020). Being in an accident while conducting company business would reflect poorly on your judgment as well as on your employer.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=201#h5p-63

Email

Email is familiar to most students and workers. It is used to send brief, routine communications and technical information electronically. Over the years, it has become the primary form of communication for companies (Bovee, Thill, & Scribner, 2016, p.127) because it is rapid and inexpensive. In fact, it has largely replaced print hard copy letters for external (outside the company) correspondence, and by-and-large has taken the place of memos for internal (within the company) communication (Guffey, 2008).

[Email icon]. Source: https://www.iconfinder.com/icons/4417125/%40_email_envelope_letter_icon. Free for commercial use.

Email can be very useful for messages that have more content than a text message, but it is still best used for fairly brief messages or brief technical notices. It is used to send requests, confirm conversations (Writing and Communication Centre, n.d.), and to transmit documents in attachments. You may also use emails to request information about a company or organization, such as whether they anticipate job openings in the near future or whether they fund site redesign projects. In this case, you would send an email of inquiry, asking for information. Keep your request brief, introducing yourself in the opening paragraph and then clearly stating your purpose and/or request in the second paragraph. If you need very specific information, consider placing your request in list form for clarity. Conclude in a friendly way that shows appreciation for the help you will receive.

Many organizations use automated emails to acknowledge communications from the public or to remind associates that periodic reports or payments are due. You may also be assigned to "populate" a form email in which standard paragraphs are used but you choose from a menu of sentences to make the wording suitable for a particular transaction.

Emails may be informal in personal contexts, but technical and business communication requires attention to detail, awareness that your email reflects you and your company, and a professional tone so that it may be forwarded to any third party if necessary. Email often serves to exchange information within organizations. Although email may have an informal feel, remember that when used for business or technical purposes, it must convey professionalism and respect. Never write or send anything that you wouldn't want to be read in public or in front of your company president.

As with all writing, professional communications require attention to the specific writing context, and it may surprise you that even elements of form can indicate a writer's strong understanding of audience and purpose. The principles explained here apply to the educational context as well; use them when communicating with your instructors and classroom peers.

Guidelines for Effective Professional Emails

Open with a proper salutation: Salutations demonstrate respect and avoid mix-ups in case a message is accidentally sent to the wrong recipient. Be aware of their levels of formality. Consider, for example, the difference between a salutation like "Dear Ms. Abenaki," (external and formal in tone) and "Hi Barry," (internal and informal).

Include a clear, brief, and specific subject line: An effective subject line helps the recipient understand the essence of the message, so make it brief, concrete, and specific. For example, "EMS software proposal attached" or "Electrical specs for project Y" inform the reader of the subject of the message. Avoid using a subject line that is too vague, like "Proposal."

Ensure that the content is accurate: To avoid costly decisions based on inaccurate information, ensure that the technical and business content of the message is accurate. In critical communications, you should ask a colleague for a second look before sending the message.

Close with a signature: Identify yourself by creating a signature block that automatically contains your name and business contact information. You can do this using the settings in the email software.

Avoid abbreviations: An email is not a text message, and the audience may not find your wit cause to ROTFLOL (roll on the floor laughing out loud). Do not use abbreviations, acronyms, or symbols.

Be brief: Omit unnecessary words.

Use a readable structure and format: Divide your message into brief paragraphs for ease of reading. A readable email should get to the point and conclude in three small paragraphs or less. Use this basic structure for multi-paragraph messages: Open with the purpose statement and background, add details/explanation, end with a courteous close or an action request.

Reread, revise, and review: Catch and correct spelling and grammar mistakes before you press "send." It will take more time and effort to undo the problems caused by a hasty, poorly written email than to take the time to get it right the first time. Some email software makes this process easy by flagging errors.

Reply promptly: Watch out for your own emotional response—never reply in anger—but make a habit of replying to all emails within twenty-four hours, even if only to say that you will provide the requested information in forty-eight or seventy-two hours.

Follow up: If you don't get a response in twenty-four hours, email or call. Spam filters may have intercepted your message, so your recipient may never have received it.

Use "Reply All" sparingly: Do not send your reply to everyone who received the initial email unless your message absolutely needs to be read by the entire group.

Avoid using all caps: Capital letters are used on the Internet to communicate emphatic emotion or yelling and are considered rude.

Test links: If you include a link, test it to make sure it is working. You can do this by sending yourself a test message.

Consider file size and options: Audio and visual files are often quite large; avoid exceeding the recipient's mailbox limit or triggering the spam filter. If your file is of an excessive size, upload it to cloud storage and share the file using a link.

Tip: Add the address of the recipient last to avoid sending your message prematurely. This will give you time to do a last review of what you've written, make sure links work, make sure you've added the attachment, etc., before adding the sender's address and hitting Send.

This following video by Indeed Career Tips offers up-to-date effective strategies on how to compose a professional email.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=201#oembed-1

(Email Etiquette: Tips for Professional Communication in the workplace, 2022)

Check out the University of Waterloo's Writing Professional Emails in the Workplace for more information.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=201#h5p-64

Email Format

Most people will recognize the similarity between memo and email formats since the email header has been modeled on the memo header.

To:
Cc.:
Bcc.:
Subject:_____
The message is then inserted here using the document design characteristics discussed in previous chapters.

"From" has been removed from the fields because the email software automatically adds that information; it has been added to the sample "reader's view" below. The same applies for **the date**, which is also added automatically. While you can add Cc. (or complimentary copy) information to a memo, the field is available in the email software, as is the Bcc (blind copy) field. Use the complimentary copy field to add the email addresses of those secondary recipients whom you wish to receive a copy of your message. Use the blind copy field to add the email addresses of readers whom you wish to receive a copy of your message without your original recipient knowing.

The sample email below demonstrates the principles listed above.

From: Steve Jansen <sjansen@aplconstruction.com>

To: All Employees <allemployees@aplconstruction.com>

Date: September 12, 20XX

Subject: Working at Heights Training

Dear Colleagues:

Please sign up for the next available Working At Heights training offered free of charge by the company. Working At Heights training is a program offered to all employees who must work on construction projects.

As you know, our company wants to ensure your safety when working at heights and abide by a recent Ontario occupational health and safety regulations that aim to protect the well being of workers.

If you are working at heights and have not as yet taken this training, please sign up for the next workshop scheduled for Friday, October 9 from 8 a.m. to 5 p.m. For more information on the Working At Heights training program, please visit https://worksitesafety.ca/

Please let me know if you will attend by filling out the attached form.

Steve Jansen
CEO, APL Construction, Inc.

Memos

Memoranda, or **memos**, are one of the most versatile document forms used in professional settings. Memos are "in-house" documents (sent within an organization) to pass along or request information, outline policies, present short reports, and propose ideas. While they are often used to inform, they can also be persuasive documents. A company or institution typically has its own "in-house" style or template that is used for documents such as letters and memos.

Memo Format

The **Header Block** appears at the top left side of your memo, directly underneath the word **MEMO** or **MEMORANDUM** in large, bold, capitalized letters. This section contains detailed information on the recipient, sender, and purpose. It includes the following lines:

TO: Give the recipient's full name, and position or title within the organization

FROM: Include the sender's (your) full name and position or title

DATE: Include the full date on which you sent the memo

SUBJECT or RE: write a brief phrase that concisely describes the main content of your memo.

Place a horizontal line under your header block, and place your message below.

Memos look much like emails and are characterized by a simple header formatted as follows:

MEMORANDUM

To:
From:
Date:
Re.:
_____

The message is then inserted here using the document design characteristics discussed in previous chapters.

In the "From:" field, handwrite your initials after your typed name to authenticate the document if you are to print the memo for distribution. "Re." refers to "Regarding". This term is used in technical workplaces instead of "Subject", which we see in business memos. Having said this, some technical workplaces will replace "Re." with "Subject". You would include a concrete and specific Subject or Re.

line. See the above Guidelines for Effective Professional Emails for more information about subject lines.

Figure 9.2.2 shows a sample of an "in-house" memo style, with annotations pointing out various relevant features. The main formatted portions of a memo are the Logo or Letterhead (optional), the Header Block, and the Message. The attached Memos PowerPoint reviews some of these features in detail.

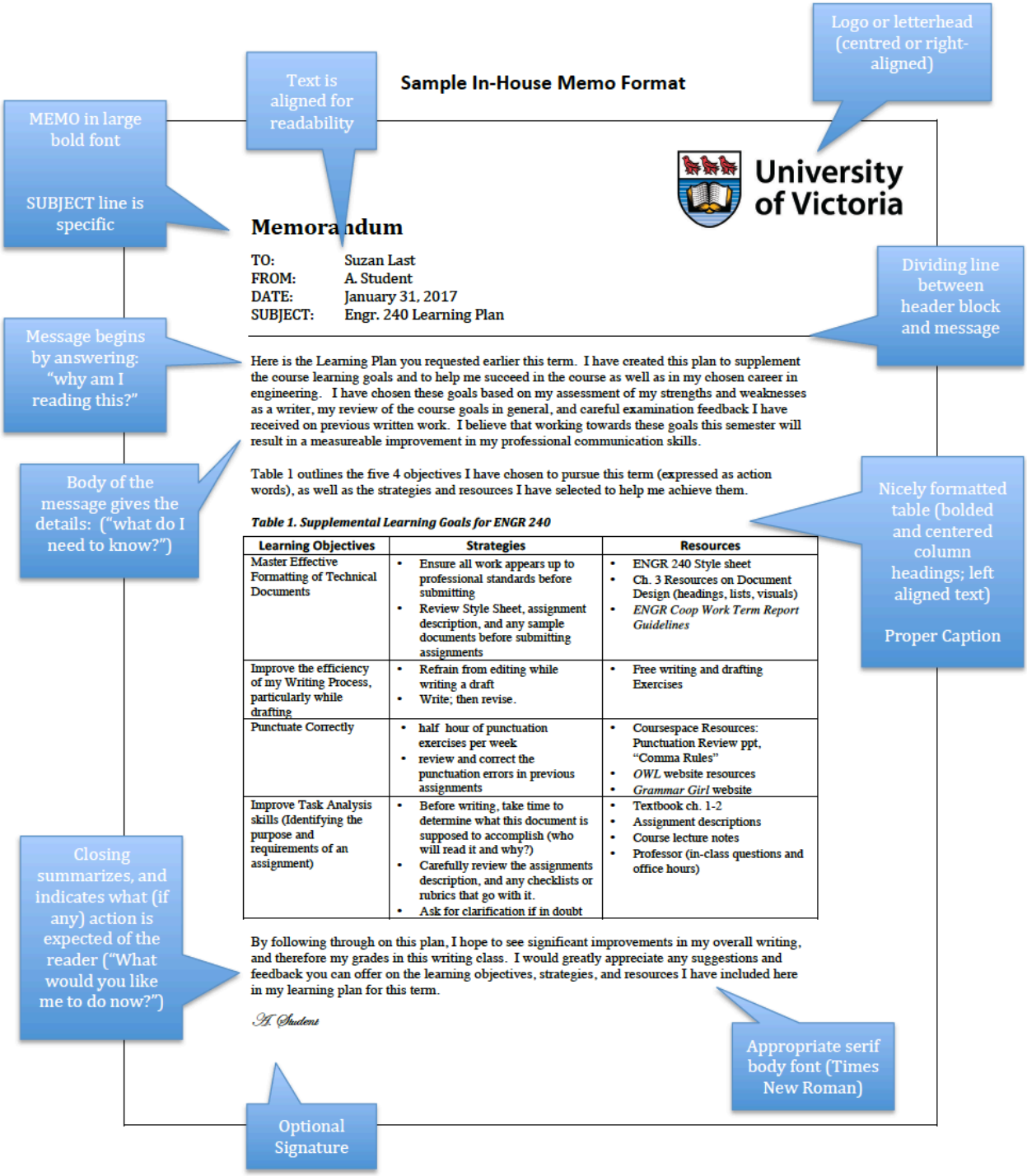


Figure 9.2.2 *Sample Memo, annotated. [Image description]*

Memo Message Structure

The length of a memo can range from a few short sentences to a multi-page report that includes figures, tables, and appendices. Whatever the length, there is a straightforward organizational principle you should follow. Organize the content of your memo so that it answers the following questions for the reader:

1. **Opening and background:** Why do I have to read this and what are the circumstances leading to this message?
2. **Details:** What do I need to know?
3. **Closing:** What am I expected to do now?

Memos are generally very direct and concise. There is no need to start with general introductions before getting to your point. Your readers are colleagues within the same organization and are likely familiar with the context in which you are writing. Think of the message as building blocks:

Opening: The opening sentences of the memo's message should make the purpose clear to the reader. Get to the point by stating your purpose. If necessary, include brief background information to clarify the context.

Details/Explanation: The middle section of the message should give all of the information needed to adequately inform the readers and fulfill the purpose of the memo. Start with the most general information, and then add the more specific facts and details. Include enough detail to support your purpose; omit the nice-to-know information. Doing a good audience analysis will help you determine what information should be included and what can be left out.

Action Close: The final part of the message indicates what, if any, action is required or requested of the reader(s). If you are asking your reader(s) to do something, be as courteous as possible and indicate how this action will also benefit them. Include a deadline or due date so the reader knows when to get back to you–especially if the request is time-critical.

This structure applies to longer email messages as well as letters. For more information on writing memos, check out the memo page on the **Online Writing Lab** at Purdue University: [Parts of a Memo].

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=201#h5p-65

Letters

Letters are brief messages sent to recipients that are often outside the organization. They are often created using company letterhead templates and are generally limited to one or two pages. While email and text messages may be used more frequently today, the business letter remains a common form of written communication for formal, external matters. It can serve to introduce you to a potential employer, convey a project estimate to a client or partner, or announce or market a product or service, for example. Often, the letter format is used for short reports when more substantial information, like site observations, must be conveyed to an external party.

There are many types of letters, and many adaptations in terms of form and content, but this section covers the elements of a traditional block-style letter. Letters may serve to introduce your skills and qualifications to prospective employers (cover letter), deliver important or specific information, document an event or decision, or introduce an attached report or long document (letter of transmittal). **Figure 9.2.3** shows a basic letter of transmittal meant to introduce a technical report to its recipient. Often, writers will include a paragraph acknowledging key individuals who have provided as

Roger McMahon
32598 Collins Way
Redmond, OR 97756
(541) 567-2546

Letterhead (sender's return address)

September 28, 2015

Spacing above and below the date can vary to make the text fit logically on the page.

Tina Blakely, Owner
Three Creeks Spa Service
12129 Lone Tree Place
Sisters, OR 97759

Inside address: the name, title, and address of the intended recipient

Dear Ms. Blakely:

Use a formal title and last name in the greeting, unless you are close friends with the recipient. Follow the greeting with a colon.

Enclosed you will find my final report on team building for employees at Three Creeks Spa Service. I am excited to have you review my findings which include extensive research of strategies that have been successful for other organizations like Three Creeks. In my informal conversations with some of the other staff at Three Creeks, I know they are also excited to explore some of these team-building activities.

If you have any questions about the content in this report, please don't hesitate to contact me either by phone at the phone number above or in person at the shop. I look forward to the opportunity to discuss this with you further.

Sincerely,

Roger McMahon

Roger McMahon
Three Creeks Spa Service Dispatcher

Line spacing: Leave one blank line after the address, the greeting, and each paragraph in the body. After the complimentary closing, (Sincerely, Yours truly, etc.), leave four lines as space for a signature, then type the sender's full name and title on two lines as shown here.

Figure 9.2.3 *Sample letter of transmittal (click image for an accessible PDF) (Hamlin, Rubio, & DeSilva, n.d. CC-BY-NC-SA 4.0).*

Characteristics of Effective Letters

A typical letter format has ten main parts (partially adapted from Cruthers, 2020):

1. **Letterhead/logo**: Sender's name and return address; often includes the company name and logo
2. **Date:** Written in full
3. **The receiver's block:** Name, position, company, and address of the recipient
4. **Salutation**: "Dear _____: " use the recipient's name, if known; use a colon for punctuation (this differs from email salutations which require a less formal comma). A common salutation may be "Dear Mr. (full name)." If you are unsure about titles (i.e., Mrs., Ms., Mr., Mx., Dr.), you may simply write the recipient's name (e.g., "Dear Cameron Rai") followed by a colon. The salutation "To whom it may concern" is appropriate for letters of recommendation or other letters that are intended to be read by any and all individuals. If this is not the case with your letter, but you are unsure of how to address your recipient, make every effort to find out to whom the letter should be specifically addressed. Avoid the use of impersonal salutations like "Dear Prospective Customer," as the lack of personalization can alienate a future client.
5. **The introduction**: Establishes the overall purpose of the letter. This is your opening paragraph, which may include an attention statement, a reference to the purpose of the document, and an introduction of the person or topic depending on the type of letter. An emphatic opening involves using the most significant or important element of the letter in the introduction. Readers tend to pay attention to openings, and it makes sense to outline the expectations for the reader up front. Just as you would preview your topic in a speech, the clear opening in your introductions establishes context and facilitates comprehension.
6. **The body**: Articulates the details of the message: your explanation, technical details, a series of facts, or a number of questions belong in the body of your letter. Readers may skip over information in the body of your letter, so make sure you emphasize the key points clearly. You may choose organizational devices to draw attention, such as a bullet or numbered list. The body contains your core content, but brevity is important and so is clear support for the main point(s). Specific, meaningful information needs to be clear, concise, and accurate.
7. **The conclusion:** Restates the main point and may include a call to action. It definitely should end with good will. An emphatic closing mirrors your introduction with the added element of tying the key points together, clearly demonstrating their relationship. The conclusion can serve to remind the reader, but should not introduce new information. A clear summary sentence will strengthen your writing and enhance your effectiveness. If your letter requests or implies action, the conclusion needs to make clear what you expect to happen. This paragraph reiterates the main points and their relationship to each other, reinforcing the main point or purpose.
8. **The signature block:** Includes a complimentary close like "Sincerely," space of about 4 line spaces for the signature, the sender's name and role, along with company email address and phone extension. "Sincerely" or "Cordially" are standard business closing statements. Closing statements are normally placed one or two lines under the conclusion and include a hanging comma, as in Sincerely,
9. **Enclosure note:** Just like an e-mail with an attachment, the letter sometimes has additional documents that are delivered with it. The Enclosure line indicates what the reader can look for in terms of documents included with the letter, such as brochures, reports, or related business documents. Only include this line if you are in fact including additional documentation.
10. **Complementary copies:** The abbreviation "CC" once stood for carbon copies but now refers to complementary copies. Just like a "CC" option in an e-mail, it indicates the relevant parties that will also receive a copy of the document.

Keep in mind that letters represent you and your company in your absence. In order to communicate effectively and project a positive image, remember that

- your language should be clear, concise, specific, and respectful,
- each word should contribute to your purpose,
- each paragraph should focus on one idea,
- the parts of the letter should form a complete message, and
- the letter should be free of errors.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=201#h5p-66

Letters with Specific Purposes

In a professional context, you may write letters for many possible reasons. Below is a list of the most common kinds of letters:

Transmittal Letters: When you send a report or some other document, such as a resumé, to an external audience, send it with a cover letter that contains a brief explanation of the purpose of the enclosed document and a summary of the document's contents. Click the link to download a Letter-of-Transmittal-Template.

Letters of Confirmation: In certain formal circumstances such as in the case of a job offer or a formal invitation, it is customary to follow up with a message of confirmation formatted as a letter. You may send the letter attached to a brief email transmittal message. Using a separate letter signals your awareness of the context and shows your ability to adapt messages for specific situations.

Follow-up Letters: Any time you have asked someone to do something for you, write a follow-up letter expressing your appreciation for the time your letter recipient has taken to respond to your needs. If you have had a job interview, the follow-up letter thanking the interviewer(s) for their time is especially important for demonstrating your professionalism and attention to detail.

Letters within the professional context may take on many other purposes, such as communicating with suppliers, contractors, partner organizations, clients, government agencies, and so on. For additional examples of professional letters, take a look at the sample letters provided by David McMurrey in his online textbook on technical writing: *Online Technical Writing: Examples, Cases & Models*.

Some content in this chapter was adapted from the following source:

"Professional Communications" chapter in *Technical Writing* by Annemarie Hamlin, Chris Rubio, Michele DeSilva. This source is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

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Image descriptions

Figure 9.1.1 image description:

Design features of a 1-page memorandum.

- The logo or letterhead is at the top of the page and centred or right-aligned (in this case, it is the University of Victoria letterhead).
- "Memorandum" appears at the top of the page left-aligned in large, bold font.
- The header block (which appears under the "Memorandum" heading) includes a "to," "from," "date," and "subject" in a vertical list. Those values are aligned vertically for readability.
- A dividing line separates the header block from the message.
- The message begins by answering, "Why am I reading this?"
- The body of the message gives the details: ("What do I need to know?")
- There is a table that is nicely formatted. (The table has a caption above the table in bold and italics, column headers are bold and centred, and text is left aligned.)
- A closing paragraph summarizes and indicates what (if any) action is expected of the reader (Answering, "What would you like me to do now?")
- The text of this document uses an appropriate serif body font (Times New Roman)
- There is also a signature (optional)

[Return to Figure 9.1.1]

9.3 Instructions

One of the most common and important uses of technical writing is to provide instructions, those step-by-step explanations of how to assemble, operate, repair, or do routine maintenance on equipment or other objects. Instructions come in many forms: short emails, standard operating procedures, manuals, user guides, pamphlets, along with webinars and video tutorials. Although they may seem intuitive and simple to write, instructions are some of the worst-written documents you can find. Most of us have probably had many infuriating experiences with badly written instructions. This chapter will show you what professionals consider the best techniques in providing instructions.

An effective set of instructions requires the following:

- clear, precise, and straight-forward writing
- a thorough understanding of the procedure in all its technical detail
- the ability to put yourself in the place of the reader, the person trying to use your instructions
- the ability to visualize the procedure in detail and to capture that awareness in the steps provided
- willingness to test your instructions on the kind of person you wrote them for

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=207#oembed-1

(Instruction Documents, 2013)

Preliminary Steps

At the beginning of a project to write a set of instructions, it is important to determine the structure or characteristics of the particular procedure you are going to write about. Here are some steps to follow:

1. Do a careful audience and task analysis

Early in the process, define the audience and situation for your instructions. Remember that defining an audience means defining the level of familiarity your readers have with the topic. So

envision your real audience, not your ideal one. Doing so will help you focus on the content that a typical reader would need to perform a sequence of tasks.

2. Do a thorough task analysis

Let's use the term *procedure* to refer to the whole set of activities your instructions are intended to discuss. A *task* is a semi-independent group of actions within the procedure: for example, setting the clock on a microwave oven is one task in the big overall procedure of operating a microwave oven.

What tasks are involved in the entire procedure?

• Complete a thorough task analysis by performing the task yourself, if possible

• Group related tasks together

• Determine the number of tasks and identify phases

3. Determine the best approach for the step-by-step section

For most instructions, you can focus on tasks, or you can focus on tools (or features of tools). In a *task approach* (also known as task orientation) for instructions on using a phone-answering service, for example, you would include these sections:

- Recording your greeting
- Playing back your messages
- Saving your messages
- Forwarding your messages
- Deleting your messages, and so on

These are tasks—the typical things we'd want to do with the machine. See **Figure 9.3.1** for an example of instructions written using the task approach

On the other hand, in a *tools approach* to instructions on using a photocopier, there likely would be sections on how to use specific features:

- Copy button
- Cancel button
- Enlarge/reduce button

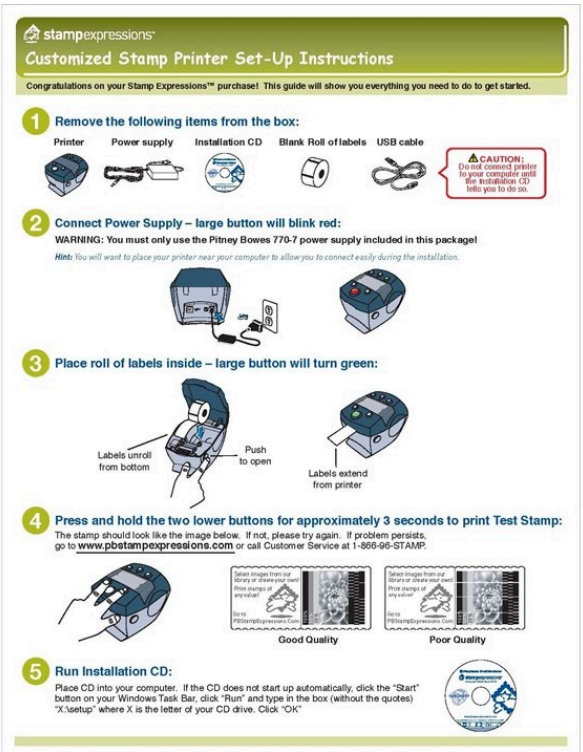

Figure 9.3.1 *An example of instructions written using the task approach (Georgia State University, 2014).*

- Collate/staple button
- Copy-size button, and so on

If you designed a set of instructions on this plan, you'd write steps for using each button or feature of the photocopier. Instructions using this tools approach are hard to make work. Sometimes, the name of the button doesn't quite match the task it is associated with; sometimes you have to use more than just one button to accomplish the task. Still, there can be times when the tools/feature approach may be preferable.

4. Design groupings of tasks

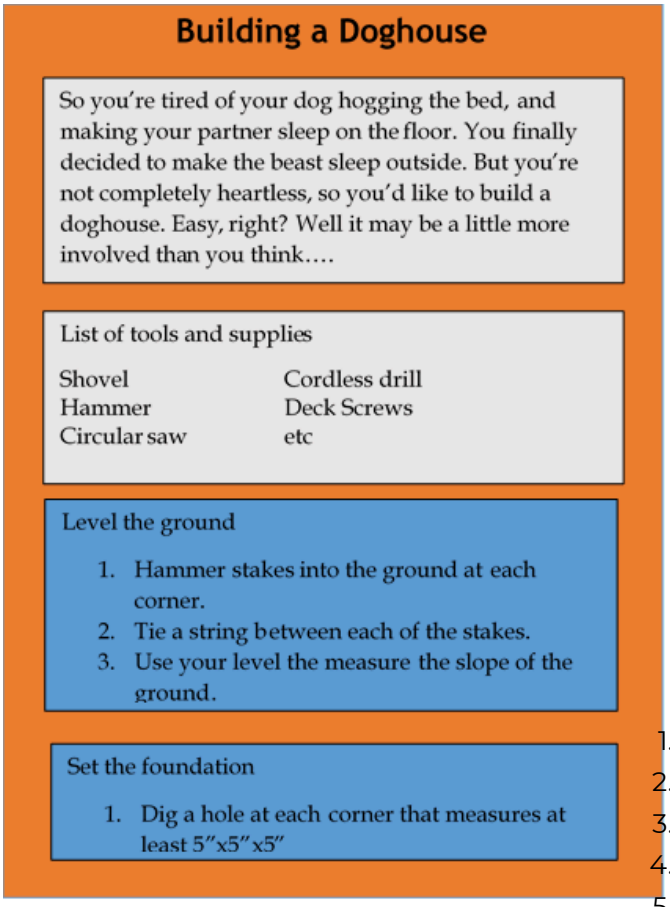

Figure 9.3.2. *Instructions are divided into multiple sections (phases) with each section containing multiple sub-steps (Beilfus, n.d.).*

Some instructions have only a single task but have many steps within that single task. For example, imagine a set of instructions for assembling a kids' swing set. In my own experience, there were more than 130 steps! That can be a bit daunting. A good approach is to group similar and related steps into phases, and start renumbering the steps at each new phase. A *phase* then is a group of similar steps within a single-task procedure. In the swing-set example, setting up the frame would be a phase; anchoring the thing in the ground would be another; assembling the box swing would be still another.

Another example would group common technical tasks as follows:

1. Unpacking and setup tasks
2. Installing and customizing tasks
3. Basic operating tasks
4. Routine maintenance tasks
5. Troubleshooting tasks

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=207#h5p-67

Common Sections in Instructions

The following is a review of the sections you'll commonly find in instructions. Don't assume that each one of them *must* be in the actual instructions you write, nor that they have to be in the order presented here, nor that these are the only sections possible in a set of instructions. Always consider your audience and context first, then adapt your document accordingly.

For alternative formats, check out the **Sample Instructions**.

A Set of Instructions Often Includes the Following

Introduction: Plan the introduction to your instructions carefully. It might include any of the following (but not necessarily in this order):

- Indicate the specific tasks or procedure to be explained as well as the scope (what will and will not be covered).
- Indicate what the audience needs in terms of knowledge and background to understand the instructions.
- Give a general idea of the procedure and what it accomplishes.
- Indicate the conditions when these instructions should (or should not) be used.
- Give an overview of the contents of the instructions.

General warning, caution, danger notices: Instructions often must alert readers to the possibility of ruining their equipment, compromising the procedure, and hurting themselves. Also, instructions must often emphasize key points or exceptions. For these situations, you use **special notices**—general notes, warnings, caution, and danger notices. General warning, caution, and danger notes will appear following the Introduction, and specific notices will appear immediately before any relevant step. Keep in mind that when a procedure involves any hazard to humans or animals, or potential for damage, you have a legal and moral responsibility to include these special notices in the opening and in the discussion of steps in your document.

Technical background or theory: At the beginning of certain kinds of instructions (after the introduction), you may need background information related to the procedure. For certain instructions, this background is critical—otherwise, the steps in the procedure make no sense.

- In technical contexts, reference to codes, regulations, manufacturer's datasheets, and other technical documents are required.
- Background on specific knowledge or skills required to perform the tasks should also be included.

For example, you may have had some experience with those software applets in which you define your own colors by nudging red, green, and blue slider bars around. To really understand what you're doing, you need to have some background on color. Similarly, you can imagine that, for certain instructions using cameras, some theory might be needed as well.

Equipment and supplies: Notice that most instructions include a list of the things you need to gather before you start the procedure. This includes *equipment*, the tools you use in the procedure (such as mixing bowls, spoons, bread pans, hammers, drills, and saws) and *supplies*, the things that are consumed in the procedure (such as wood, paint, oil, flour, and nails). Be sure to include any *personal protective equipment* (PPE) (such as masks, steel-toed boots, gloves, and goggles), as this equipment is essential to protect readers when following instructions that may involve hazards. In instructions, these typically are listed either in a simple vertical list or in a two-column list. Use the two-column list if you need to add some specifications to some or all of the items—for example, brand names, sizes, amounts, types, model numbers, and so on.

Discussion of the steps: When you get to the actual writing of the steps, keep in mind the following: 1) the structure and format of those steps, 2) supplementary information that might be needed, and 3) the point of view and general writing style.

Include a specific note, caution, danger, and warning notices before each relevant step. Placement *before* the step is the most logical placement because you would not want someone to go ahead and perform a hazardous step without first reading the warning, caution, or danger note. Notice how these special notices are used in the McMurrey sample instructions (see the link above).

Structure and format: Normally, we imagine a set of instructions as being formatted as vertical numbered lists. And most are in fact. Normally, you format your actual step-by-step instructions this way. There are some variations, however, as well as some other considerations:

- ***Fixed-order steps*** are steps that must be performed in the order presented. For example, if you are changing the oil in a car, draining the oil is a step that *must* come before putting in the new oil. These are numbered lists (usually, vertical numbered lists).
- ***Variable-order steps*** are steps that can be performed in practically any order. Good examples are those troubleshooting guides that tell you to check this and check that when you are trying to fix something. You can do these kinds of steps in practically any order. With this type, the bulleted list is the appropriate format.
- ***Alternate steps*** are those in which two or more ways to accomplish the same step are presented. Alternate steps are also used when various conditions might exist. Use nested bulleted lists with this type, with OR inserted between the alternatives, or include a lead-in indicating that alternatives are about to be presented.
- ***Nested steps*** may be used in cases when individual steps within a procedure are rather complex in their own right and need to be broken down into sub-steps. In this case, you indent further and sequence the sub-steps as a, b, c, and so on.
- ***"Step-less" instructions*** can be used when you really cannot use numbered vertical list or provide straightforward instructional-style directing of the reader. Some situations must be so generalized or so variable that steps cannot be stated.

Supplementary discussion: Often, it is not enough simply to tell readers to do this or to do that. They need additional explanatory information such as how the thing should look before and after the step; why they should care about doing this step; what mechanical principle is behind what they are doing;

even more micro-level explanation of the step—discussion of the specific actions that make up the step.

The problem with supplementary discussion, however, is that it can hide the actual step. You want the actual step—the specific actions the reader is to take—to stand out. You don't want it all buried in a heap of words. There are at least two techniques to avoid this problem: you can split the instruction from the supplement into separate paragraphs; or you can bold the instruction.

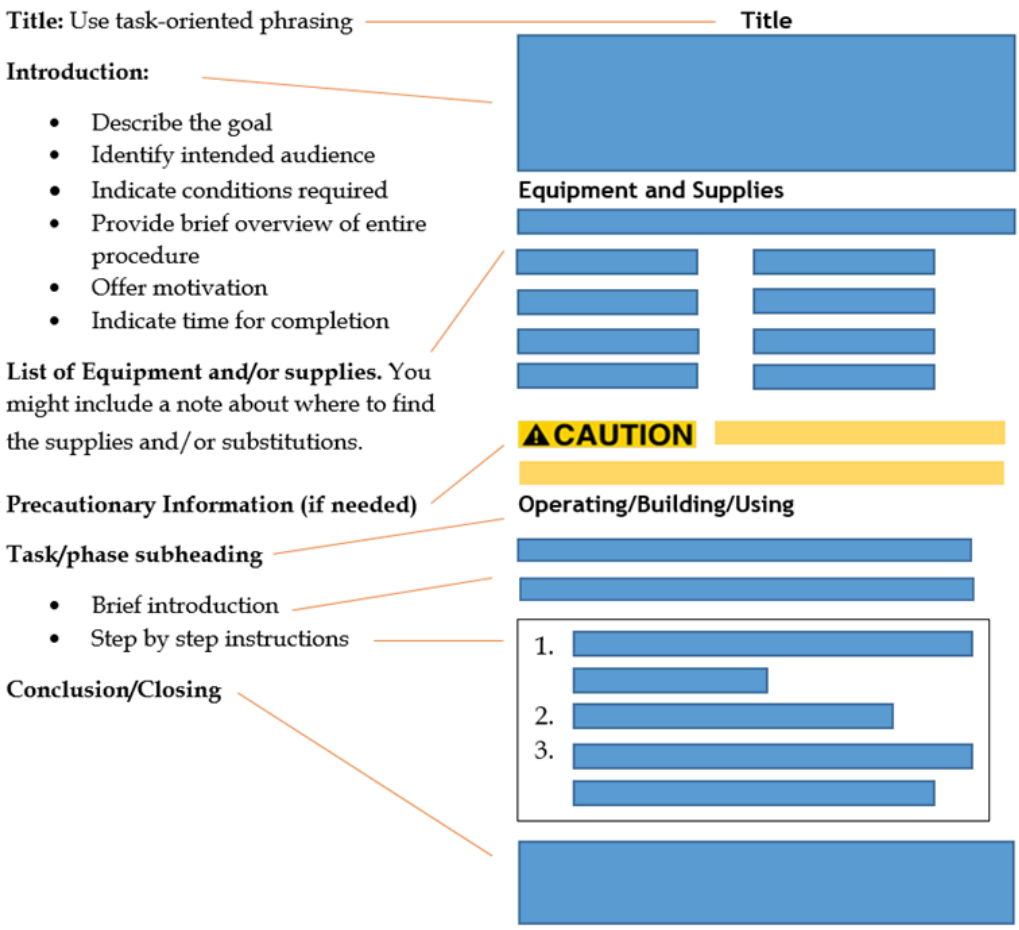

Figure 9.3.3 *An example of how instruction can be written. Remember to see the link above for alternatives (Beilfus, n.d.).*

Knowledge Check

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Writing Style

Avoid using the passive voice as the trend nowadays is to engage the reader using an active verb that is task-focused. The use of the **passive voice** in instructions can be problematic. For some strange reason, some instructions sound like this: "The **Pause** button should be depressed in order to stop the display temporarily." Not only are we worried about the pause button's mental health, but we wonder who's supposed to depress the thing (*ninjas*?). It would be more helpful to indicate when the reader must "**press** the Pause button." Consider this example: "The Timer button is then set to 3:00." Again, one might ask, "is set by whom? *Ninjas*?" The person following these instructions might think it is simply a reference to some existing state, or she might wonder, "Are they talking to me?" Using the third person can also lead to awkwardness: "The user should then press the Pause button."

Instructions should typically be written using command verb forms (also known as the imperative mood) and using "you" to make it perfectly clear what the reader should do. Here is an example:

Step 2: Inflating your automobile tires with air

2.1. After driving to the service station, locate the air compressor and park the car next to it.
2.2. Remove the valve stem caps on all four tires.
2.3. Check the PSI number for your vehicle's tires.
2.4. Turn on the air compressor. (Insert sufficient coinage if necessary).
CAUTION: Do not over-inflate your tires. Doing so will result in faster tread wear and tear.
2.5. Inflate each tire with air from the compressor.
2.6. Check the tire pressure (or PSI) of each tire and adjust using the tire gauge.
2.7. Recap each valve with the valve stem caps.

Note: Each step (except for step 1) begins with a verb in the present tense–the imperative mood. Step 2.1, begins with a qualifier: "*After driving to the service station. . .*" The step then goes on to use a command style to explain the step.

Also, note the numbering: in technical instructions, use this numerical method for indicating the section or phase each step belongs to: Step 2.1 belongs to Section 2.

Example created by Robin L. Potter

Illustrating Your Instructions

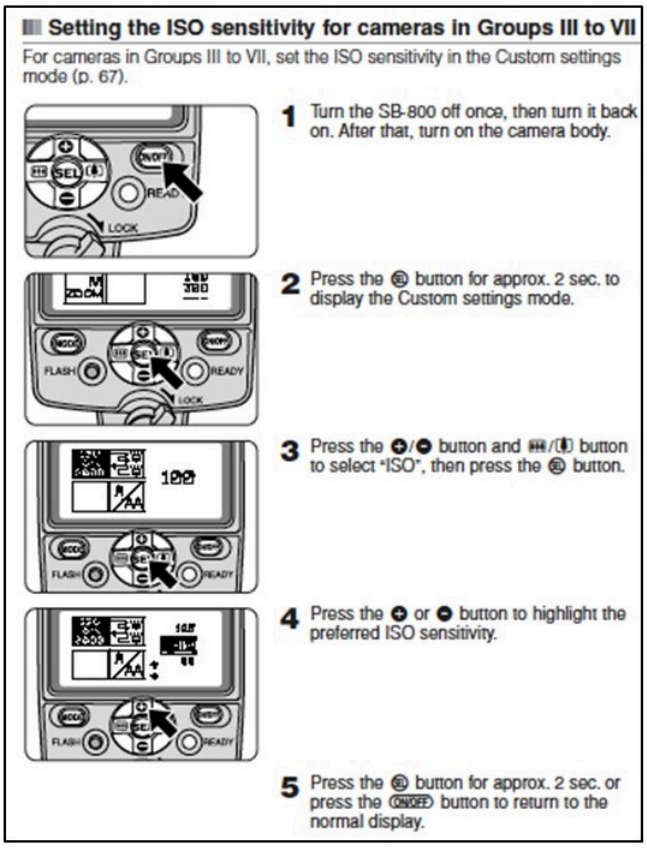

Figure 7.3.4 *Each instructions includes an illustration of specific step in process (Wood, 2013).*

You may have noticed that many companies, like Canon and Ikea, now opt for pictorial formats for instructions. In so doing, they are attempting to minimize language barriers when offering their products in countries around the globe. They are also decreasing their costs for translating instructions and minimizing the potential for language errors and content inaccuracies that can occur through the translation process.

Text-based instructions, however, are still common. Perhaps more than in any other form of technical writing, visual aids or visual tutorials are crucial to text-based instructions. Sometimes, words simply cannot explain the step. Illustrations, photographs, screenshots, and the like are often critical to the readers' ability to visualize what they are supposed to do. Be sure that the visual aids represent the image from the reader's perspective. Typically, the visual aids are placed immediately below the step described in the text. Adding visual aids to instructions is about the only time that it is acceptable to be redundant in a technical document. Be sure to include sources for the images if you have not created them yourself.

Formatting Your Instructions

Since people rarely *want* to read instructions, but often *have* to, format your instructions for reluctant readers. Try to make your reader *want* to read them, or at least not *resistant* to the idea of consulting them. A highly readable format using headings, listing, passive space, and visual aids will allow readers who have figured out some of the instructions on their own to skip to the section where they are stuck. Use what you have learned about headings, lists, visuals, and passive space to create effective and readable instructions:

Headings: Normally, you'd want headings for any background section you might have, the equipment and supplies section, a general heading for the actual instructions section, and subheadings for the individual tasks or phases within that section.

Lists: Similarly, instructions typically make extensive use of lists, particularly numbered vertical lists for the actual step-by-step explanations. Simple vertical lists or two-column lists are usually good for the equipment and supplies section. In-sentence lists are good whenever you give an overview of things to come.

Special Notices: You may have to alert readers to possibilities in which they may damage their equipment, waste supplies, cause the entire procedure to fail, injure themselves or others—even seriously or fatally. Companies have been sued for lack of these special notices, for poorly written special notices, or for special notices that were out of place. See **special notices** for a complete discussion of the proper use of these special notices as well as their format and placement within instructions.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=207#h5p-69

Revision Checklist for Written Instructions

As you reread and revise your instructions, check that they do the following:

- Provide an overview of content
- Indicate audience requirements
- Clearly describe the exact procedure to be explained
- Include a section listing equipment and supplies if necessary
- Include exact measurements and other values when required; for example, "a few drops" is far less specific than ".25 ml"
- Use various types of lists wherever appropriate; in particular, use numbered lists for sequential steps
- Use headings and subheadings to divide the main sections and subsections in a logical, coherent order
- Use special notices as appropriate

- Use visual aids to illustrate key actions, objects, and locations
- Provide additional supplementary explanation of the steps as necessary

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This chapter was adapted from Online Technical Writing by David McMurrey, which is under a Creative Commons Attribution 4.0 International License.

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9.4 Standard Operating Procedures (SOPs)

ROBIN L. POTTER

A standard operating procedure (commonly referred to as SOP) is a specific type of document that consists of instructions for controlled processes. Controlled processes include steps or procedures that must be performed consistently and accurately each time that they are performed due to safety, quality control, or testing considerations. SOPs help organizations maintain consistency in the performance of critical tasks by many employees. The SOP informs the reader about the procedure's authorization, frequency, purpose, scope, and revision history. It also contains a description of the equipment needed and the steps that must be followed in a specific sequence.

Often used in contexts where testing requirements are stringent and where safety is top of mind, these documents help employees maintain quality and safety in their work. Specifically, SOPs are used in the following areas (de Sain & Sutton, n.d.):

- Manufacturing
- Testing Methods
- Quality Testing Methods
- Maintenance
- Calibration
- Equipment Use

For example, SOPs are required in the pharmaceutical industry to regulate how drugs are manufactured, handled, stored, distributed, sold, transported, labelled, and destroyed. These documents form part of departmental audits by regulators, so they must be frequently and regularly updated.

