

Technical and Professional Writing Genres

Technical and Professional Writing Genres: A Study in Theory and Practice

Researched and Written by Dr. Michael Beilfus, Staci
Bettes,
and Dr. Katrina Peterson

Edited by Dr. Eric Howerton and Katie Rieger
Cover Design by Kaitlyn Warren



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Art History and Its Publications in the Electronic Age by Hilary Ballon and Mariet Westermann.

Choosing and Using Sources: A Guide to Academic Research by Cheryl Lowry.

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Find This Book

Technical and Professional Writing Genres has been adopted for use by [Oklahoma State University](#), the [University of Phoenix](#), [Houston Community College](#), and bookmarked for use by Alamo Community/Technical College.

The resource can also be found at:

[Open Textbook Library](#)

[ShareOK](#)

[pdfs.semanticscholar.org](#) (an early version)

[Merlot](#)

[The National ODEL in TVET Learning Resource Catalogue](#)

It is the intent of the authors that digital access, digital pdf access, and print pdf access to this resource be made available for free to students.

Contact kathy.essmiller@okstate.edu with questions, suggestions, or adoption information.

Reviews

Amy Rubens, Associate Professor, Radford University, on 1/12/23 for the [Open Textbook Library](#).

4.5/5 Stars

Comprehensiveness: 4

The title suggests the textbook book offers a genre-driven exploration of technical and professional writing (TPW). On the whole, the textbook delivers on this promise. It is divided into two sections: the first describes

the foundational principles of TPW while the second outlines how those strategies are used within the most common TPW genres, such as instructions, proposals, and reports. Also addressed are additional genres that are crucial for accomplishing the work of TPW, such as correspondence (e.g., email) and writing for the hiring process (e.g., resumes). The textbook does not cover genres such as flyers, websites, or social media; this is not surprising given the explicit focus of the textbook. That being said, TPW writing style in the textbook is given little attention—just a few short paragraphs. This is surprising considering the extent to which the book purports to be an introduction to TPW; most students encountering this text, therefore, would have had little guidance in understanding how TPW writing style differs from the academic writing style they have been trained in for most of their educational lives. Overall, though, instructors who choose this text may be able to rely on it in their TPW courses (introductory, at least) to a significant extent.

Content Accuracy rating: 5

The textbook offers theoretical frameworks and practical applications that are in keeping with TPW as a scholarly discipline and professional field.

Relevance/Longevity rating: 3

TPW is intertwined with technology, but references to technology in this textbook are a mixed bag in terms of their currency. For instance, the chapter on ethics is very current, as it helps TPW students navigate the use of online sources in ways they may not have considered in previous writing courses. But, the sections on email and text messages could be updated so that they speak more authentically to today's college students and the ways in which email, video conferencing, chat, and social media messages have become central to our personal and

professional lives post-COVID-19. The chapter on resumes and cover letters could be updated to be more relevant to the needs and expectations of today's job seekers.

Clarity rating: 4

For the most part, the text is written with accessible language, and in this way, the text models plain language, a mainstay of PTW. At times, language can become somewhat esoteric or “academic.”

Consistency rating: 5

Terminology is used consistently throughout the text and is in keeping with conventions of the field.

Modularity rating: 5

The text easily lends itself to modular use, which is a boon for TPW instructors who are using OER in their courses. NB: The topics of “design” and “research” appear to be organized within (discrete) chapters, but they also are addressed at length in other parts of the textbook. This does not detract from the overall modularity of this textbook, in my view.

Organization/Structure/Flow rating: 5

The textbook's structure is logical; this is especially true of the early chapters, which introduce students to the field (i.e., purpose, basic tenets). Still, because the book is highly modular, it can easily be reordered to suit an individual instructor's pedagogical needs.

Interface rating: 4

For most computer users, the interface is clean and easy to navigate. Collapsible menus allow users to easily navigate to specific areas of the textbook. The textbook occasionally utilizes internal links to allow navigation to related content in another chapter. An important note: Instructional graphics and some short sample documents (e.g., submittal letter) are embedded in the textbook as images (.png) while lengthier student sample documents

open to web-accessible PDFs that are supported by a university library system. The non-decorative images (graphics and short sample documents) embedded in the text do not appear to have alt text added to them. Some PDFs do not appear to be optimized for screen readers.

Grammatical Errors rating: 5

This text models good writing in terms of grammar.

Cultural Relevance rating: 4

The textbook is inclusive and respectful in terms of its use of language, sample document content, and suggested exercises. However, the textbook does not extensively address how TPW practitioners can be inclusive and respectful in their own use of language. Inclusiveness as it relates to document design is addressed in detail, though.

Comments

Relevant, useful, and meaningful practice activities are included in the textbook; many seem lend themselves well to in-class work (think-pair-share). Sometimes, these activities are not always listed in each chapter's table of contents.

Mandy Palmer, on [OERCommons](#)

This is an excellent, accessible, comprehensive textbook for Technical Writing. A review of this resource demonstrates that it hits the evaluation markers of: 1. Reliability/Credibility/Quality of Content, 2. Scope of Content, 3. Organization & Design, 4. Current or up-to-date information, and 5. Credentials of author(s).

Further, students find this book approachable and relevant.

OpenOKState Student Privacy Guidelines

OpenOKState and the OSU Libraries Library Teaching and Learning (T&L) Team* strive to enable engaging learning experiences for students using a variety of digital resources**. When you—the student—use these resources, you’re likely to produce some data, such as data about how you used the resources (e.g., what you clicked on) or the content you produced while using the resources (e.g., answering a question).

In line with our values and our beliefs about student data privacy, our T&L team has created and closely follows a set of guidelines, made up of 5 core principles, for any type of student data we might come in contact with.

We aim to be exceedingly transparent with you about your data. On this page, you can learn about our team’s values and beliefs regarding student data privacy as well as explore the 5 core principles of our Student Data Privacy Guidelines.

If you have any questions about these guidelines or about your data privacy, please don’t hesitate to contact the Director of Library Teaching and Learning, Holly Reiter, at holly.reiter@okstate.edu.

*The data and Guidelines referenced on this page are unique to Library Teaching & Learning, and do not indicate guidelines for the Library or the University as a whole.

**For our purposes, digital learning objects include interactive tutorials, OStateTV or YouTube videos, the mobile Library Scavenger Hunt, visits to web pages that

host these items, Pressbooks, and graduate student workshop registration.

Values and Beliefs

Values

Our Library Teaching and Learning team values:

- Prioritizing student needs and welfare
- Restoring and protecting equity and assisting students in doing the same
- Incorporating student voice and experiences and using it to shape our practice
- Providing “digital sanctuaries,” or digital environments that prioritize and promote student safety

Student Data Privacy Beliefs

As a Teaching and Learning team, we have foundational, ethical, scholarship-shaped beliefs about student data that have shaped our student data practice and guidelines.

We believe in prioritizing student data privacy to...