In addition, SOPs can be used in business, such as in finance, human resources, administration, customer service, and marketing (Brampton Small Business Enterprise Centre, n.d.). In essence, the document guides professionals in performing their responsibilities in a standardized or uniform manner. More importantly, in the sciences, manufacturing, and quality assurance, SOPs enable organizations to comply with the standards established by laws, regulations, and policies. Review the video below about the importance of having and following a SOP.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=209#oembed-1

(The Importance of a Standard Operating Procedure, 2022)

SOP Format and Components

The format of SOPs is standardized in that typically, within an organization, the SOP format is uniform across the organization. The title page must contain a standardized header (See **Figure 9.4.1**). Though there may be some variance across organizations within an industry, the page 1 header usually includes the following elements:

Table 9.4. 1: ***Components of page 1 of SOPs***

Component	Description
Title	The SOP title—written using specific and concrete language Example: *Standard Operating Procedure for the Testing of COVID-19 Samples*
Company name	The name of the company that created the SOP
SOP number	A unique identifying number used for tracking purposes
Pagination	Page number, along with the total number of pages Example: 1 of 5
Applicable to	Employee roles to whom the SOP would apply: e.g., supervisor, lab technician
Effective date	The date when the SOP went into use
Version number	A number indicating the document version
Originator and date	The person who originated the document
Verifier and date	The person who verified the document prior to circulation
Authorizer and date	The person who authorized the release of the document

You can see by the example in **Figure 9.4.1** below how the various components for page 1 of SOPs are typically distributed.

TITLE: COMPANY NAME

SOP NUMBER: PAGE #:

APPLICABLE TO: VERSION #:

EFFECTIVE DATE:

NEXT REVISION DATE:

	Originated by	**Verified by**	**Authorized by**
Name			
Role			
Date			
Signature			

Figure 9.4.1: *Sample SOP title page header.*

The body of the SOP typically contains these components:

Table 9.4.2: ***Typical sections of SOP documents***

Components	Description
Purpose	Briefly states the purpose of the document.
Scope	Delimits the scope of the document: the procedural elements it covers and does not cover.
Responsibility	Describes the responsibilities of person roles who would likely be involved in supervising or performing the process.
Frequency	Indicates how frequently the procedure must be completed
Safety notices	Includes caution, danger, and warning notices as applicable to the procedure.
Definitions/abbreviations	Clarifies any important technical terminology used in the SOP
Associated documents	Lists documents used to inform the creation of the SOP; may include laws, codes, regulations, material safety data sheets (MSDS), safety data sheets (SDS), and the like.
Equipment and materials required	Lists any equipment or materials required for the tasks to be performed; includes personal protective equipment.
Procedure	Explains in a numbered sequence the steps that are required to complete a task.

Version history	Includes a chart indicating the revision numbers and dates.
References	Lists the resources used to create the SOP.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=209#h5p-70

To view sample SOPs, click on the following links:

- SOP for the Calibration and Maintenance of Weigh Balances (U.S. Environmental Protection Agency (2017).
- Operational Procedures: Calibration procedures for common equipment used by the CFIA Inspectorate
- Manitoba. (2020, November). SOP for Protocol Swabbing (Adult and Pediatric)**.**

Format Requirements

SOPs must be created using standardized formatting consisting of the following:

- Include the SOP title and number, company name, and page number on every page.
- Format the page number as follows: page X of Y—page 1 of 5.
- Single-space all text, and add a line space between bullet/listed items.
- Number all the parts of the SOP as follows: (e.g., 1, 1.1, 1.1.1, 2, 2.1, 2.1.1. . .) and nest (indent) sub-steps.
- Use bold to highlight headings.

SOP Language and Style

Like any set of instructions, SOPs must be clear and straightforward, so use language that is precise and specific to convey information relating to the procedure. Follow these tips for creating an effective SOP style (see examples in **Table 9.4.3**):

- Use clear, specific, and concrete language.
- Choose straight-forward vocabulary.
- Use a concise, active, and direct approach.
- Use the imperative mood by preferring the action word for each step.
    - e.g., "Place the tachometer trigger on one half of the rotor unit."

Table 9.4.3: ***Examples of vague and specific wording***

Vague Wording	Specific Wording
for a few minutes	for 5 minutes
add a few drops at a time	add 0.1 ml at a time
store in the freezer	store at -20°C to -30°C
incubate	incubate at 37±1°C
spin down the sample	spin at 10,000 rpm for 10 mins at 2-8°C

The SOP Lifecycle

SOPs are created to address the need for compliance to laws, regulations, or policy and serve to establish norms for the performance of specific types of tasks. These documents, then, are created with careful attention to task requirements, compliance exigencies, quality control, and revision protocols.

Include these steps when creating an SOP:

1. Clearly identify and define the need and audience for the SOP.
2. Complete a thorough task analysis so as to create a complete procedure.
3. Submit the draft document for review by various stakeholders including managers and users.
4. Test the document and obtain feedback via survey, interviews, and/or observation.
5. Revise the document and submit it to a quality assurance review.
6. Ensure the document is compliant to laws, regulations, and policies so as to pass audits.
7. Track revision dates.
8. Control old SOP versions (may involve collecting and destroying outdated SOPs).

For more information about instructions generally, please refer to Chapter 9.3: Instructions.

Knowledge Check

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9.5 Technical Descriptions and Definitions

Knowledge Test

Take this short quiz to find out what you already know about Technical Descriptions and Definitions.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=218#h5p-72

Descriptive technical writing uses a combination of visuals and text to both "show" and "tell" the reader about the information being conveyed. Like more creative descriptions, technical descriptions sometimes draw on the "five senses" and metaphorical comparisons (analogies) to allow the reader to fully conceptualize what is being described. More often, however, they rely on concrete, measurable descriptors. Technical descriptions can take many forms, depending on purpose and audience. Descriptions can range from a brief sentence, to a paragraph, a whole section of a report, or an entire manual. Poorly written technical descriptions can cause confusion, waste time, and even result in catastrophe! Technical product descriptions are often legally required to ensure safety and compliance. Attention to detail is critical.

Product specifications require detailed descriptions of design features; instructions often require specific descriptive detail to "show" the reader what to do. Some general categories of technical descriptions include the following:

- **Mechanism Descriptions:** Provide a detailed overview of the physical aspects of a tool, machine or other mechanical device that has moving parts and is designed to perform a specific function. These could be product descriptions for sales or manufacturing, documentation of design specifications, infographics, etc. This chapter focuses in detail on this kind of description.
- **Process Descriptions:** Detail a series of events (natural/biological/ecological, mechanical, social, or psychological phenomenon) that happen in a particular sequence in order to achieve a specific outcome. These can be categorized into ***non-instructional*** processes (such as a process that analyses how an internal combustion engine works, or natural processes like

photosynthesis) and ***instructional*** processes (such as recommended/required procedures and explicit step-by-step instructions to be followed). (See Chapter 9.3 for detailed information on **Writing Instructions**).

- **Definitions:** Clarify the specific meaning, often related to a specific context, or express the essential nature of the terms being defined. These can range in length from a simple clarifying phrase to a glossary, to an extended document of several pages. Definitions will often include detailed descriptions and visuals to illustrate ideas. Extended definitions are created using various rhetorical strategies: classification, exemplification, analogy and comparison, history, and components, along with relevant visuals. You can find a good example of such a description on the NASA Mars Perseverance Rover site; the overview of the spacecraft that conveyed the Perseverance Rover to Mars includes various rhetorical strategies. Can you pick them out? Click on the link below to view a student PowerPoint presentation on how to write effective definitions for technical purposes. This presentation is included with the express permission of the student.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=218#video-218-1

(Technical Definitions, 2015)

Definitions in Technical Writing – Student Presentation

Knowledge Check

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Technical Description of a Mechanism

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(Writing Technical Descriptions , 2015)

Writing Technical Descriptions from **Safwan Brightwell**

Mechanism descriptions should provide a clear understanding of the object being described, including

- General appearance and physical properties
- Overall function/purpose
- Component parts
- How the parts interact to create a functioning whole.

The reader should be able to clearly picture, and therefore understand, the nature of the object being described, what it does, and how it works.

In order to achieve this clarity for the reader, the writer must choose significant details and organize information logically. Select details that can be described precisely and measurably, such as

color	materials	texture, smell, taste
shape	component parts	finish
size	properties	patterns, designs
dimensions	principles at work	interactions

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=218#h5p-74

Depending on the reader's need, the description may range from a general overview requiring only a few sentences to a multi-chapter manual detailing every aspect of the mechanism's parts and functions in order to troubleshoot technical problems and complete repairs. For a fun example of the latter, see the *Star Trek: The Next Generation: Technical Manual* (cover depicted in **Figure 9.5.1**), which provides detailed descriptions of all equipment and technology used aboard the fictional U.S.S. Enterprise-D.

Before you begin to draft your description, you must consider your **purpose** and **audience**: Why does your audience need this description? What will they use it for? For example, are you describing different types of solar panels for the average consumer to help them choose the one that best fits their needs? Are you giving schematics to technicians and installers?

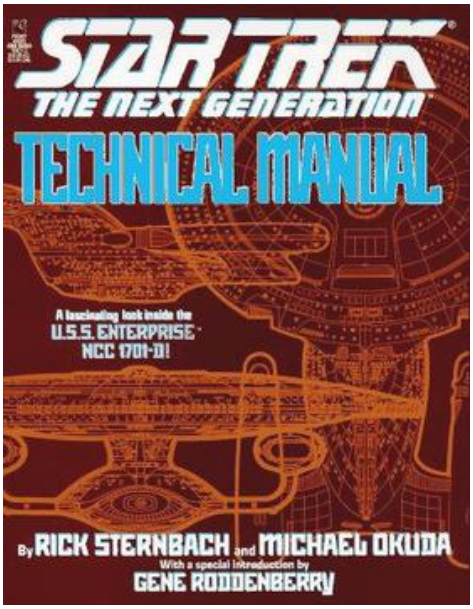


Figure 9.5.1 *Cover Page of "Star Trek: The Next Generation: Technical Manual" (Sturnback & Okuna, 1991).*

Once you have your purpose and audience clearly in focus, draft a description that includes the following elements:

1. ***Definition***: What is it, and what is its main purpose?
2. ***Overview***: Describe the mechanism's overall appearance ("big picture").
3. ***Components***: Describe the main component parts in labeled sections; consider the order of information carefully here. Create a logical connection between each component described.
4. ***Explanation:*** How do the parts work together to fulfill their function? What key principles govern its functioning? Consider how much detail is necessary here for your intended audience.
5. ***Visuals:*** Include graphics that clearly illustrate the mechanism and/or its parts. Show the device as a whole; consider showing specific details in expanded views, cut-aways, or labeled diagrams. You may even embed or link to videos showing the device in action.
6. ***Conclusion***: Depending on the purpose, you might review the product's availability, manufacturing, costs, warnings, etc.)
7. ***References***: Include sources you have used in your description, or additional sources of information available (if relevant), including specifications, codes, regulations, and manufacturer's datasheets.

You might consider using a template, like the Technical Description Template below, keeping in mind that while templates can be helpful guides, they do not provide much flexibility and may not work for all situations.

Technical Description Template

Audience and Purpose	Who will read this description and why?
Definition and Function	What is it? What does it do? What is its purpose?
Overview	Describe its overall appearance (shape, size, color, texture, etc.)
Components and Explanations	Describe the component parts (chose most relevant features) and explain how they work together. Use descriptive detail related to physical features, like size, weight, colour, texture, materials, composition, etc.
Visuals	What kind of illustrative graphics will you use? Where? • Diagrams • Photographs • Cut-away views • Exploded views
Conclusion	Do you need to offer any further information? History? Warnings? Context? Costs? etc.
References	Any sources used, or supplemental sources to suggest.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=218#h5p-75

Notations

Physical characteristics, such as temperature, dimensions, weight, and distance are customarily noted with numerical information that must be written with consistency and accuracy. Learning about technical notations will help you answer questions like: "When do I spell out a number and when do I use a numeral?" "Do I place a space between a number and the value?" "Do I add an 's' for multiples of any value; for example, do I add an 's' to 'cm' for centimeters over one?" For a primer on technical notations, see the IEEE article: Using Numbers in Technical Documents (Elliott, 2016). Also check out the APA Style section: Numbers (2019).

Sample Descriptions

Examine the description of the “Up Goer Five” in **Figure 9.5.2** (click on image for larger version). Who might the intended audience be?

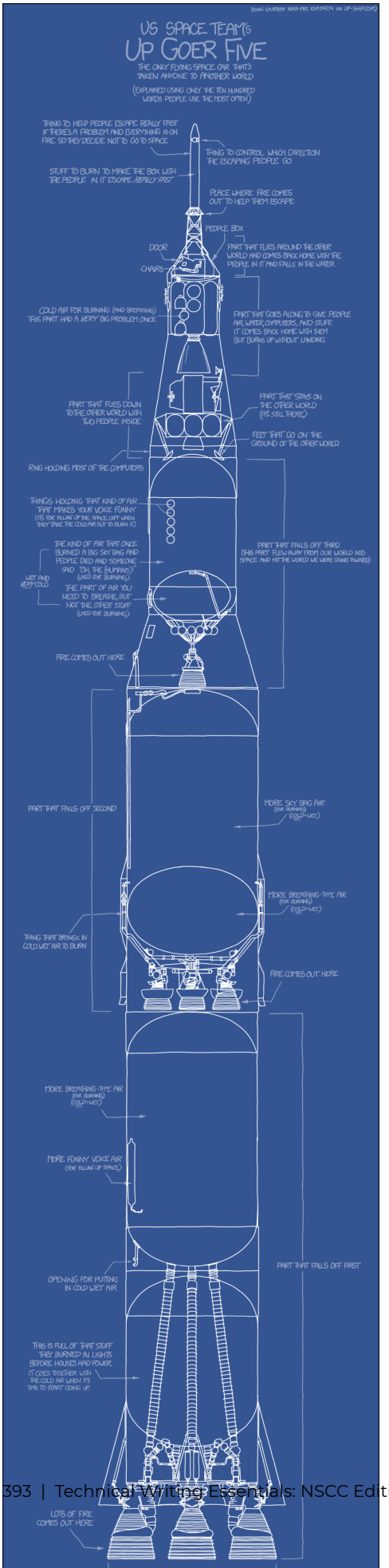

(IMAGES COURTESY NASA-PMC ID#1049574 VIA UP-SHIP.COM)
US SPACE TEAM'S
UP GOER FIVE
THE ONLY FLYING SPACE CAR THAT'S TAKEN ANYONE TO ANOTHER WORLD
(EXPLAINED USING ONLY THE TEN HUNDRED WORDS PEOPLE USE THE MOST OFTEN)
THING TO HELP PEOPLE ESCAPE REALLY FAST IF THERE'S A PROBLEM AND EVERYTHING IS ON FIRE. SO THEY DECIDE NOT TO GO TO SPACE
THING TO CONTROL WHICH DIRECTION THE ESCAPING PEOPLE GO
STUFF TO BURN TO MAKE THE BOX WITH THE PEOPLE IN IT ESCAPE REALLY FAST
PLACE WHERE FIRE COMES OUT TO HELP THEM ESCAPE
PEOPLE BOX
DOOR
CHAIRS
PART THAT FLIES AROUND THE OTHER WORLD AND COMES BACK HOME WITH THE PEOPLE IN IT AND FALLS IN THE WATER.
COLD AIR FOR BURNING (AND BREATHING) THIS PART HAD A VERY BIG PROBLEM ONCE
PART THAT GOES ALONG TO GIVE PEOPLE AIR, WATER, COMPUTERS, AND STUFF. IT COMES BACK HOME WITH THEM BUT BURNS UP WITHOUT LANDING.
PART THAT FLIES DOWN TO THE OTHER WORLD WITH TWO PEOPLE INSIDE
PART THAT STAYS ON THE OTHER WORLD (IT'S STILL THERE)
FEET THAT GO ON THE GROUND OF THE OTHER WORLD
RING HOLDING MOST OF THE COMPUTERS
THINGS HOLDING THAT KIND OF AIR THAT MAKES YOUR VOICE FUNNY (IT'S FOR FILLING UP THE SPACE JUST WHEN THEY TAKE THE COLD AIR OUT TO BURN IT)
THE KIND OF AIR THAT ONCE BURNED A BIG SKY BIRD AND PEOPLE DIED AND SOMEONE SAID "OH, THE HUMANS!" (USED FOR BURNING)
WET AND VERY COLD
THE PART OF AIR YOU NEED TO BREATHE, BUT NOT THE OTHER STUFF (USED FOR BURNING)
PART THAT FALLS OFF THIRD (THIS PART FLEW AWAY FROM OUR WORLD INTO SPACE AND HIT THE WORLD WE WERE GOING TOWARD)
FIRE COMES OUT HERE
PART THAT FALLS OFF SECOND
MORE SKY BIRD AIR (FOR BURNING) (COLD+WET)
MORE BREATHING-TYPE AIR (FOR BURNING) (COLD+WET)
THING THAT BRINGS IN COLD WET AIR TO BURN
FIRE COMES OUT HERE
MORE BREATHING-TYPE AIR (FOR BURNING) (COLD+WET)
MORE FUNNY VOICE AIR (FOR FILLING UP SPACE)
PART THAT FALLS OFF FIRST
OPENING FOR PUTTING IN COLD WET AIR
THIS IS FULL OF THAT STUFF THEY BURNED IN LIGHTS BEFORE HOUSES HAD POWER. IT GOES TOGETHER WITH THE COLD AIR WHEN ITS TIME TO START GOING UP
LOTS OF FIRE COMES OUT HERE

Figure 9.5.2 *A description of the blueprints for NASA's Saturn Five rocket using only the 1000 most commonly-used English words* (Munroe, n.d.).

Compare the description in **Figure 9.5.2** to the information given on the NASA website about the Mars Curiosity Rover.

Note the differences in the level of detail, vocabulary, and overall purpose of the descriptions. If you used the information on the NASA site to fill in the **Technical Description Template**, you might end up with something like the following chart. Objectives

Template for Description of Mars Curiosity Rover

Definition	Curiosity Rover – a NASA robot designed to explore Mars
Function	Travels around the Gale Crater on Mars, collecting data to send back to Earth. Its mission is to see if Mars could ever have supported life and if humans could survive there someday
Overview	Car-sized, 6-wheel robot, about 7' tall, with a roughly square chassis that has several appendages connected to it that house sensors of various types
Components	• Main body protects the computer, electronics and instrument systems • "Neck and head" section is like a mast coming out of the centre of the chassis; this houses many of the rover's cameras • Six legs – "rocker bogie" design – wide apart– allows all wheels to remain on uneven terrain • Arm – roughly 7' long, (with "shoulder, elbow and wrist" joints), with a "hand" at the end, extends out of the front of the chassis. This contains many tools for drilling, collecting samples, etc. • "Tail" – contains radio-isotopic power source that powers the rover
Visuals	• Overall view (front and sides; top view, bottom view) • View of arm with labelled components • View of head and neck with labeled components
Conclusion/Supplemental	Information about lifespan? Travel speed? Energy use?
References	NASA website – Mars Curiosity Rover page

You may find that some of these elements are not necessary; again, consider what your target audience already knows. Strike a balance between unnecessarily stating the obvious and incorrectly assuming your readers have knowledge that they lack.

In refining the details of your description and its component parts, consider the following:

- **Organization**: Use a logical principle to organize your description

- Top to bottom (or foundation upward)
- Left to right (or right to left)
- Inside to outside (or outside to inside)
- Most important to least important features
- Central component to peripherals
- Material properties, etc.

Figure 9.5.3 *Organizing principles used to write technical descriptions (adapted from Isrealov, 2020)*

- **Language:** Use specific, precise, concrete terms – avoid vague or overly general terms
  - Use correct terminology and notations – define terms as necessary for your audience
  - Use analogy to describe an unfamiliar thing in terms of a familiar thing
  - Use objective language – no "ad speak" or subjective terms
  - Use present tense, active verbs to describe how the device appears and what it does
  - Use words that create vivid and specific pictures in the reader's mind.

EXERCISE 9.5.1 Practice technical description

Choose a common, everyday object (such as one of the objects in **Figure 9.5.4**) and draft a technical description for an audience unfamiliar with the object. Start by imagining a target audience and purpose, and then try filling in the Technical Description Template with detailed information. Using the information in your template, draft a short description of 1-2 paragraphs, and add properly-captioned visuals.

Figure 9.5.4 *Common objects for practice description. Sources:* Corkscrew and bicycle images: https://www.flickr.com/photos/dogbomb/527733767 and https://www.flickr.com/photos/8205548@N08/4607907389. CC BY 2.0.

How to Develop Your Descriptions (McMurrey, 1997-2022)

The ability to explain complex, technical matters with ease, grace, and simplicity so that nonspecialist readers understand almost effortlessly is one of the most important skills you can develop as a technical writer. This ability to "translate" difficult-to-read technical discussions is important because so much of technical writing is aimed at nonspecialist audiences. These audiences include important people such as supervisors, executives, investors, financial officers, government officials, and, of course, customers.

Here are some strategies for "translating" technical discussions, that is, specific strategies you can use to make difficult technical discussions easier for nonspecialist readers to understand.

You use your understanding of your audience to decide

- What information to include in the document
- What information to exclude from the document
- How to discuss the information you do include in the document

Translating is particularly important because it means supplying the right kinds of information to make up for the reader's lack of knowledge or capability. Translating thus enables readers to understand and use your document. Some combination of the techniques discussed in this chapter should help you create a readable, understandable translation:

Defining unfamiliar terms	The "in-other-words" technique
Comparing to familiar things	Posing rhetorical questions
Elaborating the process	Explaining the importance or significance
Providing description	Providing illustration
Reviewing theoretical background	Providing historical background
Providing examples and applications	Providing the human perspective
Shorter sentences and paragraphs	Stronger transitions

This list by no means exhausts the possibilities. Other techniques include:

- *Headings.* See the section on using headings that break up text and emphasize points and on how to construct headings that guide readers from section to section.
- *Lists.* See the section on constructing lists that break up text and emphasize points and on how

to construct headings that guide readers from section to section.

Definitions of unfamiliar terms

Defining potentially unfamiliar terms in a report is one of the most important ways to make up for readers' lack of knowledge in the report subject.

Facial Characteristics of FAS Victims

Taken as a whole, the face of patients with fetal alcohol syndrome (FAS), is very distinctive. Structural deficiencies are thought to be the result of reduced cellular proliferation in the developing stages of the embryo because of the direct action of the alcohol. The face has a drawn-out appearance with characteristics that include short palpebral fissures, epicanthic folds, low nasal bridge, a short upturned nose, indistinct philtrum, small midface, and a thinned upper vermilion.

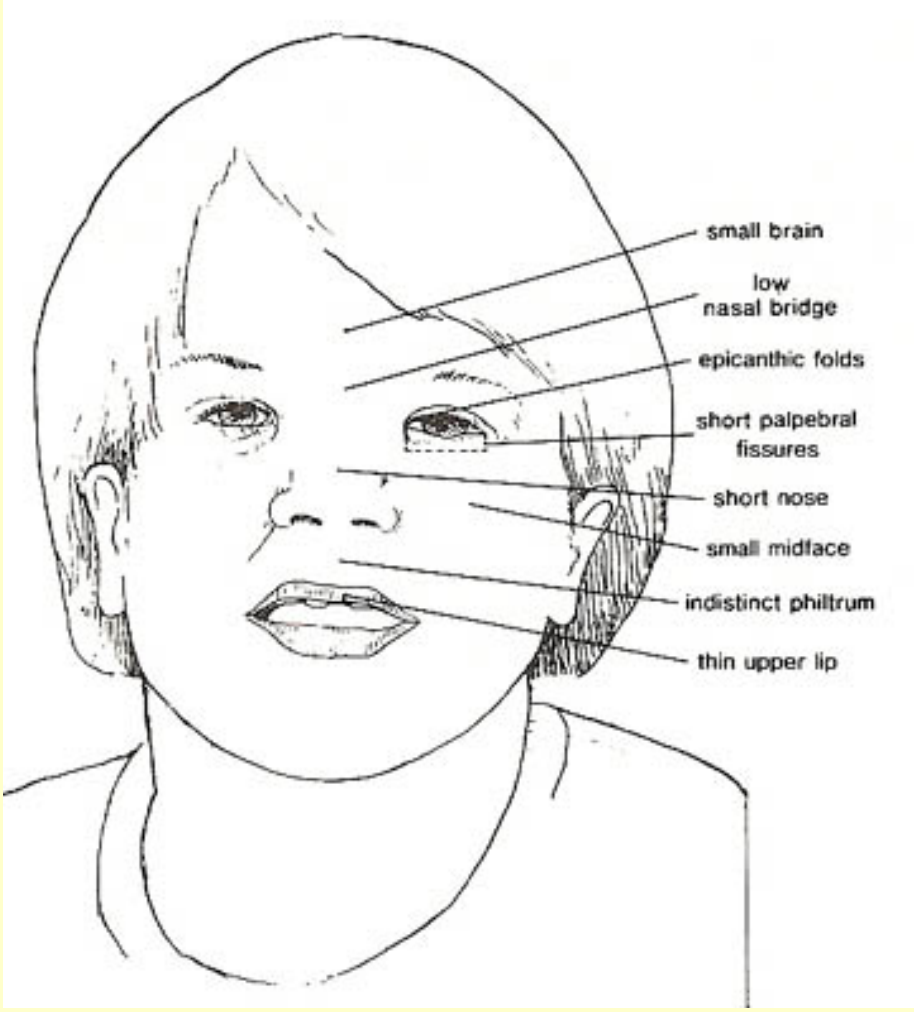


Figure 2. Facial features characteristic of FAS

Palpebral features are the longitudinal openings between the eyelids. In FAS victims, they tend to be short possibly because the eye size is so small. Most deficiency of the eye is reflected in these shortened palpebral fissures. Epicanthic folds are the vertical folds of skin on either side of the nose, sometimes covering the inner corner of the eye. They are present as a normal characteristic in persons of certain races and also occur as a congenital malformation in patients with FAS. The philtrum is the vertical groove in the middle of the upper lip and below the nose region. It tends to be smooth in patients with fetal alcohol syndrome, and as a consequence the upper lip may lack its usual indentation bow. The upper, red portion of the upper lip is the vermilion; it is often very thin in patients with FAS. The thinned vermilion is a major feature in contributing to the overall drawn-out appearance of the face....

Comparisons to familiar things

Comparing technical concepts to ordinary and familiar things in our daily lives makes them easier to understand. For example, things in the world of electronics and computer—a downright intimidating area for many people—can be compared to channels of water, the five senses of the human body, gates and pathways, or other common things. Notice how comparison (highlighted) is used in these passages:

> The helical configuration of the DNA strands is not haphazard. The nitrogen bases on each strand align themselves to form nitrogen base pairs. The pairs are T-A and C-G. Each pair is held together by hydrogen bonds. The pairing of the bases serves to fasten the two helical nucleotide strands together in much the same way as the teeth of a zipper hold the zipper together. The existence of the complementary base pairs explain the constant ratios of T/A and C/G. For every T there must be a complementary A and for every G there must be a complementary C.
> David S. Newman, *An Invitation to Chemistry* (New York: Norton, 1978), pp. 380-381.

> All the death and all the misery from a virus so small that 2-1/2 million of them in a line would take up one inch. Flu viruses fall into three types: A, B, and C. Type A, the most variable, causes pandemics as well as regular seasonal outbreaks; type B causes smaller outbreaks and is just now receiving greater attention; type C rarely causes serious health problems.
>
> In appearance, a flu virus somewhat resembles the medieval mace—a ball of iron studded with spikes; moreover, individual part of the flu virus are compared to indivdual parts of the mace. These spikes are two surface proteins called hemagglutinin (HA) and neuraminidase (NA). Inside the virus is a thick tangle of genes. In many other viruses, a number of different genes fit onto one strand of nucleic acid; but each flu gene is a separate segment of ribonucleic acid (RNA)—eight threads in all.
>
> The mace metaphor provides a crude but vivid picture of the influenza virus at work. Hemagglutinin is the substance that in effect bashes into a cell during infection and allows the virus access to the cell interior where it can replicate. Neuramindase permits all the viral offspring to break free of the host cell once replication is complete.Stephen S. Hall, "The Flu," *Science 83*, (November 1983), pages 56-57.

Elaborating the process

Explaining in detail the processes involved in the report subject can also help readers. Consider a paragraph like this one, containing only a sketchy reference to the process:

> The Video Alert and Control dashboard system, a newly developed system to help drivers avoid accidents, graphically projects an image of hazards in the road.

This brief reference can be converted into a more complete explanation as is illustrated here:

The Video Alert and Control dashboard systems uses a number of components to help drivers avoid accidents. The infrared detector is the key detecting device in that it searches for warm objects in or near the path ahead of the car. The infrared detector senses the upcoming trouble well before the driver by sensing warm-bloodedness and then alerts the driver. The infrared detector also senses the heat of oncoming traffic.

All of these objects are shown graphically on the video screen. To differentiate wildlife from other cars, the x-ray unit is used to check for metal in the object ahead. Thus, if a warm object is detected with metal in it, the computer reads it as a car and shows it on the screen as a yellow dot. On othe other hand, if no metal is detected in the warm object, it is read as an animal and plotted as a red dot....

Providing descriptive detail

Descriptions also help nonspecialist readers by making the report discussion more concrete and down-to-earth:

Jarvik and his colleagues have been working on other designs, such as a portable artificial heart, which they think will be ready for a patient within the next two years.

Electrohydraulic Heart

Jarvik has been developing electric-energy converters and blood pumps during the past year. The electrohydraulic energy converter has only one moving part. The impeller of an axial-flow pump is attached to the rotor of a brushless direct-current motor, with the impeller and the rotor supported by a single hydrodynamic bearing. Reversing the rotation of the pump reverses the direction of the hydraulic flow. The hydraulic fluid (silicone oil of low viscosity) actuates the diaphragm of a blood pump just as compressed air does in the Jarvik-7 heart design. This hydraulic fluid is pumped back and forth between the right and left ventricles.

The energy converter is small and simple and therefore can be implanted without damaging vital structures. It weighs nearly 85 grams and occupies nearly 30 cubic centimeters. The converter requires an external battery and an electronics package, which is connected to the heart by a small cable through the patient's chest. The batteries weigh 2 to 5 pounds and can be worn on a vest or belt. The battery unit requires new or recharged batteries once or twice a day. The cable through which the power is transmitted from the battery to the heart also carries control signals from the microcomputer controller.

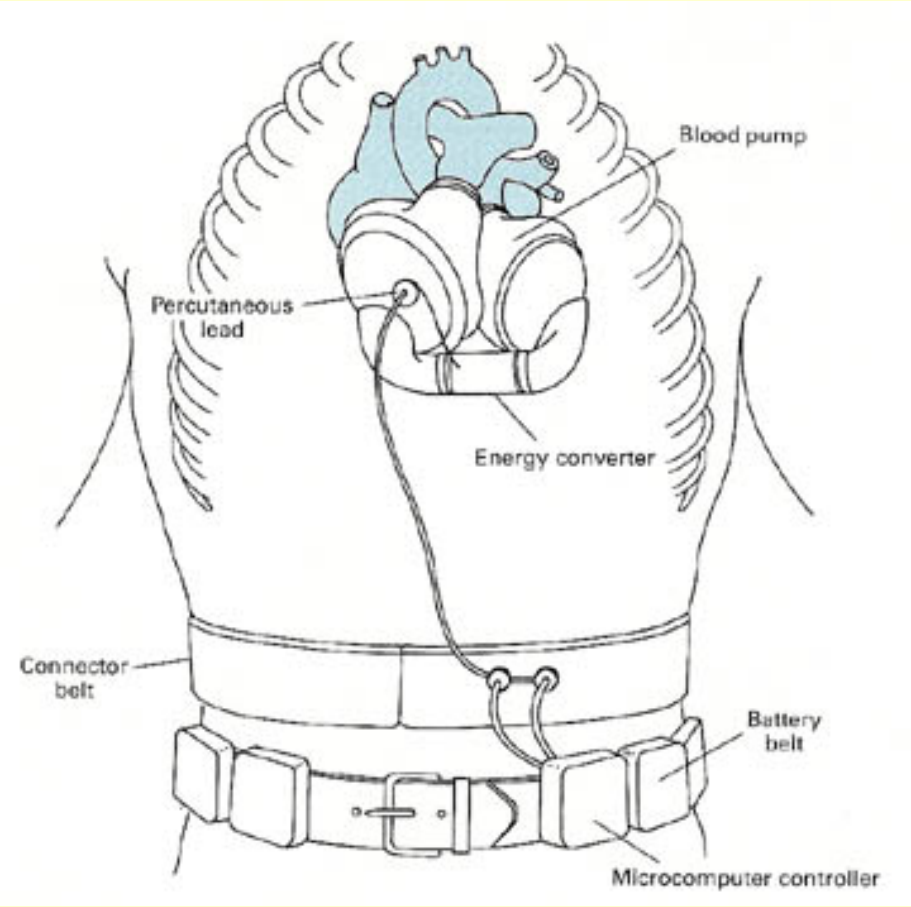


Figure 12. Electrically driven artificial heart system. Source: Jarvik, Robert K. "The Total Artificial Heart," *Scientific American*, January 1981, p. 80.Jacqueline R. Mudd, *Report on Artificial Methods of Combating Heart Disease*, University of Texas at Austin, May 6, 1983.

Providing illustrations

Illustrations—typically, simple diagrams—can help readers understand technical descriptions and explanations of processes. You can see the use of illustration in the FAS example above: epicanthic folds and the philtrum are labels in the diagram.

Providing examples and applications

Equally useful in translating complex or abstract technical discussions are examples or explanations of how a thing can be used. For example, if you are trying to explain a LINUX command, showing how it is used in an example program helps readers greatly. If you are explaining a new design for a solar heating and cooling system, showing its application in a specific home can help also.

Continuous Speech

Continuous speech causes many problems in computerized speech recognition. In fluent speech, many words overlap. For example, when the "t" in "cat" combines the "y" in "your," the phrase, "You gave the cat your dinner," sounds like, "You gave the catcher dinner" [8:69].

Some words have built-in pauses that are often longer than word boundaries. For example, the word "vector" has a natural pause between the "c" and the "t." In an actual experiment, a machine listened to the phrase, "recognize speech," and printed, "wreck a nice beech" [5:57].

As vocabularies increase, words are more likely to become confused. Some words are subparts of others, such as "plea" and "please," while some words have similar acoustics, such as "what" and "watt" [23:151].Heidi E. Cootes, *Report on Computers that Recognize Speech*, University of Texas at Austin, May 6, 1983.

Now here is a passage with a longer, extended example:

...The user "scrolls" the worksheet right and left or up and down to bring different parts of it into view. Each position (that is, each intersection of a column and a row) on a screen corresponds to a record in memory. The user sets up his own matrix by assigning to each record either a label, an item of data or a formula; the corresponding position on the screen displays the assigned the label, the entered datum or the result of applying the formula.

Consider a simple example. A company comptroller might enter the label Cash in the record corresponding to Column B, Row 1 (position B1), Reserves at C1 and Total at D1. He might then enter $300,000 at B2, $500,000 at C2 and the formula +B2+C2 at position D2. The screen will show $800,000 at D2. If the comptroller changes the B2 entry to $200,000, the program will reduce the total displayed at D2 to $700,000. Moreover, what is entered in records B2 and C2 need not be primary data; it can be a function of data held in other recordsHoo-Mi D. Toong and Amar Gupta, "Personal Computers," *Scientific American*, (December 1982), pp. 99-100.

Shorter sentences and paragraphs

As simple a technique as it may seem, reducing the length of sentences can make a technical discussion easier to understand. Consider the following pairs of example passages, the second versions of which contain shorter sentences. (The passage still needs other translating techniques, particularly definitions, but the shorter sentences do make it more readable.) Notice too that shorter paragraphs can help in the translation process, not only in the example below but throughout this chapter.

Original version: longer sentences

> UV-flourescence was determined on aliquots of the hexane extracts of subsurface water using the Perkin-Elmer MPF-44A dual-scanning flourescence spectrophotometer upon mousse sample NOAA-16, considered the best representative of cargo oil. Every day that samples were processed, a new calibration curve was developed from serial dilutions of the reference mousse (NOAA-16) at an emission wavelength of ca. 360 nm, and other samples were compared to it as the standard. Emission was scanned from 275-500 nm, offset 25 nm from the excitation wavelength, with the major peak occurring at 360 nm for the reference mousse solutions. In each sample, the concentration of flourescent material, a total oil estimate, was calculated from its respective flourescence, using the linear relationship of flourescence vs. concentration of the reference mousse "standard," with a correction factor applied to account for the reference mousse containing only about 30 percent.

Revised version: shorter sentences

> UV-flourescence was determined on aliquots of the hexane extracts of the subsurface water. These measurements were performed using a Perkin-Elmer MPF-44A dual-scanning flourescence spectrophotometer. Mousse sample NOAA-16 was used as the best representative of cargo sample. Other samples were compared to it as the standard.
>
> Every day that samples were processed, a new calibration curve was developed from serial dilutions of the reference mousse (NOAA-16). Tests were run at an emission wavelength of ca. 360 nm. Emission was scanned from 275-500 nm, offset 25 nm from the excitation wavelength. The major peak occurred at 360 nm for the reference mousse solutions.
>
> In each sample, the concentration of flourescent material, a total estimate, was calculated from its respective flourescence. The linear relationship of flourescence vs. concentration of the reference mousse "standard." A correction factor was applied to account for the reference mousse containing only about 30 percent oil.

Stronger transitions and overviews

Transitions and overviews guide readers through text. In difficult technical material, transitions and overviews are important. (For in-depth discussion, see transitions.)

- *Repetition of key words.* As unlikely as it may seem, using the same words for the same ideas is

a critical technique for comprehension in technical discussions. In other words, don't refer to the hard drive as a "fixed-disk drive" one place and as "DASD" (an old IBM term meaning direct access stationary drive) in another. Same goes for verbs: stick with either "boot up" or "system reset," and don't vary.

- *Arrangement of key words.* Equally important is how you introduce keywords in sentences. If your focus stays on the topic in each sentence of a paragrah, place the keyword at or near the beginning of the second and following sentences. However, if the topic focus shifts from one sentence to the next, use the old-to-new pattern: start the following sentence with the old topic and end the sentence with the new topic. For more detail, see the discussion of topic strings.
- *Transition words and phrases.* Examples of transition words and phrases are "for example," "however," and so on. When the discussion is particularly difficult and when repetition and arrangement of keywords is not enough, use transition words and phrases. See transitions.
- *Reviews of topics covered and topics to be covered.* At certain critical moments within and between paragraph (or groups of paragraphs) occurs a transitional device that either captures what has been discussed in a short phrase, previews what is to be discussed in the following paragraphs, or both. The latter device is also called a topic sentence.

The "in-other-words" technique

Another way of translating technically difficult content is to give the reader two "looks" at the same idea by restating the difficult-to-understand version in simpler terms. The second, simpler explanation is often preceded by a phrase such as "in other words" (IOW). Here are two examples of this IOW technique:

With no electric field present, semiconductor electrons are quite happy to remain bonded in their valence bands. Only when an electric field is applied or the temperature is raised (heat can also increase electron energy) do the valence electrons begin to break their bonds, jump the energy band gap and become conduction electrons.

When a bond is broken, a vacancy or hole is left. The region in which this vacancy exists has a net positive charge. The area where the freed electron exists has a net negative charge. In a semiconductor, both electrons and holes contribute to electrical conduction. If a valence electron from another bond fills the hole without ever gaining sufficient energy to become free, the vacancy appears in a new place. It is as if a positive charge (equal to that on a electron) has moved to a new location. In other words, conduction in semiconductors is the result of two separate and independent particles carrying opposite charges and moving opposite directions under the influence of an applied electric field.David Oakley, *Introduction to Semiconductor Theory*, University of Texas at Austin, December 12, 1983.

Fatigue

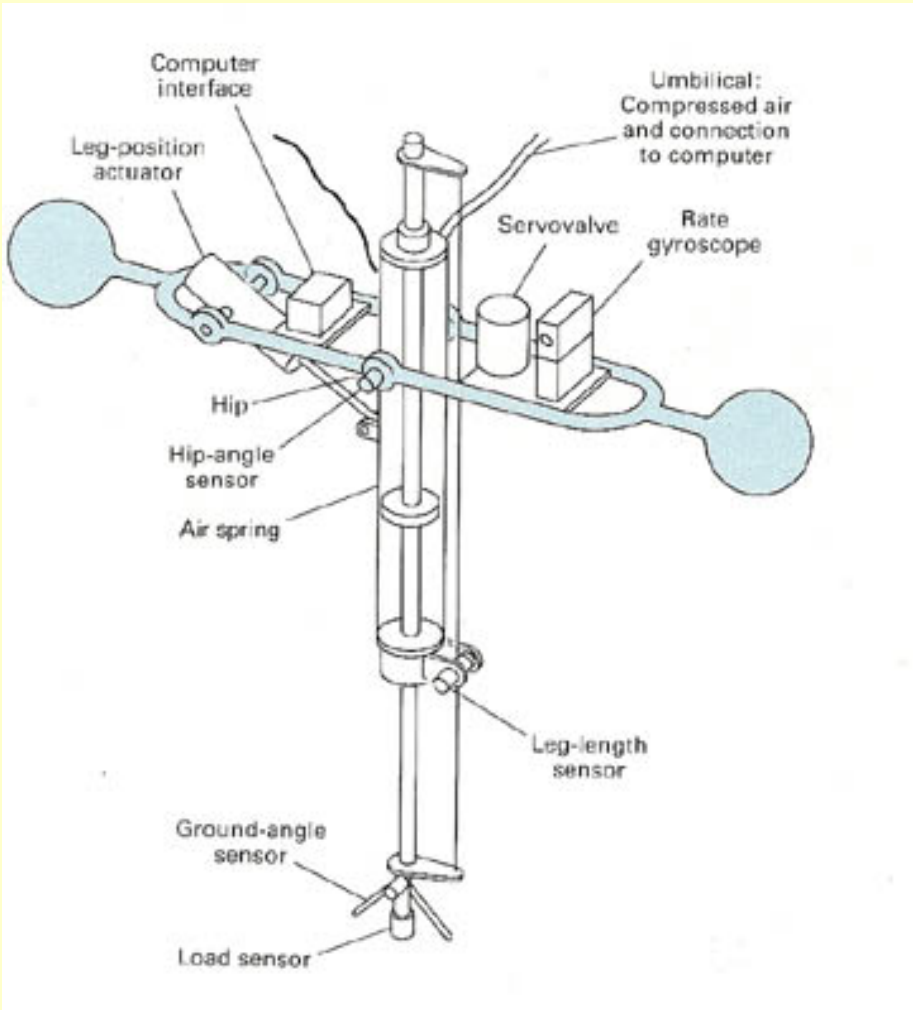
Fatigue is a phenomenon that has plagued engineers for years. It is especially bothersome when metals are involved. Simply stated, fatigue is the slow growth of a crack that ultimately leads to failure after a number of load reversals. A paperclip breaking after repeated bending is an example of fatigue. The process by which fatigue leads to failure can be divided into three stages: initiation, propagation, and failure. The nature of the second stage, propagation, is what enables composites to be immune to failure.

Posing rhetorical questions

In technical writing, you occasionally see questions posed to the readers. Such questions are not there for readers to answer; they are meant to stimulate readers' curiosity, renew their interest, introduce a new section of the discussion, or allow for a pause:

When an animal runs, its legs swing back and forth through large angles to provide balance and forward drive. We have found that such swinging motions of the leg do not have to be explicitly programmed for a machine but are a natural outcome of the interactions between the controllers for balance and attitude. Suppose the vehicle is traveling at a constant horizontal rate and is landing with its body upright. What must the attitude controller do during the stance to maintain the upright attitude? It must make sure that no torques are generated at the hip. Since the foot is fixed on the ground during stance, the leg must sweep back through an angle in order to guarantee that the torque on the hip will be zero while the body moves forward.

On the other hand, what must the balance servo do during flight to maintain balance? Since the foot must spend about as much time in front of the vehicle's center of gravity as behind it, the rate of travel and the duration of stance dictate a forward foot position for landing that will place the foot in a suitable spot for the next stance period. Thus during each flight the leg must swing forward under the direction of the balance servo, and during each stance it must sweep backward under the control of the attitude servo; the forward and back sweeping motions required for running are obtained automatically from the interplay of the servo-control loops for balance and attitude.



Two-Dimensional Hopping Machine

Marc H. Raibert and Ivan E. Sutherland, "Machines that Walk," *Scientific American*, (January 1983), p. 50.

Explaining the importance

Some translating techniques work because they motivate readers. Sometimes readers need to be talked into concentrating on difficult technical discussion: one way is to explain to them or to remind them of the importance of what is being discussed. In this example, the last paragraph emphasizes the importance):

It was Linus Pauling and his coworkers who discovered that sickle cell anemia was a molecular disease. This disease affects a very high percentage of black Africans, as high as 40 percent in some regions. About 9 percent of black Americans are heterozygous for the gene that causes the disease. People who are heterozygous for sickle cell anemia contain one normal gene and one sickle cell gene. Since neither gene in this case is dominant, half the hemoglobin molecules will be normal and half sickled. The characteristic feature of this disease is a sickling of the normally round, or platelike, red blood cells under conditions of slight oxygen deprivation. The sickled red blood cells clog small blood vessels and capillaries. The body's response is to send out white blood cells to destroy the sickled red blood cells, thus causing a shortage of red blood cells, or anemia.

The sickle cell gene originated from a mistake in information. A DNA molecule somehow misplaced a base, which in turn caused an RNA molecule to direct the cell to make hemoglobin with just one different amino acid unit among the nearly 600 normally constituting a hemoglobin molecule. So finely tuned is the human organism that this tiny difference is enough to cause death.

Since the disease is nearly always fatal before puberty, how can a gene for a fatal childhood disease get so widespread in a population? The answer to this question gives some fascinating insight into the mechanism and purposes of evolution, or natural selection. The distribution of sickle cell anemia very closely parallels the distribution of a particularly deadly malaria-causing protozoan by the name of *Plasmodium falciparum*, and it turns out that there is a close connection between sickle cell anemia and malaria. Those people who are heterozygous for the sickle cell gene are relatively immune to malaria and, except under reasonably severe oxygen deprivation such as that found at high altitudes, they experience no noticeable effects due to the sickle cell gene they carry. Half the hemoglobin molecules in the red cells of heterozygous people are normal and half are sickled. Thus, under ordinary circumstances the normal hemoglobin carries on the usual respiratory functions of blood cells and there is little discomfort. On the other hand, the sickled hemoglobin molecules precipitate, in effect, when the malaria-causing protozoan enters the blood. The precipitated hemoglobin seems to crush the malaria protozoan, thus keeping the malaria from being fatal.

The significance of all this should be pondered. Nature is willing to sacrifice approximately half the children in the malaria-infested regions of Africa so that the species can survive. The reason half the children die is that, on the average, approximately one-quarter of the children will be homozygous for abnormal hemoglobin and will die of sickle cell anemia, while one-quarter will be homozygous for normal hemoglobin and will likely die of malaria. The half of the population that is heterozygous will survive to reproduce. This means that the species, not the individual, is the ultimate unit of Darwinian evolution.David S. Newman, *An Invitation to Chemistry*, pages 387-388.

Providing historical background

Discussion of the historical background of a technical subject helps readers because it gives them less technical, more general, and sometimes more familiar information. It gives them a base of understanding from which to launch into the more difficult sections of the discussion:

Now that alcohol is being used in more and more social settings, it extremely important to recognize its teratogenic effects. Teratogenic, or malforming, agents produce an abnormal presence or absence of a substance that is required in physical development. Although Sullivan first reported on the effects of maternal drinking during pregnancy in 1899, the serious implications of his findings were virtually ignored for the next 50 years. It was not until the dramatic identification of a pattern of malformations, termed the fetal alcohol syndrome (FAS) by Jones et al in 1973, that the scientific community acknowledged the potential dangers of heavy maternal alcohol use. Since then, there has been increasing recognition that alcohol may be the most common drug in causing problems of malformations in humans.

Each morning in the soft, coral flush of daybreak, a laser dawns on Mars. Forty miles above frigid deserts of red stone and dust, it flares in an atmosphere of carbon dioxide. Infrared sunlight kindles in this gas a self-intensifying radiance that continuously generates as much energy as a thousand nuclear reactors. Our eyes are blind to it, but from sunrise to sunset Mars bathes in dazzling lasershine.

The red planet may have lased in the sun for eons before astronomers identified its sky-high natural laser in 1980. The wonder is that its existence was unknown for so long. In 1898, in *The War of the Worlds*, H.G. Wells scourged earth with Martian invaders and a laserlike death ray. Pitiless, this "ghost of a beam of light" blasted brick, fired trees, and pierced iron as if it were paper.

In 1917 Albert Einstein speculated that under certain conditions atoms or molecules could absorb light or other radiation and then be stimulated to shed their borrowed energy. In the 1950s Soviet and American physicists independently theorized how this borrowed energy could be multiplied and repaid with prodigious interest. In 1960 Theodore H. Maiman invested the glare of a flash lamp in a rod of synthetic ruby; from that first laser on earth he extorted a burst of crimson light so brilliant it outshone the sun.Allen A. Boraiko, "The Laser: 'A Splendid Light,'" *National Geographic*, (March 1984), p.335.

Reviewing theoretical background

To understand some phenomena, technologies, or their applications, readers must first understand the principle or theory behind them. Theoretical discussions need not be over the heads of nonspecialist readers. Discussion of theory is often little more than explanation of the root causes and effects at work in a phenomenon or mechanism. In this example, the writer establishes the theory and then can go on to discuss the findings that have come about through the use of NMR on living tissue.

To the extent that objections persist about the validity of modern biochemistry, they continue to be about reducing the processes of life to sequences of chemical reactions. "The reactions may take place in the test tube," one hears, "but do they really happen that way inside the living cell? And what happens in multicellular organisms?"

One technique is beginning to answer these questions by detecting chemical reactions as they occur inside cells, tissues and organisms including those of human beings. The technique is nuclear-magnetic-resonance (NMR) spectroscopy. It relies on the fact that atomic nuclei with an odd number of nucleons (protons and neutrons) have an intrinsic magnetism that makes each such nucleus a magnetic dipole: in essence a bar magnet. Such nuclei include the proton (H-1), which is the nucleus of 99.98 percent of all hydrogen atoms occurring in nature, the carbon-13 nucleus (C-13), which is the nucleus of 1.1 percent of all carbon atoms, and the phosphorus-31 nucleus (P-31), which is the nucleus of all phosphorus atoms.

Combining the translating techniques

This last section concludes the techniques for translating difficult technical prose to be presented here. However, take a look at writing in fields you know about, and look for other kinds of translating techniques used there. Now, here are several extended passages of technical writing that combine several of these strategies.

Fine-tuning the spectrum

To know lasers, one must first know the electromagnetic spectrum, which ranges from long radio waves to short, powerful gamma rays.

The narrow band of the spectrum we know as visible, or white, light is made up of red, orange, yellow, green, blue, and violet light. These frequencies, as well as all radiation waves, are jumbled or diffused, much as noise is a collection of overlapping, interfering sounds. Laser light is organized and concentrated, like a single, clear musical note.

In lasers, nature's disorder is given coherence, and photons—the basic units of all radiation—are sent out in regular ranks of one frequency. Because the waves coincide, the photons enhance one another, increasing their power to pass on energy and infomation.

The first devices to emit concentrated radiation operated in the low-energy microwave frequencies. Today, laser technology is extending beyond ultraviolet toward the high-energy realms of x-rays. Each wavelength boasts its own capacities as a tool for man.

A laser's beam can be modulated into an infinite number of wavelengths using flourescent dyes like those produced at Exciton Chemical Company in Ohio. At Hughes Research Laboratories in California, a blue-green laser reflected at an acute angle aneals silicon microchips, while a low-energy red laser monitors the process.

Harnessing light

As a bow stores energy and releases it to drive an arrow so lasers store energy in atoms and molecules, concentrate it, and release it in powerful waves.

When an atom expands the orbits of its electrons, they instantly snap back, shedding energy in the form of a photon. When a molecule vibrates or changes its geometry, it also snaps back to emit a photon.

In most lasers a medium of crystal, gas, or liquid is energized by high-intensity light, an electric discharge, or even nuclear radiation. When a photon reaches an atom, the energy exchange stimulates the emission of another photon in the same wavelength and direction, and so on, until a cascade of growing energy sweeps through the medium.

The photons travel the length of the laser and bounce off mirrors—one a full mirror, one partially silvered—at either end. Photons, reflected back and forth, finally gain so much energy that they exit the partially silvered end, emerging as powerful beam.

Out of the darkness: laser eye surgery

Sight-saving shafts of light able to enter the eye without injuring it, lasers are revolutionizing eye surgery.

Using techniques of New York opthalmologist Frances L'Esperance, eye surgeons employ four levels of laser energy. Exposure time ranges from 30 minutes for low-energy photoradiation to several billionths of a second for photodisruption.

With microscopic focus, beams weld breaks in the retina or seal leaking blood vessels by photocoagulation. A painless 20-minute operation call an irridectomy relieves this excess fluid buildup of glaucoma.

When an artificial lens is placed behind the iris, the supportive membrane often grows milky. A laser beam is pinpointed on the taut tissue in a series of minute explosions. This photodisruption causes the tissue to unzip and part like a curtain. Bloodless scalpels, lasers can make extremely delicate incisions, cauterize blood vessels, and leave tissue unaffected only a few cell widths away.

Beams that heal

Surgical trauma, the jarring aftermath of the surgeon's knife, may one day be consigned to the annals of primitive medicine—thanks to a procedure called "least invasive surgery" by its growing number of practitioners. Using an endoscope, surgeons can view the interior of the body and operate with the least amount of damage.

An end view of the flexible tube ... shows a large optical fiber to light the way. Smaller openings facilitate fluid suction and gas suction. A forceps, controlled by a cable near the microscope viewing lens, extracts tissue for analysis. A laser, controlled by dials to the left of the eyepiece, streams from another tube, ready to perform wherever the doctor directs it. Twisting and probing wit the end of the scope, he can identify and coagulate a bleeding ulcer in the stomach or blast tumors in the esophagus. The beam is fed through the scope by an optical fiber from a laser machine ... that might cost the hospital from $20,000 to $150,000.Allen A. Boraiko, "Lasers: A Splendid Light," *National Geographic*, (March 1984), pp. 338-346.

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10. REPORTING TECHNICAL INFORMATION

Sometimes, more complex information including some findings based on observations, inspections, and/or research must be conveyed in longer documents, called reports. Since reports are decision-making documents, it is critical that the information conveyed in such documents is supported by evidence and delivered with precision. Reports are often categorized as internal or external as well as informal or formal. You will format your report accordingly depending on the writing context and your audience. This section of the text will inform you of the different types of reports and the purposes each type serves within technical contexts.

Chapter 10 Learning Objectives

This unit will cover different report types. You will learn about their purposes, typical components and content, along with context when they are most useful.

10.1 Incident and Inspection Reports

10.2 Proposals

10.3 Feasibility and Recommendation Reports

10.4 Progress Reports

10.5 Lab Reports

10.1 Creating an Outline

The Outline

When you write, you need to organize your ideas in an order that makes sense. Order refers to your choice of what to present first, second, third, and so on in your writing. The order you pick closely relates to your purpose for writing that particular assignment. You may want to group your supporting ideas effectively to convince readers that your point of view on an issue is well reasoned and worthy of belief. In longer reports, you may organize different sections in different ways so that your purpose stands out clearly and all parts of the report work together to consistently develop your main point.

When you write, your goal is not only to complete an assignment but also to write for a specific purpose—perhaps to inform, to explain, to persuade, or a combination of these purposes. Your purpose for writing should always be in the back of your mind, because it will help you decide which pieces of information belong together and how you will order them. In other words, choose the order that will most effectively fit your purpose and support your main point.

Table 10.1.1 shows the connection between order and purpose.

Table 10.1.1 ***Order and purpose***

Order	Purpose
Chronological Order	• To explain the history of an event or a topic • To tell a story or relate an experience • To explain how to do or make something • To explain the steps in a process
Spatial Order	• To help readers visualize something as you want them to see it • To create a main impression using the senses (sight, touch, taste, smell, and sound)
Order of Importance	• To persuade or convince • To rank items by their importance, benefit, or significance

While there is no universal way for a report to be developed, conventions relating to the organization of the detail has evolved over time and is recognized in all business contexts, whether you are creating a direct or indirect document. See **Table 10.1.2** for an overview of three basic document structures.

Table 10.1.2 ***Basic Report Structures***

Direct Method	Direct Method 2	Indirect Method
Introduction with purpose statement Background Details Conclusion/ Recommendations References	Introduction with purpose statement and background Conclusion/Recommendations Details References	General introduction suggesting the subject or problem Background Details Purpose statement/main message Conclusion/Recommendations References

Before writing any report, it is important to map out your ideas in an outline. An outline is a written plan that serves as a skeleton for the paragraphs and document sections you write. Later, when you draft paragraphs in the next stage of the writing process, you will add support to create "flesh" and "muscle" for your report. The outline is an essential tool in discovering the overall progression of ideas and planning your research and visual aids.

When creating outlines, writers generally go through three stages: a **scratch outline**, an **informal** or **topic outline**, and a **formal topic** or **sentence outline:**

- **Scratch outline:** The scratch outline is generated by taking what you have come up with in your freewriting process and organizing the information into a structure that is easy for you to understand and follow
- **Informal outline:** An informal outline goes a step further and adds topic sentences, a purpose statement, and some preliminary information you have found through research.
- **Formal outline:** A formal outline is a detailed guide that shows how all your supporting ideas relate to each other. It helps you distinguish between ideas that are of equal importance and ones that are of lesser importance.

There are two types of formal outlines: the **topic outline** and the **sentence outline**. You format both types of formal outlines in the same way.

- Place your introduction and purpose statement at the beginning, under Roman numeral I.
- Use Roman numerals (II, III, IV, V, etc.) to identify main points that develop the purpose statement.
- Use capital letters (A, B, C, D, etc.) to divide your main points into parts.
- Use Arabic numerals (1, 2, 3, 4, 5, etc.) if you need to subdivide any As, Bs, or Cs into smaller parts.
- End with the final Roman numeral expressing your idea for your conclusion.

Here is what the skeleton of a traditional formal outline looks like. The indention helps clarify how the ideas are related.

1. **Introduction →** Purpose statement
2. **Main point 1** → *becomes the topic sentence of body paragraph 1*

    - Supporting detail →*becomes a support sentence of section 1*
        - Subpoint
        - Subpoint
    - Supporting detail
        - Subpoint
        - Subpoint
    - Supporting detail
        - Subpoint
        - Subpoint

3. **Main point 2** → *becomes the topic sentence of section 2 [same use of subpoints as with Main point 1]*
    - Supporting detail
    - Supporting detail
    - Supporting detail
4. **Main point 3** → *becomes the topic sentence of section 3 [same use of subpoints as with Main points 1&2]*
    - Supporting detail
    - Supporting detail
    - Supporting detail
5. **Conclusion**
6. **References**

Constructing Informal or Topic Outlines

An informal topic outline is the same as a sentence outline except you use words or phrases instead of complete sentences. Words and phrases keep the outline short and easier to comprehend. All the headings, however, must be written in parallel structure.

Step 1: Create a purpose statement for your report

To plan your business report, you will begin by writing a draft purpose statement. A purpose statement is a concise presentation of the key idea you will develop in your report. It is the focal point for the development of ideas in your report. Write the purpose statement at the top of your outline. You can revise this later as your research and writing evolves.

The rest of your outline will include the main topics and sub-points you will develop in each paragraph or section of the report.

Step 2: Identify the main ideas that relate to your purpose statement

Based on the reading and research you have already done, list the main topics that you plan to discuss in your report. Consider carefully the most logical order, and how each point supports your purpose statement. These topics will become main ideas that will be developed.

Step 3: Identify the supporting points and evidence for each topic

Each topic will be supported by supporting points and evidence that you have compiled from other sources. Each piece of information from another source must be cited, whether you have quoted directly, paraphrased, or summarized the information.

Step 4: Create your outline

Outlines are usually created using a structure that clearly indicates topics and supporting points. In the example below, main ideas are numbered, while the supporting ideas are indented one level and labelled with letters. Each level of supporting detail is indented further.

Here is the informal topic outline that Mariah constructed for the report she is developing and that has been partially adapted for this text. Her purpose is to inform, and her audience is a general audience of her fellow college students. Notice how Mariah begins with her purpose statement. She then arranges her main points and supporting details in outline form using short phrases in parallel grammatical structure.

1. Introduction
    - 1.1. Purpose statement: This report offers an overview of the available choices in digital technologies along with their specifications.
2. E-book readers
    - 2.1. Books easy to access and carry around
        - 2.1.1. Electronic downloads
        - 2.1.2 Storage in memory for hundreds of books
    - 2.2. An expanding market
        - 2.2.1 E-book readers from booksellers
        - 2.2.2 E-book readers from electronics and computer companies
    - 2.3. Limitations of current e-book readers
        - 2.3.1. Incompatible features from one brand to the next
        - 2.3.2. Borrowing and sharing e-books
3. Digital cameras taking over from film cameras
    - 3.1. Three types of digital cameras

3.1.1. Compact digital cameras

3.1.2. Single lens reflex cameras, or SLRs

3.1.3. Cameras that combine the best features of both

3.2. The confusing "megapixel wars"

3.3. The zoom lens battle

4. Flat screen televisions

4.1. 1080p vs. 768p

4.2. Plasma screens vs. LCDs

4.3. Home media centres

5. Conclusion

5.1. How to choose wisely

6. Reference

Writing at Work

Word processing programs generally have an automatic numbering feature that can be used to prepare outlines. This feature automatically sets indents and lets you use the tab key to arrange information just as you would in an outline. Although in business this style might be acceptable, in college or university your instructor might have different requirements. Teach yourself how to customize the levels of outline numbering in your word processing program to fit your writing context.

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10.2 Incident and Inspection Reports

Incident and inspection reports are used routinely in technical workplaces to respond to occurrences or report observations that may have an impact on decision-making. More specifically, incident reports are used to report on unusual occurrences or events, such as accidents, thefts, broken or malfunctioning equipment, and human resources issues. Inspection reports, on the other hand, are used to report on observations, such as site conditions, installations, and the like.

Accident and Incident Reports

What are accident and incident reports? An accident or incident report documents an injury, accident, work stoppage, equipment failure, worker illness, or personal problem.

You might write an accident/incident report for any of the following situations:

- someone was injured at work
- machinery or other equipment malfunctioned or broke
- work stopped for a significant period of time
- an employee complained of harassment, violence, or bullying
- an employee came to work intoxicated

Why are these reports important? Accident and incident reports can be used in insurance claims, workers' compensation awards, and even lawsuits. When writing such reports, it is important to document events accurately to avoid attributing blame or identifying causes incorrectly. The stakes are high when writing these reports, so it is important to follow the instructions provided in this unit carefully.

Figure 10.2.1 *Three reasons incident reports are important (SafetyCulture, 2019).*

What goes in an accident/incident report? Accident/incident reports document the *who, what, where, when,* and *how* of occurrences. They sometimes also identify *why* something may have occurred when it is possible. Key components of accident/incident reports are the corrective and preventive actions sections. The corrective actions section describes actions that have been taken to restore the situation; the preventive actions section would include suggestions to prevent the occurrence from happening again.

How do I format an accident/incident report? In many companies, accident/incident reports are completed using a prepared form. The form would ask much of the information listed in the below "Checklist for Accident/Incident Reports." If the company you work for does not have a form, you can either create a form and use it as a template for such reporting in the future, or you can document the incident in an incident report–usually formatted as a short memo report.

Checklist for Accident/Incident Reports – Include key details about the incident in your report. Such detail should include the following:

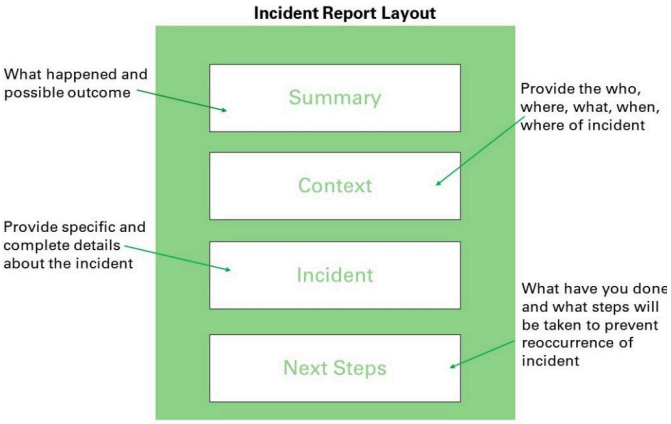

Figure 10.2.2 *Information layout with description for incident reports (Ewald, 2017).*

- Date of the event
- Location
- Full names of the people involved
- Names of witnesses
- Events leading up to the accident
- Environmental conditions if applicable (slippery floors, poor lighting, hazardous materials, etc.)
- Description of the task that was being performed at the time of the incident/accident
- Detailed description of the event
- Parts of body injured (if an injury occurred) and/or parts of equipment damaged
- Description of employee's response immediately after the event (grabbing injured arm, running from room, etc.)
- Extent of damage
- Treatment of injury or course of action taken

Some employers ask for an analysis of why the event took place and a recommendation for future prevention.

Figure 10.2.3 *An explanation of the four types of incident reports (Griffiths, 2021).*

Who is the audience of accident/incident reports? Since these reports have legal ramifications, the writer should consider the audience to be anyone from the people involved in the incident to your manager, insurance agents, investigators, and/or law enforcement to judges.

Other Considerations:

- **Witnesses**: Unless you are working alone, you should always seek as many perspectives as is reasonable and possible when writing an accident/incident report. Different people may see different things or remember the situation differently.
- **Neutral Language**: Because these documents may be used in court or in other legal proceedings, it is important to use objective language consisting of specific facts and neutral statements instead of impressions or emotional statements.

Examples:

Poor Example (too biased/emotional): John was just doing his job, working hard like he always does, and being a great team player when Mark rammed into him with the forklift like he was some hitman from an action movie.

Good Example (neutral and specific): John Smith was loading boxes on shelf B2 when Mark Peterson backed into him with the forklift, causing John to fall backward and hit a stack of boxes on the floor.

Poor Example (based on impressions): It just seemed like Gus was always kind of sweet on Tanya, but he was kind of creepy at the same time. He just made everyone feel uncomfortable. He was too touchy-feely.

Good Example (neutral and specific): On March 13, 2014, three employees (Margo Swinton, Barb Gell, and Tom Haven) heard Gus Broler say he had a crush on Tanya Vincent (another employee). On March 14, 23, and 29, Tanya reported to her supervisor that Gus Broler made her feel uncomfortable because he continued to give her a back rub after she said she did not want him to touch her.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=228#h5p-76

Inspection Reports

What are inspection reports? An inspection report documents objective observations made regarding the conditions of a site, property, equipment, and installations.

Figure 10.2.4 *Image presenting information to be included in an inspection report (Provost, 2017).*

You might write an inspection report for any of the following situations:

- installation proficiency or condition of fire prevention equipment
- condition of a building
- building code compliance
- networking equipment installation
- post-repair conditions

Why are these reports important? Inspection reports can be used for a variety of reasons: for determining the suitability of a building for a specific use; for assessing the quality and accuracy of an equipment installation; to determine compliance to regulations or code. These reports are used for decision-making purposes, insurance claims, and even lawsuits. When writing such reports, it is important to document observations accurately and objectively.

What goes in an inspection report? Inspection reports document what the writer has observed based on a physical inspection. They also document deficiencies and required corrective measures. The corrective actions section describes actions that must be taken to correct or improve the conditions.

How do I format an inspection report? In many companies, routine inspections are documented using a checklist. This is common in fire protection, for example. If the company you work for does not have a routine checklist, you can either create one for routine inspections and use it as a template for such reporting in the future, or you can document an inspection in an inspection report–usually formatted as a short memo report.

Checklist for Inspection Reports – Include key details about your observations in your report. Such detail should include the following:

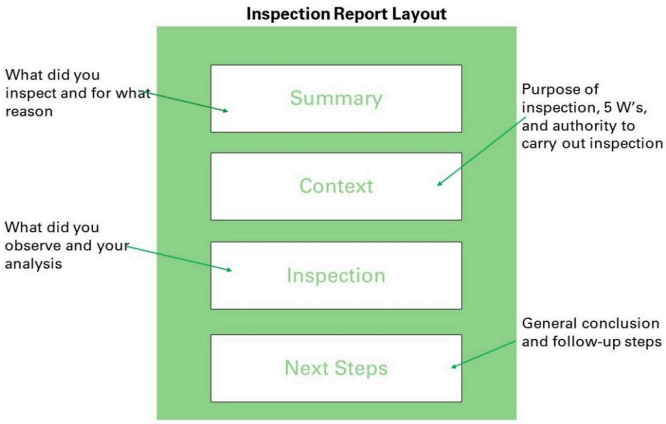

Figure 10.2.5 *Inspection report layout with descriptions (Ewald, 2017).*

- Date and time of the inspection
- Location
- Full names of people who attend the inspection
- Circumstances leading up to the inspection: authorization, request, etc.
- Overall description of the object being inspected
- Detailed description of the object being inspected
- Deficiencies observed
- Environmental conditions if applicable (slippery floors, poor lighting, hazardous materials, etc.)
- Corrective actions that are required

Who is the audience of inspection reports? Since these reports may have financial and/or legal ramifications, the writer should consider the audience to be anyone from your manager, property owners, sales agents, government regulators, insurance agents, investigators, and/or law enforcement and judges.

Language Use:

- **Use Neutral Language**: These documents may be used to make decisions that have considerable financial implications, so it is important to use objective language consisting of specific facts and neutral statements instead of impressions or emotional statements.
- **Use of Jargon:** Carefully consider your audience. If your primary or secondary readers are likely to be non-technical, either use plain language, or include a glossary or in-text definitions for the technical terminology, or jargon, used in your report.

Example:

Poor Example (non-specific): The shingles on the roof were poorly installed, with some of them missing from having been blown away by the wind.

Good Example (neutral and specific): Shingles on the upper front left side of the roof of 19 Cosborne Ave. in Toronto were blown off by the wind storm of February 15, 20XX. The exposed patch of roof is measured at 5 feet by 6 feet. No water-resistant sheeting is visible; exposed wood must be covered to prevent water damage while repairs are pending.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=228#h5p-77

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10.3 Proposals

The Life Cycle of a Project Idea

A great idea does not usually go straight from proposal to implementation. You may think it would be a great idea to construct a green roof on top of the CITE building, but before anyone gives you the go ahead for such an expensive and time-consuming project, they will need to know that you have done research to ensure the idea is cost effective and will actually work. **Figure 10.3.1** breaks down the various stages a project might go through, and identifies some of the typical communication tasks that might be required at each stage.

Most ideas start out as a proposal **to determine** if the idea is really feasible, or **to find out** which of several options will be most advantageous. So before you propose the actual green roof, you *propose to study whether or not it is a feasible* idea. Before you recommend a data storage system, you should *propose to study three different systems to find out which is the best one for this particular situation*. Your proposal assumes the idea is worth looking into, convinces the reader that it is worth spending the time and resources to look into, and gives detailed information on *how* you propose to do the "finding out."

Figure 10.3.1 *Phases of a project and some accompanying communication tasks (Last, 2019).* [Lightbulb image]. Source: https://www.iconfinder.com/icons/667355/aha_brilliance_idea_think_thought_icon. *Free for commercial use.*

Knowledge Check

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Once a project is in the implementation phase, the people who are responsible for the project will likely want regular status updates and/or progress reports to make sure that the project is proceeding on time and on budget, or to get a clear, rational explanation for why it is not. To learn more about Progress Reports, go to 10.5 Progress Reports.

Proposals

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(How to write a Business Proposal in 10 Easy Steps, n.d.)

Proposals are some of the most common types of reports you will likely find yourself writing in the workplace. A proposal, in the technical sense, is a document that tries to persuade the reader to implement a proposed plan or approve a proposed project. Most companies and organizations rely on effective proposal writing to ensure successful continuation of their business and to get new contracts. With an effective proposal, the writer convinces the reader that the proposed plan or project is worth doing (worth the time, energy, and expense necessary to implement), that the author is the best candidate for implementing the idea, that the proposed plan is realistic and feasible, and that the proposed course of action will result in intangible benefits.

Figure 10.3.2 *Not that kind of proposal. Source: https://pixabay.com/en/couple-love-marriage-proposal-47192/. Pixabay License.*

Proposals are often written in response to a **Request For Proposals** (RFP) by a government agency, organization, or company. The requesting body receives multiple proposals responding to their request, reviews the submitted proposals, and chooses the best one(s) to go forward. Thus, your proposal must **persuade** the reader that your idea is the one most worth

pursuing. Proposals are persuasive documents intended to initiate a project often in response to a challenge and get the reader to authorize a course of action proposed in the document. These might include proposals to

- perform a task (such as a feasibility study, a research project, etc.)
- provide a product
- provide a service

Proposals can have various purposes and thus take many forms; they are usually adapted to the situation at hand. They may include sections such as the following:

- Introduction and/or background
- Problem statement
- Purpose/motivation/goal/objectives
- Definition of scope and approach
- Review of the state of the art
- Technical background
- Project description
- Schedule of work/timeline
- Budget
- Qualifications
- Conclusion

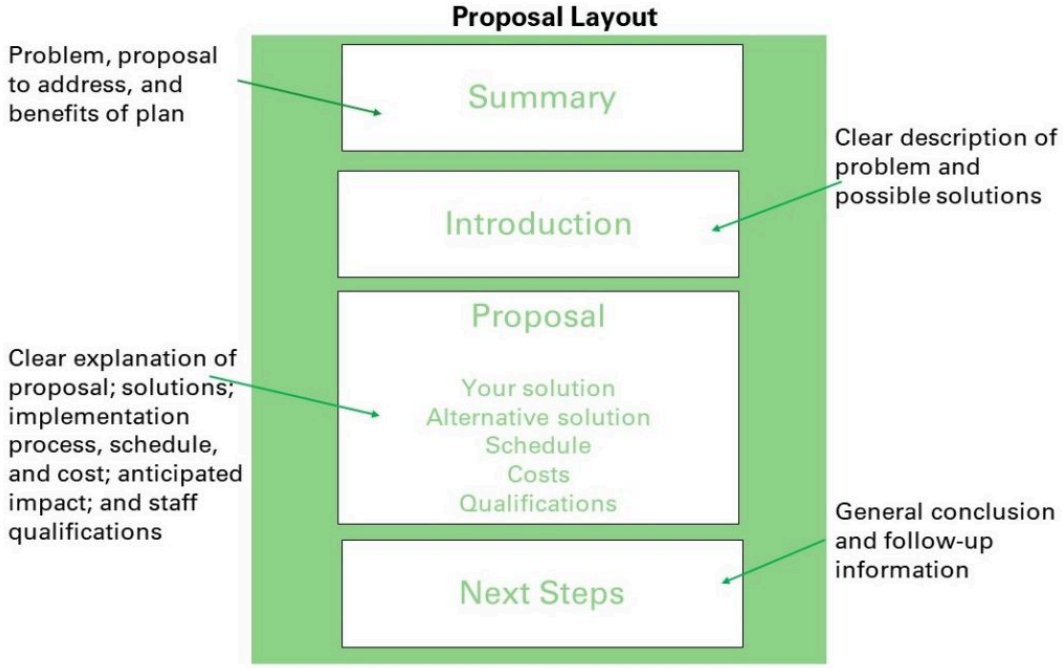

Figure 10.3.3. *A general template for developing a proposal that can be adapted for various proposal types (Ewald, 2017).*

Four Kinds of Proposals

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(Types of Business Proposals, n.d.)

- **Solicited Proposals:** An organization identifies a situation or problem that it wants to improve or solve and issues an RFP (Request for Proposals) asking for proposals on how to address it. The requesting organization will vet proposals and choose the most convincing one, often using a detailed scoring rubric or weighted objectives chart to determine which proposal best responds to the request.
- **Unsolicited Proposals:** A writer perceives a problem or an opportunity and takes the initiative to propose a way to solve the problem or take advantage of the opportunity (without being requested to do so). This can often be the most difficult kind of proposal to get approved and so should include a persuasive rationale for the proposed course of action.
- **Internal Proposals:** These are written for someone within the same organization as the writers. Since both the writer and reader share the same workplace context, these proposals are generally shorter than external proposals and usually address some way to improve a work-related situation (productivity, efficiency, profit, etc.). As internal documents, they are often sent as memo reports, or introduced with a memo transmittal document if the proposal is lengthy.
- **External Proposals**: These are sent outside of the writer's organization to a separate entity (usually to solicit business). Since these are external documents, they are usually sent as a formal report (if long) and introduced by a letter of transmittal. External proposals are usually sent in response to a Request for Proposals, but not always.

Knowledge Check

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EXERCISE 10.2.1 Task Analysis

Identify the kinds of proposals you would be likely to write within the industry you will be joining upon graduation. Place them within the grid below. Given the kinds of proposals you would write, what forms would you use (memo report, letter report, or formal report)?

	Solicited	**Unsolicited**
Internal		
External		

Proposals written in a technical writing course generally do the following:

1. Identify and define the problem that needs to be solved or the opportunity that could be seized. You must show that you clearly understand the problem/situation if you are to convince the reader that you can solve it. Rubrics that assess proposals generally place significant weight (~20%) on clarity and accuracy of the problem definition.
2. Describe your proposed project, clearly defining the scope of what you propose to do. Often, it is best to give a general overview of your idea, and then break it down into more detailed sub-sections.
3. Indicate how your proposed solution will solve the problem and provide tangible benefits. Specifically, indicate how it will meet the objectives and abide by the constraints outlined in the problem definition. Give specific examples. Show the specific differences between "how things are now" and "how they could be." Be as empirical as possible, but appeal to all appropriate persuasive strategies. Emphasize the results, benefits, and feasibility of your proposed idea.
4. Include the practical details: Propose a budget and a timeline for completing your project. Represent these graphically (budget table, and **Gantt chart)**. Your timeline should include the major milestones or deliverables for the project, as well as dates or time frames for the completion of each step.
5. Conclude with a final pitch that summarizes and emphasizes the benefits of implementing your proposed idea – but without sounding like an advertisement. Ask for authorization to proceed.

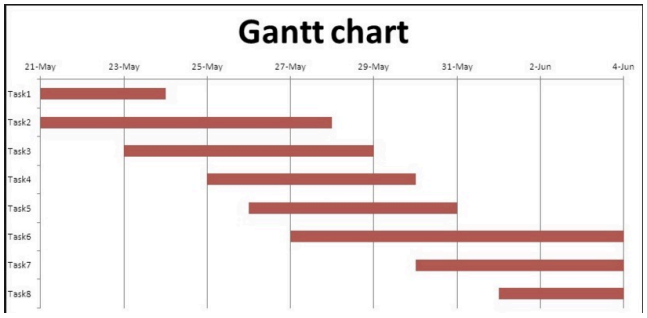

Figure 10.3.4 *An example of a Gantt chart used to detail the project schedule and budget (Priority Matrix, n.d.).*

Additional Proposal Elements

All proposals must be convincing, logical, and credible, and to do this, they must consider audience, purpose and tone. They are persuasive documents, so all components must be carefully considered as you integrate them into the document. You should also do the following:

> An engineering proposal is not an advertisement. It must show, with objective language, clarity, and thoroughness, that the writers know what they are doing and will successfully complete the project.
>
> Irish and Weiss (2013)

1. Describe your qualifications to take on and/or lead this project; persuade the reader that you have the required skills, experience, and expertise to complete this job.
2. Include graphics to illustrate your ideas, present data, and enhance your pitch.
3. Include secondary research to support your claims and to enhance your credibility and the strength of your proposal.
4. Choose format according to the context; is this a memo report to an internal audience or a formal report to an external audience? Does it require a letter of transmittal?

Sample Proposal Organization

Each proposal will be unique in that it must address a particular audience, in a particular context, for a specific purpose. To read sample proposals, visit David McMurrey's *Online Technical Writing # Proposals* for examples. However, the following offers a fairly standard organization for many types of proposals:

Introduction/ Background	Clearly and fully defines the problem or opportunity addressed by the proposal, and **briefly** presents the solution idea; convinces the reader that there is a clear need, and a clear benefit to the proposed idea.
Project Description	Detailed description of solution idea and detailed explanation of how the proposed idea will improve the situation: 1. Confirm the feasibility (is it doable?) How will you find out? 2. Explain the specific benefits of implementing the idea and the consequences of not doing it 3. Give a detailed description or explanation of your proposed idea or methodology, and the resources needed to achieve goals. 4. Address the potential obstacles or objections; concede where appropriate.
Qualifications	Establish the writer's qualifications and experience to lead this project.
Timeline and Budget	Provide a detailed timeline for completion of project (use a Gantt chart (see Figure 8.2.4) to indicate when each stage of the project will be complete). Provide an itemized budget for completing the proposed project.
Conclusion	This is your last chance to convince the reader; be persuasive! And ask for authorization to proceed.
References	List your research sources.

Language Considerations

Proposals are fundamentally *persuasive* documents, so paying attention to the rhetorical situation—position of the reader (upward, lateral, downward or outward communication), the purpose of the proposal, the form, and the tone—is paramount.

- Clearly define your purpose and audience before you begin to write.
- Be sure you have done the research so you know what you are talking about.
- Remain positive and constructive; don't blame people or dwell on the negative
- Be solution-oriented; you are seeking to *improve* a situation.
- Make your introduction very logical, objective, and empirical; don't start off sounding like an advertisement or sounding biased; avoid logical fallacies.
- Use primarily logical and ethical appeals; use emotional appeals sparingly.

As always, adhere to the 7 Cs by making sure that your writing is

- ***Clear and Coherent***: Don't confuse your reader with unclear ideas or an illogical structure.

- ***Concise and Courteous***: Don't annoy your reader with clutter, unnecessary padding, inappropriate tone, or hard-to-read formatting.
- ***Concrete and Complete***: Avoid vague generalities; give specifics. Don't leave out necessary information.
- ***Correct***: Don't undermine your professional credibility by neglecting grammar and spelling, or by including inaccurate information.

Why Project Proposals Might be Rejected

A proposal or recommendation needs research to convince the reader that the idea is worth pursuing or implementing. A project proposal could be rejected for any of the following reasons related to insufficient research:

- **Unclear Problem:** The research problem is not clearly defined so the research plan has no clear focus (your ideas are too vague and not well thought out)
- **Unnecessary Project**: This issue is already well-known or the problem has already been solved (or is in the process of being solved). For example, proposing that the school cafeteria should replace plastic cutlery with compostable cutlery, when it has already done so, would result in a rejected proposal.
- **Impractical Scope**: Access to information, resources, and equipment needed to complete your proposed study may not be available; adequate conclusions cannot be reached in the designated time frame and with resources available. For example, if you propose to do a study that will take two years, but your project is due in two months, the proposal will be rejected.

Knowledge Check

Use the clues provided to complete the crossword puzzle. The answers to all the clues can be found on this page.

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View this LinkedIn video, Writing Proposals, for step-by-step instructions on proposal writing.

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Image descriptions

Figure 10.2.1 image description:

Once there is an idea, a project goes through a design process made up of four stages.

1. Pre-project planning.
    - Problem Definition – identifying needs, goals, objectives, and constraints.
    - Define context and do research.
    - Identify potential projects.
    - Public engagement projects; Stakeholder consultation.
2. Project Development.
    - Propose a project (budget, timeline, etc.).
    - Create or respond to a request for proposals, evaluate proposals.
    - Develop or design solution concepts.

    - Project management plan.
    - Feasibility Studies, Recommendation Reports).

3. Project Implementation.

    - Write contracts and apply for permits for construction and building sites.
    - Progress reports, status updates.
    - Documentation of project.
    - Continued research and design improvements.

4. Project completion.

    - Final reports and documentation.
    - Close contracts.
    - Ongoing Support: User Guides, Troubleshooting, FAQs.

[Return to Figure 10.2.1]

10.4 Recommendation Reports and Feasibility Studies

Feasibility and recommendation reports are most often the final step in a series of documents, often beginning with a **proposal** and perhaps a series of **progress reports**, or they can be created in response to a smaller challenge. Feasibility, recommendation, evaluation, and assessment reports, are analytic reports that all do roughly the same thing—provide a careful study of a situation or problem, and often recommend what should be done to improve a situation. There are some subtle differences among these types, and names for them can vary. They can be written as long reports in response to complex situations as well as shorter reports for less complex ones.

Feasibility and **recommendation** reports do roughly the same thing—provide a careful study of a situation and recommend what should be done to improve the situation.

This chapter will discuss what feasibility and recommendation reports consist of and how to create and organize their contents. To view examples of feasibility and recommendation reports, please visit David McMurrey's *Online Technical Writing: Examples, Cases, and Models*.

Feasibility Reports

A feasibility report presents an opinion about a situation (for example, a problem or opportunity) and a plan for doing something about it. The report then discusses whether that plan is "feasible"—whether it is practical in terms of current technology, economics, time frame, social needs and preferences, and so on. The feasibility report answers the question "Should we implement Plan X?" by stating "yes," "no," or sometimes a "maybe" or "under certain conditions." Not only does it indicate whether the idea is feasible, it also provides the data and the reasoning behind that determination; conversely, it might outline the reasons why the idea cannot or should not be implemented, or what obstacles must be overcome before the idea can become feasible. Typical questions addressed in these reports include

Figure 10.4.1 *10 reasons conducting a feasibility study will benefit a project (AF Bureau, 2020).*

- ***Is it possible?*** Can this be done within the allotted budget, time frame, legal and regulatory conditions, and technical capabilities?
- ***Is it financially viable?*** Even if it falls within our budget, *should* we do it? Will it have long-

term benefits that outweigh costs? Is there a less expensive or financially risky way to achieving the same result? How does it compare to the cost of doing nothing about this situation?

- ***Will it be accepted by the community?*** Will people be in favor of this idea? Will anyone be opposed to it? How much public support is necessary to make this successful? (What kind of stakeholder consultation might be necessary to determine this?)
- **Do we have the expertise and human capital to proceed?** Does the company have the expertise, resources, and time to commit to the completion of the project within a specified time?

Recommendation Reports

A recommendation report starts from a stated need; it outlines criteria for assessing the options, it offers a selection of solution options, presents a detailed comparative analysis of the options, and then recommends one, some, or none. For example, a company might be looking at grammar-checking software and want a recommendation on which product is the best fit for them. Criteria for selection might be cost, installation, training, and privacy. As the report writer on this project, you could study the market for this type of application and recommend one particular product, two-to-three possible products (differing perhaps in their strengths and their weaknesses), or none (maybe none of them are appropriate for the client's specific needs) after comparing each using the criteria for selection. The recommendation report answers the question "Which option should we choose?" (or in some cases "Which are the best options?) by recommending Product B, or maybe both Products B and C, or none of the products. These recommendations might arise from questions such as

- What should we do about Problem X?
- What features or characteristics would address our needs?
- What is the best way to provide Function or Service A?
- Should we use Technology X or Technology Y to perform Function Z?

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(Feasibility Analysis, 2021)

Knowledge Check

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Typical Contents of Recommendation and Feasibility Reports

Whatever variety of feasibility or recommendation report you write, whatever name people call it—most of the sections and the organization of those sections are roughly the same.