- Protect students
- Respect student autonomy
- Return power to students and establish equity
- Protect students’ intellectual freedom
- Build trust between students and Library

Teaching and Learning

- Enable student data privacy literacy

Core Principles of Student Data Privacy

Responsibility

The Teaching and Learning team believes it's our ethical responsibility to protect your data privacy. Specifically, we uphold the responsibility to:

- Ensure any collected data is handled carefully, used effectively, and used only for the stated purpose.
- Prevent unauthorized disclosure, use, or collection of your data
- Follow specific steps in data collection, use, storage, and destruction.
- Carry a shared understanding of our role in your data privacy.

Transparency

T&L believes you shouldn't have to wonder what's happening with your data, so we strive to be as open and transparent with you as possible. For each digital learning object we use, we'll share the following:

- What we are and are not collecting
- Why we're collecting it

- How it's being collected
- How it's being used
- Who has access to the data

To keep you safe, we strive to store and process all data according to best practices. We'll only collect the minimum amount of data necessary to achieve our stated objectives.

Privacy and Consent

T&L believes that privacy is your right. We strive to honor your privacy by never releasing any personally identifiable information unless it is to your instructor of record who is using the digital learning object within their class.

Occasionally, we may share aggregates of de-identified or anonymized data internally (e.g., with Library administrators) or externally (e.g., at Library or industry conferences). We do this to continuously improve effectiveness, evaluate the effectiveness of our teaching and learning program, or to help evolve and shape the practices of our profession. Aggregating the data means that the data is in summary form and no individual student can be identified.

Finally, we will never sell or otherwise commodify your data, and will always prioritize the use of vendors and resources that do the same.

Confidentiality and Security

T&L takes great strides to ensure that any and all data we collect is kept confidential and secure.

We use several vendors to help us create and host

digital learning objects and collect analytics. Sometimes, these vendors have access to your personally identifiable information for operational purposes, so we intentionally investigate and select vendors that also prioritize confidentiality and security.

Access

Sometimes we do collect and store personally identifiable information so we can do things like retain records for your instructor of record or keep track of event registrations. In these cases, T&L believes you have the right to know what that data is, request corrections if you think it's incorrect, and request that it be deleted. Please note, we'll always make every effort to honor deletion requests, but sometimes we're required to retain records for various reasons. If that's the case, we'll be open about why we can't delete it now, and if and when it can be deleted.

Acknowledgements

Library Teaching and Learning would like to acknowledge several projects that helped inform our *Guidelines*. We extend our sincerest gratitude for the effort and dedication that individuals invested in these works.

- [The Open University's Student Policies and Regulations: Ethical Use of Student Data for Learning Analytics](#)
- [The JISC Code of Practice for Learning Analytics](#)
- [National Information Standards Organization's](#)

[\(NISO\) Consensus Principles on User's Digital Privacy in Library, Publisher, and Software-Provider Systems](#)

- [Stanford CAROL & Ithaka S+R Project of Responsible Use of Student Data in Higher Education](#)
- [UC Berkeley Research, Teaching, and Learning's Learning Data Principles](#)
- [University of Hawai'i at Mānoa's Resolution Supporting Learning Data Privacy Principles and Practices](#)

Last updated 8/10/2021 by Kathy Essmiller.

I. Theory

Chapter 1: Introduction

Michael Beilfuss

1.1 What is Technical Writing?

You are probably wondering what this “technical writing thing” is. Someone may even have told you “It’s this course where they make you write about computers, rocket science, and brain surgery.” Well, not really, as you will see in a moment.

Technical writing is an audience-centered means of communication that provides a reader with clear and easy access to information so they understand both the document’s and the author’s purpose and respond accordingly. The technical writer and reader have a vis-à-vis relationship. The writer recognizes, respects, and addresses the importance of the audience’s time by being clear, concise, and accessible. The writer strives for effective and efficient communication by providing documents written in specific formats, using unambiguous language to convey clearly accessible information. The reader in turn thoroughly processes the information in order to give a thoughtful response or take appropriate action.

Technical writing courses introduce you to the skills, genres, and other important aspects of writing in the worlds of science, technology, and business—in other words, the kind of writing that scientists, nurses, doctors, construction managers, computer specialists, government officials, engineers, and other professionals do as a part of their

regular work. The skills learned in technical writing courses are useful in a broad spectrum of fields, including education and social sciences.

To learn how to write effectively for the professional world, you will study common types of reports, special format items such as lists and headings, simple techniques for creating and using graphics in reports, and some techniques for producing professional-looking final copy. This book focuses on skills and genres. The idea is that while you learn the conventions that govern one genre, such as technical instructions, you will also practice skills such as the appropriate use of graphics and design to facilitate communication. It is important to build a strong foundation of skills and genre knowledge so that you can more efficiently complete writing tasks when they arise.

This approach will allow you to apply what you learn here to a variety of situations. The skills and genre knowledge you will acquire in this book should be flexible and adaptable. Sometimes technical writing is formulaic, which can be a good thing if you need to communicate something with great clarity and efficiency. However, do not let formulaic writing sap the energy out of everything you write.

Rhetorical Situation

One of the most important skills you will practice is analyzing and understanding the rhetorical situation of your writing task. Essentially, the rhetorical situation describes the relationships between and among the audience, writer, content, and context of communication. That might sound complicated right now, but it can basically be broken down into an awareness and sensitivity to the needs of your audience. What does your audience

already know? What do they want out of your document? Where, when, and how are they going to use the document you create? These are some of the questions you want to ask yourself before you begin any writing task. There is more on audience below, and throughout this book.

Without even knowing it, you may be familiar with these concepts from your college, or even high school, composition course. If you have ever heard of the terms *ethos*, *logos*, or *pathos*, you know something about classical (Aristotelian) rhetoric and what is often called the *rhetorical situation*. If your writing is based on *logos*, you would be using facts, reason, and logic to communicate your message; if your argument is based on *ethos*, you would be relying on your credibility as a writer to communicate your message; and if your writing is based on *pathos*, you are attempting to appeal to your audience's emotions (joy, fear, hope, anger, pride, etc). For more about these appeals see "[Ethos, Logos, Pathos](http://georgehwiliams.pbworks.com/w/page/14266873/Ethos-Pathos-Logos-The-3-Rhetorical-Appeals)"¹.

Technical writing courses build on what you have learned in other writing courses. You will have an opportunity to dust off those writing tools, and practice the art and craft of effective communication. However, there is plenty new to learn! If you currently have a job in which you do some writing, you will discover that you can put what you learn in your technical writing course to immediate use.