The structural principle fundamental to this type of report is this: You provide not only your recommendation, choice, or judgment, but also the data, analysis, discussion, and the conclusions leading to it. That way, readers can check your findings, your logic, and your conclusions to make sure your methodology was sound and that they can agree with your recommendation. Your goal is to convince the reader to agree with you by using your careful research, detailed analysis, rhetorical style, and documentation.

The general problem-solving approach for a recommendation report entails the steps shown in the example below.

Typical Recommendation Report Elements

1. Identify the **need**	What is the "unsatisfactory situation" that needs to be improved or addressed?
2. Identify the **criteria** for responding to the need	What is the overall goal? What are the specific, measurable objectives any solution should achieve? What constraints must any solution adhere to?
3. Determine the solution **options** you will examine	Define the scope of your approach to the problem. Identify the possible courses of action that you will examine in your report. You might include the consequences of simply doing nothing.
4. Study how well each **option** meets the **criteria**	Systematically study each option, and compare how well they meet each of the objectives you have set. Provide a systematic and quantifiable way to compare how well the solution options meet the objectives (weighted objectives chart).
5. Draw **conclusions** based on your analysis	Based on the research presented in your discussion section, sum up your findings and give a comparative evaluation of how well each of the options meets the criteria and addresses the need.
6. Formulate **recommendations** based on your conclusion	Indicate which course of action the reader should take to address the problem, based on your analysis of the data presented in the report.

These steps generally coincide with how you will organize your information. Your report will be divided into several sections that will likely include most or all of the following elements:

1. **INTRODUCTION:** The introduction should clearly state the document's purpose. Your introduction will include the problem definition, which discusses the "unsatisfactory situation" or opportunity that has given rise to this report and the requirements that must be met. You should also include some background information to describe the circumstances leading up to the situation and your report. Finally, provide an overview of the contents of the report.
2. **TECHNICAL BACKGROUND:** Some recommendation or feasibility reports may require establishing the need for the recommendation in order to make the rest of the report meaningful. You should include some background information to describe the circumstances leading up to the situation and your report. For example, a discussion of the power and speed of tablets is going to necessitate some discussion of RAM, megahertz, and processors. Also, describe your research methods.
3. **REQUIREMENTS AND CRITERIA**: A critical part of feasibility and recommendation reports is the discussion of the requirements (objectives and constraints) you'll use to reach the final decision or recommendation. Here are some examples:

    - If you're trying to recommend a tablet for use by employees, your requirements are likely to involve size, cost, hard-disk storage, display quality, durability, and battery function.
    - If you're looking into the feasibility of providing every student at Austin Community College with an ID on the ACC computer network, you'd need to define the basic requirements of such a program—what it would be expected to accomplish, problems that it would have to avoid, and so on.
    - If you're evaluating the recent program of free bus transportation in Austin, you'd need to know what was expected of the program and then compare its actual results to those requirements.

    Requirements can be defined in several ways:

    Numerical Values: Many requirements are stated as maximum or minimum numerical values. For example, there may be a cost requirement—the tablet should cost no more than $900.

    Yes/no Values: Some requirements are simply a yes-no question. Does the tablet come equipped with Bluetooth? Is the car equipped with voice recognition?

    Ratings Values: In some cases, key considerations cannot be handled either with numerical values or yes/no values. For example, your organization might want a tablet that has an ease-of-use rating of at least "good" by some nationally accepted ratings group. Or you may have to assign ratings yourself.

    The requirements section should also discuss how important the individual requirements are in relation to each other. Picture the typical situation where no one option is best in all categories of comparison. One option is cheaper; another has more functions; one has better ease-of-use

ratings; another is known to be more durable. Set up your requirements so that they dictate a "winner" from a situation where there is no obvious winner. A "weighted objectives chart" or "Decision Matrix" is often used in these cases.

4. **DISCUSSION OF SOLUTION OPTIONS:** In certain kinds of feasibility or recommendation reports, you'll need to explain how you narrowed the field of choices down to the ones your report focuses on. Often, this follows right after the discussion of the requirements. Your basic requirements may well narrow the field down for you. But other considerations may disqualify other options—explain these as well.

   Additionally, you may need to provide brief **technical descriptions** of the options themselves. Don't get this mixed up with the comparison that comes up in the next section. In this description section, you provide a general discussion of the options so that readers will know something about them. The discussion at this stage is not comparative. It's just a general orientation to the options. In the tablets example, you might want to give some brief, general specifications on each model about to be compared.

5. **COMPARATIVE ANALYSIS:** One of the most important parts of a feasibility or recommendation report is the comparison of the options. Remember that you include this section so that readers can follow the logic of your analysis and come up with different conclusions if they desire. This comparison can be structured using a "block" (whole-to-whole) approach, or an "alternating" (point-by-point) approach.

Block Approach	Alternating (Point-by-Point) Approach
All the information about Option 1	Compare all Options according to Criteria A (cost)
All the information about Option 2	Compare all Options according to Criteria B (functionality)
All the information about Option 3	Compare all options according to Criteria C (ease of use)
Direct Comparative Analysis of all three options and Summary of Results	Summary of Results

You might compare three options (1, 2, and 3) using three criteria for comparison (A, B, and C). If you were comparing tablets, you'd likely use the point-by-point approach, having a section that compared all three options based on cost (criteria A), another section that compared them on battery function, and so on. You *wouldn't* have a section that discussed everything about option 1, another that discussed everything about option 2, and so on. That would not be effective or efficient because you still have to make direct comparisons somewhere near the end of your discussion (such as in a weighted objectives chart).

Each of these comparative sections should end with a conclusion that sums up the relative strengths and weaknesses of each option and indicates which option is the best choice in that

particular category of comparison. Of course, it won't always be easy to state a clear winner—you may have to qualify the conclusions in various ways, providing multiple conclusions for different conditions.

If you were writing an evaluation report, you wouldn't be comparing options. Instead, you'd be comparing the thing being evaluated against the requirements placed upon it, or the expectations people had of it. For example, Capital Metro had a program of more than a year of free bus transportation. What was expected of that program? Did the program meet those expectations?

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(Three Rules for Better Comparison Tables, 2019)

6. **SUMMARY TABLE:** After the individual comparisons, include a summary table (such as a **weighted objectives chart**) that summarizes the conclusions from the comparative analysis section. Given the trend to increasing use of visual narrative in reports, some readers are more likely to expect and pay attention to details in a table; however, you still have to write up a clear summary paragraph of your findings.

7. **CONCLUSIONS:** The conclusions section of a feasibility or recommendation report amalgamates all of the conclusions you have already reached in each of the comparison sections. In this section, you restate the individual conclusions, for example, which model had the best price, which had the best battery function, and so on. You could give a summary of the relative strengths and weaknesses of each option based on how well they meet the criteria.

   This section has to go further. It must untangle all the conflicting conclusions and somehow reach the final conclusion, which is the one that states which is the best choice. Thus, the conclusion section first lists the *primary conclusions*—the simple, single-category ones. Then it must state *secondary conclusions*—the ones that balance conflicting primary conclusions. For example, if one tablet is the least inexpensive but has poor battery function, but another is the most expensive but has good battery function, which do you choose and why? The secondary conclusion would state the answer to this dilemma.

8. **RECOMMENDATIONS:** The final section of feasibility and recommendation reports states the recommendations which flow directly from your conclusions and directly address the problem outlined in the introduction. These may sometimes be repetitive, but remember that some readers may skip right to the recommendation section. Also, in some cases where there may be a best choice, you may not want to recommend it. For example, early in their history, laptop computers were heavy and unreliable—one model may have been better than the rest, but even

so, it may not have been worth having. You may want to recommend further research, a pilot project, or a re-design of one of the options discussed.

The recommendation section should outline what further work needs to be done, based solidly on the information presented previously in the report and responding directly to the needs outlined in the beginning. In some cases, you may need to recommend several ranked options based on different possibilities.

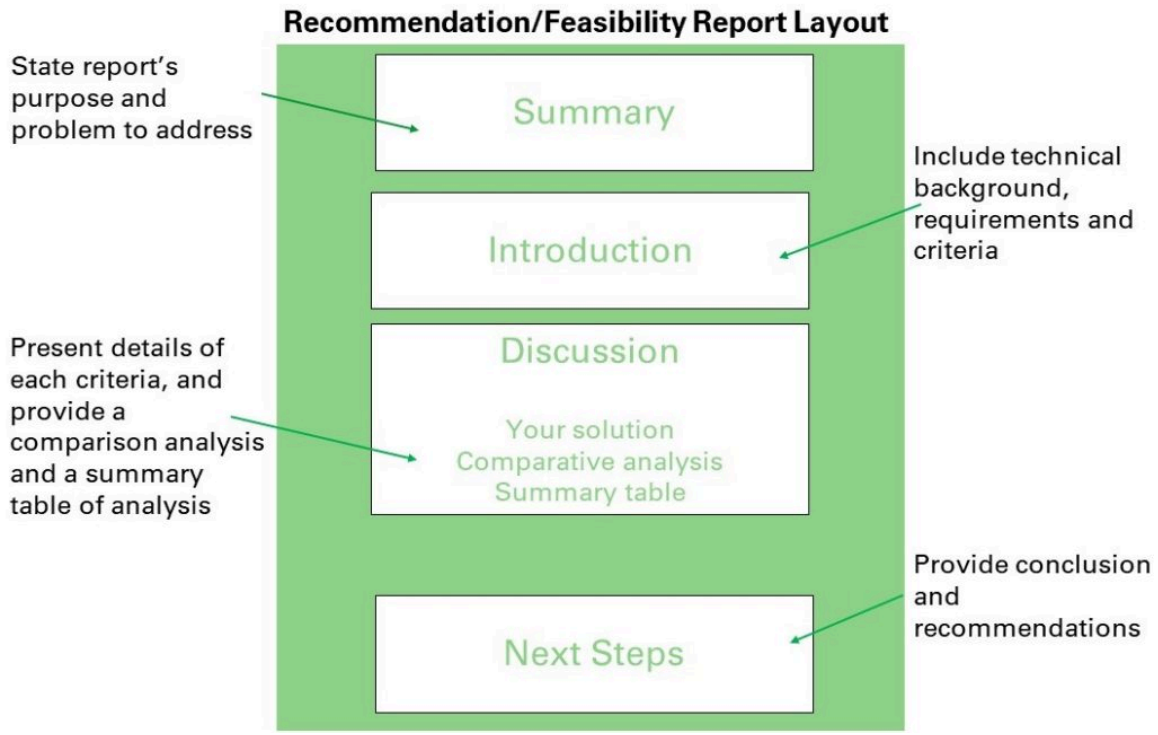

Figure 10.4.2 *A general overview of the components of a recommendation or feasibility report (Ewald, 2017).*

Knowledge Check

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Revision Checklist for Feasibility and Recommendation Reports

As you reread and revise your feasibility or recommendation report, ensure that you have included all of the sections and elements described below.

Revision Checklist for Recommendation Reports

Document Section	Key Content Elements	Check
Introductory Sections	Indicate the situation and the audience.	
	Discuss the background of the problem or opportunity—what brought about the need for the report? Give technical background if necessary.	
	State requirements—those factors that influence the decision on the choice of options (objectives and constraints).	
	Indicate how the field of options was narrowed to the ones being compared (if relevant).	
	Provide an overview of the contents.	
Discussion Sections	Organize the comparative analysis/discussion of the options using the point-by-point or whole-to-whole approach. Choose the structure that best matches your content and purpose.	
	At the end of each comparative section, state the best choice in terms that point of comparison.	
	Include a table, if possible, in which you summarize all the key data.	
Conclusion	Restate all the key conclusions from the Discussion sections.	
	State secondary conclusions, and base them on requirements established at the beginning.	
	State a final conclusion (about the overall feasibility of the idea or about the overall strengths and weaknesses of each option compared).	
Recommendations	Make recommendations for future actions; include actionable steps.	
References	Fully document any sources used in the report in a list of references.	
Appendices	Add any additional information that has been referred to but not included in the body of the report.	

Knowledge Check

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This chapter was adapted from David Murrey's "Recommendation and Feasibility Reports," in *Online Technical Writing*, which is licensed under a Creative Commons Attribution 4.0 International License.

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10.5 Progress Reports

You write a progress report to inform a supervisor, associate, or client about the progress you have made on a project over a specific period of time. Periodic progress reports are common on projects that go on for several months (or more). Whoever is paying for this project wants to know whether tasks are being completed on schedule and on budget. If the project is not on schedule or on budget, they want to know why and what additional costs and time will be needed.

Progress reports answer the following questions for the reader:

- How much of the work is complete?
- What part of the work is currently in progress?
- What work remains to be done?
- When and how will the remaining work be completed?
- What changes, problems or unexpected issues, if any, have arisen?
- How is the project going in general?

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=243#oembed-1

(Progress Report: How to Write, Structure and Make it Visually Attractive, 2021)

Knowledge Check

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Purpose of a Progress Report

The main function of a progress report is persuasive: to reassure clients and supervisors that you are making progress, that the project is going smoothly, and that it will be completed by the expected date — or to give reasons why any of those might not be the case. They also do the following:

- provide a brief look at preliminary findings or in-progress work on the project,
- give your clients or supervisors a chance to evaluate your work on the project and to suggest or request changes,
- give you a chance to discuss problems in the project and thus to forewarn the recipients, and
- force you to establish a work schedule, so that you will complete the project on time

Format of a Progress Report

Depending on the size of the progress report, the length and importance of the project, and the recipient, a progress report can take forms ranging from a short informal conversation to a detailed, multi-paged report. Most commonly, progress reports are delivered in the following forms:

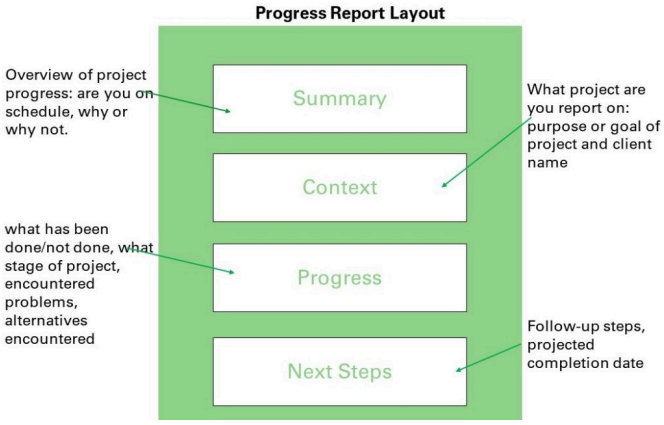

Figure 10.5.1 *A typical outline for a progress report (Ewald, 2017).*

- **Memo report**: a short, semi-formal report to someone within your organization (can range in length from 1-4 pages)
- **Letter report**: a short, semi-formal report sent to someone outside your organization
- **Formal report:** a long, formal report sent to someone within or outside of your organization
- **Presentation**: an oral presentation given directly to the target audience

Organizational Patterns for Progress Reports

The recipient of a progress report wants to see what you've accomplished on the project, what you are working on now, what you plan to work on next, and how the project is going in general. The information is usually arranged with a focus either on time or on task, or a combination of the two:

- **Focus on time:** shows time period (previous, current, and future) and tasks completed or scheduled to be completed in each period
- **Focus on specific tasks:** shows the order of tasks (defined milestones) and progress made in each time period
- **Focus on larger goals**: focus on the overall effect of what has been accomplished

Information can also be arranged by report topic. You should refer to established milestones or deliverables outlined in your original proposal or job specifications. Whichever organizational strategy you choose, your report will likely contain the elements described below. To view examples of progress reports, visit David McMurrey's *Online Technical Writing.*

Progress Reports – Structural Overview

1. Introduction

Review the details of your project's purpose, scope, and activities. The introduction may also contain the following:

- date the project began; date the project is scheduled to be completed
- people or organization working on the project
- people or organization for whom the project is being done
- overview of the contents of the progress report

2. Project status

This section (which could have sub-sections) should give the reader a clear idea of the current status of your project. It should review the work completed, work in progress, and work remaining to be done on the project, organized into sub-sections by time, task, or topic. These sections might include the following:

- description of work completed to date, referencing work reported in previous progress reports
- timeline for when remaining work will be completed
- problems encountered or issues that have arisen that might affect completion, direction, requirements, or scope

3. Conclusion

The final section provides an overall assessment of the current state of the project and its expected completion, usually reassuring the reader that work will progress (even if you have encountered some challenges). It can also alert recipients to unexpected changes in direction or scope, or problems in the project that may require intervention.

4. References section if required.

Progress reports can be create for any type of project. Please see **Figure 10.5.2** below for an example of a short progress report (formatted as a memo report) relating to the adaptation of an open resource textbook for a business communication subject.

Sample Progress Report

To: Tom Bartsiokas, Coordinator

From: Robin Potter, Professor

Date: March 29, 20XX

Subject: Status of the Adaption of the EAC594 OER Text

Progress on the adaption of the EAC594 OER textbook is going well and is expected to be completed as planned by September 20XX.

Using the TEC400 OER textbook as the foundation for the EAC594 OER text, I have been tasked with adapting the text so that it suitable for our degree-level business communication subjects at Seneca. Adaption involved revising the text so it addresses the needs of business communication students. Such revisions include

- changing content to make the text context-specific for business students
- adding chapters on types of correspondence
- adding examples and sample documents specific to business communication
- removing content most related to technical communication contexts
- adapting chapter-specific PowerPoint slide decks so they align to the new EAC594 OER text

Work Completed

As of March 20XX, I have adapted content up to Chapter 8 and removed chapters that pertained to technical communication in particular. Four chapters pertaining to the unit on correspondence have been created for this EAC594 OER:

- Chapter 7.2 Message Structure
- Chapter 7.3 Positive and Neutral Messages
- Chapter 7.4 Persuasive Messages
- Chapter 7.5 Negative Messages

Problems Encountered

At present no problems that prevent the continuation of the work on the project have arisen. Generally, the Pressbooks software is easy to use, so the project remains on track.

Work to be Completed

Sections 9 and 10 along with the appendices will be adapted before the end of the Winter term, as planned. If time permits, I will add a chapter on intercultural communication; otherwise, it will be added when I resume work on the project in the Spring term. After the completion of the chapters, the text will be ready for your review and for our technical expert, Tricia Hylton, to begin adding the 5HP interactive and visual content.

I expect to complete the adaption of the PowerPoint slide decks that will accompany the EAC594 OER text by the end of June 20XX.

Conclusion

By September 20XX, we will have a text ready for a fall pilot by our business communication faculty. I look forward to their feedback as well as the feedback of our students.

Please let me know if you require additional information.

Figure 10.5.2 *Example of a progress report*

Knowledge Check

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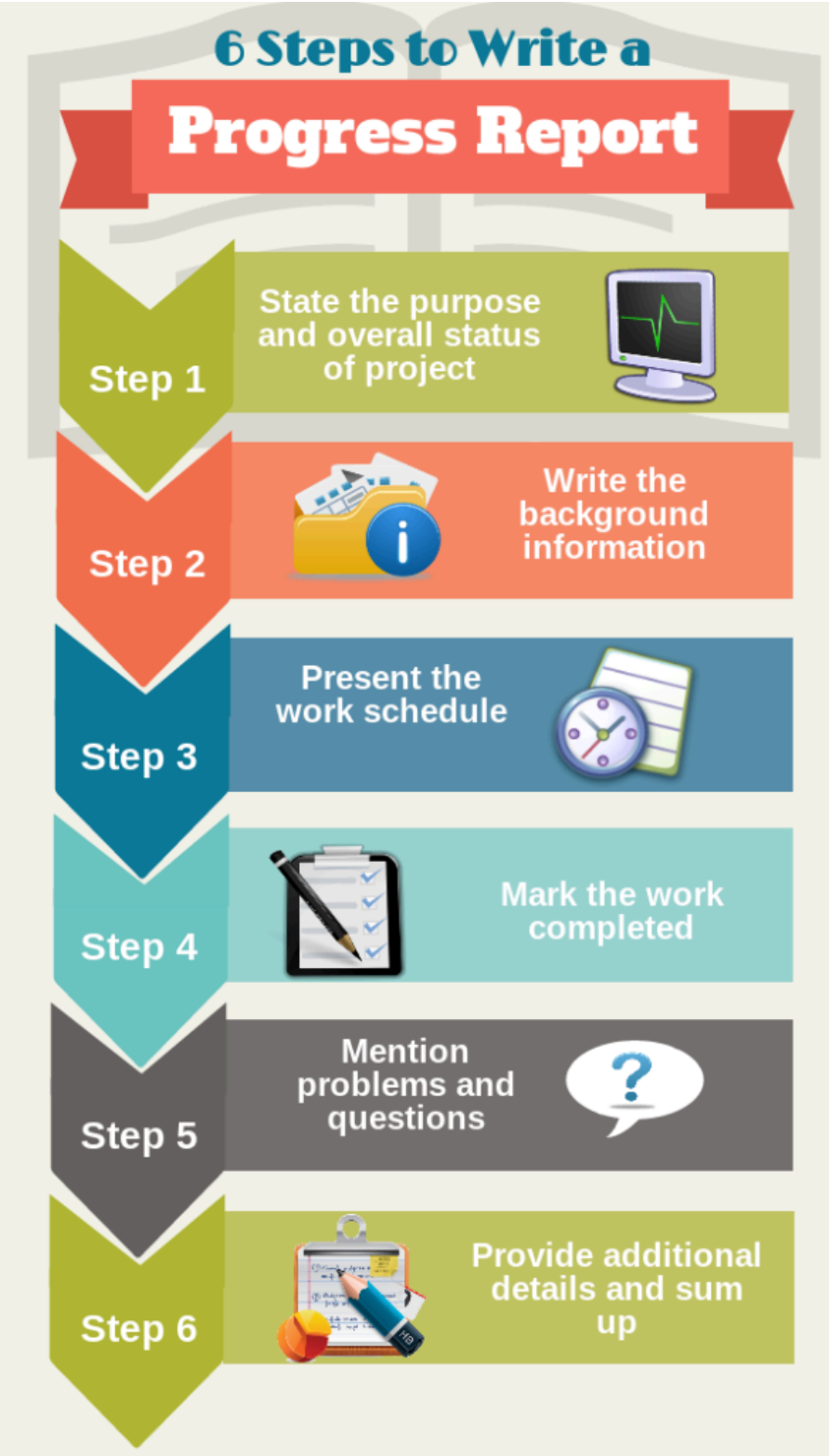

Figure 10.5.3 *Six simple steps to complete a progress report (EssayShark, 2017).*

Note: Some contents of this chapter have been adapted from McMurrey, D. (1997-2017). *Online Technical Writing: Progress Reports*.

References

EssayShark. (2017). Six steps on how to write a progress report. https://essayshark.com/blog/infographic-6-steps-on-how-to-write-a-progress-report/

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Piktochart. (2021). Progress reports: How to write, structure, and make it visually attractive [Video]. Youtube. https://www.youtube.com/watch?v=yQTje_GYhb4

10.6 Lab Reports

Whether your research takes place in a university lab or on some remote worksite, you will often have to write up the results of your work in a lab report. Most basically, this report will describe the original hypothesis your work attempts to test, the methodology you used to test it, your observations and results of your testing, your analysis and discussion of what this data means, and your conclusions.

In an academic context, especially in early courses, you are often asked to replicate the results of others rather than conduct your own original research. This is usually meant to instill an understanding of the **scientific method** into students, and teach students the proper use of instruments, techniques, processes, data analysis, and documentation. Once you demonstrate your ability to understand and apply the scientific method in these contexts, you will be able to design your own research studies and develop new knowledge. Your reports then become the way you pass on this new knowledge to the field and to society at large.

For scientists and engineers to make valuable contributions to the sum of human knowledge, they must be able to convince readers that their findings are valid (can be replicated) and valuable. Thus, the way that you write these reports can impact the credibility and authority of your work; people will judge your work partly on how you present it. Yes, even lab reports have a persuasive edge and must make careful use of rhetorical strategies. Careless writing, poor organization, ineffective document design, and lack of attention to convention may cast doubt on your authority and expertise, and thus on the value of your work.

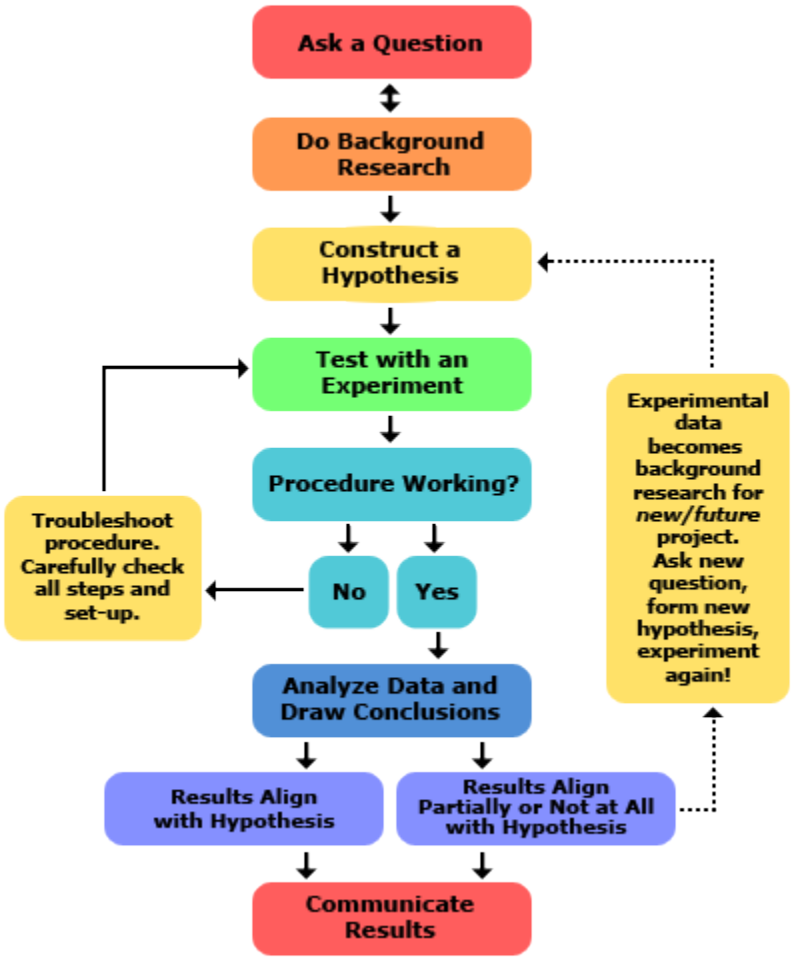

Figure 10.6.1 *An outline of the scientific process used to conduct experiments (ScienceBuddies, n.d.).*

Knowledge Check

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Science and Rhetoric

Some aspects of your report that might require you to think rhetorically are exemplified in how you approach the following questions:

- Why is this research important? How does it solve a problem or contribute in some way to expanding human knowledge?
- What have other researchers already discovered about this? How are you contributing to this conversation?
- What gaps are there in our knowledge about this topic?
- Why have you chosen this methodology to test your hypothesis? What limitations might it have?
- How and why do you derive these inferences from the data you have collected?
- What further research should be done? Why?

Writing a Lab Report

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=248#oembed-1

(How to Write a Lab Report, 2018)

Knowledge Check

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Your report will be based on the work you have done in the lab. Therefore, you must have a plan for keeping careful notes on what you have done, how you have done it, and what you observed. Researchers often keep a notebook with them in the lab, sometimes with pre-designed tables or charts for recording the data they know they will be observing (you might be given a lab manual

to use while completing a particular experiment to record your observations and data in a pre-organized format). Try to plan ahead so that you can capture as much information as possible during your research; don't try to rely only on memory to record these important details.

How you choose the content and format for your report will depend on your audience and purpose. Students must make sure to read lab manuals and instructions carefully to determine what is required; if writing for publication, make sure to follow the submission guidelines of the publication you are sending it to. Lab reports typically contain the elements outlined below.

Typical Elements of a Lab Report

Title: Craft a descriptive and informative title that will enable readers to decide if this interests them and will allow keywords to be abstracted in indexing services. Ask your instructor about specific formatting requirements regarding title pages, etc.

Abstract: Write a summary of your report that mirrors your report structure (Hypothesis, Methods, Results, Discussion, Conclusion) in condensed form—roughly one sentence per section. Ideally, sum up your important findings.

Introduction: Establish the context and significance of your work, its relevance in the field, and the hypothesis or question your study addresses in the Introduction. Give a brief overview of your methodology for testing your hypothesis and why it is appropriate. If necessary for your readers, provide a specialized theoretical framework, background or technical knowledge to help them understand your focus and how it contributes to the field. Your instructor may describe a target audience for you; pay attention to that and write for that audience. More detailed reports may require a literature review section.

Materials and Methods: This section has two key purposes. First, it must allow any reader to perfectly replicate your method; therefore, you must provide a thorough description of what you used and how you conducted your experiment. Second, you must persuade your reader that your chosen methodology and the materials are appropriate and valid for testing your hypothesis and will lead to credible and valid results. This section will generally include 1) a list of all materials needed (which may include sub-lists, diagrams, and other graphics), and 2) a detailed description of your procedure, presented chronologically. Traditionally, the Sciences have required writers to describe what they did using the passive voice, as passive mode emphasizes the materials and actions taken and de-emphasizes the role of the scientist in the process. This is slowly changing, as the use of active voice is more concise; however, you should consult your instructor about which is preferred in your context.

Results: The Results section presents the raw data that you generated in your experiment and provides the evidence you will need to form conclusions about your hypothesis. Present only the data that is relevant to your results (but if you omit data, you may have to explain why it is not relevant). You can organize this section based on chronology (following your methodology) or on the importance of data in proving (or negating) the hypothesis (most important to least important). Present data visually whenever possible (in tables, graphs, flowcharts, etc.), and help readers understand the context of your data. Make sure you present the data honestly and ethically; do not distort or obscure data to make it better fit your hypothesis. If data is inconclusive or contradictory, be honest about that. In the Results

section, you should avoid interpreting or explaining your data, as this belongs in your Discussion section.

Discussion: The Discussion section includes your analysis and interpretation of the data you presented in the Results section in terms of how well it supports your original hypothesis. Start with the most important findings. It is perfectly fine to acknowledge that the data you have generated is problematic or fails to support the hypothesis. This points the way for further research. If your findings are inconsistent, try to suggest possible reasons for this.

Conclusion: In one or two short paragraphs, create the Conclusion to review the overall purpose of your study and the hypothesis you tested; then summarize your key findings and the important implications. This is your opportunity to persuade the audience of the significance of your work.

Acknowledgments: In a brief Acknowledgements paragraph, formally express appreciation for any assistance you have received while preparing the report (financial/funding support, help from colleagues or your institution, etc.).

References: In References, list all references you have cited in your report (such as those you may have included in a literature review in your introduction, or sources that help justify your methodology). Check with your instructor or publication guidelines for which citation style to use.

Appendices: Any information that does not fit within the body sections, but still adds valuable information to your report, can be placed in an appendix. Whereas your Results section may present summarized data, the full data tables may appear in an appendix. You may also include logs, calculations, or notes on analytical methods. Be sure to refer to your appendices in the body of your report to signal where readers can find additional information. You may include more than one appendix: Appendix A, Appendix B, etc. They are not numbered.

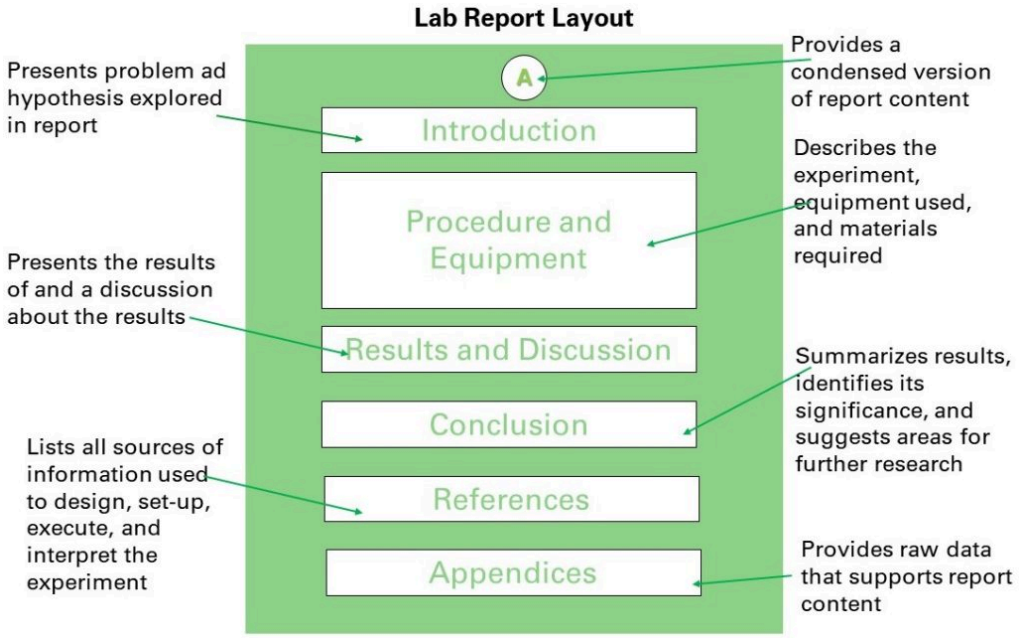

Figure 10.6.2 *Typical layout of a lab report (Ewald, 2017).*

How you write up the results of a scientific experiment will generally follow the formulaic pattern described above and shown in **Figure 10.6.2**, but this may vary depending on audience and purpose. As a student, you are often writing to demonstrate to your instructor that you have mastered the knowledge and skills required in a particular course. But remember that science writing generally focuses on the observable results, not on your "learning experience." Your report should include what anyone doing this experiment might observe and conclude; these do not typically include personal reflections. In the professional academic world, your report may have to pass through a rigorous peer-review process before being published in a scholarly journal. As a professional, your work may result in the development of products and services that will be used by the public, so documenting your process and findings has financial, safety, and legal implications. It is therefore critical that your writing is accurate and ethical.

Knowledge Check

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A Note on Scientific Writing Style

Lab reports are often written using the past tense, 3rd person, and passive verb constructions when describing what was done and what was observed. Why do you suppose that is?

Strict adherence to this style has in recent years been relaxed somewhat, and you might find more science writing that uses first person and active rather than passive verb constructions. Can you think of reasons why this is changing?

Additional Resources

For a fun example of a process report that is similar in many ways to a lab report, see **Drafting Behind Big Rigs – Mythbusters Report** (.pdf)

When evaluating scientific literature that you read, you might find the following TED-Ed video by David H. Schwartz helpful: Not all Scientific Studies are Created Equal.

References

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10.7 Sustainability reporting

Businesses have traditionally focused on their performance on financial and accounting information. It is only in recent years that the business community has shifted to additional metrics — in terms of environmental and societal impact — to assess their business performance. Over the past decade, **sustainability reporting** has been increasingly adopted by corporations worldwide. In fact, in Canada alone, 91 percent of companies report on their sustainability and environmental, social and governance (ESG) performance ("KPMG in Canada Report," 2022).

ESG reporting is not yet mandatory in Canada, with the exception of federally regulated financial institutions (banks and insurance companies). In Canada, the Canadian Sustainability Standards Board (CSSB) was launched in 2022 to "advance the adoption of sustainability disclosure standards in Canada" (FRAS Canada, n.d.) "The CSSB develops Canadian Sustainability Disclosure Standards (CSDS) that align with the global baseline standards developed by the International Sustainability Standards Board (ISSB) – but with modifications to serve the Canadian public interest" (FRAS Canada, n.d., para. 1).

For now, sustainability reporting currently focuses on two main goals:

1. Documentation and assessment of an organization's environmental and social impact
2. Communication of a company's sustainability efforts and progress to stakeholders

Sustainability reporting typically focuses on comparing performance in the current year to the previous year and comparing it to specific goals and targets. It can also include a longer-term focus and comparisons to other companies in similar industries and in the same geographic areas.

Sustainability reporting is also referred to as "triple bottom line" reporting, meaning that it takes into account not only the financial bottom line of a company but also the environmental and social "bottom lines" for a company. Sustainability reporting reflects the interrelated progress of a company in the three areas — also referred to as **people, planet, and profit**.

Sustainable data metrics

For businesses to understand and improve corporate sustainability performance, organizations need accurate **carbon**, **energy**, **toxics**, **waste**, and other **sustainability data**. While traditional business financial statements — such as balance sheets and net income statements — may help a business determine if it is financially sustainable (an important part of business sustainability), they are alone inadequate in measuring a company's environmental and social progress.

Just as there are accounting standards, such as generally acceptable accounting principles (GAAP), to provide organizations with a common "language" of reporting financial information, there are also

standards and processes that have been developed for organizations to measure and communicate their position and progress on sustainability.

Watch this video produced by IBM that explains sustainable data metrics.

The corporate sustainability report

One of the most important aspects of sustainability reporting is the communication of the information so that it can be evaluated by stakeholders. For most businesses, the most visible form of sustainability information communication is in their annual corporate sustainability report. This has become an increasingly common document released by major companies and is typically featured on their websites. Many companies will have a section of their website specifically dedicated to highlighting their initiatives and outcomes relating to sustainability. Sustainability information can be included on consumer packaging or other marketing pieces to help brand the sustainability efforts of the company and assist consumer choice.

Companies may not always call this document an annual **sustainability report** or **environmental, social and governance** (**ESG)report**; it could also be called a **corporate social responsibility report**, **corporate responsibility report**, **global responsibility report**, or many other variants, but they all represent an annual report that discusses the ecological, economic, and social impacts of the company. While each company's annual sustainability report is different and tailored to the organization, there are often several key common features in a sustainability report.

Key common features of an annual sustainability report include the following:

- **Executive introduction.** A statement from the CEO or other prominent officials at the company discussing the importance of sustainability for their company and discussing how sustainability integrates into their organization.
- **Performance summary.** A summary of goals, sustainable performance indicators (SPIs), and key events related to sustainability over the past year. Many sustainability reports base their presentation of information on the Global Reporting Initiative (GRI).
- **Detailed sections.** These sections provide more in-depth discussion of areas of sustainability highlighted in the performance summary. At a minimum, reports will typically discuss economic, environmental, and social impacts. But there may be dedicated sections for specific areas, such as the supply chain or corporate governance.

Table 10.7.1: ***Sustainable performance indicators***

SPI Type	Types of Information
Economic performance indicator	Company turnover, profit, quantity of products sold, and market share
Social performance indicator	Customer satisfaction, data protection & privacy, gender and diversity, employee engagement, community relations, human rights, labour standards
Environmental performance indicator	Climate change & carbon emissions, air and water pollution, biodiversity, deforestation, energy efficiency, waste management, water scarcity
Governance performance indicator	Board composition, audit committee structure, bribery and corruption, executive compensation, lobbying & political contributions, corporate culture, whistleblower schemes

Note. **Table 10.7.1** highlights the most common sustainable performance indicators that are used to evaluate an organization's sustainability practices over the past year. Adapted from Canada Energy Sector, 2023.

Conclusion

Businesses have become increasingly more sophisticated in their aspirations and approaches to sustainability—including an embrace of greater transparency—which has translated into tools and sustainability evaluation methods that continue to improve and expand over time.

Currently, there are a number of guides and toolkits online to assist organizations with their ESG reporting.

ESG Resources

- CPA Sustainability: A library of sustainability resources for Charted Professional Accountants.
- Bank of Canadian Entrepreneurs (BDC): A site that contains reporting templates for both ESG and EDI intiativies.
- Government of Canada – Corporate Social Responsibility: A government of Canada website that features an implementation guide for Canadian businesses, corporate social responsibility toolkit, sustainability roadmap, and other useful resources.
- SHIFT: An online platform containing sustainability frameworks and ESG tools.

Sample ESG reports

- Canadian Tire
- City of Toronto

- Loblaw Companies Ltd.
- Scotia Bank

Other resources

- Seneca Libraries Sustainability Guide
- The 17 sustainable development goals

Attributions

Content has been adapted from:

"The Sustainable Business Case Book" by Ross Gittell, Matt Magnusson and Michael Merenda, Saylor Foundation is licensed under CC BY-NC 4.0

References

Big Shifts, Small Steps – Canadian Addendum: Survey of Sustainability Reporting 2022. KPMG, 2022.

"Canadian Sustainability Standards Board." w*ww.frascanada.ca*, www.frascanada.ca/en/cssb.

Government of Canada, Canada Energy Regulator. "CER – the Canada Energy Regulator and ESG – Overview of Environmental, Social, and Governance (ESG)." w*ww.cer-Rec.gc.ca*, 27 Nov. 2023, www.cer-rec.gc.ca/en/about/publications-reports/canada-energy-regulator-esg/canada-energy-regulator-esg-overview.html?=undefined&wbdisable=true. Accessed 1 Mar. 2024.

11. PRESENTATION SKILLS

Oral presentations may be one of the most anxiety-inducing prospects for many students and professionals alike. Yet the ability to plan your presentation, use available technologies, and speak clearly and confidently in public is an important competency in the workplace.

Since there is an enormous amount of information on this topic available on the internet, and since "showing" is often more effective than "telling," links to several online resources are included to help you sort through and find credible and authoritative sources of information and sample presentations to help you learn more and develop your own presentations.

Chapter 11 Learning Objectives

This chapter will help you develop confidence and skills in presenting information orally, both individually and as a team, and in designing visually effective presentations in person and virtually by focusing on the following areas:

11.1 Applying skills and techniques that will help build your confidence as a presenter

11.2 Developing presentation skills by using a systematic process to practice delivery and use visual rhetoric

11.3 Using software features and slide tools to design your presentation

11.4 Using collaboration skills to effectively present as a team

11.5 Extending and applying your skills to present virtually

11.1 Building Confidence as a Presenter

MONIKA SMITH AND SUZAN LAST

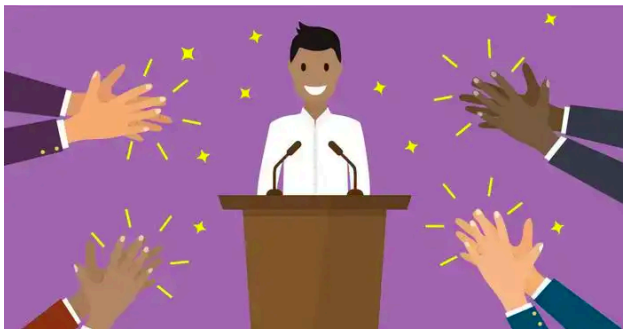

Figure 11.1.1 *A confident public speaker (TED Masterclass, n.d.).*

"Even the greatest was once a beginner."

Muhammad Ali

"All the great speakers were bad speakers at first."

Ralph Waldo Emerson

In this section, you will find some practical steps for becoming an effective public speaker, based on the principle that no matter how much of a novice or an expert you are, there's always something to learn and room to improve. If you feel anxious about speaking in front of others—and, admittedly, most people do—then the steps, information, and additional resources provided here will help build your confidence, give you some stage tools to work with, and direct you to resources to further solidify your learning.

Before you begin the process of building skills, watch the video below, How I Overcame My Fear of Public Speaking (2017) by Danish Dhamani, then consider the preliminary steps that follow.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=254#oembed-1

Knowledge Check

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Preliminary Steps

1. Acknowledge the Challenge: The first thing to acknowledge up front is that, aside from extroverts (a minority of the population), most people dislike, if not actively shudder at, the idea of public speaking. For many people, even those who have to speak as part of their job, the mere thought of speaking in front of a crowd can evoke feelings of doom and gloom: furrowed brows, shaking hands, trembling voice, and palpitations.

Figures from a range of sources show you're in good company:

- From a 2015 Canadian Cancer Society survey: 33% of the 1500 people surveyed feared public speaking the most.
- From a Statistic Brain survey quoted in *Forbes*: 74% of people suffer from a fear of public speaking (Zimmerman, 2017).

Hence, if you'd like to become an effective public speaker but feel anxious at the prospect of actually *doing* public speaking, you're not alone. Your fear of public speaking isn't a personal failing; it's a common human response.

The good news, of course, is that fear of public speaking can be overcome. Some of the most famous voices we know initially struggled as speakers: James Earl Jones, the voice of Darth Vader in *Star Wars*, overcame tremendous personal and social anxieties to "find his voice" and in doing so, got to the point where he could comfortably and confidently speak up and speak out (Jones & Niven, 1993). You can too.

2. Recognize the Costs and Benefits: Acknowledge the personal and professional costs of remaining stuck and not tackling the challenge that speaking before others can pose. Unfortunately, even if employees have strong technical skills, an admirable work ethic, and intelligent, innovative ideas, if they struggle to speak confidently and coherently in a public or workplace setting, they may find it difficult to make a strong positive impact. For example, fear of public speaking can

- lead people to believe they're less competent and worthy than they are,
- keep their ideas from being heard and acted on, and
- become a glass ceiling in their own career and thwarting advancement.

Being unable to persuasively communicate your ideas in front of a group or audience means that, more likely than not, your ideas, skills, and potential—qualities that could have helped solve a problem and made a positive impact—don't get heard.

All these negatives stand in sharp contrast to what can be achieved with a strong, persuasive, confident voice. Once you commit to developing your voice as a presenter, you'll find that speaking up is both

liberating and empowering: It not only allows your ideas to be heard, it enables you to accomplish the goals you set. Putting effort into developing your professional speaking skills will pay off in the long run, maximizing your potential as a professional.

3. **Commit to Learning:** Whether public speaking makes you anxious or whether you enjoy taking center stage, everyone can learn how to become a better public speaker. Regardless of where you are on the public speaking spectrum, you can always develop your skills by learning about and practicing the tips, techniques, and strategies that successful public speakers use to inform, persuade, and even inspire their audiences.

4. **Commit to Thorough Preparation:** Whether you are presenting to a small group at a workplace meeting or to a larger crowd at a conference, completing a thorough preparation will help to build your confidence in the material you will be presenting. Knowing your materials will help to lessen your anxiety and allow you to take some pleasure in the speaking experience.

You may be interested in reading more about overcoming presentation anxiety. Michael J. Gelb, in *Mastering the Art of Public Speaking* (2020), offers a lively, straightforward "how-to" approach to public speaking, paying special attention to how to overcome your fears and feel more confident. In short, it's all about preparation.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=254#h5p-90

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11.2 Developing Presentation Skills

SUZAN LAST; MONIKA SMITH; AND ROBIN L. POTTER

Like any kind of advanced communication skill, the art of giving effective presentations is not in-born; it requires deliberate practice. View the video below for some tips on giving effective presentations.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=257#oembed-1

(7 Tips to Overcome Your Fear of Public Speaking, 2017)

An excellent way to learn more about delivering effective presentations is to follow a systematic process:

1. Observe others.
2. Study their strategies and reflect on their effectiveness.
3. Select and practice strategies that will work for you; reflect and get feedback from others.

Step 1: Observation

You can learn a lot simply by observing how successful public speakers "work the room" and engage their audience. Observe what they do. How do they use their voice to make it work as a tool of communication? How do they deploy tone, pausing, pacing, and projection? What do they do with their hands? How do they make use of the physical space around them? Take note of how speakers physically operate, either in person or in media: Identify what they do, make note of what you feel works well and what doesn't, then put what you've learned into practice.

As a student, you might start by observing your professors. Aim to identify what makes one professor a great lecturer and another less engaging. Compare what they do with their voice, their hands, their gestures, their movements. Pay attention to how they pace their talk to draw you in and create emphasis. Reflect on what they do to convey a sense of enthusiasm for what they're talking about—or fail to do so. You want to know what kinds of things to avoid—a dull monotonous tone, for example—as well as what kinds of things to adopt to ensure your voice comes across as a powerful tool for communicating your ideas clearly and emphatically.

EXERCISE 11.2.1: Observation in Action

Whether observing your favourite professor give a lecture; watching your favourite podcaster, TV or YouTube presenter; or viewing the videos linked below, turn your observations into an active learning experience: Create a list of what the speakers do well *as speakers*, and then use them as role models. The goal is to create a toolkit of practical tips, approaches, and ideas for building confidence, developing your own "spark" as public speaker, and engaging your audience. In short, watch, observe, and learn.

Here are some public speakers on film that you may enjoy watching and learning from:

- **Really Achieving Your Childhood Dreams** by Randy Pausch (2007), computer scientist (Carnegie Mellon). As you watch the video, make note not simply of what he says, but *how* he says it.
- **The Wisdom of a Third Grade Dropout Will Change Your Life** by Rick Rigsby (2017) offers a glimpse into the impact of storytelling on supporting key ideas.
- **The Joy of Stats** by Hans Rosling (2010) offers an engaging and inspiring description of 250,000 data points from over 200 years for 200 countries—in 4 minutes flat!

As you are watching these presentations, take note of the following characteristics to build a short inventory of elements you would like to emulate in your own presentations:

1. **Openings:** How do the presenters open their speeches? How do they introduce the topic? Do they straight-away announce their main point, or do they engage the audience first and lead into their thesis?
2. **Transitions:** How do the presenters move from one idea to the next? Do they pause and announce the next topic, or do they smooth the flow of ideas by using transition devices and thematic content?
3. **Tone and style**: What tone is used to present the information? Super serious? Humorous? A balance of both? Is the content high-information focused, or does it consist of a balance of high information and story-telling?
4. **Voice and facial expression:** How is voice used to support the tone and the content? Is the speaker using a mono-tone or is the speaker modulating voice for emphasis and engagement? Do you *feel* the ideas as well as *hear* them? Is the speaker smiling and showing enjoyment in the speaking process? Is the speaker looking down and reading text, or is the speaker looking outwards and making eye contact with the audience?
5. **Gestures:** How is the speaker making use of the body and gestures to emphasize ideas and engage the audience?
6. **Closing:** How does the speaker close the presentation? Are you left with a memorable statement that will help you remember the key point?

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=257#h5p-91

Step 2: Study and Reflect

Learning from experts who lay out a set of simple techniques is a confidence builder because it shows that great speakers are made, not born. With deliberate practice, anyone can do this. There are no mysteries, just specific, applicable strategies that *anyone* can adopt to establish rapport with an audience and make a meaningful impact.

Here are some more great online resources to help you develop your presentation skills further:

- Better Public Speaking (MindTools)–(Look in the menu to the left of the screen for more resources)
- Toastmasters 5 Tips for Public Speaking (YouTube)
- 10 Most Common Rookie Mistakes in Public Speaking – Terry Gault (Prezi Blog)
- The Power of Your Hands – Allan Pease (TED)
- How to Sound Smart in your TED Talk – Will Stephen (TED)

Videos are helpful because they not only provide information, but visually demonstrate the ideas (both showing and telling); however, you can also learn from many books on the subject. Check out Lee LeFever's, *The Art of Explanation: Making your Ideas, Products, and Services Easier to Understand* (2012), which invites you to become an "explanation specialist" by using simple elements to motivate your audience and inspire them to say "yes!" to your designs and ideas.

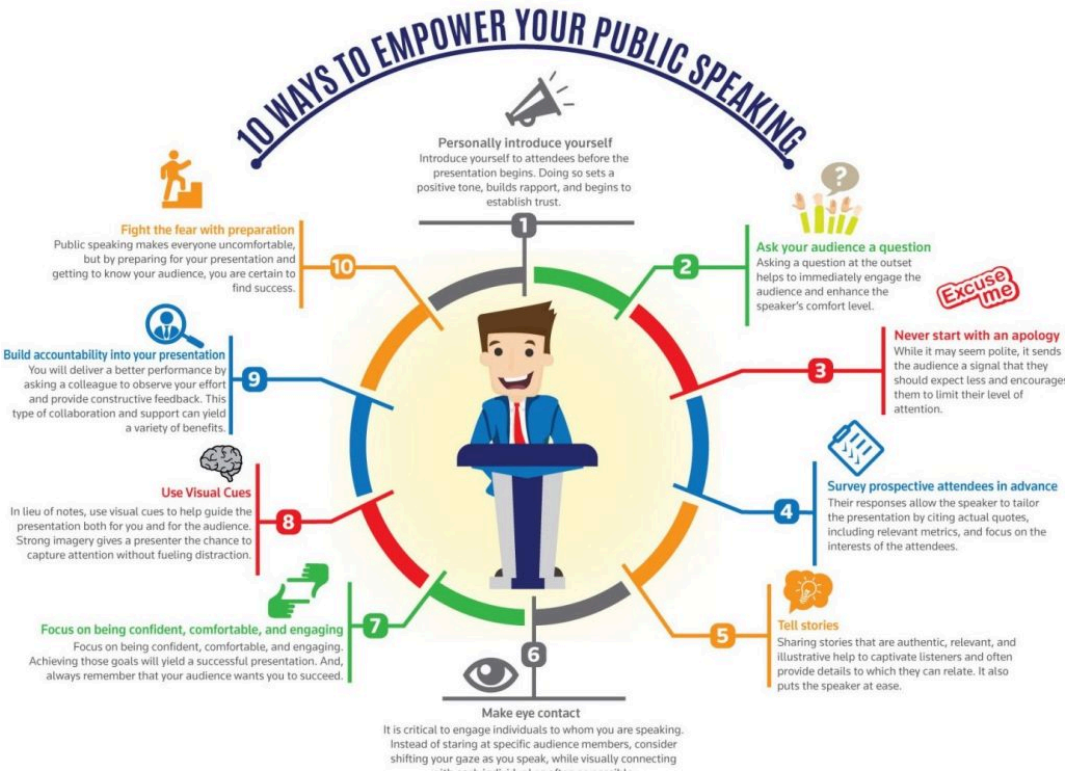

Figure 11.2.1 *Tips to make you a more effective public speaker ([The Impact Lawyer,](#) 2023).*

EXERCISE 11.2.2

Take notes from the sources while you study them. Making written notes about points you want to remember is an effective way to promote deep learning. As you watch each of the videos, identify two-to-three key tips. If you are doing this activity in class, share your "top two" tips with classmates and make note of their "top two" tips in turn.

Then consider the value of the tips and strategies you've compiled. What makes them seem to work so well and, equally important, how could you feasibly incorporate them into your presentations to make them your own?

Step 3: Practice and Assess your Progress

Now that you have identified strategies that you find effective and think might work for you, try putting them into practice. See if the strategies you have learned add some extra "oomph" to your presentation style. Try creating videos of your own practice sessions. Use them to observe your

technique and to improve on your delivery. Either by engaging in self-reflection, or by asking for feedback, consider how well these strategies worked for you and whether you need to further hone, adapt, or change the way you used them. These "draft" videos allow you to focus on aspects such as voice, volume, pace, and gestures. Reviewing these will help you build confidence, speak fluently, and hold an audience's attention.

EXERCISE 11.2.3 Build your repertoire

Just as you did when watching your videos, make a list of key tips that you want to adopt as a presenter. Select a "top three" strategies, reflect on those three, rehearse them and put them in practice when you get a chance. Going through these steps will get you primed and ready to put the tips into play when the time comes to actually deliver your talk. Keep adding tips to your repertoire until you've got a good, well-rounded set of strategies designed to keep your audience alert, engaged, and wanting to hear more!

Knowledge Check

View the video below and answer the questions presented.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=257#h5p-92

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11.3 Designing Your Presentation

SUZAN LAST AND ROBIN L. POTTER

How you organize the contents of your presentation and how you design your slide deck will help to determine whether or not your message is conveyed in its most powerful form. This chapter will focus on speech structure and on slide design.

Speech Structure

You are by now familiar with the conventions of technical correspondence and report structure: introduction, background, details, conclusion. This structure forms the backbone for most messaging in technical fields. Many presentations are created using this simple structure as well, often melding the introduction and background together to save on time. The key message would constitute the high point of the presentation, followed by information that supports that point. This "triangle-shaped" structure is used commonly.

To determine how your presentation should be constructed, consider your purpose. In technology, the purpose often falls within the following, according to David McMurrey (1997-2017):

- ***Informative purpose:*** A presentation can be primarily informative. For example, as a member of a committee involved in a project to relocate the plant, your job might be to give a presentation on the condition of the building and grounds at one of the sites proposed for purchase. Or, you might be required to go before the city council and report on the success of the new city-sponsored recycling project.
- ***Instructional purpose:*** A presentation can be primarily instructional. Your task might be to train new employees to use certain equipment or to perform certain routine tasks.
- ***Persuasive purpose:*** A presentation can be primarily persuasive. You might want to convince members of local civic organizations to support a city-wide recycling program. You might appear before city council to persuade its members to reserve certain city-owned lands for park areas, softball and baseball parks, or community gardens.

When creating a presentation that has a persuasive message, you have structural options. You can organize your content using the traditional "triangle" method, or you can use the "what is, what can be" comparative method shared by Nancy Duarte in her presentation below *The Secret Structure of Great Talks* (2011). In this presentation, which offers a great example of effective persuasive presentation structure and design, Duarte reveals that speeches that have changed society make use of this "what is, what can be" structure, which compares what the current situation is to what the situation can be in its improved form after your great idea is implemented. Keep this structure in your toolbox for times when you want to persuade the reader to implement a new procedure, accept a proposed project, or sell a new product, for example.

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Knowledge Check

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A Brief Overview of PowerPoint

Even the most dynamic speakers often make use of visual aids to accompany their presentation and help illustrate their ideas. Having well-designed visuals as part of your presentation is one way for presenters to add interest and audience engagement to their talks. Despite much discussion on the pros and cons of this medium, PowerPoint is probably the most common software used to create presentations using visual aids. While many other presentation tools are worthy of your consideration, PowerPoint is a standard, versatile workplace tool, so it would be wise to gain proficiency with it. The key concept to remember is that your visual aids should *supplement* and *illustrate* what you want to say to your audience.

When designing a PowerPoint presentation, it is helpful to be familiar with the key terminology used to discuss the various elements.

- **Deck**: The deck is the entire presentation (all the slides in the presentation; see **Figure 11.2.1)**.

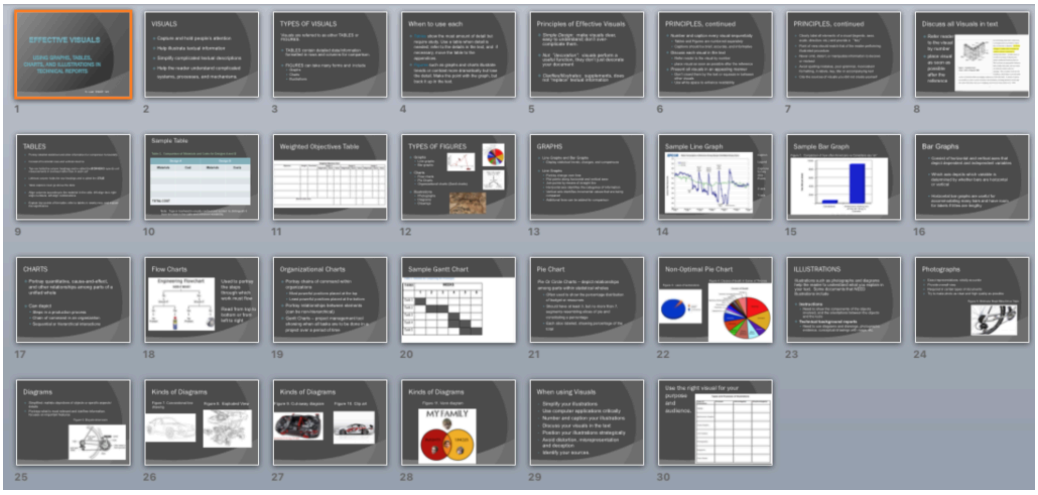

Figure 11.2.1 *PowerPoint Deck*

- **Gloss**: Gloss is what the speaker says about each slide. The speaker should not simply read what is on the slide. Slides should have minimal text in the form of keywords and short bullet points. It might include key quotations. The speaker should elaborate on what is written or shown on the slide.
- **Slide**: The slide is one "page" of the presentation (**Figure 11.2.2** shows one slide from the deck above) with the various elements identified. **Note the source entry for the image at the bottom of the slide. Even images must be cited!**

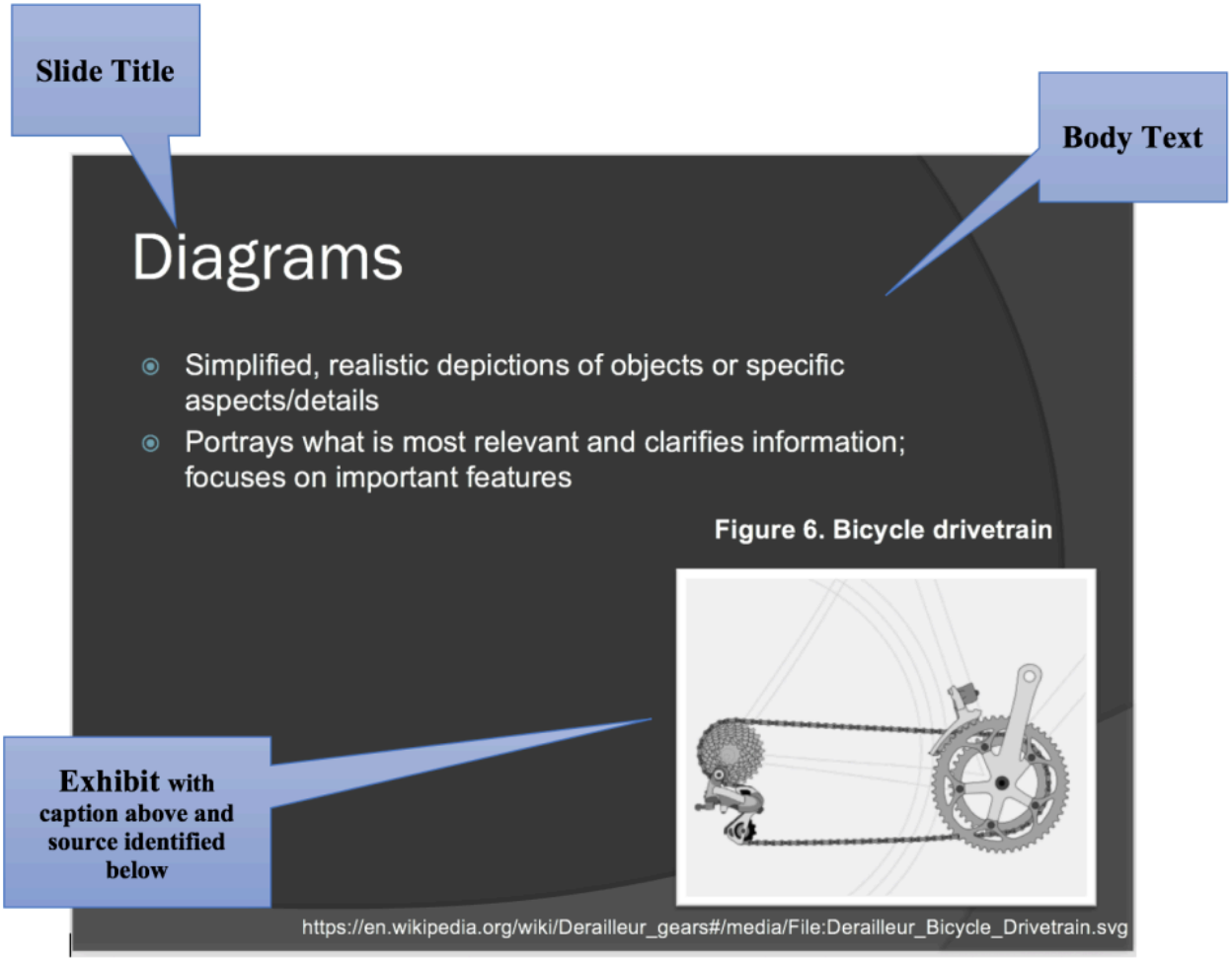

Figure 11.2.2 *PowerPoint slide (Keithonearth, n.d.).* CC BY-SA 3.0.

- **Slide Titles**: Usually at the top of the slide, the titles acts as "headings" indicating the topic to be discussed in each slide.
- **Body Text:** Body text is the written text on the slide, often in the form of bullet points or key terms. This text should be kept to a minimum (keywords/phrases; quotations you want to read out loud). Don't write your "script" in the slide's body text.
- **Exhibits**: Exhibits are illustrative graphics on the slides that are glossed in the presentation. You should discuss graphics and explain what is important about them.
- **Decorative visuals**: Decorative visuals are slide motifs, themes, and other non-essential images that add visual appeal to the slides, but do not illustrate substantive ideas.
- **Sources:** Citation notes indicating the sources for images.
- **Notes**: The section underneath the slide where you can write notes you want to cover in your gloss. The audience will not see the "notes" portion.

You may want to view sample presentations: Click on the presentations listed below or take a look at the PowerPoint decks that accompany this textbook to see detailed examples of effective presentation decks.

Sample PowerPoint Presentations Using Traditional Structure

PowerPoint Presentation on PRESENTATIONS (.ppt)

Definitions in Technical Writing – Sample student presentation (.pdf) (Created by Isaac Morton)

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=262#h5p-94

Designing Slides for Technical Information

You will probably be most familiar with the slide design illustrated above, with each slide containing a title and content consisting of bullet points. You will see this design in most of your professors' lectures. Though it is the most commonly used slide design, it has also been criticized as being too rigid and resulting in poor long-term information retention. When this traditional slide design was compared to the assertion-evidence slide design discussed below, researchers discovered that using assertion-evidence slide structure resulted in deeper learning and understanding (Garner, et al. 2011).

Assertion-evidence slide structure, pioneered by Michael Alley at Penn State University, consists of a statement, or assertion, usually placed where the slide title would normally be placed. Among other types of content, the body of the slide would then include (excerpted from McMurrey, 1997-2022):

- **Drawing or diagram of key objects:** If you describe or refer to any objects during your presentation, show visuals of them so that you can point to different components or features.
- **Tables, charts, graphs:** If you discuss statistical data, present them in some form or table, chart, or graph. Many members of your audience may be less comfortable "hearing" such data as opposed to seeing them.
- **Other research data or information:** Usually presented in text or charts.

Below is a video by Robert Yale (2013) that reviews conventional PowerPoint disadvantages, studies in information retention, and the assertion-evidence structure. If you want to learn how to create slides using this method and see examples, please view this video as it is a good primer.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=262#oembed-3

Visual Rhetoric

PowerPoint is not the only visual medium you might use. Posters, infographics, and other kinds of displays can also work to effectively convey your message if they are well designed. Considering how to present ideas visually can be as important as determining what to say. Here are some resources to help you design visual information in a rhetorically effective way:

Visual Rhetoric page from the Online Writing Lab (OWL) at Purdue University

Rule of Thirds (Wikipedia)

Psychology of Font Choices (The Daily Egg)

Putting It All Together

As you deepen your knowledge of general slide deck design, check out these two texts, which are considered key primers on the topic of presentation design.

- Garr Reynolds, ***PresentationZen: Simple Ideas on Presentation Design and Delivery*** provides a clear, easy-to-read set of tips for cutting through the noise and blather of modern life and reaching an audience through simple, pared-down slides and story-telling: two techniques that can help you connect with and inspire your audience in an authentic, genuine way.
- Nancy Duarte, ***Slideology: The Art and Science of Creating Great Presentations*** looks to the role of presentation software in the visualization of ideas and information. Its goal is to turn you into a "visual thinker" so you can design presentation graphics that enable your audience to easily and effectively process data—an especially valuable skill for technical presenters who often have to convey complex data in meaningful ways to non-technical audiences. Review the video below for a video explanation of these principles.

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(How to Create Better Visual Presentations, 2014)

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=262#h5p-95

Note: Some of the contents of this chapter have been adapted from David McMurrey (1997-2022), *Online Technical Writing: Oral Presentations*. *https://mcmassociates.io/textbook/oral.html* CC by Attribution 4.0

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11.4 Presenting as a Team

SUZAN LAST AND CANDICE NEVEU

Since many projects are undertaken in teams, presentations related to those projects are also often given as a team. Presenting coherent and engaging information as a team takes practice and coordination, and while different team members may share the work by being responsible for different elements of the preparation and delivery, sometimes giving a presentation as a team can entail more work than doing a solo talk. View the video below for team presentation strategies.

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(Delivering a Successful Team Presentation, 2021)

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=265#h5p-96

Below are some useful resources that provide information on things to consider when presenting as a team.

Resources on Presenting as a Team

How to Coordinate a Team Presentation (Coursera: Oral Communication for Engineering Leaders) (4:45 min.)

This video resource is presented by two professors who teach at Rice University in Engineering Leadership. They model and discuss how to coordinate a team presentation.

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20 Things that Great Presenting Teams Ask Before They Open Their Mouths (Inc. com)

In this article, communications expert Deborah Grayson Riegel poses 20 questions that you should consider as a team in preparing for your presentation. This is a great list and would help your team consider perhaps the less obvious things.

Ask the Experts: Presentation Strategy for Team and Group Presentations (Total Communicator e-zine)

Peter Guiliano, communications consultant and Chairman of Executive Communications Group, provides tips on preparing and delivering successful team presentations.

---

10 Rules for Presenting as a Team (Public Words)

Nick Morgan PhD, a communications professor and coach, offers some advice for team presentations. While some information overlaps with the sources above, he does offer some additional tips and suggestions that may be of interest such as ways to handle a discussion.

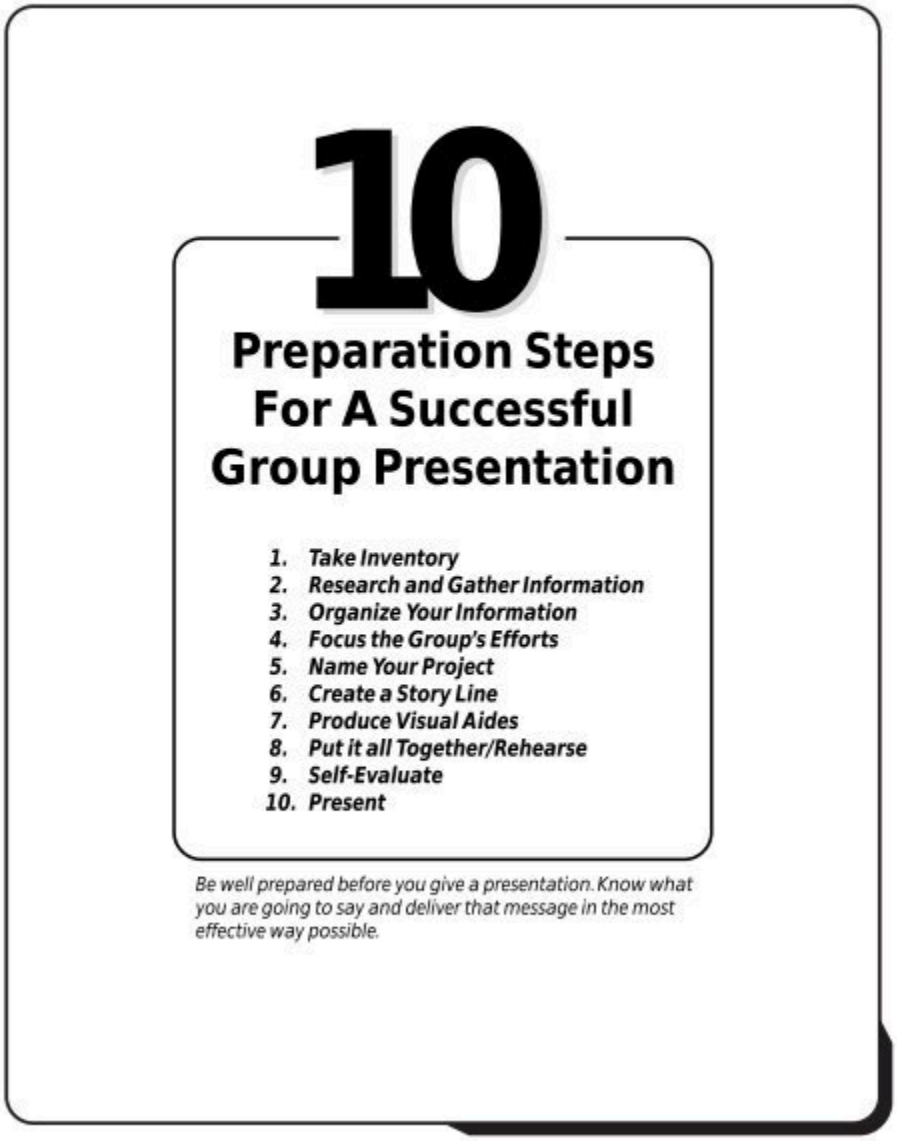

Figure 11.4.1 *A few tips teams can follow to deliver a stellar presentation (iptv.org, 2014).*

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11.5 Presenting Virtually

ROBIN L. POTTER

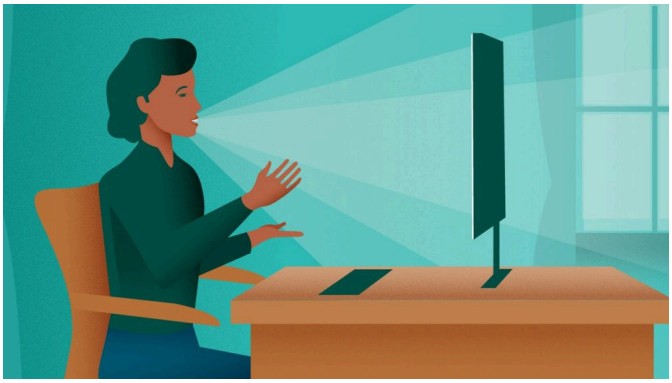

Figure 11.5.1 *Position yourself well in front of the monitor for a professional virtual presentation (Lowenbraun, n.d.).*

The global pandemic of 2020-2021 gave companies, organizations, institutions, and their employees a time to pause and assess how they can use their time and resources to their advantage. Telecommuting in many cases was the only way that businesses and industries could continue to operate amid pandemic shut-downs and restrictions. These organizations discovered that they could operate effectively while lowering overhead costs, even when employees worked from home. The big shift to the "work from home" (WFH) model required that companies ramp up digital communication strategies and that employees quickly learn them so that businesses could survive. Now, especially since the WFH model appears to be a lasting change in the way businesses operate, virtual meeting tools have become a routine part of daily workplace communication.

Using communication technologies effectively is a necessity if businesses and industry are to thrive. While many are familiar with email and text messaging, not everyone is comfortable with software that enables face-to-face, or virtual, meetings. Yet such software enables businesses to conduct meetings when employees and other relevant parties are not in the same location. And with global business on the rise, this software can help to facilitate international communication and information sharing while reducing travel and other costs.

At these virtual meetings, you may be asked to deliver some information or even a more formal presentation. Drawing on experience, this chapter will focus on key principles to assist you in delivering an effective presentation using virtual meeting software. Most meeting software contains the same basic tools, but these tools may be built into the interface quite differently. Given the zooming popularity of Zoom Video and Web Conferencing during the pandemic, we will use Zoom as a model when referring to specific functionalities.

Preparing for Your Virtual Presentation

While previous chapters addressed the planning process that goes into creating any presentation, when delivering a presentation virtually it is good practice to develop some key habits to ensure

that the presentation goes smoothly. Presenting from home can have certain challenges, so being prepared will go a long way to creating a polished and professional image.

1. **Invitation Link:** Ensure that you have the invitation link for the scheduled presentation. If you are not the one who is organizing the meeting at which you will be presenting, make sure that the person who is has sent you the invitation with the link. When the meeting is set to begin, click on the link to join the virtual meeting. If you are organizing the meeting, ensure that you have shared the link with invitees. On the day of the meeting, resend the link to attendees so it is at hand. Launch the meeting software about 30 minutes before the meeting begins so you can ensure that the software is working as expected.
2. **Attire:** Wear professional clothing to convey a professional workplace image, even if you are delivering your presentation from the comfort of your home.
3. **Presentation Slide Deck:** If you are using a slide deck, open it and keep it at the ready in the bottom toolbar of your screen if you are using a laptop or desktop. During your presentation, you will be asked to share your presentation deck so attendees can view the slides as you are presenting. Keeping it at the ready will help you find it quickly when it is time for you to present and will prevent attendees from seeing your computer files.
4. **Mute and Video Buttons:** In Zoom, as in many other video conferencing software, you can mute yourself and pause the video while you listen to other speakers. Often, these settings are preset by the meeting organizer, so you will not have control over them. If you do have control, you can use the mute tool while others are speaking to avoid noise from your environs from being heard by everyone at the meeting. Gauge the context: In many businesses and industries it is expected that you do not pause your video so that everyone can see each other during the meeting.
5. **Chat Tool:** Most video conferencing software also includes a chat tool. When you arrive in the virtual meeting room, use it to type a greeting if everyone is muted. You can also use it to post questions when someone else is presenting. When you are presenting, it is likely that others will also post their questions to the chat. Sometimes, presenters prefer to field questions during the presentation, others prefer to address all questions at the end. You should come to an agreement with the moderator at the start of the presentation as to when you would like to field the questions and comments. The chat can also be used by the moderator to post links and other bits of information as needed during both text and verbal conversations. In any meeting, it is good practice to have a moderator who will respond to chat comments and relay questions to the presenter.
6. **Connect with Two Devices:** For technical demonstrations and training connect to the meeting with two devices: The first device will focus on your face or presentation deck, while the second device can focus on your demonstration and materials. Viewers can select which video they would like to view at any given time.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=269#h5p-97

Delivering Your Virtual Presentation

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(Oral Presentations, 2021)

Delivering a virtual presentation is luckily quite similar to delivering one in person. You will most likely use a slide deck, and you will also attend to the same elements of delivery, such as pace, tone, voice, gestures, and the like. The technology, however, offers some unique challenges; being aware of these and adapting your delivery will allow you to present more effectively.

1. **Interactive Tools:** Be prepared to use interactive tools like the chat, poll, reactions, and other tools to get the audience engaged and interacting during your presentation. In order for the audience to know what to expect and what to do, inform them about the use of these tools before you begin your presentation.
2. **Camera Angle:** Ensure that your laptop or desktop camera is at eye level. Too often, the camera is situated below eye level resulting in an unflattering view of the speaker's chin or nose.
3. **Posture:** Stand up. Deliver your presentation standing up. You will discover that you have more confidence and will have a more professional attitude than if you are seated.
4. **Lighting:** Ensure that you have sufficient lighting. You want the audience to see you well. Dim lighting can result in poor image quality.
5. **Background:** When meeting virtually from your home, ensure that you use a background that is suitable for a workplace video call. While a home office would be ideal, not all homes have such a space. In this case, choose a location that is suited for a business call. You can also opt to use a virtual background offered on some virtual conferencing platforms. Some also allow you to post your own virtual background. Avoid uploading a beach photo; rather, use an image depicting a more professional context.
6. **Distractions:** Ensure that you have taken the necessary steps to avoid distractions during your

meeting and especially during your presentations. We have seen televised clips of children and pets deciding to make entrances during virtual meetings. While charming, you want to avoid any interruptions while you present.

7. **Presentation Share:** Most video conferencing software will have the capability to share your slide deck to the screen so that the audience can view your slides as you deliver your presentation. With your slide deck at the ready on the bottom toolbar, simply click on the Share button in the video conferencing software then click on your slide deck to make it visible to the audience. Your host will have to make the sharing option available for all this to work.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=269#h5p-98

Wrapping Up

When you have completed your presentation, a few wrap-up activities typically occur, so be prepared for them.

1. **Questions From the Chat:** An engaged audience will post questions and comments to the chat tool. The meeting organizer or moderator will keep an eye on the chat comments and questions and will choose the appropriate time at the end of the presentation to convey them to you if you have not agreed to field the questions and comments earlier during the presentation.
2. **Break Out Rooms:** Advanced features in video conferencing software will include break out rooms where attendees can be divided into smaller groups for discussions. If you are the guest speaker and break out rooms are used, you will most likely be asked to visit each room to check in on the discussions and add your commentary. These break out rooms help to create a more personal approach to meetings.
3. **Sharing the Slide Deck:** Often presenters are asked to share the slide deck with the audience or with organizers of the meeting. If you agree, save your slide deck to a cloud storage file so that you can easily share the link to the slide deck.
4. **Sharing the Presentation Recording:** Zoom and other video conferencing tools enable recording of meetings and presentations. It is common courtesy for meeting organizers to ask for permission before recording any presentation. If you agree, the presentation will be

recorded, downloaded, and saved in a file. This file may be too large to be attached to an email message. Save the recording file to a cloud storage, then share the link via email or post it in a shared file that attendees can access.

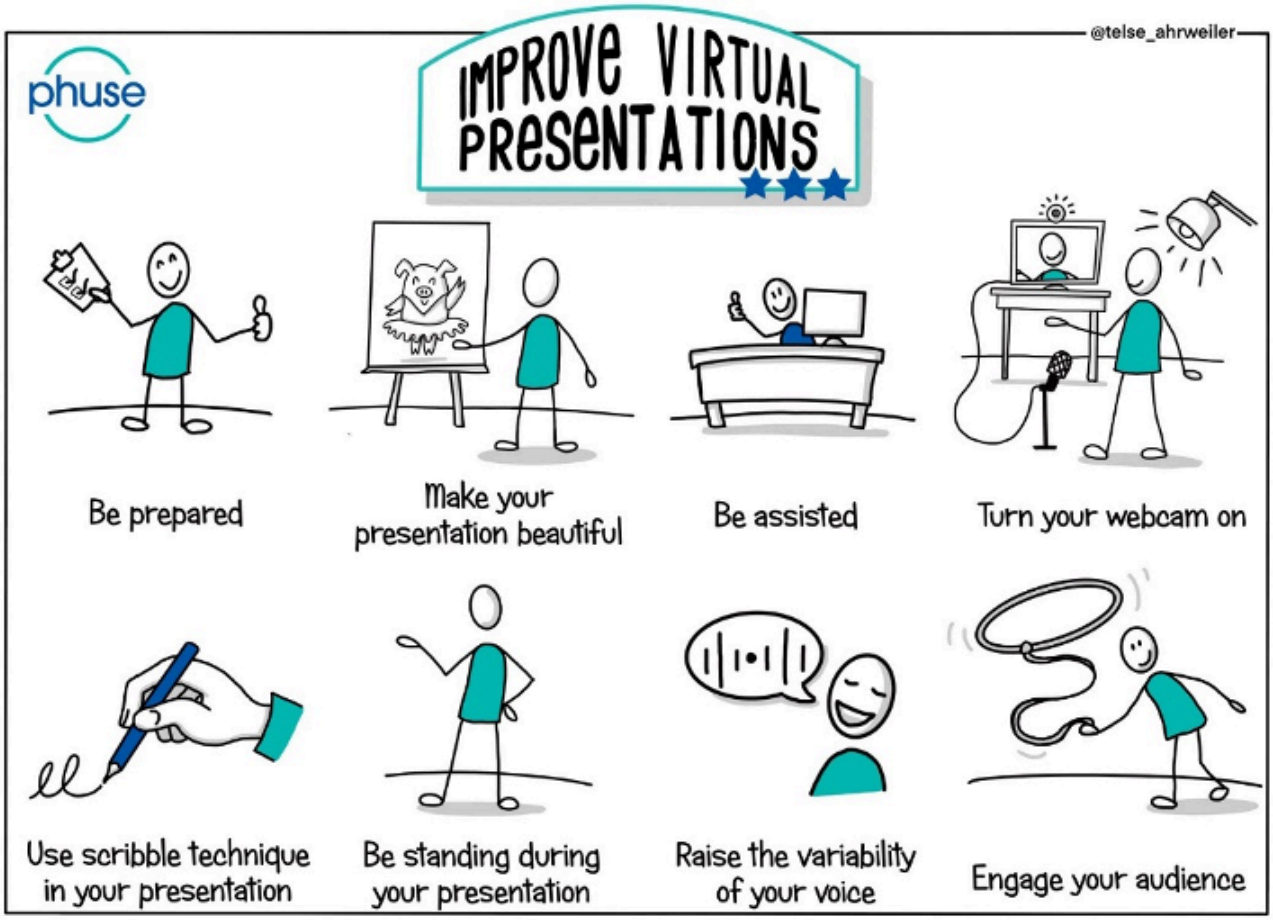

Figure 11.5.2 *A summary of tips to improve your virtual presentation skills. (PHUSE Blog, 2022).*

For additional tips on how to run effective virtual meetings, read [How to Run Effective Virtual Meetings] on MindTools.

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APPENDIX A: INDIGENOUS CONSIDERATIONS

Learning Objectives

Learn about the following topics:

A1: Indigenous History

A2: Truth and Reconciliation

A1: Indigenous Peoples: A Brief History

For many of us, information contained in history books is considered an accurate reflection of our past. But what happens when that information is not factual or true? What happens when history reflects the perspective of "those who held the most power [and] chose the stories that were to become a part of history" (Johnson, n.d., para 2). What happens when history is used as a tool of the powerful to justify and retain power? Canadian history, as told by history books, has "discounted, ignored, and erased from history" (Johnson, n.d., para 2) the existence and contributions of Indigenous peoples. This chapter looks to the seldom acknowledged vibrant life being lived on **Turtle Island** long before colonization by Europeans. If we are to understand the present, it is important to have more than the colonizers' version of history.

Pre-Colonial Contact

Typically, for decades, the Canadian history shared and taught began with colonization — with explorers and adventurers discovering a vast land that was sparsely populated by savages. Thankfully, that narrative is beginning to change. What can be said though with certainty about what life was like on Turtle Island before colonization?

Given the vastness and climate diversity of the land now known as Canada, it is important to consider how the way of life would have differed for people living in different regions of this land. One of the things that would have been common though is a connection to water not just for survival, but as a significant cultural signifier. The traditions and ways of life of the many nations across Turtle Island were influenced by the water features near them.

A lot of what is known about the way of life on Turtle Island pre-contact comes from the archeological evidence, but also from the journals and reports of the early colonists. We know that plants were being used for medicinal purposes, maple sugaring was common, and corn, beans, squash, rice, and other vegetables were being harvested.

Pan-Indigenizing, making overarching statements that apply to all Indigenous people, is problematic. This is especially the case when it comes to governance and leadership. From the stories and traditions that have been passed down, some communities were hierarchical, either with patriarchal or matriarchal leadership, while others relied solely on the circle governance model of all voices being heard in decision-making. It is also known that **Two-Spirit** people were highly revered and looked to for guidance as they hold the gifts of both genders and can see things from more than one gender viewpoint.

One final element of life to mention here is that of cooperation and sharing. Many alliances, confederacies, and treaties between nations were held long before colonization. These were always undertaken in the spirit of cooperation, the sharing of resources, trade, and peace.

For a detailed look at what is known about the way of life pre-contact, see: The Standard of Living Before European Settlement.

PBS aired a four-episode series called Native America that examines the way of life in the Americas before colonization. While heavily focused on the United States and South America, much can be learned about the history of the land we are presently on through this series. You can access the series through clips provided on the Native America in the Classroom website.

Colonial History and Legacy

It is important to understand that the history of colonization begins with rather peaceful and mutually beneficial interactions between Europeans and First Nations and Inuit populations. During first contact, Europeans relied on Indigenous people for successful trade and even survival. Early on there was an agreement between Indigenous people and Europeans to share the land. Both parties could see the mutual benefits of their trade relationship. This posture of friendship by Europeans was a facade used to win over trust in order to establish invasive strategies to displace Indigenous people.