About Technical Writing

While technical communication is essential in a wide range of fields and occupations, technical writing is also a fully

1. <http://georgehwiliams.pbworks.com/w/page/14266873/Ethos-Pathos-Logos-The-3-Rhetorical-Appeals>

professional field of its own with degree programs, certifications, and even theory. There are no fewer than five scholarly journals that are devoted completely or in part to publishing articles related to technical writing; what it is, how it works, how it is changing, and how to teach it. The journals include: *Technical Communication Quarterly*, *Journal of Technical Writing and Communication*; *Journal of Business and Technical Communication*; *English for Specific Purposes*; and *Issues in Writing*. Technical writing is a field with a lot of growth and income potential, and an introductory technical writing course is a good way to determine if you are interested in a career in this field or work in which writing is a major component.

Workplace Writing

Many students of technical writing courses are not necessarily planning for a career as a technical writer or instructor. However, this course will provide you with an introduction to the kinds of writing skills you need in practically any professional career. No matter what sort of work you do, you are likely to do some writing—and much of it may be technical in nature. Furthermore, if you hope to advance in your career and eventually manage people or open your own business, having technical writing skills is a critical communication tool that will save you time and money. If you lack these skills, you may not be able to properly assess the quality of a report you have assigned someone to write, or you may end up sending emails that are unintentionally offensive, or you may be forced to hire a professional writer to create your employee manuals and instructional guides. The more you know about, *and practice*, the basic technical writing skills revealed in this text, the better you will be at writing. And that will be good

for the projects you work on, for the organizations you work for, and—most of all—for you and your career. Make no mistake, if you want to succeed in your career, you have to be a successful communicator – and a large part of that includes writing.

The Meaning of “Technical”

Technical communication—or technical writing, as the course is often called—is not writing about a specific technical topic such as computers, but about *any* technical topic. The term “technical” refers to knowledge that is not widespread, that is more the territory of experts and specialists. Whatever your major is, you are developing an expertise—you are becoming a specialist in a particular technical area. Whenever you try to write or say anything about your field, you are engaged in technical communication.

Importance of Audience

Another key part of the definition of technical communication is the receiver of the information—the audience. Technical communication is the delivery of technical information to readers (or listeners or viewers) in a manner that is adapted to *their* needs, *their* level of understanding, and *their* background. Most technical documents are also written with a respect for the audience’s time, meaning sentences are written as efficiently as possible and content is arranged and displayed in a way that allows the reader to quickly locate relevant information. In fact, this audience element is so important that it is one of the cornerstones of technical writing: you

are often challenged to write about technical subjects in a way that a beginner could understand. Sometimes you have to write for an audience of other specialists, but generally speaking, you are communicating information to someone who does not already know or have it.

This ability to “translate” technical information to non-specialists is a key skill to any technical communicator. In a world of rapid technological development, many people are constantly falling behind. As a result, technology companies regularly struggle to find effective ways to help current or potential customers understand the advantages or the operation of new products. Even within businesses, people with different skill sets need to be able to communicate effectively with one another; engineers need to communicate with lawyers; mechanics with accountants; sales people with managers and executives.

You do not have to write about computers or rocket science—write about the area of technical specialization you know or are learning about. And plan to write about it in such a way that your audience will understand. (See the [chapter 2](#) for more on this topic.)

Really Technical Writing

You should know that professional technical writers do in fact write about very technical stuff—information that they cannot begin to master unless they go back for a Ph.D. But without a PhD in rocket science, how is a technical writer supposed to know create accurate instructions for how to properly secure the linkages between rocket mounts and fuel delivery systems? How is the writer supposed to gain that knowledge in just a few weeks before the rockets need to ship? How do they manage? Professional technical

writers rely on these strategies to ensure the technical accuracy of their work:

- Study books, articles, reports, websites related to the product
- Review product specifications: What the product is supposed to do, how it is designed
- Interview subject-matter experts (SMEs): The product specialists, developers, engineers
- Attend product meetings during the development cycle
- Participate in live demonstrations of the product
- Become familiar with similar, competing products
- Experiment with working models of the product
- Ask subject-matter experts to review work for technical accuracy and completeness

Of course, experienced technical writers will tell you that product development moves so fast that specifications are not always possible and that working models of the product are rarely available. That is why the Subject-matter Experts' review is often the most important. Based on the list above, you can also see that technical writing is often a collaborative process, where many people contribute to the process of creating the final product.

Technical Writing and Academic Writing

You have probably taken at least one academic writing

course before this one, so you will be familiar with some of the practices of writing for your college classes.

The concentration on definite purpose, strict format, and use of appropriate language in technical writing define the differences between technical writing and academic writing. The academic writer's purpose may be to write an assignment, a story, a letter, etc. These works may or may not have a reader outside the classroom. However, technical writing is always much more concerned with articulating a clearly defined purpose with a specific, known reader. Regardless of the number of stakeholders, and the variety of people who may encounter and read your documents, it is important to have a clear idea of your primary reader.

In technical writing courses, the focus is typically the analytical report. Just about everything you do in the course is aimed at developing skills needed to produce this report. Of course, most technical writing courses begin with a resume and application letter, and many include writing a set of instructions to help practice making technical knowledge available to non-experts. Remember that much of this book is based on mastering both skills and genres. While creating these documents and mastering the forms (or genres), you will also learn advantageous strategies for a document's graphics, layout, and design. However, the main assignment in most technical writing courses is the analytical report.

Planning to write this report consists of several phases:

1. Establishing group roles
2. Writing a proposal in which you lay out your research strategy

3. Performing primary and secondary research
4. Analyzing research
5. Writing the report

Before writing the report, however, you will likely be assigned shorter documents (memos, emails, outlines, drafts) where you get accustomed to using things like headings, lists, graphics, and special notices—not to mention writing about technical subject matter in a clear, concise, understandable way that is appropriate for a specific audience.

CAUTION. You should be aware that technical writing courses are writing-intensive. If you are taking a full load of classes, working full time, and juggling unique family obligations, please consider whether this is the right time for you to take technical writing. Consult with your professor about the workload for this class in order to make your decision.

You will probably write more in your technical-writing course than in any other course you have ever taken, and the writing is expected to look professional. It is time to stop thinking of yourself as students and your assignments as inconsequential busy-work. Instead, start thinking of yourselves as professionals who are learning new skills and putting into practice those skills you have already mastered.

1.2 Cultural Diversity and Technical Communication

Culture is part of the very fabric of our thought, and we cannot separate ourselves from it. When you are analyzing

the rhetorical situation, it is a good idea to consider the cultural context(s) that may be in play. Every business or organization has a culture, and within what may be considered a global culture, there are many subcultures or co-cultures. For example, consider the difference between the sales and accounting departments in a corporation. We can quickly see two distinct groups with their own symbols, vocabulary, and values. Within each group, there may also be smaller groups, and each member of each department comes from a distinct background that in itself influences behavior and interaction. Now, change that context to an act of communication. Who will hear it? Who could read it? What will your colleagues or readers of another culture take from it—intended or not? Sometimes, the focus of technical communication is quite easy; the primary reader is clearly targeted through demographic research. But, think about how much more effective and more dynamic a communication could be if the writer considered the potential cultural perspectives at work.