A key strategy in the domination of Turtle Island is the Doctrine of Discovery; a doctrine of superiority that legitimized the colonization of sovereign Indigenous nations globally in the name of Christianity. This global take-over included the land of Indigenous people in what is now Canada.

The Doctrine of Discovery claimed that if land was vacant, it could be claimed by explorers in the name of the Monarchy. Since Indigenous people were non-Christian this meant they were less than human (savages), and therefore since the land was uninhabited by humans, Christian Europeans had the right to colonize whatever land they discovered.

The notion of *terra nullius*, meaning empty land, was also used to legitimize colonization. If the land was empty of humans, it was free for the taking. Since Indigenous people were non-Christian, they were uncivilized, nonhuman, or savage, and therefore the land was terra nullius and taking it was justified.

The Royal Proclamation

The Royal Proclamation of 1763 is a document that outlined European settlement of Indigenous land. King George III issued this document to provide guidelines of how Britain could claim territory. While much of the language in the Royal Proclamation of 1763 can be difficult to understand, the essence of the Proclamation is that Indigenous rights and territory are recognized by the Crown (at the time the British King but now the federal government). The Proclamation acknowledges that Indigenous title to land will continue to exist and that it would continue to exist as such unless ceded by a treaty. At the time, it was only the Crown that could purchase land and anyone that wished to buy land had to buy it from the Crown.

Although the Proclamation promises protection of Indigenous lands (when the proclamation states: their land shall never be *molested* or *disturbed*), this is still a colonial document that establishes a colonial view of land as possession. Also, it is a document that was created without the consultation of Indigenous peoples.

The Royal Proclamation of 1763 is still a legitimate official document. Despite this, the settlement of Europeans began to grow in numbers, mostly without consultation or negotiation with Indigenous peoples of the territory. Sometimes, however, *treaties* were established between Indigenous peoples and the government to ensure Indigenous people were compensated for the land taken, although the *fairness* of these treaties are contested.

The following video provides an overview of the Royal Proclamation of 1763 and its impact.

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The Indian Act

Although Indigenous people had laws that were established long before colonization, the federal government wanted a more structured relationship of control over them, their communities, lands, and resources. The Indian Act was created with the purpose of assimilating First Nations people into European-Canadian society. The Indian Act has been historically discriminatory and oppressive, which has contributed to several violations of human rights. Many amendments have been made to the Act over the years but it is still a current piece of legislation used to outline various rules and regulations involving reserve land, governmental responsibilities of band councils, and other aspects of life for Indians with status. It is the Indian Act that defines who can and cannot acquire status.

> "The great aim of our legislation has been to do away with the tribal system and assimilate the Indian people in all respects with the other inhabitants of the Dominion as speedily as they are fit to change".
> (Sir John A. MacDonald, 1887)

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For more information on the Indian Act, visit the webpage 21 Things You May Not Have Known About the Indian Act and read the list.

Treaties

Intent

The traditions and protocols of Indigenous treaties existed long before first contact with Europeans. Indigenous people had engaged in their own forms of governance for hundreds of years; sharing resources and building alliances between nations. For First Nations people, treaties are considered sacred. To honour their sacredness, protocols and negotiations involved ceremonial aspects such as a pipe ceremony or an exchange of symbolic items.

The peaceful and harmonious alliances between Indigenous groups that were formed hundreds of years ago still exist today. One of the most well-known examples of this is the Haudenosaunee Confederacy (also known as Six Nations or Iroquois Confederacy) and is considered the first democracy. The Haudenosaunee includes Mohawk, Oneida, Onondaga, Cayuga, and Seneca, and later included Tuscarora. There is also the Three Fires Confederacy beginning in the 1600s that is made up of Ojibway, Potawatomi, and Odawa nations. The Wabanaki Confederacy dates as far back as the 1680s and includes the Mi'kmaq, Wolastoqey, Peskotomuhkatiyik, Abenaki, and Penobscot.

Figure A1.1 *During early Treaty negotiations medallions were presented as gifts to First Nations negotiators that symbolized agreements made between First Nations and the Crown.*

The Dish with One Spoon treaty between the Anishinaabe, Mississaugas, and Haudenosaunee nations living around the Great Lakes is an example of the spirit and intent in which First Nations would have entered into treaty agreements with Europeans. The sharing of resources for the sustenance of all in a spirit of peace and friendship was at the foundation of the treaty process from a First Nations perspective.

During early contact with Europeans, First Nations began negotiating peaceful co-existence with the newcomers. A well-known example of this is the Two-Row Wampum between the Haudenosaunee and the Dutch that would ensure friendship, peace, and respect for as long as the sun shines, the grass grows, and the rivers flow. Indigenous groups across Turtle Island were familiar with the process of negotiation and treaty-making by the time of European contact; however, they were not prepared for the different approaches to the treaty process that Europeans would bring.

Figure A1.2 *A depiction of the Two Row Wampum belt (left) that represent the solidified agreements between two parties, and the Dish with One Spoon Belt (right) believed to pass the knowledge of the agreements made from generation to generation.*

The Treaty Relationship

Treaties are not a thing of the past; they are living agreements with current obligations. We are all treaty people, and it is our responsibility to become educated on what it means to be a treaty partner.

Treaties are legally binding agreements that set out the rights, responsibilities and relationships of First Nations and the federal and provincial governments. Ontario, where Seneca Polytechnic is located, and other areas in Canada, would not exist as it is today without treaties. They form the basis of the relationship between Indigenous and non-Indigenous people. Although many treaties were signed more than a century ago, treaty commitments are just as valid today as they were then (Ontario.ca, n.d.). A map of the many treaties that make-up Ontario is below. As you review the map, consider what Ontario would look like today if indigenous peoples were not removed from their land.

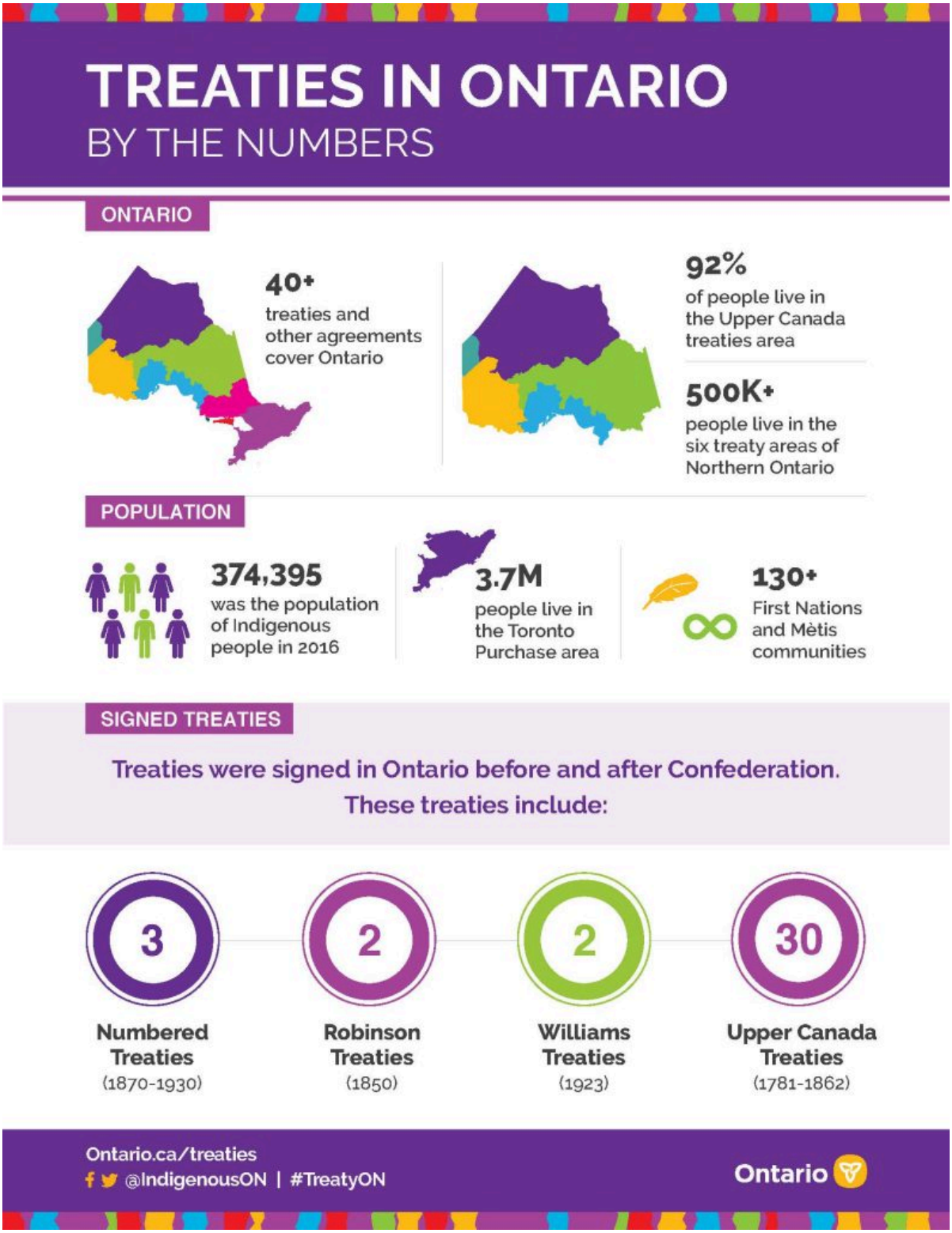

Figure A1.3 *A map of Ontario providing info on the number of treaties and additional statistics about Ontario's indigenous population.*

To gain more knowledge of what it means to be a treaty person, see *We are all Treaty People* below, a video that promotes Treaty Education within the Mi'kma'ki Territory (Nova Scotia).

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Figure A1.4 *10 principles outlines by the Government of Canada (GOC) to improve relationships with Indigenous Peoples in Canada.*

The Government of Canada under the current Trudeau Liberal government has established ten principles respecting the Government of Canada's relationship with Indigenous peoples. As you read through these principles, consider how well the Government (Crown) is doing in living up to these principles, and what could you be doing to hold the government accountable to upholding these principles?

According to the GOC (2021) "these Principles are a starting point to support efforts to end the denial of Indigenous rights that led to disempowerment and assimilationist policies and practices. They seek to turn the page in an often troubled relationship by advancing fundamental change whereby Indigenous peoples increasingly live in strong and healthy communities with thriving cultures. To achieve this change, it is recognized that Indigenous nations are self-determining, self-governing, increasingly self-sufficient, and rightfully aspire to no longer be marginalized, regulated, and administered under the *Indian Act* and similar instruments" (para. 6).

When looking at treaties, it's important to consider the different worldviews of Indigenous Peoples and European settlers. For Indigenous Nations, treaties were viewed as an equal relationship where both nations can live together and share the land. On the other hand, European settler governments didn't view Indigenous Peoples as equals. They viewed treaties as a way to assimilate and remove Indigenous Peoples from their lands (Historica Canada).

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=275#h5p-250

Conclusion

The nation of Canada was founded on patriarchal, monarchist, Christian, white European colonialism. This chapter has presented some of this history and its ongoing impact on people who are First Nations, Métis, and Inuit. While some progress and change is happening, a very long road to reconciliation lies ahead for Canada and Indigenous peoples. In our next chapter, we'll examine Canada's path towards reconciliation.

Attributions

This page has been edited and remixed from the following sources. Supplemental information has been provided by Tricia Hylton.

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A2: Towards Truth and Reconciliation

Canada's first National Day for Truth and Reconciliation occurred on September 30, 2021. This day was meant to mark "the experiences of First Nation, Inuit and Métis Peoples who went through residential school system, a chain of institutions disguised as schools to assimilate Indigenous children into mainstream Canadian society" (APTN National News, 2021) and to recognize the generational impacts of this system on Indigenous peoples. Recognizing this day came about in fulfillment of Call 80 of the Truth and Reconciliation Commission Calls to Action. Honourable Justice Murray Sinclair, Chair of the Truth and Reconciliation Commission of Canada, says in the interview that the National Day for Truth and Reconciliation is about atoning for what was done and ensuring it never happens again and that the first step in reconciliation is to learn the truth about Canada.

As stated in the previous chapter, the truth is, the nation of Canada was founded on patriarchal, monarchist, Christian, white European colonialism. While we know that stating this so boldly is no doubt going to offend some people, we must open ourselves up to the truth about Canada's history. In doing so, we can also recognize that although this fact is Canada's historical foundation, it no longer needs to be our present and our future. The future is created by us. We have the power to take this history and its ongoing impact and create a more equitable and just future by walking down the road to reconciliation.

Although the term reconciliation may be familiar. Full awareness as to what reconciliation really means for all of us is sometimes lacking. The Honourable Justice Murray Sinclair provides a brief overview of what reconciliation means in the following video.

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Residential Schools – A Summary

Content Warning: Please note that this section covers difficult topics and Survivor stories related to residential schools that some readers may find distressing. For residential school Survivors and their families, 24-hour support is available through the Indian Residential Schools Crisis Line at 1-800-721-0066. If you're a student from an Ontario college, please consult the student support services available at your college.

From 1883 to 1996, Christian churches ran more than 130 federally-funded residential schools which were created to assimilate Indigenous children into Canadian society. Over 150,000 First Nations,

Inuit, and Métis children and youth were forcibly taken from their homes and placed in residential schools. Many children died as a result of inadequate conditions and abuse. Those who survived, experienced trauma and its continued effects. The 2015 Truth and Reconciliation Commission report called the residential school system and act of cultural genocide by the Canadian government and Christian churches (Defining Moments in Canada, n.d.).

The history of residential schools in Canada can be traced as far back as the 17th century. Watch the video below, *Residential Schools in Canada: A Timeline,* to learn about the significant dates in its history.

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Some additional facts about residential schools are illustrated in **Figure B1.1**.

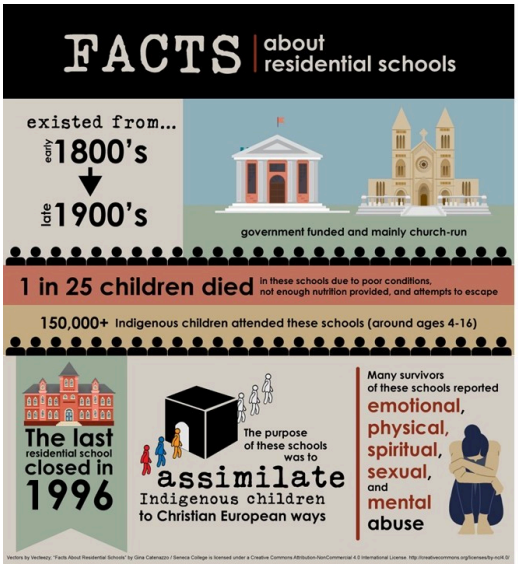

Figure A2.1 *Some important facts about Canada's residential school system that from the 1800's – 1900's (Catenazzo, n.d.).*

While the *Truth and Reconciliation Commission of Canada Report* covers the history of residential schools extensively, open the tab below for some quick facts about residential schools.

An interactive H5P element has been excluded from this version of the text.

You can view it online here:

https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=280#h5p-253

For more information, please visit the Residential Schools Timeline on the *Canadian Encyclopaedia* website.

The Truth and Reconciliation Commission made it clear that there are numerous children who were taken from their families to attend residential schools who were never heard from again, and that it is highly likely that many of these children are in unmarked graves on properties near former residential schools. Currently, many First Nations are in the painful process of uncovering the locations of some of these grave sites. The first of these discovers was at the former Kamloops Indian Residential School on the traditional territory of the Tk'emlúps te Secwépemc people.

Figure A2.2 *The memorial for children who did not return from the Kamloops Residential School.*

Intergenerational Trauma

Intergenerational or historical trauma, is trauma experienced by cultural groups as a result of oppression. When nothing is done to address the trauma, it gets passed down through generations. At the same time, harmful behaviours that arose because of the trauma eventually become normalized and continue to become present through generations (Teach for Canada). In the case of residential schools, children who were in these schools "returned to their home communities without the knowledge, skills or tools to cope in either world. The impacts of their institutionalization in residential school continue to be felt by subsequent generations" (The Canadian Encyclopedia).

Intergenerational effects of resident schools include:

- Family & parenting: Because residential schools enforced a parenting model that is based on abuse, punishment, control, and neglect, Survivors of residential schools weren't familiar with how to create nurturing environments for their own children. This has also been attributed to higher rates of family violence and domestic partner abuse among Survivors.
- Mental health: The psychological, spiritual, physical and sexual abuses experienced by residential school Survivors have resulted in mental health challenges for many.
- High rates of unemployment and homelessness.
- Poor housing conditions in First Nations communities.
- Higher number of Indigenous Peoples involved in the justice system. (The Canadian Encyclopedia)

Towards Reconciliation

Reconciliation Starts with Survivors

It can be difficult to hear the stories directly from Survivors about their residential school experiences. It is important though to acknowledge their courage in coming forth in their class action lawsuit to speak the truth and ask for accountability from the Government. If not for their voice, we would not be in this moment of opportunity to know the truth about the past and to work towards a more equitable and just future for Indigenous people on Turtle Island.

Watch the animated short documentary, Namwayut: We Are All One, where Chief Robert Joseph shares some of his residential school experiences.

As you view the video, consider the hope Chief Robert Joseph holds that because we are all one, reconciliation is possible.

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94 Calls To Action

Learning about and acknowledging the truth is one of the steps towards genuine reconciliation. As the Truth and Reconciliation Commission stated in their final report, "Without truth, justice, and healing, there can be no genuine reconciliation. Reconciliation is not about 'closing a sad chapter of Canada's past,' but about opening new healing pathways of reconciliation that are forged in truth and justice."

Focusing on Canada's residential school history and legacy is challenging. Hope is gifted to us though through the Calls to Action. The 94 Calls make it very clear as to what needs to change in Canadian society in order to learn from the past, to address the inequities that exist, and reconcile relationships. It will take personal, public, and political will to see these Calls to Action met. We all must do our part.

Read the Truth and Reconciliation Commission of Canada: Calls to Action and consider:

- Which of the calls to action are relevant to you in your future career and field ?
- What actions are you taking, or do you need to take, to meet these Calls?

The CBC has created this interactive news page, Beyond 94, that tracks the progress of the Calls to Action. Visit Beyond 94 and explore the interactive features.

After reviewing Beyond 94, in your opinion, how is Canada doing in meeting the Calls to Action?

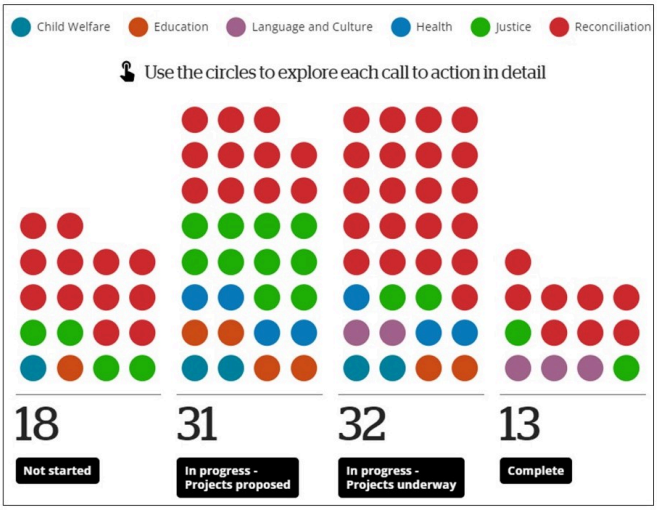

Figure A2.3 *Visit the CBC's Beyond 94 to track Canada's progress toward implementing the 94 Call to Action.*

The six volumes of the Truth and Reconciliation Commission of Canada report are available through McGill-Queen's University Press or can be read online at this Government of Canada website.

If you are unable to read the report in its entirety, please read The Summary of the Final Report of the Truth and Reconciliation Commission of Canada, Honouring the Truth, Reconciling for the Future.

An even more abridged version of the report is available as A Knock on the Door, that can be heard as an audiobook.

Conclusion

Jody Wilson-Raybould (2022) says this about what the process to true reconciliation will involve:

> True reconciliation is a marathon, not a sprint. True reconciliation is not an event. There is not a moment of time when it happens, and after which we can say 'we are done' and move onto something else. It is ongoing, a long-term undertaking of creating new patterns of social, cultural, and economic relations as individuals, peoples, communities, and governments. It is about building a vision of the future that both addresses, and breaks away from, the legacy of colonialism. Achieving this takes endurance, resilience, and consistent effort. It also means recognizing from the beginning that it requires staying the course, even when it feels incredibly hard.

Attributions

This page has been edited and remixed from the following sources. Supplemental information has been provided by Tricia Hylton.

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APPENDIX B: EMPLOYMENT COMMUNICATION

This appendix focuses on the written component of the hiring process, along with the interview process. The advice given here represents a fairly broad consensus of employer expectations, but it can't apply to all because each employer is unique in what they're seeking from applicants. It's like dating: everyone has a unique list of preferences. If someone falls within the range of what you're looking for and you fall within their range, then it might work out. In the tech industry, the only way to know for sure that you're both what the other is looking for is by networking, applying for jobs, and attempting job interviews. After examining strategies for job hunting, we'll cover the résumé and cover letter-writing process with the goal of producing job application materials that will considerably increase your chances of getting an interview and landing your dream job.

A hiring competition involves written and oral "exams." You must pass the written component (the cover letter and résumé) before you move on to the oral (the interview), and you must outperform the competition in the oral to get the job. The oral component proves that you can carry a conversation, represent the company in face-to-face interactions with customers, and see eye-to-eye with managers and co-workers while conducting day-to-day operations in a personable manner. Representing you in your physical absence, your cover letter and résumé mainly assure employers that you have the experience and skills required to be successful in the job. They also prove whether you are literate and conscientious enough to protect the company's reputation when writing on their behalf to customers and other stakeholders.

The chart below emphasizes the elements of applications that are most noticed by potential employers.

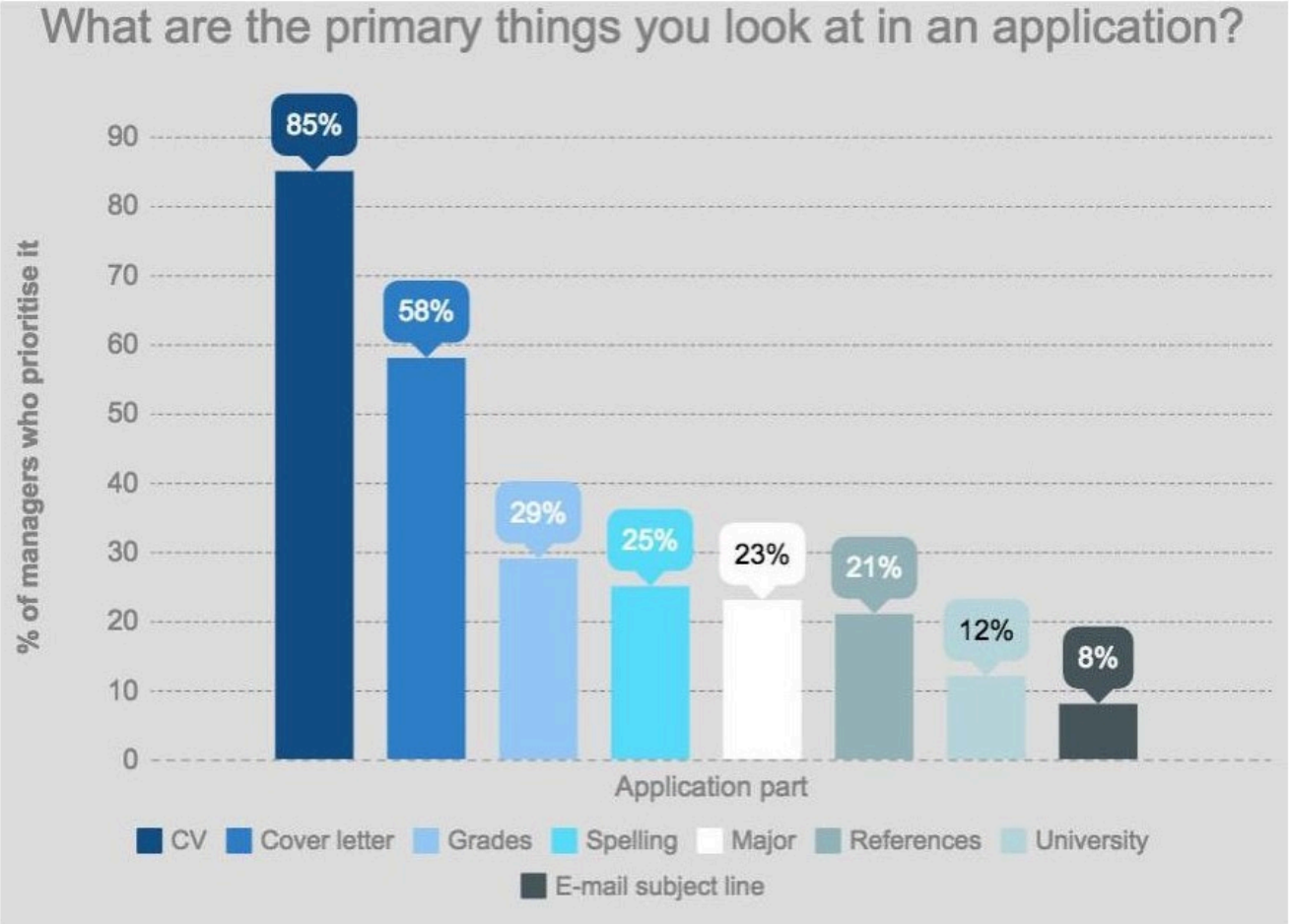

Figure B1 *Employers indicate the information they consider most important in a job application package (Hadicke, 2016).*

Please note: Content for this section of the text has been partially adapted from Tom Bartsiokas' and Tricia Hylton's *Communicating @ Work* (2019), partially adapted from Jordan Smith's original *Business Communication for Success* (2015) and other sources as indicated.

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Hadicke, G. (2016). What employers want in your application. *Graduateland*. https://graduateland.com/article/what-employers-want-application

B1: Finding a Job

Job Search Strategies

If you devote a portion of your life to training for a career, nothing is more important at the end of that program than getting a job where you can apply your training and launch your career. The job application process poses a challenge that requires a skill set quite different from that which your core program courses teach you, yet you cannot get a job without this skill set. In most professions, the competition for jobs is so fierce that only your communication A-game can help you through the hiring process. This chapter focuses on key behaviors and actions that will help you to find a job that best fits your interests, knowledge, and skills.

To get started, take a look at this video by the BI Norwegian Business School (2017) on the job search process: *The Job Hunting Process*

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=287#oembed-1

Networking

A recent study showed that approximately 61% of job seekers either used their personal network and/or online social network to land their dream job (*Business Communications*, 2019). What exactly is a personal network and why is it so effective? A network is a group of people with whom you have a personal relationship based on similar interests. As you build this network and cultivate the relationships, you develop a connection and, most importantly, trust with the people in your network. These relationships become useful because the majority of the job market is hidden; that is, some jobs are not advertised through conventional means. Most jobs are often found through referrals and word of mouth; thus, having a network of people that can give you inside information about available jobs in your field is invaluable. In addition to the inside information, people in your network may also serve as personal references and a bridge between your potential employer and you. Some tips to help you develop a personal network include:

- Develop a list of people to speak with about your job search
- Contact the people on your list
- Call and possibly arrange a meeting with any referrals provided by your contact list
- Join an online networking group

- Conduct research on additional networking tips and trends

Figure B1.1 displays the various types of networks that exist in your life. As you can see, you can draw upon many types of contacts when you are seeking employment.

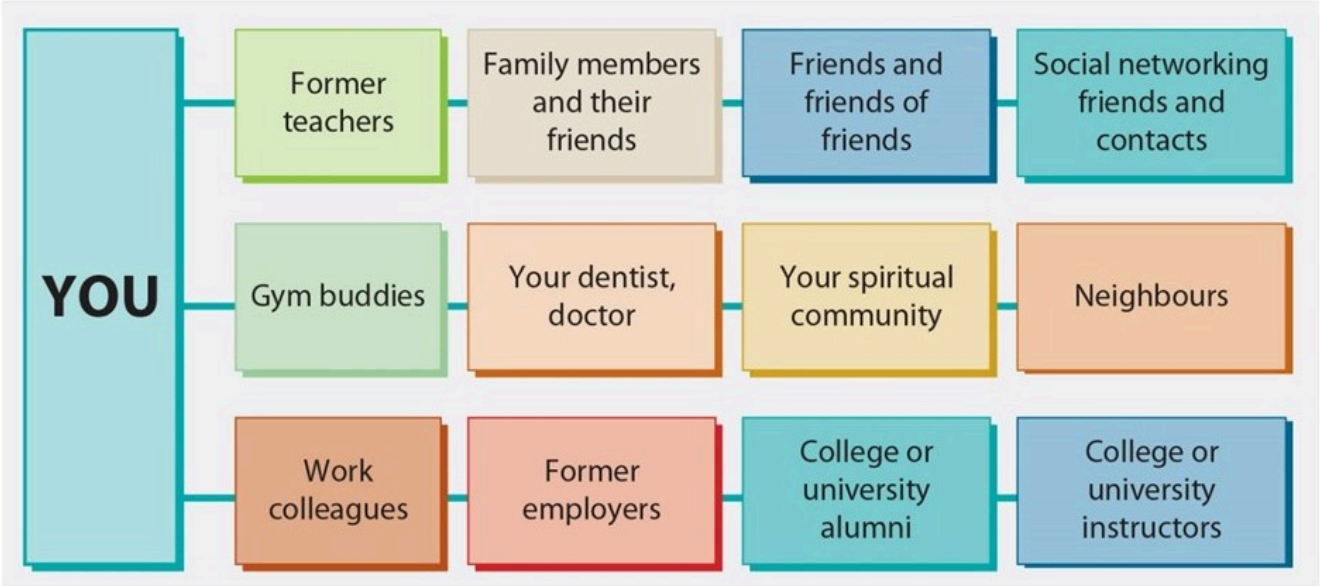

Figure B1.1 *A matrix template to help develop a personal network. (Business Communication, 2019)*

Networking involves building relationships over time. This applies not only to personal networks, but also online networks. An online social network is somewhat different than a personal network. Though you may have hundreds of contacts or followers in your social network, the degree to which you know each other will be limited by how deep a relationship you have developed with them. You will most likely not know most of your followers, be they on LinkedIn, Instagram, Snapchat, Twitter, and Facebook; however, when thinking strategically about your career goals, you can develop professional profiles and cultivate your relationships with key followers over time. Start now, and read more about this topic in the chapter, The Online Application Process.

Online Job Sites

According to a recent Jobvite survey and as depicted in **Figure B1.2**, job boards continue to be the number one medium to access job opportunities (Morgan, 2019). While you could begin your job search by using major job search engines like Monster and Indeed, you should also narrow your search by consulting a wide range of platforms, including technology job boards, where job advertisements are posted. Here are a few resources to get you started:

- **Job boards**: Browse sites like Indeed, CareerBuilder, Glassdoor and Monster to search for jobs in your field.
- **Specialty technology job lists: L**ook for job boards in technology, such as Tech Talent Canada,

Work in Tech, itjobs.ca, techjobs.ca

- **Company, organization and government websites**: Visit the employment section on websites of companies you admire; search federal, provincial, and city websites for job government job postings.
- **Seneca College student employment site:** Visit the Seneca Works website for employment opportunities. You should also visit the placement office/career center and attend job fairs hosted at Seneca.

The following are sites are also worth searching for job postings and other information they offer on the job market:

- Job Bank
- Workopolis
- CareerBuilder
- Eluta
- Jobboom
- SimplyHired
- WOWjobs
- Charity Village

Figure B1.2 *A recent survey confirms that job boards continue to be the number one job search tool (Morgan, 2019).*

Many job seekers also use craigslist to look for work; just be aware that craigslist postings often lack detail and may come from headhunters or placement agencies, rather than from the direct employer.

Once you have found a job, make sure to print and/or save a copy of the job posting or job description. You will use this document to help you tailor your application materials. Because companies often delete the job posting once they have received sufficient applicants, it is important that you save your own copy of the document by copying the text and pasting it into a new document, or by saving the webpage.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=287#h5p-99

Industry Associations, Conferences, and Job Fairs

Joining a professional association and attending its meetings and conferences will give you ample opportunities to network with employers and their recruiting agents. You should consider joining a professional association while you are a student so as to benefit from student membership and conference rates. Networking during association meetings and participating in committees will help you to establish your reputation as a professional and meet potential employers in the process. As in the previous scenarios, this only works if you are friendly and outgoing.

Conference participants who merely soak in others' presentations and discussions without networking are effectively invisible to the recruiters. Make the effort to deliver in student presentation sessions or even participate on the conference organizing committee, whether paid or as a volunteer. The key is seizing the opportunities to meet professionals in your field.

You should also attend career fairs and sign up for interviews with visiting recruiters. Because colleges are a great resource for the emerging labour pool, they have tight connections with industry partners. When company recruiters come to your college, be there to ask them about their employment opportunities. Recruiters aren't interested in students who aren't interested in them, so do your homework and arrive prepared to ask intelligent questions and make a good impression. Attending career fairs and talking to recruiters is a great way of showing interest in a company and opening doors to further conversations.

You can do all this before you graduate. Imagine how many contacts you can accumulate over a three-to-four year program. By the time you graduate, you would have many people in your network who could possibly give you leads on job openings in your career field.

For your convenience, listed below are industry associations you can explore:

Air Transport Association of Canada (ATAC)

Canada's Association of Information Technology (IT) Professionals (CIPS)

Canadian Association of Pharmacy Technicians (CAPT)

Canadian Society of Civil Engineering (CSCE)

Canadian Fire Safety Association (CFSA)

CWB Group (Welders Association)

Ontario Association of Certified Engineering Technicians and Technologists (OACETT)

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=287#h5p-100

Personal Branding

What is a personal brand and how do you develop one? A personal brand is a representation of yourself that highlights what you offer in terms of skills, knowledge, interests, and accomplishments. Begin developing your personal brand by asking yourself the following questions:

- What about yourself do you want to emphasize in the job search process?
- What qualities distinguish you from everyone else?
- What unique skills can you offer your employer?
- What makes you a sought-after employee?
- How will you make your future workplace better?

Use this information to promote yourself in online and offline forums. Online, create a Facebook page and a LinkedIn profile. Offline, create business cards and write an elevator pitch to introduce yourself at industry conferences, professional association events, and job fairs. No one will do a better job at promoting you than you will. For your information, here is a TEDx talk that explains personal branding further: *Designing a Personal Brand From Zero to Infinity* (2017).

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=287#oembed-2

Figure B1.3 explains the four steps involved in developing a personal brand for graduates.

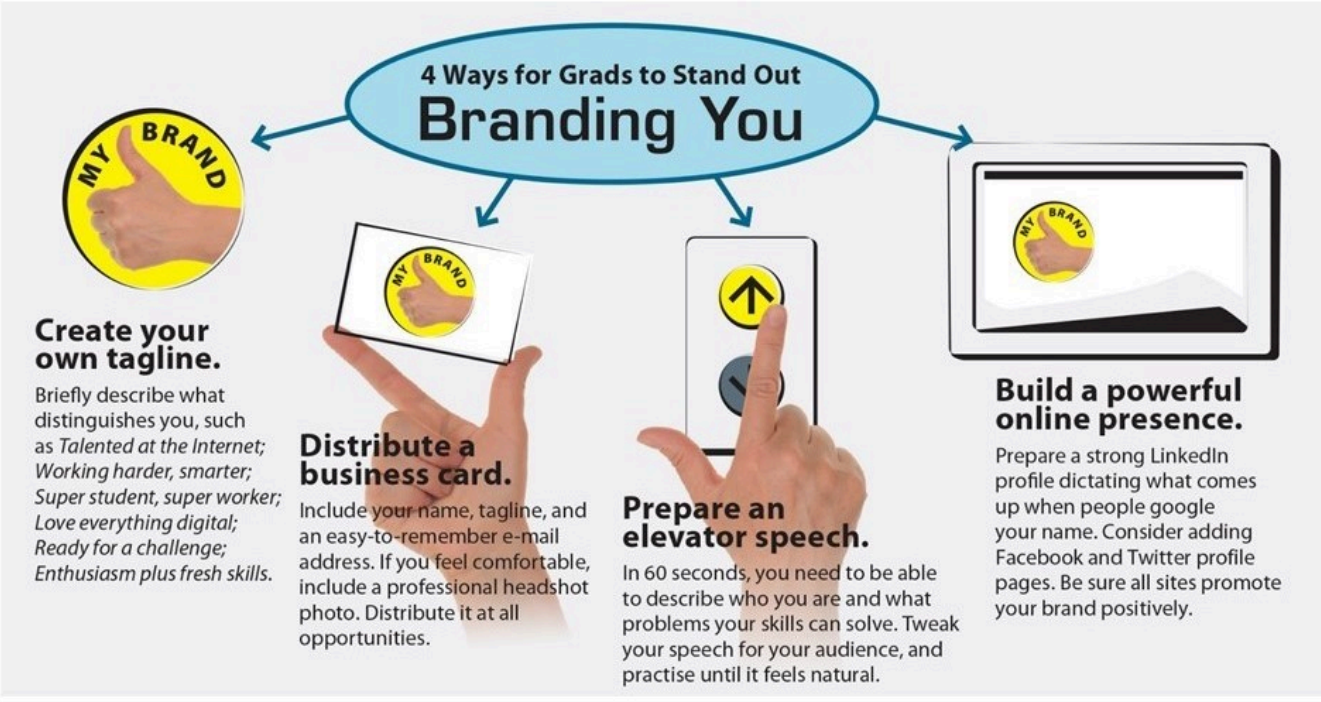

Figure B1.3 *The four steps in the personal branding process are explained (Business Communication, 2019).*

EXERCISES B1.1

1. **Begin developing your network.** Conduct at least one referral interview or join one online networking group. Record the results you experienced and the information you learned from the networking options you chose.
2. **Use several of the job search engines** listed above to collect five job postings that you would be interested in applying to if they were available upon graduation. If you can't find any in your local region, look further afield in neighbouring cities or even other provinces or countries you'd be interested in moving to. Compare the various postings. Identify common terms used in the lists of required skills and job duties. What are the common work experience and educational qualifications identified as required as assets?

Please note: Content for this section of the text has been partially adapted from Tom Bartsiokas' and Tricia Hylton's *Communicating@Work* (2019), which has been adapted from Jordan Smith's original *Business Communication for Success* (2015). Some content has been adapted from a chapter on preparing to apply for work by Megan Savage, in *Technical Writing* (n.d.).

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B2: Résumés and Cover Letters

Two key documents are required when applying for a job: your résumé and the cover letter. However, in addition to these, you must have the ability to create job application documents that are adapted to suit specific job advertisements. Carefully analyzing job postings will help you to assess your qualifications vis-a-vis their requirements, understand the job description, and customize your cover letter and résumé to more adequately highlight your knowledge, experience, and abilities in relation to the advertised posting.

Analyzing the Job Advertisement

Analyzing the job advertisement before creating your cover letter and editing your résumé enables you to more specifically address the requirements of the available job in your documents. Remember that the job advertisement has been carefully crafted to convey important information about the available position and the qualifications the employers are seeking in the ideal candidate. Key elements to analyze in a job include the following:

1. **The Job Description:** The job description will typically offer a lot of detail about the various responsibilities involved in the position. Read it carefully and use it as a kind of checklist for determining if you have the experience and qualifications that will enable you to perform the various tasks and take on the responsibilities.
2. **Education and Experience:** Educational qualifications are usually listed and will include university, certifications, and other specialized training, such as at-heights training, software knowledge, and the like. The minimum number of years of work experience in the field is also stipulated in this section of the job advertisement as well as specifics about the types of experience the employer is requiring.
3. **Qualifications:** Employers will include a rather comprehensive list of qualifications that they are seeking in their prospective hires. The qualifications section will describe the knowledge, skills, and capabilities that the employer is seeking in prospective candidates. This is another checklist for you to use as a way of self-assessing your suitability for the available job. If you have most of the qualifications, consider applying for that job.
4. **Personal Qualities:** In addition to role specific qualifications, employers will also specify the attributes that the ideal candidate should have. Such attributes may include: the ability to work well with others and independently, team collaboration skills, ability to work under pressure, interpersonal and communication skills, languages, and such.

Job advertisements will also include information like posting date, start date, salary, working conditions and physical demands along with a company description. Use these components to further inform your decision as to the suitability of the job for you.

Print out the job description and annotate it; get into a conversation with it:

- **Highlight or underline any qualifications that you hold** — any skills you have, technologies you've used, etc.
- **Make note of any past achievements that relate to any of the preferred qualifications.** For example, if the job description seeks a candidate who can diagnose and solve technical problems, write down an example of a specific time in which you did so in a professional or academic setting.
- **Circle any key terms you might use in your own materials**. Using the same terms as a potential employer demonstrates to that employer that you are able to "speak their language."
- **Note any questions/uncertainties and any qualifications you do not have** in order to decide what to highlight and what to downplay in your materials (as well as what you need to learn more about).

Interestingly, only some applicants will have all the qualifications stipulated in the job advertisement. If you do have about 2/3 of the qualifications, go ahead and apply. Often, some skills and knowledge can be acquired once you are on the job.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=291#h5p-101

Researching Your Potential Employer

It is important that you research your potential employer as well as the job for which you're applying. The easiest way to research a potential employer is to visit the company's website. Look for an "about us" page or a "mission statement," and observe how the company describes its goals and values.

Try to answer the following questions about the company or organization:

- Whom does this company serve?
- Who are this company's partners or competitors?
- What technologies would I use at this company?
- What is the tone of this company's materials (formal, conservative, humorous, "cutting edge," etc.)?

- How would you describe this company's brand?

Here are a few more ways to research a company: Search for its name on LinkedIn and other social media sites, browse for news articles about the company or press releases written by the company, speak with friends or colleagues who work for the company, or call the company to request an informational interview.

As you research, look for ways to connect with the company:

- What do you admire about the company?
- Where do your values and interests overlap with those of the company?
- What makes this company a good fit for you?

Try to summarize your connection to the company in one sentence. Remember that your potential employer is also your audience, so adapt your tone, examples, and level of technicality accordingly.

Job Application Documents

A **résumé** is what employers focus on the most when judging an applicant's suitability for doing the job for which they're hiring. The résumé is the central document of your job application and is created using specific structural and stylistic conventions. Using this document as a guide, employers will ask themselves: Does the candidate have the right combination of core and soft skills to do that job? Did they acquire those skills with the right combination of education, employment, and other experience? Are they able to put a document together in a clear, concise, correct, organized, and reader-friendly way?

The **cover letter** is the first thing hiring managers see of you and plays a key role in convincing them to consider your application. Besides introducing the résumé and requesting an interview, the cover letter is a sales pitch explaining how you will benefit the company where you are applying. It also proves that you can put coherent, persuasive sentences and paragraphs together when writing formally on the employer's behalf. The cover letter must be flawless because, like the résumé that follows it, even one writing error could be read as a sign of the poor quality of work to come and prompt the hiring manager to save time by shredding it immediately.

The résumé and cover letter work together to establish your credibility and suitability as a job candidate. These documents will therefore be the focus of the discussion below. But, let's begin with the self-inventory as a first step to creating your résumé.