Diversity includes many different factors, ranging from race and ethnicity to culture and worldview. The more diverse an audience, the harder it becomes to tailor a speech to that audience. However, the more we study cross-cultural communication issues, the more aware we become. It is, of course, impossible to know every culture well; some of us are still working on learning our own! However, it may be helpful to recognize several paradigms used to discuss culture, in order to recognize certain characteristics, while also appreciating cultural uniqueness and seeking to avoid generalizations.

Appreciating cultural uniqueness helps us to understand major communication styles. The terms *collectivist* and *individualistic* are sometimes used to discuss cultural differences. Many Americans value family,

but American culture also places a strong emphasis on making our own choices in career, education, marriage, and living arrangements. In more collectivist cultures, the family or larger community may have a strong voice in an individual's life choices. An individual's decisions may be more strongly influenced the community than individual preferences.

Closely related to the distinction between collectivistic and individualistic is the distinction between high-context and low-context cultures. High-context cultures are so closely tied together that behavioral norms are implicit, or not talked about directly; they tend to be understood and unstated, having been learned through close observation and/or even unconsciously through immersion in the culture. Here is an example of a high-context exchange. If you and your friends have a routine of watching football every Sunday, saying "I'll see you guys this weekend for the game" implies that the "when" and "where" of the game is so ingrained that it does not need to be explicitly stated.

Continuing the example from above, in these cases you might be gathering with a new group of friends who need explicit, high-context communication to know what is going on: "We'll meet at Jay's house on Bleaker Street at 11:30 on Sunday morning." High-context cultures are described as more relational, collectivist, intuitive, and contemplative. This means that people in these cultures emphasize interpersonal relationships; developing trust is an important first step to any business transaction. High-context cultures may emphasize group harmony and consensus over individual achievement. Low-context cultures are often described as more action-oriented, practical, direct, and precise. In contrast, high-context cultures spend more time on interpersonal trust, may be

less direct and straightforward, and may use more polite or flowery language. These descriptions are useful to some extent, but they can also be problematic due to their tendency to generalize. A person from a high-context culture is perfectly capable of being action-oriented, for example, while a person from a low-context culture still values interpersonal trust and politeness. While it is important to be aware of these possible cultural differences, you should never allow this awareness to ossify into an unconscious stereotype or bias. Do not base your judgments on people solely on generalizations – whether those generalizations seem ungenerous or even generous.

Another way to distinguish among cultural groups is to consider decision-making and the predominant communication modes. Some cultures emphasize a strongly narrative communication mode, with storytelling being the way the important information is conveyed. Others value group discussion and keeping the harmony of the group, while others rely heavily on the advice of elders in decision making. These practices say a lot about our shared histories and our values, views of the past, and approach to interpersonal trust. Nonverbal communication, which is very noticeable to us when we experience a new culture, is divided into types such as: oculusics (eye behavior), haptics (touch behavior), proxemics (distance from others), vocalics (voice characteristics), chronemics (use of time in communication), and kinesics (use of the arms, legs, and posture).

Each of these focal points has unique patterns in various cultures, and the differences in nonverbal communication behavior may have deeper cultural meanings. Some cultures may avoid eye contact out of respect; their high-context nature means direct

confrontation is discouraged. Other cultures tend to judge low eye contact rather harshly, as either dishonest, disinterest, or indicating low self-esteem. In many Western cultures, punctuality is valued strongly. Other cultures simply do not understand the Western love affair with the hands on the clock.

People from the United States are sometimes seen by other cultures as loud (vocalics), too direct and forward (oculesics), taking up too much space (kinesics and proxemics), and uncomfortable with touch or close spaces (haptics and proxemics). Of course, audiences of different cultural backgrounds may include those for whom English is a second (or third or fourth) language. Watch out for metaphors, slang, and figurative language that simply have no meaning to non-native speakers of English. Many American expressions have to do with sports—everything from poker to football—and have no significance to those who have not grown up around those sports. Some of our expressions are actually racist or have a racist past, without our knowing or recognizing it because we do not know the origin of the phrase. Even a phrase that seems innocuous such as “bury the hatchet” could be viewed as culturally insensitive to Native Americans. If you use it, you are referring (inadvertently) to ethnic stereotypes as well as using references that non-U.S. cultures would not understand. There are many other such phrases that are worth interrogating and avoiding when recognized.

As emerging technology makes communicating with people around the world easier and more common, there is a good chance you will find yourself communicating or interacting with persons from other cultures in your future careers. Primarily, recognize the underlying values of the culture. The value and place of family may matter greatly, for example. You would want to be sure to show respect

to parents and grandparents in everything you say; if you cannot do that, do not mention them at all. Other values may have to do with how genders are treated, modesty in clothing, or criticism of the government. Do not jump to judge speakers of other cultures by Western standards. As a piece of concluding advice, always seek for commonalities over differences; if you dig into cultural differences far enough, you will often find that our different houses are built on similar foundations.

1.3 Chapter Summaries

Below you will find brief summaries of each chapter in this book. After reading through them all, you should have a good sense of what you will learn as you work through the content.

Chapter 2: Audience

This chapter focuses on audience and different considerations for revising your document based on the audience(s). The type of audience identified will shape your document's format, terminology, style, and technical level. There are several types of audiences, including *experts*, *technicians*, *executives*, *gatekeepers*, and *nonspecialists (laypeople)*. However, most documents you create will have multiple audiences: often, a *primary audience*—the main audience for the document—and a *secondary audience*—other audiences that are likely to read the document, but who are not the main focus of the document. In addition to the type of audience, you should analyze the audience to identify other factors that can affect

how the document is received, including *background*, *needs and interests*, *culture and values*, and *demographic characteristics*. The rest of the chapter gives strategies to revise a document's content for your audience, including changes to the content, style and format, sentence style, and document design.

Chapter 3: Group Work

This chapter covers some of the fundamentals of team work. After introducing the importance and prevalence of team work in the workplace, the chapter describes how best to build teams and ensure that they run smoothly. One of the first things a team needs to do is take an inventory of each member's qualifications. Assessing qualifications allows teams to better assign roles, some of which are described here. Once the team has been built and everyone knows their roles, the planning stage begins – specific responsibilities are allocated among the group members to best fit their qualifications, the group writes out a schedule, and plans for any problems that may arise either within or outside the group. The chapter ends with a number of tips for a successful team project.

Chapter 4: Ethics

In this chapter, you will learn about some of the ethical challenges that you may encounter in your professional and academic life, especially when it comes to technical writing. First you will want to consider what your ethical code is so you can be prepared when you find yourself

in uncomfortable and/or unethical situations. The chapter covers ethical principles, how ethics may affect the presentation of information, and some common ethical problems encountered by technical writers. Much of this chapter is concerned with the appropriate and ethical use and documentation of sources. The chapter provides some practical information on how to make sure your writing is ethical and how to handle ethical dilemmas and possible legal issues in the workplace.

Chapter 5: Design

This chapter briefly summarizes fundamental concepts to consider as you craft print and electronic texts. In this chapter you will read about basic principles of document design that allow writers to combine graphic elements with text to convey a message to audiences. Beginning with a discussion of standard conventions (of formatting, language, and style), the chapter then shares some basic guidelines for document design, moving forward to focus on integration of graphics, callouts and captions. Other topics include tables of contents, figures and tables, headings and the well-known CRAP test used by graphic designers. For additional resources, see the activities included at the chapter's end.

Chapter 6: Emails, Letters, Memos

This chapter introduces the basics of email writing and etiquette, also providing information on memos and texting. It offers suggestions about when (and when not to!)

use email in business communication. It details the basic conventions of structure: the header/address information, greeting, message body, and closing. It gives an overview of Netiquette, the expectations of online etiquette, which has application for other genres of online communication as well. The chapter concludes with a bulleted list of takeaways and tips, followed by additional teaching and learning resources.

Chapter 7: Career Documents

Looking for and landing the perfect job may seem like a daunting task. If you are uncertain where to start, know that most successful job applicants feel the same uncertainty at some point. This chapter will walk you through the process of applying for jobs from start to finish. Perhaps most importantly, it will provide you with two distinct tools that can help you to construct the materials for a strong, effective, and successful job application (Bay 75): 1) the résumé and 2) the job application letter. Résumés and application letters are among the most important documents in the employment process (Oregon 199). Beginning with an overview of the big-picture process, this chapter moves forward with suggested methods for finding job ads and constructing the genre documents for a job packet. In the résumé section, it discusses the following topics: *Purposes and Goals*, *Types of Résumés*, *Sample Résumés*, *Drafting and Design: Where to Start, What to Include/Exclude*, *Optional Sections*, and *Drafting Activities and Resources*. The next section on application letters will share information about deciphering the job description, as well as letter format, structure, and content. The chapter concludes with information on interviews,

followed by specific guidelines for the job packet you will construct in English 3323.

Chapter 8: Technical Instructions

The chapter begins with a brief overview of the importance of knowing how to write instructions followed with some basic guidelines. The chapter goes into some depth in regards to analyzing the rhetorical situation for writing instructions. The rhetorical situation includes the purpose, audience and context for any particular set of instructions. Next we cover how to plan and organize the writing process followed by information about the content that is typically included in instructions. The chapter ends with some nitty-gritty tips on writing the instructions.

Chapter 9: Proposals

This chapter defines when and where you would use a proposal. Before drafting, you define some preliminary qualities, including if the proposal is written for internal or external audiences, is solicited or unsolicited, and if you are proposing a known or unknown solution. Next, the chapter discusses further considerations for your audience, followed by a breakdown of common sections present in most proposals. As proposal content can vary depending on the type and purpose and audience, a section is included on additional, project-specific sections which could be included in some proposals, such as client analysis and implementation sections. The standard design and format of a proposal is discussed, with emphasis on adaptability

for the reader. The end of this chapter contains a revision checklist for proposals.

Chapter 10: Research

In this chapter, you will learn how to plan for conducting different types of research, depending on your research goals. The chapter starts by giving information on creating a hypothesis and research questions to guide your research. In addition, you will learn about conducting both primary and secondary research and when to choose one or the other. Different types of both primary and secondary research are discussed, to help you decide which is best for your specific project. Information for creating your own survey and interview questions is included, as well as tips for evaluating secondary sources.

Chapter 11: Reports

The standard components of the typical technical report are discussed in this chapter, including preliminary choices, audience and purpose considerations, common sections of reports, and format. As you read and use these guidelines, remember that these are guidelines, not commandments. Different companies, professions, and organizations have their own varied guidelines for reports—you will need to adapt your practice to those as well as the ones presented here. In some industries, reports even use Excel files and other types of untraditional formats. In addition to the content and style of a standard report, the end of the chapter included details on two specific sub genres of reports that

you may need to write during your education and beyond—*Progress Reports* and *Internship and Co-op Reports*.

Chapter 12: Oral Reports

This chapter shares basic principles for the preparation and delivery of oral reports. Since presentations often include a visual component, the chapter begins with guidelines for creating an effective PowerPoint, Prezi, or Keynote. It includes tips for developing effective slides, while acknowledging the drawbacks of presentation software. It also offers suggestions to help speakers prepare well, overcome anxiety, and consider their speaking context. It gives an overview of expected structural conventions—how to set up an introduction, body, and conclusion—and ends with useful delivery tips.



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Chapter 2: Audience

Staci Bettes

Chapter Synopsis

This chapter focuses on audience and different considerations for revising your document based on those audiences. The type of audience identified will shape your document's format, terminology, style, and technical level. There are several types of audiences, including *experts*, *technicians*, *executives*, *gatekeepers*, and *non-specialists (laypeople)*. However, most documents you create will have multiple audiences: often, a *primary audience*—the main audience for the document—and a *secondary audience*—other audiences that are likely to read the document, but who are not the main focus. In addition to the type of audience, you should analyze the audience to identify other factors that can affect how the document is received, including *background*, *needs and interests*, *culture and values*, and *demographic characteristics*. The rest of the chapter gives strategies to revise a document's content for your audience, including changes to the content, style and format, sentence style, and document design.

2.1 Introduction

A key concern of technical communication is the receiver of the information—the audience. Technical

communication is the delivery of technical information to readers (or listeners or viewers) in a manner that is adapted to their needs, level of understanding, and background. Your documents must clearly convey new information to the reader, and you often need to translate highly technical concepts to groups with differing levels of technical knowledge—this is a key skill for any technical communicator. Therefore, the audience is one of the most important considerations in planning, writing, and reviewing a document. Adapt your writing to meet the needs, interests, culture, and background of those who will be reading your documents.

It is often not enough to identify a single audience for documents. There are several types of readers who may use them, each with different backgrounds, education levels, needs, and interest in the topic. All should be considered when analyzing the audience for a successful technical document.

2.2 Types of Audiences

During the planning stages of your document, you should analyze the audience to identify the type (or types—it is rarely just one type) of readers. Identifying what type of reader may be interested in your document will help you create an improved, more effective document.

Common Types of Audiences

The following are several types of common audiences for technical documents:

- **Experts:** People who know the business or

organization (and possibly the theory and the product) inside and out. They designed it, they tested it, and they know everything about it. Often, they have advanced degrees and operate in academic settings or in research and development areas of the government and technology worlds (the creators, specialists).