Conducting a Self-Inventory

As you work on your résumé, you may worry that you have nothing valuable to include, or you may worry that you are "bragging." One way to get over these hurdles is to allocate pre-writing time to a

self-inventory. Brainstorm your skills, accomplishments and knowledge. What did you accomplish at work, school, or a volunteer position? What skills have you learned? What would you tell a friend or family member you were proud of having achieved there? In addition to program-specific skills, you can also add a range of other skills. Get started by asking yourself the following questions:

- What specific computer programs am I good at using? Do I have examples of work to show employers how I've used them at an intermediate or advanced level?
- Do I work well with others? Have I demonstrated this with my employment experience or with volunteer or extracurricular activities such as league sports or clubs?
- Am I better at following instructions or giving them? Am I destined for leadership roles? What proof can I offer up either way?
- Can I read, write, and converse in another language besides English? At what level of proficiency?
- Am I a quick learner? Am I a creative thinker? Can I think of specific instances as proof of my answers to these questions if asked in a job interview?
- Am I a good communicator in both written and spoken situations? What evidence can I offer employers of my proficiency in both?
  (Guffey, Loewy, & Almonte, 2016, pp. 377-378)

Another way to generate a list of keywords relating to your area of specialization is to consult the vocational learning outcomes of your current academic program. These describe the skills that industry employers have said graduates must have to be considered for hire. Many of these skills are noted in the learning outcomes of your college courses.

Of course, you can't put all of these on a résumé because the full list would include too many, be too detailed, and would need to be rewritten in your own words. At this point, however, what's important is that you begin a master list of such skills that you can tailor for the résumé when you see the skills and duties employers list in their job postings. Matching the skills you have with those that employers are seeking is the key to a successful application.

In addition, try writing down key terms and action verbs that describe your experiences and accomplishments, and don't worry yet about putting them into a résumé format. Here is an exercise to guide you.

EXERCISE B2.1

For help brainstorming action verbs that describe your skills, browse a key term list such as the one below. First, scan the groupings of skills (Communication Skills, Creative Skills, Financial Skills etc.) for key terms related to skills you have or work you have done. Then, write down 1) categories of skills you

have (again, Communication Skills, Creative Skills, Financial Skills etc.) and 2) action verbs that describe skills you have or work you have done (e.g. analyzed, performed, calculated, advocated, etc.).

Communication/ People Skills	Creative Skills	Management/ Leadership Skills	Helping Skills	Organizational Skills
Collaborated	Combined	Assigned	Aided	Arranged
Communicated	Created	Coordinated	Arranged	Categorized
Developed	Developed	Decided	Assisted	Distributed
Edited	Drew	Improved	Contributed	Organized
Incorporated	Illustrated	Led	Cooperated	Recorded
Proposed	Planned	Managed	Encouraged	Responded
Suggested	Revised	Oversaw	Helped	Updated
Synthesized	Shaped	Recommended	Motivated	Tracked
Translated	Crafted	Reviewed	Supported	Monitored
Facilitated	Conceived	Supervised	Prepared	Synthesized
Mediated	Established	Delegated	Bolstered	Adapted

Table adapted from Creating Resumes I by Roads to Success, licensed under CC BY-SA 4.0 (Savage, n.d.).

As you gather information about your work history and skills, double-check that your information is accurate and current – gather dates of employment, dates of training, lists of activities you have been involved in, academic awards, achievements and special projects. Job descriptions or performance reviews from previous jobs can also include key terms to include on your résumé. Finally, ask former coworkers or managers about your significant workplace contributions.

EXERCISE B2.2

Get a partner and a piece of paper. Take ten-minute turns speaking and writing. The speaker should describe past work history and experience, especially as it relates to the job at hand. The writer should take notes while listening to her partner's description, taking care to note any key terms she hears. The writer should also ask questions that help the speaker go into detail about the experience (who, what, when, where, why?). Be sure to ask about specialized technical skills and knowledge. Finally, the writer should help identify any skills or achievements the speaker may not realize he or she has; sometimes we have a skill that we don't recognize because we assume it is something *everyone* can do. Then, switch.

Knowledge Check

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The Résumé

Can you get to an interview without a résumé? In most cases, no. The résumé is key to the hiring process–even in the age of LinkedIn. Sometimes one writing mistake—even just one little typo– will eliminate your candidacy. Employers demand perfection in the résumé for the following reasons:

- When the hiring manager's task is to whittle down a pile of a hundred applications to about five for interviews, even one writing mistake in a résumé gives them the reason they're looking for to send the résumé to the shredder, thinning out the pile a little further.
- A perfect résumé speaks volumes about how conscientious a job applicant can be about the quality of work to be produced on the job. If a résumé is poorly written, the employer can safely expect a similarly poor quality of work if the applicant became an employee.

Figure B2.1 *Top reasons resumes are rejected by hiring managers (Liu, n.d.).*

Employer expectations are high and rising. **Figure B2.1** describes how employers use employment documents and your social media presence to narrow the pool of candidates pre-interview. Gone are the days where a printed résumé was all you had to create. Today you must also project a professional image online in whatever employers find when they Google-search you—because they almost certainly will. Even your electronically submitted résumé must be written with a consideration of the electronic filters employers use to scan applications and pre-select those that truly answer the job posting's requirements.

The next section will help you increase your chances of getting to interview for the job you've been training so hard for by writing a résumé that meets employer expectations. First, watch this Business Insider video, *A Business Insider Reveals What a Perfect Résumé Looks Like* (2016) for more information.

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Knowledge Check

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Developing Your Résumé

To be competitive in any fierce job competition, a generic résumé—i.e., the kind that you made a hundred copies of to get your first job and handed out to every shop on the street that had a "Help Wanted" sign in the window—just isn't suitable for a job search related to your career field. Your best chance of succeeding is to make your applications stand out with superior quality, knowing that your application will be just one of the dozens, perhaps even hundreds, vying for interview spots. Along with those marred by glaring errors, generic résumés are the first to go into the shredder.

A targeted résumé, however, is tailored to present information specific to the job posting. An employer's job posting is a wish-list of all the skills and qualifications that would set up the applicant for success in the position advertised and reflects the selection criteria the employer applies to every job application. The employer expects that each section of the résumé will prove the applicant is perfect for the job, as well as meet general expectations for quality of writing—clarity, conciseness, correctness, and accuracy—as well as document readability and organization.

You may choose from three résumé types based on your situation and employer requirements. Each type of résumé is defined by the method by which information is organized in it:

1. Reverse-chronological résumé: For each experience section (Education, Employment, and Related), this résumé lists your professional activities starting with the present or latest (most recent) at the top and your first (oldest) at the bottom. A key feature is a column with date ranges in months and years beside each educational program, job, and relevant activity you've done. This presents the hiring manager with a snapshot of where you're at right now in your professional development, how you got there, and where you came from. See **Figure B2.2** for an example.

STUDENT NAME

Email: studentname@gmail.com | *Phone:* (333)-222-1111 | *Address:* 232 President Dr., Apt. 1, Plano, TX, 70074

EDUCATION

OKLAHOMA STATE UNIVERSITY **December, 2016**

B.Sc. Mechanical Engineering **GPA – 3.82/4.00**

EXPERIENCE

***System Engineering*, Texas Instruments (Dallas, TX)** **03/2017 - Present**

+ Execute capital/expense projects for systems such as HW, ChW, HVAC, and Cathodic Protection

***Teaching Assistant*, OKLAHOMA STATE UNIVERSITY (Stillwater, OK)** **01/2016 – 12/2016**

+ Assisted professors in coursework related to Thermodynamics II and System Dynamics

***Project Engineer*, M INDUSTRIES – JOHN Z CO LLC (Tulsa, OK)** **05/2016 – 08/2016**

+ Wrote material requisitions and data sheets for vendors
+ Performed property, area, and cost analysis on refractory materials
+ Visited refinery in *Minnesota* to help resolve issues related to pilots and duct burner Piping
+ Reviewed and revised P&ID, GA and fabrication drawings
+ Created shipping lists using BOM to be sent to customer
+ Generated quote using Salesforce and sent to customer
+ Created cost estimate tool using VBA

***Engineering Business Development Intern*, ARNE (Houston, TX)** **05/2015 – 08/2015**

+ Completed objectives given by Senior LIBD Analyst
+ Built volumetric and commercial models to analyze impact of downstream sales
+ Assisted Business Development Managers with preparation of ZPR, RIC and customer projects
+ Practiced creative thinking and performed strategy studying for

PROJECTS

Design Heating and Cooling system for an office

+ The project involved calculating the heating and cooling loads, selecting relevant heating/cooling equipment and diffusers, and finally designing the ductwork for an office at a given location.

Designing an Airline Pod Handling System

+ The project required the design team to develop a cost effective, robust and safe system to retrieve and deliver passenger pods for a range of aircrafts from A320 to A380 sized.

Designing a Turbine

+ Based on given specifications of a power plant, the task was to estimate the number and detailed design of turbines and penstocks required to extract all the power possible from the water reservoir.

SKILLS

Computer Skills: MS Office, VBA, Python, EES

Other Skills: Problem Solving, Effective Communication, Public

ACTIVITIES

Project Lead - Safe Schools

Project Lead - Slow the flow

AWARDS

> OSU Regents Scholarship

> CEAT Scholarship

> President's and Dean's Honor Roll Certificates

Presentation, Adaptability, Motivational Leadership & Time management ***Languages:*** English & Hindi	***Memberships*** - Golden Key International Honor Society & Phi Theta Kappa Honor Society ***House Captain*** - High school ***Head*** - Pupil Representative Council	> International Informatics Olympiad, 6th Rank > T.I.M.E Examination, 12th Rank Nation-Wide

REFERENCES

Name, *Title*	**Name, *Title***
Organization	**Organization**
Relationship	**Relationship**
E-mail	**E-mail**

Figure B2.2 *Detailed chronological résumé with original color and design choices, created using Excel (Peterson, 2020, OER).*

Reverse-chronological résumés can be revealing in ways that might not cast you in an entirely positive light. Exclusively short-term employment and significant gaps in your work and educational history will raise questions (Vandegriend, 2017). However, there are alternative ways of organizing a résumé.

2. Functional (a.k.a. competency- or skills-based) résumé: Rather than organize the résumé around experience sections measured out in months and years, the functional résumé makes important skills the subheadings. The bullet points that follow explain in more detail what each skill entails, how it was acquired through training or education, and how it was practiced and applied professionally. The functional résumé is ideal if you have questionable gaps in your employment or educational history because it omits or de-emphasizes date ranges.

Here are some categories you may want to consider when drafting a functional résumé:

- Communication skills
- Teamwork skills
- Leadership skills
- Honors and special achievements
- Athletic involvement and achievements
- Volunteer experiences

Review the following: **Figure B2.3** "Sample Functional Résumé 1" and **Figure B2.4** "Sample Functional Résumé 2" are examples of how a functional résumé might look.

Figure B2.3 *Sample Functional Résumé 1 (Kinonen, Mold, Erickson, & Curtin, 2017, OER).*

NICOLE FRANK
333 Ross Avenue • Palm Beach, FL 22222
Email: rh333@uwisconsin.edu • Cell: 917.333.5555

OBJECTIVE:

To secure an entry-level position in the health care industry, using my volunteer experience, along with my client focus, and results oriented approach.

EDUCATION:

U Wisconsin, Madison, WI
BS degree, expected Spring 2012
Major: health care, Minor: communications
GPA: 3.8
Problem Solving/Analytical Skills

- Was part of a task force that developed an innovative approach for reviewing patient data, when original plans included purchasing a new system, Mercy Hospital, 2010
- Interacted with other departments to improve surveillance of hospital visitors and vendors, Mercy Hospital, 2009

People/Leadership Skills

- Manager of hospital gift shop, with revenues of $5K per week, Mercy Hospital, 2008
- Team captain for women's varsity tennis team, University of Wisconsin, 2010. Member of team 2008–Present

Communication/Writing Skills

- Presented team project in University of Wisconsin health care competition, winning first place
- Wrote and edited health care policies/procedures by incorporating feedback from four other departments; policy manual used by entire hospital
- Presented team project to more than fifty students in Communications class, earning an A on the report, and an A in the class

Figure B2.3 *Sample Functional Résumé 2 (Kinonen, Mold, Erickson, & Curtin, 2017, OER).*

3. Combination functional and reverse-chronological résumé (also known as the hybrid résumé): This is the most popular form and the basis for the information on targeted résumé parts given below. It uses the reverse-chronological format for the standard experience sections showcasing the applicant's educational and employment history but adds a Skills and Qualifications Summary

at the beginning to highlight the applicant's abilities and credentials that match the job posting requirements. See **Figure B2.4** for a sample combination or hybrid résumé.

Phil Phillips
1000 Yonge Lane, #5
Cityland, ON X0X 0X0
(123) 456-9999
example-email@example.com

Professional Summary

Reliable Pipeline Welder with an AWS Certification capable of handling any size job or project. Experience in planning complex pipe system layouts utilizing both orthographic and isometric drawings. Specialize in petrochemical and power production industries requiring extreme attention to detail and full understanding of all safety codes and procedures.

Highlights

- Current AWS 6GR Certification
- Comprehend detailed plans and specifications
- Lay-out, install and repair all types of pipes and tubing
- Maintain safe work environment and clean safety record
- Capable of adapting to challenging working conditions in the field

Relevant Work Experience

Pipeline Welder
Middleburg Petroleum Industries
Cityland, ON
2015 to present

- Develop detailed work plans in support of project specifications
- Implement work plans through hands-on participation and/or supervision of staff
- Inspect all work for compliance with job specifications
- Point out deficiencies as necessary and supervise and approve corrective actions
- Test pipelines and other related systems
- Supervise compliance with safety regulations and minimized or removed workplace hazards

Pipeline Welder
Coastline Construction Company

Cityland, ON
2012 to 2015

- Read and comprehended contract plans and specifications
- Measured, cut and installed pipes according to plans
- Maintained clean and safe work environment
- Installed valves and other control equipment for pipeline testing
- Submitted projects for testing and corrected deficiencies as required

Education

Cityland Community College, Cityland, ON
A.A.S. Welding Program, 2014

Cityland Technical Institute, Cityland, ON
Pipeline Welder Apprenticeship 2012

Certifications

American Welding Society (AWS) 6GR Certification

References furnished upon request

Figure B2.4 *Sample combination or hybrid résumé (Fleming, n.d., OER).*

Résumé Sections

Let's look in detail at how you can make your résumé meet common (but not necessarily all) employer expectations in all parts of a combination reverse-chronological/functional targeted résumé.

Personal Information. The personal information header appears at the top of the document. Use your full legal name. Below your name, add your contact information, including your physical mailing address, phone number, and email address. Whatever phone number you give, ensure that the personalized message that a caller hears if they're sent to voicemail is a professional one. Also, don't use your work email address unless your current employer is okay with you using it to look for work elsewhere. Finally, space permitting, include a personal website such as a link to your LinkedIn profile and/or online portfolio.

The **Objective** statement should mention the company and position in question. This type of statement confirms to the employer that the résumé is targeted. The Objective statement singles out the employer as the applicant's priority. A targeted résumé's Objective statement focuses on what exactly the applicant can do **for** the employer. See below for an example.

Example: *To contribute to an increase in sales at Company XYZ as a top sales representative*.

Skills and Qualification Summary. This skills and qualifications section follows the Objective because of its importance in declaring in one neat package the major attributes that match those in the job posting. If the job ad lists four main skills—let's call them skills "ABCD"—the candidates who list skills ABCD in this section will have the best chance of getting an interview because they frontload their résumé with all the top-priority items the employer seeks. Doing this shows you can follow instructions and says to the employer, "I read your job posting and am confident that I'm what you're looking for."

Your Skills and Qualifications Summary section helps you pass the filter that many employers use to scan electronically submitted applications by using enough of the job posting's keywords. If your application fails to mirror exactly the key terms listed throughout the job posting, the employer might not even see yours.

Dividing the Skills and Qualifications Summary into sub-lists related to categories of the job will increase your chances of meeting the employer's approval. To use this prized real estate on the page effectively, consider arranging the sub-lists in three columns; a couple could be for job-specific technical skill sets, another for transferable soft skills. Only do this, however, if you're sure that your application formatting won't be electronically filtered out. Some of the online application software will convert résumés into scannable formats, often scrambling text into an unreadable mess. **Table B2.1** provides an example of how to organize a table with categories highlighting your job skills.

Table B2.1 ***Examples of job skills categories***

Programming Language	Software	Interpersonal
• 3 years' advanced proficiency in C++ • 2 years' intermediate use of C# • 1 year of familiarity with OpenGL	• 3 years' advanced proficiency with 3ds Max • 5 years' functional proficiency with Photoshop • 2 years' familiarity with Java	• Excellent leadership and teamwork skills • Advanced writing and presentation skills • Fully bilingual (reading, writing, speaking) in English and French

Employment Experience. The Employment Experience section follows the same format as the Education section. List your jobs in reverse-chronological order with your current (or most recent) job first and your earliest last. List the month/year date ranges in the same position as in the Education section. The months are important because a date range such as "2015-2016" is misleading if you

worked a few weeks before and after New Year's, whereas "Dec. 2015 – Jan. 2016" honestly indicates seasonal work. **Figure B2.5** presents a sample employment experience section.

EMPLOYMENT EXPERIENCE

Student Support Representative, Student Support Services — Apr. 2016 – Present
The AC Hub, Algonquin College, Ottawa ON

- Provide effective customer service in supporting student and faculty clientele

Sandwich Artist, Person in Charge, Subway — Jul. 2014 – Apr. 2016
Rideau Centre Food Court, Ottawa ON

- Managed staff and conducted quality-control inspections
- Ensured customer service satisfaction through direct interaction and team motivation
- Fostered effective teamwork among staff by role-modeling and conflict resolution

Figure B2.5 *Sample employment experience section that lists employment experience in reverse chronological order (Bartsiokas & Hylton, 2019).*

At the beginning of your working life, include whatever jobs you've done (except perhaps newspaper or flyer delivery), but make them relevant by adding transferable skills as sub-points underneath. While you should omit task-specific skills, definitely list transferable skills (e.g., teamwork) that match those listed in the job posting. As you can also see in **Figure B2.6**, use bullet-point action words to describe your experience. Use verbs for the present job in the present tense, and list those for past jobs in the past tense. Use clear, high-impact action verbs such as the following:

Achieved	Coordinated	Expanded	Innovated	Provided	Served
Analyzed	Corrected	Expedited	Introduced	Reduced	Spearheaded
Approved	Delegated	Facilitated	Investigated	Represented	Spurred
Averaged	Designed	Grew	Managed	Resolved	Streamlined
Collaborated	Directed	Implemented	Organized	Restructured	Strengthened
Constructed	Enabled	Improved	Overhauled	Reviewed	Supervised
Contributed	Engineered	Increased	Pioneered	Revitalized	Targeted
Converted	Established	Initiated	Prioritized	Screened	Transformed

Figure B2.6 *Action words for describing your responsibilities (Bartsiokas & Hylton, 2019).*

When in bullet-point descriptions of skills in a three-part ***verb + object + prepositional phrase*** structure, some of the above action verbs may look like the following:

- **Collaborated** consistently with team members in working groups improving departmental processes
- **Streamlined** collaborative report-writing processes by switching to Google Docs
- **Organized** annual awards dinner celebration for a department of 150 employees
- **Designed** 13 internal feedback forms in the company intranet for multiple departments
- **Secured** government program funding successfully for eight departmental initiatives

Focus on quantifiable achievements and use actual numerical figures when possible. Also, place adverbs after the verb rather than beginning points with them (e.g., not *Consistently collaborated with team members*) so that you always lead with verbs (Guffey, Loewy, & Almonte, 2016, p. 387). To make your accomplishments more concrete, Google executive Laszlo Block (2014) advises you to structure them according to the following formula:

Accomplished X as measured by Y by doing Z.

Even if your job is just a grocery store cashier, you can quantify your achievements and put them in perspective. Instead of "Processed customer purchases at the checkout," saying "Served 85 customers per day with 100% accuracy compared to my peers' average of 70 customers at 90% accuracy" demonstrates your focus on achieving outstanding excellence with regard to KPIs (key performance indicators), which hiring managers will love (Block, 2014).

As you add more industry-specific work experience throughout your career, you can move those transferable skills to only career-oriented entries in this section and delete non-industry-related work experience. A decade or two into your working life, you'll have a solid record of only career-oriented work experience in résumés targeted to career employers.

The gold standard of experience that employers want to see in a résumé is that you've previously done the job you're applying for—just for another employer (Vandegriend, 2017). This means that you can carry on in the new position with minimal training. If that's the case, you should place your Employment Experience section above your Education section. Otherwise, recent college graduates should lead with their more relevant Education section, appealing to employers hiring for potential rather than for experience.

References. In the context of the résumé, references are former employers who can vouch for you as a quality employee when asked by your prospective employer. You have two options for how to fill out your References section:

1. Simply say "**References available upon request**" under the heading "References" following the Related Experience section.
2. Include a References section (as in **Figure B2.7)** with actual entries when applying to a smaller

organization that will likely make quick decisions about hiring.

John M. Smith

C: 555.555.5555 • E: John.Smith@utexas.edu

School Address:
123 Campus Street
Austin, TX 12345

Permanent Address:
456 Oak Drive
Queens, NY 67890

References:

Jane Jones
Supervisor, JCrew Retail Store, May 2007—August 2007
Phone: 555.555.5555
E-mail: janejones@jcrew.org

El VonRoth
Professor, University of Chicago, Spring 2008
Phone: 555.777.5555
E-mail: elvonroth@uchicago.edu

Joe Vernie
Director, YMCA South Shore, Spring 2010
Phone: 555.999.5555
E-mail: jvernie@ymca.org

Figure B2.7 *Sample list of references (Kinonen, Mold, Erickson, & Curtin, 2017).*

If you include references, put them all on one page at the end of your application, so they can be separated from your résumé and shredded at the end of the hiring process. Three or four references is best, and each must be someone who was in a position of authority over you, such as a manager or supervisor, for at least two years, ideally. The assumption is that less than two years is not enough time to fully assess the consistency of an employee's work ethic. List your references in order of what

you expect to be the most enthusiastic endorsement down to the least. Do not include coworkers, friends, or family members among your references.

Each reference must contain the following pieces of information:

1. **Full name in bold,** followed by a comma and the reference's official job title capitalized (e.g., Manager, Supervisor, CEO, or Franchise Owner)
2. **Company** or organization they represent (or represented when you worked under them, though they've since moved on to another company).
3. **Phone number** as employers checking references prefer to call, rather than email, so they can have a quick back-and-forth conversation about the candidate.
4. **Email address** to allow the for the potential employer to set up a time for a phone call with the reference or to ask for details in writing if a phone call is somehow difficult or impossible (e.g., time-zone differences or international calling charges).

It's very important that you confirm with your references that they will provide you with a *strong* endorsement (use those words when you ask) if called upon by a potential employer. Don't be afraid to ask. Providing references is part of a manager's or supervisor's job. They got to where they are on the strength of their former employers' references, and there's a "pay it forward" principle motivating them to do the same for the employees under them. If they don't believe in your potential, they'll likely be honest in advising you to ask someone else.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: *https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=291#h5p-104*

The Cover Letter

An important distinction in the content between the résumé and cover letter is that the former is focused on your past, while the cover letter is focused on your future with the company. Many job applicants wastefully use the cover letter to express in sentences what they listed in point-form in their résumé. To be persuasive, however, the cover letter must convince the employer that you will apply the skills and qualifications developed through previous work, education, and other experience **to your future job**. They want to see how you believe you'll help meet their business goals and fit within the company culture. If you answer the "What's in it for us if we hire you?"

question that hiring managers direct towards any cover letter, you increase your chances of getting an interview.

Is a cover letter even necessary? In cases where you know that the employer thinks they're just a waste of time, then you can obviously skip it. Sometimes job postings will helpfully clarify whether they want a cover letter or not. What if they don't say either way, though? The safe bet is to write a cover letter as part of your targeted approach to the job application. It'll show the hiring manager that you've made the extra effort to explain how well you suit the job and give them more information to make a well-informed decision about you. Adding a cover letter looks better than all the applicants who didn't bother. Check out this Careercake (2013) video that will introduce you to cover letters.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=291#oembed-2

As a direct-approach message, the cover letter generally follows the AIDA pattern of persuasive message in its four paragraphs:

A for **Attention**	States emphatically what job you want and that you qualify
I for **Interest**	Summarizes how you will apply your skills and qualifications
D for **Desire**	Explains why you're interested in the company and job itself
A for **Action**	Requests that the reader consider you for an interview

Cover Letter Sections

Let's look in more detail at how to write each of the cover letter paragraphs plus surrounding parts.

Opening Salutation. The most impressive cover letters address the hiring manager formally by name in the opening salutation (Guffey et al., 2016, p. 398). "Dear Ms. Connie Jenkins:" tells the employer right away, "Take me seriously because I'm a targeted résumé" compared to the droves of applications introduced by generic cover letters beginning with "To whom it may concern:" or, worse, with no introductory cover letter at all. If the job posting identifies the recipient, creating a customized salutation gives you an early lead in the competition because it shows that you can follow orders, which not everyone does.

If the job posting does not identify the hiring manager, finding their name also shows that you're resourceful and conscientious because you care about finding the right person to deal with—qualities employers love. You may have to dig for that information on the company website,

by Google-searching for the company's HR or recruiting personnel, or calling the company to ask whom you can address your application.

Job Opening Identification. If your cover letter responds to a job posting, its first paragraph should do no more or less than the following:

1. State the official **job title** of the position you're seeking, as well as the reference number if one was provided in the job posting. Get right to the point by saying emphatically, "With 3 years experience in geo-surveying, I am applying for the position of . . ." or "Please accept this application submitted with keen interest for the position of . . . ." Don't waste the reader's time with redundant lead-ins such as "I'm Todd Harper and I'm applying for . . ."; they can see your name at the top and/or bottom of the page.

If the job posting included a reference number, include it in parentheses after the job title. Also, include it in the bolded **subject line** above along with the job title. Employers use job reference numbers to direct applications to the correct competition, especially if the company is large enough to run several at once.

2. **Say where you found out about the job** in the first sentence after naming the job title. If you were recommended by someone in the company, name-dropping works well here. Whether you heard about the job from a close network contact or if a recruiter recommended it or you saw the advertisement on Indeed, clearly state where you heard about the job.

3. **State that you're qualified** for the position by mentioning a key qualification or experience. Then direct the reader to what follows. Be courteous in this request. A concluding sentence such as p*lease consider the following application describing how I meet the required qualifications for the position* nicely introduces the following paragraphs and résumé.

If your cover letter introduces an **unsolicited application**—i.e., it's a "cold call" prospecting for work rather than responding to a job posting—take a more indirect, persuasive approach than the direct one advised above. Start by asking if the employer is in need of someone who can do what you do, then detail the skills you have that will benefit the employer.

Skills and Qualification Summary. Use your second paragraph to explain how you'll apply the skills you've learned and practiced throughout your education, work, and other experience t**o benefit the employer** in the position you're applying for. Getting right to the point with this in a solicited application (responding to a job posting) is vital because anything you include that doesn't instantly convince the employer that you have what they're looking for is going to disqualify your application quickly. Avoid repeating and stretching out the Skills and Qualifications Summary section of your résumé.

Make the paragraph instead about how you're going to benefit the employer, using those skills to help the company achieve its technical and business goals, which requires knowing and saying what they are. This is why you were advised to research the company at the outset of the application process and note their products and/or services, clientele demographics, and mission/vision statement. Show that you know what they want and that you have the necessary skills to deliver

exactly that. If you convince the employer that you bring a skill set that will set you up for success in the position right away (with only minimal mandatory training), you're a step closer to the interview. If you list skills that only partially mirror what the posting asks for (or, worse, not at all), however, you've moved your application a step closer to the shredder.

Employer Preference. Though many applicants meet the required baseline qualifications for the job, only those who look like they will be a good "fit" in the company or organization culture will be invited for an interview. The paragraph that follows the qualifications paragraph is crucial to convincing the employer that you'll fit in nicely. To assure the employer you will be truly happy in that position, say what attracts you to it and to the company in general. Perhaps you have been a customer in the past and were really impressed by the product or service and the people you dealt with, and now you want to participate in the effort to make more satisfied customers like you've been. Saying that your priority is to make the company's customers and stakeholders happy, perhaps by paraphrasing the mission or vision statement available on their website and making it your own, goes a long way toward convincing the employer that you're their kind of people.

Closing Requests. End your letter's message concisely with two or three sentences that do the following:

1. **Thank the reader** for considering your application. Politely phrase this as a request to read on to the next page: *I very much appreciate your considering me for this position. Please review the attached résumé for a more detailed explanation of how I meet or exceed the required qualifications*.
2. **Request an interview.** Since winning an interview spot for a chance to get a job offer is the entire goal of the application, make your intentions clear by stating your desire to talk in person. You can say that you look forward to meeting and discussing further your "fit" in the organization, since that's exactly what they'll be doing with the interview. Though some cover letter writing guides advise ending with confidence, saying something like you'll be contacting them to arrange an interview or, worse, thanking them in advance for the job offer to come or asking when you can start the job will appear entitled in the worst way. Any statement that assumes a certain victory looks like you're saying that this opportunity is owed to you rather than earned. An important part of being courteous here at the letter's closing is being humble.

See **Figure B2.8** below for a sample cover letter.

Sample Student Cover Letter – Welding

Albert Flynn
94 Example North Street
Odessa, ON X0X 0X0
(000) 123-9999
albert.tac @ email.com

April 1, 20XX

Mr. Bruce Campbell
Manager Works
Kinder Morgan
2 Some Avenue
Odessa, ON 0X0 X0X

RE: Welder Position

Dear Mr. Campbell:

I am writing to apply for the position of welder at Kinder Morgan, as advertised in the *Daily Tribune*. I have a technical certificate in welding, AWS credentials as a Certified Welder Fabricator, and five years of experience in welding. I always keep safety guidelines at the forefront while completing welding work, and I ensure my coworkers do as well.

As indicated in the enclosed résumé, I am adept at welding metal components to repair or fabricate products using brazing, electric arc, and gas welding equipment. Additionally, I have a demonstrated ability to read and interpret layouts and blueprints. Moreover, I am proficient in different measuring tools such as tape measure, dial caliper, micrometer, and protractor. Above all, I am able to follow health and safety guidelines while performing the welding and fabrication tasks.

As a worker, I am a strong team player and work well with coworkers and supervisors. I am also flexible and able to work long hours when needed for a project and to come in for additional shifts. I am also eager to share project ideas that will move Kinder Morgan into future success.

I am confident that my experiences, expertise, and strong interest in exceeding the goals of Kinder Morgan make me an exceptional candidate for your welder position. I look forward to discussing my qualifications with you further in a meeting.

Thank you for your time and consideration.

Sincerely,

Albert Flynn

Enc. Résumé

Figure B2.8 *Sample cover letter for a technical position (Fleming, n.d.).*

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=291#h5p-105

EXERCISE B2.3

1. Write a targeted résumé for the job posting you chose in the previous chapter. Moving forward, you can use this as a model for how to excerpt a targeted résumé from your generic CV.

2. Write an unsolicited cover letter for your dream job. Take the indirect approach and be convincing in how you present your pitch.

Credits: Content for this section of the text has been partially adapted from Tom Bartsiokas' and Tricia Hylton's *Communication@ Work* (2019), which has been adapted from Jordan Smith's original *Business Communication for Success* (2015). Some content has been remixed and adapted from the chapter entitled Preparation by Megan Savage, in *Technical Writing* (n.d.). Model documents have been remixed from OER sources as indicated. Some content was created by Robin L. Potter.

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B3: The Online Application Process

Artificial intelligence is now the big time-saver for recruiters as the technology can sort through hundreds of applications in a fraction of the time a human can. Applicant tracking systems and other intelligent screening software will most likely be the first to "read" your job application documents. These technologies sort through all applications using keywords to identify those applications that best suit the available job. Therefore, your application documents must be strategically customized for every job posting to which you are responding. For applicants, online job boards, social networks, and mobile technology have become the permanent engines of modern-day job search. The number of apps available to assist job applicants through the job search process is numerous. Thus, knowing how to take advantage of these apps, how to build your online presence, and how to navigate through the online application process are skills the 21st-century job seeker should know.

To get started, view the following video, *How to Apply for a Job Online*, which provides some basic knowledge on the online job application process.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=296#oembed-2

The Intelligent Application Process

Artificial intelligence has become an important tool in seeking out candidates, screening résumés, running interviews, and selecting new hires. Technology, as the video above indicates, removes many obstacles in the hiring process. In fact, a 2018 survey of trends in the hiring process reveals that 70% of companies have used social media to find and hire employees, and 89% plan to use social media as part of their future hiring process (TalentNow, 2019; see **Figure B3.1**). Consequently, securing a job in the current and future job market will involve understanding the ins and outs of the online application process.

Figure B3.1 *A 2018 survey revealing the role social media are playing in the online hiring process. (TalentNow, 2019).*

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=296#h5p-106

Creating Your Online Presence

Clearly, having or creating an online presence is one important factor in the new intelligent job search environment. Let's examine how to create an impactful online presence.

Social Network Sites

If you haven't done this yet, create a professional web presence by assembling a well-developed LinkedIn profile. It is one of the first online profiles that prospective employers check out when considering a candidate. This site and other social networking sites offer plenty of advice on how to make the most of social media platforms, so search a few out to get a picture of the consensus on

what makes for a successful profile. A good, current place to start is How to Use LinkedIn Effectively (Doyle, 2021) because this article contains links to several in-depth guides for building each aspect of your profile.

If you've already created a LinkedIn profile, show potential employers that you're fully committed to your profession by continually updating it as your acquire experience and complete projects. Keep building your network by following professionals in your career field and adding content related to your area of expertise. Engage with your online network by responding to posts and connecting with individual thought leaders. Consider your online profile as a space where you can show that you are a motivated professional.

As you gain more professional experience throughout your career, add it all to your online profile to create a master CV ("curriculum vitae," meaning "course of life" in Latin) from which you can extract targeted résumés for particular job applications. It's okay if your targeted résumé and CV cover the same content at the beginning of your working life because you won't have much to put in either; employers will understand that when they see the year you graduated from college. As you gain more experience, be selective about what you include in a targeted résumé; however, your LinkedIn CV will provide employers with a fuller picture of what you've been doing with your life. They will be impressed that (1) you were able to present to them a slice of that history relevant to the job at hand, and that (2) you're so much more well-rounded than your targeted résumé lets on. They'll see that you have depth.

The Résumé (Online Considerations)

Yes, the résumé is still very important for the online application process. The more closely your résumé matches what an employer's applicant tracking system (ATS) is looking for, the better your chance of landing an interview and getting the job. Using keywords from job postings is always a good strategy, but modern ATSs are also screening for additional qualities. Ensuring your online résumé contains the following characteristics improves the probability that it will be selected by an ATS. Here are a few tips for customizing your résumé:

Use keywords strategically: Using keywords is good, but using keywords in context is better. That is, use keywords in a manner that ensures the ATS will recognize the mentioned skills as desirable.

Focus on nouns: To attract the attention of hiring managers, focus on nouns. The ATS looks for three types of nouns:

- Job titles, positions or roles
- Technical skills or specializations
- Certification, tools used, or specific experience

Vary job title phrasing: Varying the job title can ensure ATS recognition

Highlight the skills section: Adapt the skills section to ensure it responds to desired skills

Use simple formatting: Keep the résumé format simple so as to facilitate easy translation to an online format. Consider converting the basic résumé to a plain-text.

Create customary résumé headings: Using conventional headings will increase ATS recognition

(*Business Communications*, 2019)

E-portfolios

An e-portfolio provides an opportunity for job seekers to present their skills and talents in a very tangible manner. An e-portfolio allows the job seeker to provide a basic résumé containing links to projects, assignments, videos, social media sites (e.g., LinkedIn) to provide a comprehensive overview of their skills and personality for prospective employers. See **Figure B3.2** for an overview of e-portfolios.

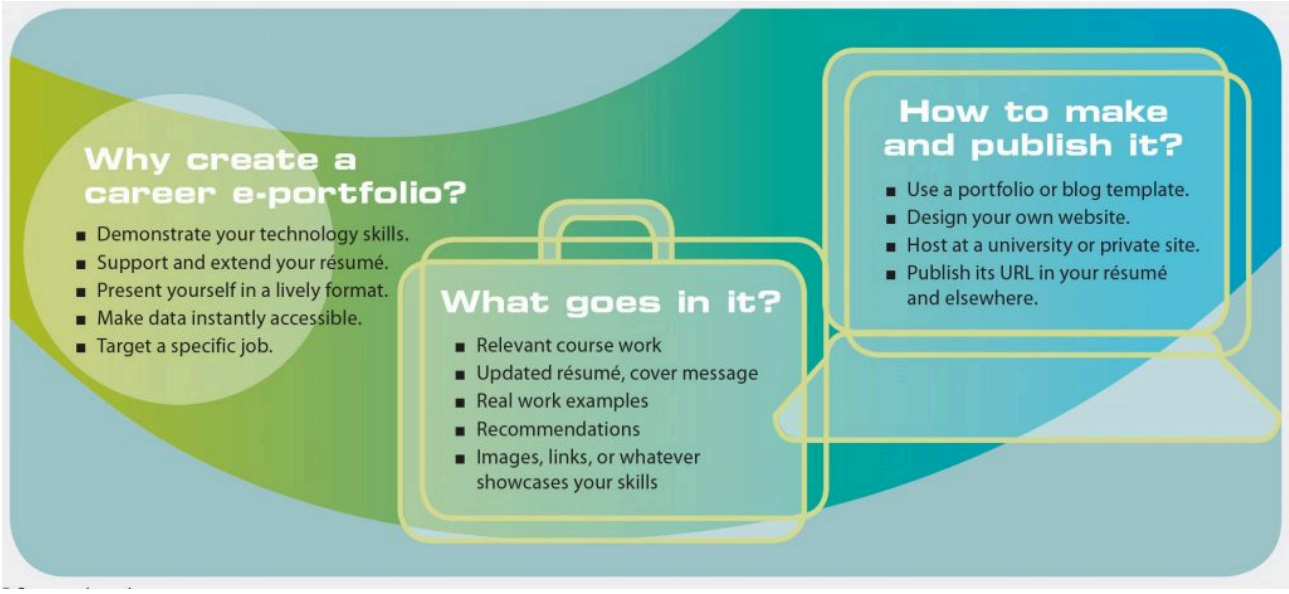

Figure B3.2 *The why, what, and how of developing an e-portfolio. (Business Communications, 2019)*

You can create an e-portfolio yourself by creating a website using free website builders like Wix, Squarespace, Weebly, and WordPress. These sites offer customizable templates that you can adapt to your needs. There, you can store your résumé, project work, letters of recommendation, and other artifacts displaying your qualifications, experience, and education using appealing page designs and imagery. Remember to use imagery that reflects your professional persona or brand.

Video Résumés

Finally, another vehicle for an online job application is the video résumé. This format is becoming a key recruiting tool for many companies. A video résumé allows job applicants to present their skills, qualification, and unique interests in multiple formats. Three skills in particular that are highlighted through this medium include speaking, presentation, and technical skills. For a job requiring such skills, a well-produced video résumé provides an advantage over those applicants who apply in the more traditional manner. With the availability of video and video editing apps, creating a video résumé is well within the capabilities of most college students. Here are some tips to create a video résumé:

- **Approach:** Be yourself. Explain why you are the best candidate for the job and how you would be an asset to the organization. Include a fun fact about yourself to highlight your individuality and personality.
- **Attire:** Dress appropriately for the career field; it is always best to dress professionally.
- **Focus on content:** Customize the video content to respond to or match the specific job opening.
- **Limit the duration:** Keep the video résumé to 1 – 3 minutes.

Watch the following video for more advise on creating a video resume.

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Knowledge Check

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Conclusion

The job application process has become one that is highly influenced by intelligent agents. In addition to the traditional job application process, a variety of online apps and other tools provide the motivated and strategic job seeker with a wide selection of resources to optimize chances of landing an interview. These are really exciting times for job seekers willing to use these tools in the online application process.

EXERCISE B3.1

Even if you are not in the job market yet, becoming familiar with LinkedIn can open your eyes to the kinds of information employers seek and also give you practice at filling in templates such as those in the ATS. It can also afford you the opportunity to engage with leaders in your field through postings and comments. The easiest way to begin is to create your profile. You may want to click on the Settings tab to create the privacy settings that match your comfort level. Then, once you are comfortable with your profile, you can make it public and begin engaging with your community by following companies and leaders in your field.

Please note: Content for this section of the text has been partially adapted from Tom Bartsiokas' and Tricia Hylton's *Communication@Work* (2019), which has been partially adapted from Jordan Smith's original *Business Communication for Success* (2015).

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B4: Interviewing Skills

The job interview is one of the most challenging and hope-inspiring events of our lives. It consists of a meeting with a potential employer during which you discuss your qualifications for an available job. Here, you would be asked to discuss how your education, work experience, interests, and character align with the job. Often interview questions go beyond to reveal how you relate to others, solve problems, use specialized skills, and would fit into a specific department or the organization as a whole.

Employment interviews come in all shapes and sizes, and may not be limited to only one exchange or one interaction. A potential employee may very well be screened by a computer (as the résumé is scanned) and interviewed online or via the telephone before the applicant ever meets a representative or panel of representatives. The screening process may include formal tests that include personality tests, background investigations, and consultations with previous employers. Depending on the type of job you are seeking, you can anticipate answering questions, often more than once, to a series of people as you progress through a formal interview process. Just as you have the advantage of preparing for a speech, you can apply the same research and public speaking skills to the employment interview. Let's examine this process in more detail, starting with the following video: *Top Interview Tips: Common Questions, Body Language & More* (2020).

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=300#oembed-1

The Interview Process

The invitation to interview means you have been identified as a candidate who meets the minimum job requirements and demonstrates potential as a future employee. Your cover letter, résumé, and/or related application materials may demonstrate the alignment between your qualifications and the job duties, but now comes the moment where you will need to articulate those points out loud in a bid to convince the interviewer that you are indeed the right person for the job. To achieve this goal, you must arrive prepared to discuss how you can be an asset to the organization. To be able to do this, you must know yourself as well as the organization and the job that has been posted, so careful preparation is required to optimize your performance. There is no one right or wrong way to prepare and present at your interview; however, some elements are common across interview opportunities.

Preparation

The right frame of mind is an essential element for success in communication, oral or written. For many, if not most, the employment interview is surrounded with mystery and a degree of fear and trepidation. Just as giving a speech may produce a certain measure of anxiety, you can expect that a job interview will make you nervous. Anticipate this normal response, and use your nervous energy to your benefit. To place your energies where they will be put to best use, the first step is preparation.

Briefly, the employment interview is a conversational exchange in which the participants try to learn more about each other. Both conversational partners will have goals in terms of content, and explicitly or implicitly across the conversational exchange will be relational messages. Attending to both points will strengthen your performance. To prepare for an employment interview, research the company, market, and even individuals in your effort to learn more about the opportunity.

If you have been invited for an interview, you can rest assured that you have met the basic qualifications the employer is looking for. Hopefully, this initiation signal means that the company or organization you have thoroughly researched is one you would consider as a potential employer. Perhaps you have involved colleagues and current employees of the organization in your research process and learned about several of the organization's attractive qualities as well as some of the challenges experienced by the people working there.

Businesses hire people to solve problems, so you will want to focus on how your talents, expertise, and experience can contribute to the organization's needs. The more detailed your analysis of their current challenges, the better. You need to be prepared for standard questions about your education and background, but also see the opening in the conversation to discuss the job duties, the challenges inherent in the job, and the ways in which you believe you can meet these challenges. Take the opportunity to demonstrate the fact that you have "done your homework" in researching the company. Table 1: "Interview Preparation Checklist" presents a checklist of what you should research before you consider yourself prepared for an interview.