- **Technicians:** People who build, operate, maintain, and repair the items that the experts design and theorize about. They have highly technical knowledge as well, but of a more practical nature (the hands-on users, operators).
- **Executives:** People who make business, economic, administrative, legal, governmental, or political decisions about the products. Executives frequently have little technical knowledge about the subject. Often, executives will be the primary audience for documents such as proposals and reports (the CEOs, committees, hiring managers).
- **Gatekeepers:** People who oversee the writer and the document. They decide if the document is compliant with rules, regulations, legal obligations, and/or the needs of the writer's employer. Think of them as the direct supervisors of the writer—they confirm that a document will fulfill its purpose for the client, as well as ensure compliance with the company's rules, regulations, and policies. In the classroom, your instructor will often be your gatekeeper—they ensure you follow the standards and goals of the assignment (the writer's supervisors, lawyers, instructors).

- **Non-specialists:** People with the least technical knowledge of the topic. They want to use the new product to accomplish tasks; they want to understand the new technology, products, or procedures enough to use them in a particular situation. Or, they may just be curious about a specific technical matter and want to learn about it—but for no specific, practical reason (the laypeople).

Audience analysis can become complicated when you consider that you may have a combination of audience types and backgrounds: mixed audience types, wide variability within audience, and/or unknown audiences.

Multiple or Mixed Audiences

Most documents you write will have multiple or mixed audiences. Often, it is best to think of these in terms of the *primary audience(s)* and *secondary audience(s)*.

The *primary audience* is the main reader of the document. For example, if you create a set of safety protocols to be displayed in a laboratory, the primary audience will be the technicians which use the laboratory. In this example, it is important to adapt the safety protocols for the technicians to understand, as unclear steps could lead to physical harm.

The *secondary audience(s)* is made up of others who may read or be interested in a document, but who is not the main (primary) reader. In the laboratory example, these groups could be experts who enforce laboratory regulations and safety standards, but also could be non-specialist custodial staff that clean and maintain the lab. Both of these groups may be interested in this document—the experts

ensure that safety standards are met, while the non-specialists may need to follow the displayed protocols in an emergency. Additionally, the secondary audience may be someone your primary reader consults if your message, report, proposal, etc. is a request for a specific action. For example, if you are a salesperson making a pitch to a client, that client may need to consult their supervisor before agreeing to your terms.

How should you approach writing a document with so many possible readers? First, *identify the primary audience* of your document. Then, *identify likely secondary audiences*, if any.

Most of the time, you will know who the primary audience is—you will be writing a document aimed at a particular group of people or a single person. You may have a client you are writing for or a group you specifically want to understand your ideas. In this case, you should write your document for the primary audience, but also include information for the secondary audiences. For example, if you write a set of new procedures for a company's technicians, you must also include information that your gatekeepers insist accompany the document, such as legal clauses or business descriptions. You will also need to think about the technicians' bosses (executives) who need to approve any new procedures implemented at the site.

If you believe a document is unlikely to be used by the secondary audience(s), you can write for the primary audience only. This would be applicable if you create a set of instructions over "How to Change a Tire" for a website. You can assume most readers will be non-specialists who need assistance with the task, not mechanics, designers, or engineers in the automotive industry.

If you believe the document will likely be used by

multiple audiences or you are unsure who the primary audience is, you can then write the document so that all the audiences can understand it. This is also a good choice if you know that many different types of readers will be interested. For example, imagine you wrote a research report over the use of a city's public park facilities. Community members (non-specialists) are just as likely to read the report as those on the city council (executives), the head of the Parks Department (experts), and those who maintain the parks (technicians). In this case, you would want to write your report to be accessible to all these types of audience.

2.3 Audience Analysis

Once you have identified the types of readers for a specific document, it is important to determine some of the qualities of these groups. If you are writing to a known, specific audience (e.g., Hiring Manager Serena Tims; Director of University Dining Services Ollie Lopez; the corporate board at Sony Inc.; etc.) versus a general, unknown audience (e.g., people who want to learn how to change their car's oil) you may need to do some research on the individual (if available), the company or organization they work for, or even the industry your audience is a player in. Determining these characteristics will help guide your document creation—you can decide what information needs to be included or eliminated, which terms to use or which need to be defined, an effective design for the document, and so on. Regardless of which type of reader you identify (experts, technicians, executives, gatekeepers, or non-specialists), you should analyze these groups in terms of their characteristics:

- **Background—knowledge, experience, and training:** One of your most important concerns is just how much knowledge, experience, or training you can expect in your readers. If you expect some of your readers to lack certain background, do you automatically supply it in your document? Imagine you are writing a guide to using a software product that runs under Microsoft Windows. How much can you expect your readers to know about Windows? If some are likely to know very little about Windows, should you provide that information? If you say no, then you run the risk of customers getting frustrated with your product. If you say yes, you increase your work effort and add to the document's page count (and thus the cost), and could annoy users with more knowledge. Obviously, there is no easy answer to this question—part of the answer may involve just how small a segment of the audience needs that background information.
- **Needs and interests:** To plan your document, you need to know what your audience is going to expect from that document. Imagine how readers will want to use your document. What will they demand from it? For example, imagine you are writing a manual on how to use a new smartphone—what are your readers going to expect to find in it? Do they want to quickly find answers to specific user questions, or do they expect a comprehensive breakdown of each phone function? Make decisions on what readers want to read about as well as what they do not want to read about.

- **Culture and values:** The difference between culture and values can be difficult to define, but both influence how an audience approaches new ideas. *Culture consists of the shared beliefs, attitudes, behaviors, values, and assumptions shared by an identified group of people.* It is what sets a group apart from others. *Values* are the deeply held principles that guide thoughts and actions. Think of *culture* as the social dynamic that sets the tone, and *values* as the by-products of the culture that affect decisions.

When analyzing the reader's culture, remember these five things:

- It is learned: The conscious and unconscious learning we undergo, over time, turns into beliefs that we consider to be valid. We then teach each other that these beliefs are cultural norms. They are expressed in our daily lives as behaviors and actions.
- It is shared: Although you may think of yourself as an individual, you share beliefs, rituals, ceremonies, traditions, and assumptions with people who grew up or live in similar cultural backgrounds.
- It is dynamic: Culture is dynamic and complex. Culture is fluid rather than static, which means that culture changes every day, in subtle and tangible ways. It is important to pay

attention to the cultural context of a communication to understand the depths of its dynamic properties.

- It is systemic: There are patterns of behavior and deeply rooted structural systems which are beneath the waterline. What we see at the top of the iceberg are the behaviors; we do not see what contributes to those behaviors. Changes to the system are slow and gradual; visible changes may not appear until later.
- It is symbolic: Symbols are both verbal and nonverbal in form within cultural systems, and they have a unique way of linking human beings to each other. Humans create meaning between symbols and what they represent; as a result, different interpretations of a symbol can occur in different cultural contexts. (See chapter 1 for an in-depth discussion on cultural diversity and technical writing)

There are two levels of culture and values you should consider: *personal* and *corporate*. *Personal culture* may be created by shared religion, race, ethnicity, region, and/or social groups. A classic example is the culture within a religious group—this can lead to specific types of dress, language, and celebrations. *Personal values* are the beliefs held by the

individual, but they are influenced by culture as well as other factors.

Corporate culture and values are similar, but on a micro level. *Corporate culture* is created by the employees and how they interact. Within a company, different departments may have their own cultures, in addition to the company's collective culture. *Corporate values* are set by the company, and are often reflected in their mission statements, policies, and other structures. These are the principles that guide the company's decisions and goals. When considering culture and values, identify both personal and corporate factors which can influence the reader.

- **Other demographic characteristics:** Of course there are many other characteristics about your readers that might influence how you should design and write your document—for example, age groups, type of residence, area of residence, gender, political preferences, and so on. For example, if you write a proposal to raise gas taxes by \$.01 to fund speedbumps in neighborhood streets, you will need to consider the neighborhood's habits (do most residents drive, walk, or take public transportation?), the age of resident (older residents are often on a fixed budget; younger residents may think speedbumps are a nonissue), political preference (some could be against infrastructure spending), and other qualities.

Wide Variability in an Audience

You may realize that, although you have an audience that fits into only one category, its background varies widely. If you write to the lowest common denominator of reader, you are likely to end up with a cumbersome, tedious, book-like report that will turn off the majority of readers. However, if you do not write to that lowest level, you lose that segment of readers. In this situation, most writers compose for the majority of readers and sacrifice the minority readers. Others put the supplemental information in appendixes or insert cross-references to beginners' books.

Audience Analysis Practice

A university holds open monthly meetings for potential students to get information about the university, degrees available, and other campus opportunities. For the university, the meeting's purpose is to persuade prospective students to apply, thus increasing enrollment. The university also values diversity in their student populations, and wants to encourage applications from people of different backgrounds and ages.

1. What types of potential students may attend this meeting? What are some of their characteristics?
2. What are some factors that could influence these potential students' decision to attend the university?
3. Imagine that both traditional students (younger; have not attended college) and nontraditional students (older; may already have a degree or years of work experience) are in attendance. How could their background, needs, attitudes, cultural and values, and/or demographic characteristics differ? What would be the best approach for the meeting coordinator to persuade this type of mixed audience? Why do you think so?

Figure 1: Audience Analysis Practice Activity

2.4 Adapt Your Writing to Meet Your Audience's Needs

Once you have identified and analyzed your audience, how do you use this information? How do you keep from writing something that may potentially still be incomprehensible or useless to your readers? Draft your document with your audience's needs in mind, but remember that writing can be refined over many drafts. With each subsequent draft, think more carefully about your readers, and revise and edit your document so that you make technical information more understandable for specific audiences.

The following list contains some strategies to help you make technical information more understandable for differing audiences. You can use these strategies to revise and refine as you begin to put your final document together. However, it is a good idea to be aware of your audience's needs even in the early stages of your report drafting.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://open.library.okstate.edu/technicalandprofessionalwriting/?p=20#h5p-1>

Figure 2: Common Revision Strategies List

Strategies to Revise Content

- Add information readers need to understand your document. Check to see whether certain key information is missing—for example, a critical series of steps from a set of instructions; important background that helps beginners understand the main discussion; definition of key terms. Note that some of this information can be added in the main document body, but you can also add appendices or glossaries—it depends on your audience and document type.
- Omit unnecessary information. Unnecessary information can also confuse and frustrate readers—after all, it is there so they may feel obligated to read it. Technical documents are often skimmed for important detail—excess unnecessary information could make the reader miss important information. For example, you can probably chop theoretical discussion from basic instructions.
- Change the technical level of the information. You may have the right information in your document, but it may be pitched at too high or too low a technical level. Are you using terms the reader will be familiar with? Is the sentence structure clear for the audience's reading comprehension? It may be pitched at the wrong kind of audience—for example, an expert audience rather than a technician audience. This happens often when product-design notes are passed off as instructions. Think about your audience's education level and familiarity with

the topic and terms used, and revise to make sure your content is clear for that audience.

- Add examples to help readers understand. Examples are one of the most powerful ways to connect with audiences, particularly in instructions. Even in a non-instructional text, when you are trying to explain a technical concept, examples are helpful—analogies in particular. If you already have examples, it may help to alter the technical content or level of your examples. Common examples may not be useful to experts; highly technical ones may totally miss your non-specialist readers.

Strategies to Revise Style and Format

- Change the organization of your information. Sometimes, you can have all the right information but arrange it in the wrong way. For example, there can be too much background information up front (or too little) such that certain readers get lost. Other times, background information needs to be placed throughout the main text—for example, in instructions it is sometimes better to feed in chunks of background at the points where they are immediately needed. If the document does not seem to work for the audience, try reorganizing some of the information so that the document is clearer and easier to understand.
- Strengthen transitions and key words. It may be difficult for readers, particularly non-specialists, to see the connections between the main

sections of your report, between individual paragraphs and sometimes even between individual sentences. You can make these connections much clearer by adding transition words and by echoing key words more accurately. Words like “therefore,” “for example,” “however” are transition words—they indicate the logic connecting the previous thought to the upcoming thought. You can also strengthen transitions by carefully echoing the same key words. A report describing new software for architects might use the word *software* several times on the same page or even in the same paragraph. In technical documents, it is not a good idea to vary word choice—use the same words so that people can clearly understand your ideas. Your design choices can also visually connect and transition between sections (see the “Strategies to revise document design” below).

- Write stronger introductions—for the whole document and for major sections. People seem to read with more confidence and understanding when they have the *big picture*—a view of what is coming, and how it relates to what they have just read. Therefore, writing a strong introduction to the entire document—one that makes clear the topic, purpose, audience, and contents of that document—makes the document easier to understand. In most types of technical documents, each major section includes mini-introductions that indicate the topic of the section and give an overview of the subtopics to be covered in that section to let the

reader know what information each section will contain.

- Create topic sentences for paragraphs and paragraph groups. It can help readers immensely to give them an idea of the topic and purpose of a section (a group of paragraphs) and in particular to give them an overview of the subtopics about to be covered. This is the first sentence of the paragraph, and states the main point or idea. The type of topic sentence can vary depending on document type. In an argumentative paragraph, you will make a claim which you will prove through the rest of the paragraph (e.g., reports; proposals; some emails, letters, and memos). In informative documents, the topic sentence will be an overall point which you will explain and back up in the detail sentences (e.g., informative emails, letters, and memos; results section of a report).

Strategies to Revise Sentence Style

- Change sentence style. How you write—at the individual sentence level—can make a difference to the effectiveness of your document. In instructions, for example, using imperative voice and “you” phrasing is vastly more understandable than the passive voice or third-personal phrasing. *Passive voice* is where one switches the location of the subject and object in a sentence. A simple, active sentence such as “The boy threw the ball” becomes the wordy, passive sentence “The ball was thrown

by the boy.” Taking the emphasis off the noun—in this case, *the boy*—and the action—*throw* vs *was thrown*—detracts from meaning of the sentence. Passive, person-less writing is harder to read—put people and action in your writing. There are times to write in passive voice, but technical documents generally need active sentence structure.