Figure B4.1 *Depicted here are a number of considerations before going into a job interview (Doyle, 2020).*

Table B4.1 ***Interview preparation checklist***

What to Know	Examples
Type of Interview	Will it be a behavioral interview, where the employer watches what you do in a given situation? Will you be asked technical questions or given a work sample? Or will you be interviewed over lunch or coffee, where your table manners and social skills will be assessed?
Type of Dress	Office attire varies by industry, so stop by the workplace and observe what workers are wearing if you can. If this isn't possible, call and ask the human resources office what to wear—they will appreciate your wish to be prepared.
Company or Organization	Do a thorough exploration of the company's Web site. If it doesn't have one, look for community business listings online. Contact the local chamber of commerce. At your library, you may have access to subscription sites such as Hoover's Online (http://www.hoovers.com). Use this resource as an important source for company information.
Job	Carefully read the ad you answered that got you the interview, and memorize what it says about the job and the qualifications the employer is seeking. Use the Internet to find sample job descriptions for your target job title. Make a written list of the job tasks and annotate the list with your skills, knowledge, and other attributes that will enable you to perform the job tasks with excellence.
Employer's Needs	Check for any items in the news in the past couple of years involving the company name. If it is a small company, the local town newspaper will be your best source. In addition, look for any advertisements the company has placed, as these can give a good indication of the company's goals.

Knowledge Check

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Performance

From this solid base of preparation, you need to begin to prepare your responses. Would you like some of the test questions before the test? Luckily for you, employment interviews involve a degree of uniformity across their many representations. Here are eleven common questions you are likely to be asked in an employment interview

1. Tell me about yourself.
2. Have you ever done this type of work before?
3. Why should we hire you?
4. What are your greatest strengths? Weaknesses?
5. Give me an example of a time when you worked under pressure.
6. Tell me about a time you encountered (X) type of problem at work. How did you solve the problem?

7. Why did you leave your last job?
8. How has your education and/or experience prepared you for this job?
9. Why do you want to work here?
10. What are your long-range goals? Where do you see yourself three years from now?
11. Do you have any questions?

(McLean, 2005)

When you are asked a question in the interview, look for its purpose as well as its literal meaning. "Tell me about yourself" may seem like a broad request, but it is not. The employer is looking for someone who can address their needs. Telling the interviewer about yourself is an opportunity for you to discuss how your personal qualities can become assets for the organization. Consider discussing experiences that align well with the job duties and show how you can respond to organizational needs.

In the same way, responses about your strengths are not an opening to brag, and your weaknesses are not an invitation to confess. If your weakness is a tendency towards perfectionism, and the job you are applying for involves a detailed orientation, you can highlight how your weaknesses may serve you well in the position.

In addition, consider using the "because" response whenever you can. A "because" response involves the restatement of the question followed by a statement of how and where you gained education or experience in that area. For example, if you are asked about handling difficult technical situations, you could answer that you have significant experience in that area because you've served as a customer support technician at a help desk with X company for X years. You may be able to articulate how you were able to turn an encounter with a frustrated customer into a long-term relationship that benefited both the customer and the organization. Your specific example, and use of a "because" response, can increase the likelihood that the interviewer or audience will recall the specific information you provide.

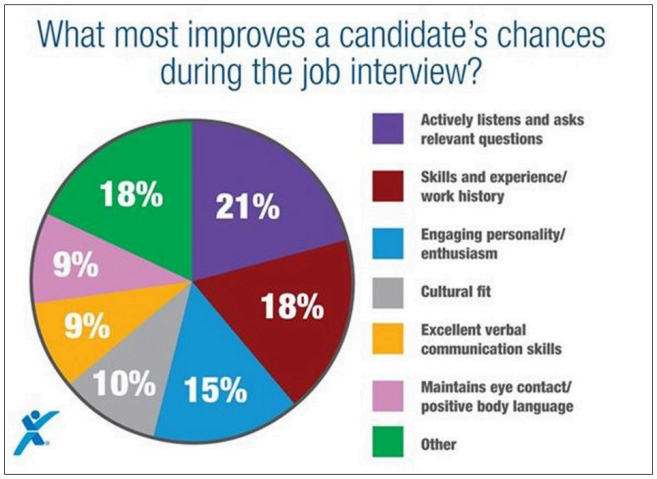

Figure B4.2 *A survey of 2,169 business leaders reveals that using active listening skills and asking relevant questions improves the chances of securing employment. (GlobalNewswire, 2018).*

You may be invited to participate in a conference call and be told to expect the call will last around 20 minutes. The telephone carries your voice and your words, but doesn't carry any visual cues. If you remember to speak directly into the telephone, look up and smile, your voice will come through clearly, and you will sound competent and pleasant. Whatever you do, don't take the call on a cell phone with an unstable connection—your interviewers are guaranteed to be unfavorably impressed if you keep breaking up during the call. Use the phone to your advantage by preparing responses on note cards or on your computer screen before the call. When the interviewers ask you questions,

keep track of the time, limiting each response to about a minute. If you know that a twenty-minute call is scheduled for a certain time, you can anticipate that your phone may ring perhaps a few minutes late, as interviews are often scheduled in a series while the committee is all together at one time. Even if you only have one interview, your interviewers will have a schedule, and your sensitivity to it can help improve your performance.

You can also anticipate that the last few minutes will be set aside for you to ask your questions. This is your opportunity to learn more about the problems or challenges that the position will be addressing, allowing you a final opportunity to reinforce a positive message with the audience. Keep your questions simple, your attitude positive, and communicate your interest.

At the same time as you are being interviewed, know that you too are interviewing the prospective employer. If you have done your homework you may already know what the organization is all about, but you may still be unsure whether it is the right fit for you. Listen and learn from what is said as well as what is not said, and you will add to your knowledge base for wise decision-making in the future.

Above all, be honest, positive, and brief. You may have heard that the world is small, and this is true. As you develop professionally, you will come to see how fields, organizations, and companies are interconnected in ways that you cannot anticipate. Your name and reputation are yours to protect and promote.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=300#h5p-109

Post-performance

You completed your research of the organization, interviewed a couple of employees, learned more about the position, were on time for the interview (virtual or in-person), wore neat and professional clothes, and demonstrated professionalism in your brief, informative responses. Congratulations are in order, but so is more work on your part.

Remember that feedback is part of the communication process: Follow up promptly with a thank-you note or e-mail, expressing your appreciation for the interviewer's time and interest. You may also indicate that you will call or e-mail next week to see if they have any further questions for

you. (Naturally, if you say you will do this, make sure you follow through!) In the event that you have decided the position is not right for you, the employer will appreciate your notifying them without delay. Do this tactfully, keeping in mind that communication occurs between individuals and organizations in ways you cannot predict.

After you have communicated with your interviewer or committee, move on. Candidates sometimes become quite fixated on one position or job and fail to keep their options open. The best person does not always get the job, and the prepared business communicator knows that networking and research is a never-ending, ongoing process. Look over the horizon at the next challenge and begin your research process again. It may be hard work, but getting a job is your job. Budget time and plan on the effort it will take to make the next contact, get the next interview, and continue to explore alternate paths to your goal.

You may receive a letter, note, or voice mail explaining that another candidate's combination of experience and education better matched the job description. If this happens, it is only natural for you to feel disappointed. It is also only natural to want to know why you were not chosen, but be aware that for legal reasons most rejection notifications do not go into detail about why one candidate was hired and another was not. Contacting the company with a request for an explanation can be counterproductive, as it may be interpreted as a "sore loser" response. If there is any possibility that they will keep your name on file for future opportunities, you want to preserve your positive relationship.

Knowledge Check

An interactive H5P element has been excluded from this version of the text. You can view it online here: *https://pressbooks.atlanticoer-relatlantique.ca/sctechnicalwriting/?p=300#h5p-110*

Conclusion

Although you feel disappointed, don't focus on the loss or all the hard work you've produced. Instead, focus your energies on where they will serve you best. Review the process and learn from the experience, knowing that each audience is unique and even the most prepared candidate may not have been the right "fit." Stay positive and connect with people who support you. Prepare, practice, and perform. Know that you as a person are far more than just a list of job duties. Focus on your skill

sets: If they need improvement, consider additional education that will enhance your knowledge and skills. Seek out local resources and keep networking. Have your professional interview attire clean and ready, and focus on what you can control—your preparation and performance.

EXERCISES B4.1

1. Find a job announcement of a position that might interest you after you graduate or reach your professional goal. Write a brief statement of what experience and education you currently have that applies to the position and note what you currently lack
2. What are the common tasks and duties of a job you find interesting? Create a survey, identify people who hold a similar position, and interview them (via e-mail or in-person).
3. What has been your employment interview experience to date? Write a brief statement and provide examples.

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APPENDIX C: WRITING FUNDAMENTALS

Technical Writing Essentials is designed to follow up on the skills learned in a first year college writing course. You learned many of these skills in the context of transferable writing in COM101 and COM111, so you are well under way to realizing the importance of these writing abilities in workplace writing. For a review of basic sentence skills and paragraph development, see Tara Horkoff's *Writing for Success* (2013/2019).

The following appendices provide a review of some of the basic conventions and expectations of writing fundamentals that you should be familiar with and that are relevant to technical writing:

C1: Transitional Words and Phrases for College Writing

C2: Sentence Structure

C3: Punctuation Matters

C4: Writing Comparisons

C5: Peer Review Essentials

Reference

Horkoff, T. & McLean, S. (2013/2019). *Writing for success*. eCampus Ontario Open Library. https://ecampusontario.pressbooks.pub/writingsuccesscdn/ This text is a derivative of Scott McLean's original 2013 version of *Writing for Success*. CC-BY-NC-SA

C1: Transitional Words and Phrases for College Writing

In previous English classes, you may have learned the basic transitional words or phrases in **Table C1.1**. These can be effective when writing simple information in a structure where you simply add one idea after another, or want to show the order of events.

Table C1.1 ***Basic beginner-level transitions***

first	firstly	first of all
second	secondly	next
third	thirdly	then
last	last but not least,	finally
moreover	furthermore	besides

However, more complex college-level and technical writing requires more sophisticated transitions. It requires you to connect ideas in ways that show the logic of why one idea comes after another in a complex argument or analysis. For example, you might be comparing/contrasting ideas, or showing a cause and effect relationship, providing detailed examples to illustrate an idea, or presenting a conclusion to an argument. When expressing these complex ideas, the simple transitions you've learned earlier will not always be effective – indeed, they may even confuse the reader.

Consider the transitions in **Table C1.2,** and how they are categorized. While this is not an exhaustive list, it will give you a sense of the many transitional words and phrases that you can choose from and demonstrate the need to choose the one that most effectively conveys your meaning.

Table C1.2 ***Sophisticated university-level transitions***

Addition	Comparison	Contrast	Cause and Effect
also	along the same lines	although	accordingly
and	in the same way	but	as a result
in addition	similarly	in contrast	consequently
in fact	likewise	conversely	hence
indeed	like	despite	it follows, then
so too		even though	since
as well as		however	so
furthermore		nevertheless	then
moreover		whereas	therefore
		yet	thus
		while	
		on the other hand	
Conclusion	**Example**	**Concession**	**Elaboration**
as a result	as an illustration	admittedly	by extension
consequently	consider	granted	in short
hence	for example	of course	that is to say
in conclusion	for instance	naturally	in other words
in short	specifically	to be sure	to put it another way
in sum	a case in point	conceding that	to put it bluntly
it follows, then		although it is true that...	to put it succinctly
so			ultimately
therefore			
thus			

Transitional words and phrases show the connection between ideas and how one idea relates to and builds upon another. They help create **coherence**. When transitions are missing or inappropriate, the reader has a hard time following the logic and development of ideas. The most effective transitions are sometimes invisible; they rely on the vocabulary and logic of your sentence to allow the reader to "connect the dots" and see the logical flow of your discussion.

For a discussion on the use of transitions in technical writing, see Marcia Riefer Johnston's Word Wise: Our Transitions, Ourselves

Common Transitional Strategies to Link Ideas

- Repeat a word or phrase from the previous sentence (or use a synonym, related word, or antonym) to show that the same idea is still being discussed, but is being developed further.
- Use the pronoun "this + noun" to show continued discussion of the idea.
- Use one of the above transitional words or phrases to show HOW you are developing your idea (are you showing contrast? Are you using an example to develop your idea? Are you showing a cause and effect relationship? Are you concluding? Are you conceding a point?).

EXERCISE C1.1 Transitions: *Place the transitional words below the paragraph into the blanks where they work most logically in the paragraphs.*

Exercise 1

A vegan can be defined as someone who does not eat meat, fish, or other animal products, such as eggs or cheese; _____, he or she eats vegetables, fruits, grains, and seeds. _____ this diet consists of non-meat food sources, a vegan typically consumes less fat and cholesterol than an individual who consumes meat. _____, raising animals for food uses valuable land, water, and energy. _____, adopting a vegetarian diet helps conserve the valuable resources that our future depends on.

- Consequently
- Because
- Furthermore
- Instead
- For example

Exercise 2

_____ many educators and parents have praised the *Harry Potter* series, some Christian parents have called for a ban on the books in their schools and libraries. Some churches have even gone as far as burning the books, citing biblical injunctions against witchcraft, _____ those in *Exodus* and *Leviticus*. _____, some Christians believe the books are compatible with Christianity, _____, that they embody basic Christian beliefs.

- However
- Although
- In addition
- Such as
- Indeed

References

Johnston, M.R. (n.d.). *Word wise: Our transitions, ourselves*. TechWhirl. https://techwhirl.com/word-wise-transitions/

C2: Sentence Structure

When building anything, it is important to be familiar with the tools you are using. Grammatical elements are the main "tools" you use when building sentences and longer written works. Thus, it is critical to have some understanding of grammatical terminology in order to construct effective sentences. If you would like to review some basic parts of speech (nouns, pronouns, articles, adjectives, adverbs, verbs, conjunctions, prepositions, etc), see the **Parts of Speech Overview** at the OWL.

The two essential parts of a sentence are the **subject** and the **predicate** (verb portion). The subject refers to the topic being discussed while the verb conveys the action or state of being expressed in the sentence. All clauses must contain both a subject and a verb; phrases, on the other hand, lack one or both a subject and a verb, so they need to relate to or modify other parts of the sentence. Main clauses, also called **independent** clauses, can stand on their own and convey an idea. **Dependent** clauses, also called **subordinate** clauses, rely on another part of the sentence for meaning and can't stand on their own.

Consider the following examples:

Independent Clause	**Phrases**
1. The **engineers** stood around the table	looking at the schematics for the machine.
(**subject**) (verb) (phrase)	(phrase) (phrase)

Sentence 1 is a simple sentence. It has one clause, with one **subject** (The engineers) and one verb (stood). These are followed by 3 modifying phrases ("around the table" "looking at the schematics" and "for the machine").

Dependent Clause	**Independent Clause**
2. After **they** discussed different options,	**they** decided to re-design the components.
Sub. Conj. (**subject**) (verb) (object)	(**subject**) (verb) (phrase)

Sentence 2 is a complex sentence, with one dependent and one independent clause, each with its own **subject**-verb combination ("**they** discussed" and "**they** decided"). The two clauses are joined by the subordinate conjunction, "after," which makes the first clause subordinate to (or dependent upon) the second one.

Being able to identify the critical parts of the sentence will help you design sentences that have a clear and effective subject-verb relationship. Knowing the components will also help you improve

your punctuation. If you would like a more detailed review of sentence structure, visit Purdue's OWL (Online Writing Lab) Mechanics page.

Sentence Structures

There are four main types of sentence structures: simple, compound, complex, and compound-complex. In the examples above, Sentence 1 is a simple sentence, while Sentence 2 is complex.

SIMPLE SENTENCES have one main clause (one subject + one verb) and any number of phrases. The following are all simple sentences:

- A simple sentence can be very effective.
- It makes one direct point.
- It is good for creating emphasis and clarity.
- Too many in a row can sound repetitive and choppy.
- Varied sentence structure sounds more natural.

COMPOUND SENTENCES have two or more main clauses joined by **coordinating conjunctions** (CC) such as *and, but, for, yet, nor, or, so (FANBOYS).* You can also connect them using punctuation such as a semi-colon or a colon. By **coordinating** the ideas, you are giving them roughly equal weight and importance.

Subject + verb, CC Subject + verb

E.g., The tires had to be changed, and the rotors had to be greased.

The following sentences are all compound:

- A compound sentence coordinates two ideas**, and** each idea is given roughly equal weight.
- The two ideas are closely related**, so** you don't want to separate them with a period.
- The two clauses make up part of the same idea**; thus**, they should be part of the same sentence.
- The two clauses may express a parallel idea**;** they might also have a parallel structure.
- You must remember to include the coordinate conjunction, **or** you may commit a comma splice.

Coordinate conjunctions consist of the following words (FANBOYS):

- **F**or

- **A**nd
- **N**or
- **B**ut
- **O**r
- **Y**et
- **S**o

COMPLEX SENTENCES express complex and usually unequal relationships between ideas. One idea is "**subordinated**" to the main idea by using a "**subordinate conjunction**" (like "while" or "although"); one idea is "dependent" upon the other one for logic and completeness. **Complex sentences** include one main clause and at least one dependent clause (see Example 2 above). Often, it is stylistically effective to begin your sentence with the dependent clause, and place the main clause at the end for emphasis, especially when the main clause contains information that would not be favorable to the reader such as in negative news messages.

Subord. Conjunction + subject + verb (*this is the dependent clause*), Subject + verb (*this is the main clause*)

E.g., After the wheels were removed, the rotors were greased.
Negative news e.g., After the wheels were removed, the damage to the rear drums was obvious.

The following are all examples of complex sentences:

- **When** you make a complex sentence, you subordinate one idea to another.
- **If** you place the subordinate clause first, you give added emphasis to the main clause at the end.
- Subordinate clauses cannot stand on their own. Despite the fact that many students try to use them that way. x (*fragment* – replace the period with a comma to fix this error)

COMPOUND-COMPLEX SENTENCES have at least two main clauses and at least one dependent clause. Because a compound-complex sentence is usually quite long, you must be careful that it makes sense; it is easy for the reader to get lost in a long sentence.

KEY TAKEAWAY

Using a variety of sentence types as well as using these types strategically to convey your ideas will strengthen your style. Keep the following in mind:

- **Simple sentences** are great for emphasis. They make great topic sentences.
- **Compound sentences** balance ideas; they are great for conveying the equal importance of related ideas.
- **Complex sentences**, when you use them effectively, show complicated relationships between ideas by subordinating one idea to another.

EXERCISE C2.1 Combining sentences

Combine the following pairs of sentences to make one idea subordinate to the other. Notice the impression you convey by how you subordinate one idea to another. If your combined sentence was a topic sentence for a paragraph, what idea would the reader expect that paragraph to emphasize?

1. Pair 1.
    - Energy drinks enhance awareness and energy level.
    - Energy drinks have negative health impacts.
2. Pair 2.
    - Smith's study found that energy drinks can increase athletic endurance.
    - The study also found that energy drinks can cause negative side effects such as headaches and "energy crashes", and can possibly lead to caffeine addiction.
3. Pair 3.
    - The rates of adolescent male violence has dropped by 20% over the last decade.
    - The rates of female adolescent violence has increased by 50% over the last decade.
4. Pair 4.
    - Nuclear power plants can pose significant dangers.
    - Nuclear energy is a clean and efficient way to generate power and reduce reliance on fossil fuels.

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C3: Punctuation Matters

> *"Punctuation marks are the road signs placed along the highway of our communication, to control speeds, provide directions and prevent head-on collisions."*
>
> Pico Iyer, "In praise of the humble comma" (2001).

Punctuation *Really* Matters!

Consider how punctuation can change the meaning of the following run-on sentence:

I have two hours to kill someone come see me.

The main function of punctuation is to separate phrases and clauses into meaningful units of information. Therefore, it is necessary to understand the basic structure of sentences—phrases and clauses—to understand the proper uses of punctuation. When punctuation is missing or incorrectly used, the reader may get a completely different message than the one intended. This can not only confuse readers and waste time, but can have disastrous results in cases where the writing has legal, economic, or safety implications–such as in technical workplaces.

[Grandma image]. https://91rules.wordpress.com/2011/10/14/who-knew-commas-could-be-so-important/. CC-BY 2.0.

An example of how a punctuation error can have real-world costs and consequences is reported in "Comma Quirk Irks Rogers": one comma error in a 10-page contract cost Rogers $2 million (Robertson, 2006). If you need further evidence, read about the case of the trucker's comma that went all the way to the supreme court, resulting in a $10 million dollar payout (Norris, 2017)!

Several helpful rules will help you determine where and how to use punctuation, but first, it might be helpful to understand the origins. Punctuation was initially developed to help people who were

giving speeches or reading aloud. Various kinds of punctuation indicated when and for how long the reader should pause between phrases, clauses, and sentences:

Comma = 1 second pause

Semicolon = 2 second pause

Colon = 3 second pause

Period = 4 second pause

These "pause rules" can still offer some guidance, but they are not foolproof, as someone might pause while speaking for many reasons, including that they simply ran out of breath, got distracted, or need time to think of a word. Below are some more consistent rules that you should follow to properly punctuate your sentences. These are presented in numerical order to help you remember the rules more easily.

COMMA RULE 1 – Introduce the subject

If the subject is not the **first** word/phrase in the sentence, place a comma before it to separate it clearly from the introductory element and indicate clearly what the subject of the sentence is.

As we have discussed before, sentences are most often strongest when the subject is the first element of the sentence: S → V → O

Occasionally, however, we might want to place a word or phrase before the subject. In cases where you want to do this, it can be helpful, and often necessary, to place a comma after that word or phrase to clearly indicate the subject of the sentence. In the following sentence, see if you can determine what the subject is without a comma to help you:

Based on that initial design concepts will be generated.

The subject—and therefore the meaning of the sentence—depends on where you place the comma. If the initial phrase is "Based on that," and "that" refers to some previously stated idea, then the sentence indicates that the subject is "initial design concepts," and the verb is "will be generated." However, if the initial phrase is "Based on that initial design," then we already have an initial design to work from and do not have to generate one. We are now focusing on creating more advanced "concepts," that will be "based on that initial design."

So if the subject is not the #1 word in your sentence, place a comma before it to clearly show what the subject is (hence "comma rule #1"). In each of the following examples, the subject of the main clause is **bolded**.

After an introductory word	Finally, **the design** must consider all constraints.
	In the initial phase, **the design** must meet early objectives.
After an introductory phrase	Meeting all the client's needs, **this design** has the potential to be very successful.
	Unlike Emma, **Karla** loves mechatronics.
	If the design meets all the objectives, **we** will get a raise.
After a subordinate clause	Although we are slightly over budget, **the design** will be cost-effective overall.
	While he interviews the client, **she** will do a site survey.

COMMA RULE 2 – Interrupt the subject and verb

Never place a single comma between the subject and verb of the sentence; you need either two commas (like brackets) or no commas between the subject and verb.

When you place an interrupting word, phrase, or clause between the subject and verb, if that phrase is a non-essential element, you must enclose that phrase in commas (use the "bracket test": if you could enclose it in brackets, then you can use commas). If the phrase is essential to the meaning, omit the commas. The words interrupting the subject and verb are **bolded** in the examples below.

Interrupting word	Communication errors, **unfortunately**, can lead to disastrous design flaws.
	The rules, **however**, are quite easy to learn.
Interrupting Non-Essential Phrase or Relative Clause	The Johnson street bridge, **commonly known as the "Blue Bridge,"** had to be replaced.
(These could be bracketed, and even omitted, without changing the meaning of the sentence)	The new bridge, **completed last year,** has a rolling bascule design.
	The new bridge, **which has a rolling bascule design**, was completed last year.
Interrupting essential phrases or clauses	The objective **that is most critical to our success** is the first one.
	That bridge **that needed replacing** was the Blue Bridge.
Do not use commas; these are essential to the meaning of the sentence	The man **with the yellow hat** belongs to Curious George.
	The student **who has the best design** will get an innovator's award.

If you would like more information on Essential vs Non-Essential elements, and when to use "that" vs "which," check out this ***Grammar Girl*** link: Which versus That

Beware the "Pause Rule"—many comma rule 2 errors occur when a sentence has a long subject phrase followed by the verb "is." People have the tendency to want to place a comma here, even though it is incorrect, simply because they would normally pause here when speaking:

> *The main thing that you must be sure to remember about the magnificent Chinese pandas of the southwest, x is that they can be dangerous.*

COMMA RULE 3 – The serial comma

When listing a series of 3 or more items, separate the items with commas.

Whether you are listing 3 or more nouns, verb, adjectives, phrases, or even clauses, use commas to separate them. In general, do **not** place a comma before the first item or after the last item. If you are only listing two items, do not separate them with commas:

"I love cooking for my family and my friends."

Only use the commas if there are three or more elements being listed. Make sure to list the elements in a consistent grammatical form (all nouns, or all verbs, or all using parallel phrasing).

2 listed elements (no commas needed)	All initial designs must incorporate mechanical structures and electrical systems. (2 nouns) Squirrels eat acorns and sleep in trees. (1 subject + compound verb (2 verbs)
3 listed elements–parallel structure	The final design must incorporate mechanical, electrical, and software subsystems. (3 adjectives describing different subsystems) Squirrels eat acorns, sleep in trees, and dig holes in the garden. (3 verbs) The proposed designs must not go over budget, use more than the allotted equipment, or take longer than one week to construct. (3 verbs: go, use, and take)
Faulty parallel phrasing (one of these things is not like the others...)	Proposed design concepts must adhere to all constraints, meet all objectives, and the components x must be on the approved list. (2 verbs and a 1 noun) The new bridge is aesthetically pleasing, structurally sound, and has x a pedestrian walkway. (2 adjectives and 1 verb) For more information about parallel listing, visit Parallel Structure at the OWL.

There is some debate about whether to place a comma before the "and" used before the final listed item. This comma, referred to as the Oxford Comma as it is required by Oxford University Press, is optional in many situations. For an optional piece of punctuation, it has stirred up a surprising amount of controversy! As with most grammatical rules, they can be broken when it is prudent and effective to do so; use your judgment, and choose the option that achieves the most clarity for your reader.

Review Comma Rules 1-3

Punctuate my imaginary award acceptance speech below, indicating where you would put commas and which rules you are following:

For their guidance and inspiration throughout my life I with all humility would like to thank my parents Lady Gaga and Ghandi.

COMMA RULE 4 – Joining clauses

Separate independent clauses by placing a comma before the coordinating conjunction.

While you might occasionally omit commas if the two clauses you want to join are very short ("She drove and he navigated."), it is a good habit to separate them with a comma for the sake of clarity. The mnemonic device for remembering the coordinating conjunctions that can link two independent clauses together is FANBOYS (for, and, nor, but, or, yet, so). When you have two complete sentences, but you want to join them together to make one larger idea, use a comma before the coordinating conjunction.

FANBOYS	Two clauses joined by a comma and coordinating conjunction
, for	We must all wear masks, **for** we want to protect our friends from COVID-19 infection.
, and	You should wash your hands, **and** you should wear a mask.
, nor	You should not make unnecessary outings, **nor** should you hang out with friends during COVID-19 lock down.
, but	Multi-layer masks offer effective protection**, but** kerchief masks do not.
, or	You can simply avoid going out**, or** you can take risks.
, yet	Some stay-at-home rules are clear, **yet** some are not.
, so	I think you understand my concerns**, so** I will leave it at that.

COMMA RULE 5

Use commas to indicate that a non-essential sentence element (a word, phrase, or clause) follows the comma, or to signal an abrupt shift in thought.

[Baby seals image]. Source: [https://www.flickr.com/photos/venditti_min_min-venditti/30088824650. CC-BY 2.0](https://www.flickr.com/photos/venditti_min_min-venditti/30088824650).

Learning comma rules takes practice, of course.

Practice makes perfect, in the long run.

Vampires make everyone nervous, even the bravest slayers.

I told you I need it by Wednesday, not Thursday.

Consider the difference between "It's raining cats and dogs" and "It's raining, cats and dogs."

SEMICOLON RULES

Use semicolons to link ideas when something stronger than a comma is needed.

A semicolon has three main functions:

1. Join closely related independent sentences into one sentence:

Scott was impatient to get married; Sharon wanted to wait until they were financially secure.

(Subject are strongly related—indeed, in this case, they are engaged!)

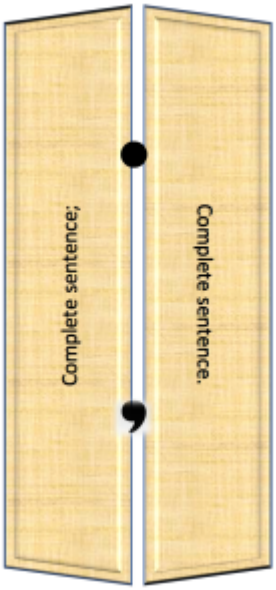
2. **Link two sentences joined by a transitional phrase/conjunctive adverb** (however, therefore, finally, moreover, etc.):

   Canadian History is a rather dull class; however, it is a requirement for the elementary education program.

3. **Separate items in a complex list where one or more of the items have internal punctuation:**

   The role of the vice-president will be to enhance the university's external relations; strengthen its relationship with alumni, donors, and community leaders; and implement fundraising programs.

In the first two cases, a semicolon works the same way a period does; if you could put a period there, then you can put a semicolon there. The semicolon simply connects the ideas more closely as part of one key idea, and makes the pause between them a little shorter.



The main rule you must remember is that if you use a semicolon in this way, the clauses on either side of the semicolon must be complete sentences. You cannot use a semicolon to introduce a phrase or fragment.

Complete sentence; complete sentence.

Think of the semicolon as working like a hinge in a bi-fold door; it joins two complete door panels that each have their own frame together as one.

Also, remember that you cannot simply use a comma instead of a semicolon to link the two clauses; that would result in a comma splice error.

The 3rd case—using semicolons to separate long, complex list items that contain commas within them—can result in complicated sentences that are difficult to read. You might consider using a bullet list instead of an in-sentence list in these cases.

How would you punctuate the following to clearly show how many courses Makiko is taking?

Makiko is taking Classics, a course on the drama of Sophocles, Seneca, Euripides, Fine Arts, a course on Impressionism, Expressionism, Modernism, Literature, a course on Satire, Pastiche, Burlesque, and Science, a new course for Arts students.

EXERCISE C3.1 Punctuation Practice : Add commas and/or semicolons as needed in the following sentences

1. Many companies make sugar-free soft drinks that are flavored by synthetic chemicals the drinks usually contain only one or two calories per serving.
2. The crab grass was flourishing but the rest of the lawn unfortunately was dying.
3. The hill was covered with wildflowers it was a beautiful sight.
4. The artist preferred to paint in oils he did not like watercolors.
5. The house was clean the table set and the porch light on everything was ready for the guests' arrival.
6. The computer could perform millions of operations in a split second however it could not think spontaneously.
7. The snowstorm dumped twelve inches of snow on the interstate subsequently the state police closed the road.
8. We invited a number of senior managers including Ann Kung senior vice-president Lionel Tiger director of information technology and Marty Sells manager of marketing.

COLON RULES

Use a colon to introduce amplification in the form of an example, explanation, quotation, summary, or list.

Keep in mind that when correctly used, colons are only placed where the sentence could come to a complete stop (i.e., you could put a period there instead). Note that in APA Style, you should capitalize the first letter of the word following the colon if what follows is a complete sentence.

Amplification	The hurricane lashed the coastal community: Within two hours, every tree on the waterfront had been blown down.
Example	The tour guide quoted Gerald Durrell's opinion of pandas: "They are vile beasts who eat far too many leaves."
List	Today we examined two geographical areas: the Nile and the Amazon.

Remember that when introducing a list, example, or quotation with a colon, whatever comes *before* the colon should be a complete sentence. You should not write something like this:

Today we examined: x

Three important objectives we must consider are: x

If these cannot end in a period, they should not end in a colon. Whatever comes *after* the colon can be a fragment or list; it does not have to be a complete sentence.

EXERCISE C3.2 Punctuation Exercises

1. Download the attached Punctuation Exercise document and compete the exercises with a classmate.
2. Choose a paragraph from the Pico Iyer's *Time Magazine* article, "In praise of the humble comma," and examine how he has used punctuation to demonstrate his point in that paragraph. In particular, note how he not only *explains* the importance of punctuation, but also *shows* its use in action.

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C4: Writing Comparisons

College classes often ask you to write comparative analyses in which you compare two or more items in a way that offers some meaningful conclusions. You can compare almost anything – even porcupine and mushrooms – as long as you have a clear reason for your comparison (a thesis) and logical criteria for comparing the items. For example, although porcupines and mushrooms seem to have very little in common (different life forms) you might compare how both porcupines and mushrooms have developed similar self-preservation methods to avoid predators. In order to compare two items, they must have obvious differences, but interesting similarities – or, conversely, obvious similarities, but interesting differences. Your reason for comparing can often be expressed by clearly articulating these interesting similarities or differences.

In technical communication, comparisons are helpful when discussing options, such as in recommendation or problem-solving reports, with a goal of recommending the option that best meets the criteria for resolving a matter. In such documents, options would be compared using the criteria as the basis for comparison with the goal of convincing the reader of the best solution.

This chapter will review

1. the basic grammar of comparative sentence structure, and
2. the overall comparative structures.

1. Comparative Grammar

We frequently engage in making comparisons in daily life. This leads to a sort of "shorthand" in the way we express comparisons. This shorthand might be understood in a conversational way, but in formal writing, we must adhere to certain grammatical standards. A correct comparative sentence should adhere to the following rules:

1. Clearly identify the things being compared.
2. Ensure the compared items are equivalent and comparable.
3. State the specific criteria for comparison.

These rules might seem obvious, but we often break them in our informal conversational comparisons. For example, the following sentence wants to compare the difficulty of dealing with the peels of apples and oranges, but grammatically compares apple peels to "my lab group," which are not equivalently comparable.

Compared with apple peels, my lab group found orange peels more difficult to deal with.

How would you fix this sentence to correctly express the comparison of apple peels to orange peels?

They say you can't compare apples and oranges, but you actually can as long as you have established their equivalence, have stated a purpose, and defined clear criteria for comparison. For example, you CAN compare apples to oranges, but you cannot compare apples to fruit. You can compare fruit to vegetables, but you cannot compare fruit to carrots. These are non-equivalent. Non-equivalent comparisons are often a result of faulty sentence structure.

Here is an example of an effective comparative topic sentence:

> *There are significant differences between apples and oranges in terms of their culinary uses, nutritional content, and growing needs.*

Comparative sentences can fail for several reasons:

1. They are incomplete (do not clearly identify the two items being compared):
    - *Apples grow better in northern climates.*
    - *Oranges have twice the vitamin C content.*
    - *Apples are considered more effective "comfort food."*
    - *This design is better.*
2. They are too vague (they don't provide enough meaningful information about the items):
    - *There were some differences in the characteristics of apples and oranges.*
    - *There were some similarities in the teamwork between the two labs.*
    - *Lab 2 was better than lab 1.*
3. The comparisons are faulty (often missing information, a sentence structure error, or idiom error):
    - *This process of juicing oranges is different than apples.*
    - *Compared with the first lab exercise, my team and I have a more professional approach toward our common goal.*
    - *Cooking apples is easier* ***as opposed to*** *oranges.*
    - *This lab helped us understand the value of teamwork* ***as against*** *individual work.*

EXERCISE C4.1

Try writing 2 or 3 comparative sentences, making sure you follow all three rules, and watching out for incorrect vernacular phrasing.

2. Comparative Structure: Alternating vs Block Structures

Comparisons are used to compare options in recommendation and other technical reports. Just as there are rules at the sentence level, there are also guidelines for comparative paragraph and report structure. Alternating (also called Point-by-point) and Block (also called Whole-to-whole) structures are common ways of organizing a comparative analysis, and the structure you use will depend on what, how, and why you are comparing. Let's say you are writing a comparative analysis of two types of wind turbines. Your overall purpose might be to analyze them to determine which is most economical to operate.

1. **Alternating Style** arranges the structure based on the criteria for comparison. One criteria might focus on characteristics; the second criteria might focus on performance, while a third might focus on maintenance.
2. **Block Style** arranges the structure based on the items being compared (each turbine). Each paragraph will focus on one of the turbine types, and may discuss more than one criteria for comparison. For example, the first section might focus on one turbine in detail, and might discuss performance and maintenance. The next section would focus on the other turbine, using the same criteria for comparison: performance and maintenance.

Often, **Alternating** structures work well for this kind of comparison, as you can structure your analysis based on a discussion of each factor in turn. You might choose to organize your analysis in a **Block** style, if the turbines are quite different and you are focusing on different criteria for comparison for each turbine. The table below shows simplified outlines for each structure:

Table C4.1 ***Simple outlines of block and point-by-point structures***

Block Style	Alternating Style
Introduction: Introduce the turbines being compared and state the purpose of your comparison (purpose statement) **Item 1 (Turbine A)** • In-depth analysis of item 1, focusing on several criteria (may need more than 1 paragraph) **Item 2 (Turbine B)** • all the things you want to say about item 2 • you may compare a bit to item 1 **Direct Comparison** You will likely need an extra paragraph here for direct comparative analysis based on the discussions in the previous sections. **Conclusion**	**Introduction**: Introduce the turbines being compared and state the purpose of your comparison (purpose statement). **Criteria 1 (Characteristics)** • Article A directly compared to Article B in terms of criteria 1 **Criteria 2 (Performance)** • Article A directly compared to Article B in terms of criteria 2 **Criteria 3 (Maintenance)** • Article A directly compared to Article B in terms of criteria 3 **Conclusion**
PROs and CONs If your items are different enough that you aren't using the same criteria for comparison, use Block style. But this can end up being a bit repetitive in that you have to remind your reader of your analysis when you get to the direct comparison part at the end.	**PROs and CONs** If you have the same criteria for each item, this is the most economical way to organize your report. But it can sound a bit "ping-pong" like if you are not careful with transitional words and phrases.

Block and Point-by-point structures are helpful principles for organizing your ideas, but keep in mind that you do not have to rigidly follow these outlines. You can mix these up a bit and use hybrid methods. Examine the excerpt below, from Douglas Rushkoff's book *Program or Be Programmed: Ten Commands for a Digital Age* (2011). Identify where the author has used block style, point-by-point style, and a mixture of the two. Also, note the use of comparative **transitional words and phrases** (highlighted for emphasis).

Sample Comparative Passage – by Douglas Rushkoff

The difference between an analog record and a digital CD is really quite simple. The record is the artifact of a real event that happened in a particular time and place. A musician plays an instrument while, nearby, a needle cuts a groove in a wax disk.... The sound vibrates the needle, leaving a physical

record of the noise that can be turned into a mold and copied. When someone else passes a needle over the jagged groove over one of the copies, the original sound emerges. No one has to really know anything about the sound for this to work. It's just a physical event—an impression left in matter.

A CD, **on the other hand**, is not a physical artifact but a symbolic representation. It's more like a text than it is like a sound. A computer is programmed to measure various parameters of the sound coming from a musician's instrument. The computer assigns numerical values, many times a second to the sound in an effort to represent it mathematically. Once the numerical – or "digital – equivalent of the recording is quantified, it can be transferred to another computer, which then synthesizes the music from scratch based on those numbers.

The analog recording is a physical impression, **while** the digital recording is a series of choices. **The former** is as smooth and continuous as real-time; **the latter** is a series of numerical snapshots. **The record has as much fidelity** as the materials will allow. The **CD has as much fidelity** as the people programming its creation thought to allow. The [configuration of] numbers used to represent the song – the digital file – is perfect, at least on its own terms. It can be copied exactly, and infinitely.

In the digital recording, **however,** only the dimensions of the sound that can be measured and represented in numbers are taken into account. Any dimensions that the recording engineers haven't taken into consideration are lost. They are simply not measured, written down, stored, and reproduced. It's not as if they can be rediscovered later on some upgraded playback device. They are gone.

Given how convincingly real a digital recording can seem—especially **in comparison** with a scratchy record – this loss may seem trivial. After all, if we can't hear it, how important could it be? Most of us have decided it's not so important at all. But early tests of analog recording **compared to** digital ones revealed that music played back on a CD format had **much less of** a positive impact on depressed patients **than** the same recording played back on a record. Other tests showed that digitally recorded sound moved the air in a room **significantly differently than** analog recordings played through the same speakers. The bodies in that room would, presumably, also experience that difference – even if we humans can't immediately put a name or metric on exactly what that difference is.

Rushkoff, *Program or Be Programmed: Ten Commands for a Digital Age,* pp. 52-54

References

Rushkoff, D. (2011). *Program or be programmed: Ten commands for a digital age*. Soft Skull Press, pp. 52-54.

C5: Peer Review Essentials

Peer review entails having a peer—a fellow student who is familiar with your assignment, or a colleague who understands your purpose in writing—read and offer feedback on the effectiveness of your document and how it might be improved. While peer review ultimately benefits the reader as a form of "quality control" ensuring an effective final product, it also has clear benefits for both the author and the reviewer. In the process of peer review, authors can get helpful feedback on how they can improve their drafts, and reviewers can learn from the document they are reviewing, reinforce the assignment and grading criteria, and come back to their own draft with a fresh perspective. For both, it is a helpful way to review content, structure, style and formatting before submitting your final document to its intended reader. Building in time for peer review also helps with time management, as you have a completed final draft well before the due date.

It is common in technical workplaces for peer review to occur, especially when complex documents that have safety, technical, and financial implications are created. Asking a co-worker, manager, subject matter or technical expert to review your document demonstrates due diligence and a commitment to quality work.

Keep the following strategies in mind to attain the maximum benefits of peer review:

Author Strategies

- **Be prepared**: Submit the most polished and complete draft possible in order to fully benefit from peer review. A partial or very rough draft can benefit from some preliminary review, but a completed draft can elicit more helpful feedback.
- **Give the reviewer some guidance**: Describe the concerns you have about your document at this point. Alert your reviewer to areas where you would particularly like some feedback. If the reviewer is not familiar with your purpose and audience, fill them in.
- **Be open to new ideas**: Avoid becoming defensive about the feedback; remember, your reviewer is trying help you improve your draft. Consider alternative viewpoints you may not have thought of before; listen before deciding what you will do.
- **Consider advice carefully**: Think critically about whether the reviewer's suggestions will help you to improve your draft and if they are appropriate for your purpose and audience. What and how you revise is ultimately up to you; seek additional advice if you are unsure what to do.

Reviewer Strategies

- **Know the document's purpose**: If the document is created for a college course, review the project or assignment description and/or grading rubric before reviewing the draft; know what the paper

is trying to achieve before you assess whether it needs revision to achieve it.

- **Focus on the positive**: Be honest and critical, but also point out strong areas within the writing where things are working well. Use positive, constructive tone to discuss areas that could use improvement. Don't gush ("your paper is so awesome!") and don't trash ("This totally sucks! Rewrite the whole thing!"). Remember your purpose is to help the author find ways to improve the draft; recognize what is already good, and suggest what needs further work.
- **Be specific**: Explain why a sentence, paragraph, or image needs improvement; explain why you as the reader are confused or bothered by a specific phrase or passage, or why the logic does not flow for you (be "reader centred").
- **Be courteous**: Be aware of your language use and tone when addressing peers. Avoid patronizing or "talking down" to your peers when giving advice.
- **Don't edit**: Your job is reviewer, not editor. Don't fix errors or phrasing problems; just point out areas that need improvement. You might offer ONE sample correction to demonstrate what you mean, but do not engage in wholesale editing. The purpose of peer review is for each person to learn how to edit their own document based on reviewer feedback.
- **Be efficient**: Don't overwhelm your author with too much detailed feedback. A page that has more feedback notes than content will be very difficult to process. Focus on a handful (three-to-six?) of the most important revisions that are needed to help improve the draft. For example, if there are numerous spelling errors, don't point them all out; highlight one or two and then comment that the draft contains numerous spelling errors that will need fixing before it can be submitted.