Revise to use more active verbs, and less be verb phrasing. All of this makes your writing more direct and immediate. Also, personalizing your writing style and making it more relaxed and informal can make it more accessible.

- Edit for sentence clarity and economy. This is closely related to the previous strategy. Writing style can be so wordy that it is hard or frustrating to read. Sentence length matters. An average of somewhere between 15 and 25 words per sentence is about right; sentences over 30 words are often mistrusted. When you revise your rough drafts, put them on a diet—go through a draft line by line trying to reduce the overall word, page, or line count by 20 percent. Try it as an experiment and see how you do. You will find a lot of fussy, unnecessary detail and inflated phrasing you can chop out. Eliminate excess words and phrases; state ideas as simply as possible while still providing necessary detail.

Strategies to Revise Document Design

- Add and vary graphics. For non-specialist

audiences, you may want to use more, simpler graphics. Graphics for specialists are often more detailed and technical. In technical documents for non-specialists, there also tend to be more “decorative” graphics—ones that are attractive but serve no strict informative or persuasive purpose at all.

- Break text up or consolidate text into meaningful, usable chunks. For non-specialist readers, you may need to have shorter paragraphs. A six to eight-line paragraph is the usual maximum. This is because a paragraph should contain content about a single idea; breaking up paragraphs into smaller ideas can help the reader more easily understand the individual topics, while also making the text less (visually) overwhelming. Notice how much longer paragraphs are in technical documents written for specialists—the ideas do not need to be broken down as much visually for a specialist to understand the content.
- Add cross-references to important information. In technical information, you can help readers by pointing them to background sources. If you cannot fully explain a topic at a certain time in a document, point to a section, chapter, or external source where the information is located. One can also include glossary of terms or appendices at the end of a document with extra information that is related, but not 100% necessary, to understand the document’s content.
- Use headings and lists. Readers can be intimidated by dense paragraphs and “walls of

text” uncut by anything other than a blank line now and then. Search your rough drafts for ways to incorporate headings—look for changes in topic or subtopic. Search your paragraphs for listings of items—these can be made into vertical lists, or look for paired listings such as terms and their definitions—these can be made into two-column lists. Of course, be careful not to force this type of formatting, and do not overdo it.

- Use special typography, and work with margins, line length, line spacing, type size, and type style. Depending on your audience, you can modify the format by making the lines shorter or longer (adjusting margins), using larger or smaller type sizes, and other such tactics. Typically, sans-serif fonts, such as Ariel, are useful for online readers. Serif fonts, such as Time New Roman, are useful for print texts. (See chapter 5 for more information about document design)

By now you should be able to see that many of the decisions you make as a technical writer depend on who will read your report. From content, to language, to layout, every aspect of your communication must keep your readers’ needs in mind.

We will spend time later in this book expanding our discussion of audience as well as document design—an important consideration that can help tremendously in making your document professional and easy to read.

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Chapter 3: Team Work and Collaborative Writing

Michael Beilfuss

Chapter Synopsis

This chapter covers some of the fundamentals of team work. After introducing the importance and prevalence of team work in the professional world and workplace, the chapter describes how best to build teams and ensure that they run smoothly. One of the first things a team needs to do is take an inventory of each member's qualifications. Assessing qualifications allows teams to better assign roles, some of which are described in this chapter. Once the team has been built and everyone knows their roles, the planning stage begins – specific responsibilities are allocated among the group members to best fit their qualifications, the group writes out a schedule, and plans for any problems that may arise either within or outside the group. The chapter ends with a number of tips for a successful team project.

3.1 Introduction

Collaboration is a necessary task in most workplaces. Collaborative writing is one of the common ways people in the worlds of business, government, science, and technology handle large writing projects. In the

professional and scholarly worlds, a lot of time, research, and energy have been devoted to understanding how teams work, and how to make them work more effectively. There is an entire industry devoted to assisting companies and organizations to get the most out of teamwork. In your career, you are more than likely to encounter situations where you have to work, and write, collaboratively. This chapter aims to help you develop the knowledge and skills to work effectively in groups.

Some people dislike group work due negative past experiences. They may be the person who seems to do more work than others, they may dislike having to rely on another person to follow through, or maybe they feel it was difficult to pull together so many ideas from so many people. Others do not mind it. They may have had positive experiences and see the value in group work. In fact, if done correctly, collaboration can be an effective tool to getting work done.

Thanks to ever emerging new technologies, writers can collaborate in exciting new ways. Using tools such as Google Docs, writers can work on texts synchronously even when they are separated by continents and oceans. Using discussion forums, musicians can exchange and remix chords with other artists from around the world. Via Skype, writers can talk with one another as they collaborate in a shared white space. And then there is Wikipedia, one of the most successful collaborative writing project ever conceived and executed. Clearly, good collaboration skills are more important now than ever before.

In our e-culture, being a successful collaborator is crucial to success. Today's workers use multiple media to share and construct meaning. Today's workers must be symbol analysts and are especially social in terms of how they communicate and learn.

When the first cave man started doodling on a stone canvas, he probably had colleagues looking over his shoulder, suggesting that he hold the brush a different way, mix the paint differently, perhaps make the buffalo appear fiercer, and so on. Many people find discussions with trusted colleagues to be an invaluable way to develop and polish ideas. Professionals in most disciplines, for example, attend conferences so that they can discuss ideas with colleagues and leading researchers. Writers in business and scientific contexts commonly work in teams with individuals responsible for their areas of expertise, such as marketing language, audience, finance, research, and editing. Some authors do not feel comfortable beginning a new project until they have discussed their ideas with others. Successful writers do not wait until they have completed a project before seeking constructive criticism. Instead, they share early drafts with critics.

This chapter will provide information and resources to help you master collaboration skills.

3.2 Building a Team

In the 1960s the psychologist Bruce Tuckman described four stages of team building: Forming, Storming, Norming, and Performing. While there has been a lot of research since then on team formation, Tuckman's stages are still often considered the benchmark for team building. You can find any number of articles, books, and videos that elaborate on Tuckman's research. For a quick overview, have a look at this Mind Tools article and brief video: ["Forming, Storming, Norming, and Performing:](#)

[Understanding the Stages of Team Formation](#)”¹ before you read the rest of this chapter.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://open.library.okstate.edu/technicalandprofessionalwriting/?p=22>

If you can choose your partners for a collaborative project, it is tempting to choose friends and/or people with similar backgrounds as yourself. If the project is deeply discipline-specific, this may be a good idea. Working with friends and close colleagues can help ease the awkward, early stages of a project. However, projects that require teams often include aspects from multiple fields and disciplines.

When you begin picking team members for a writing project in a technical writing course, you should consider choosing people with different backgrounds and interests. Just as a diverse, well-rounded background for an individual writer is an advantage, a group of diverse individuals makes for a well-rounded writing team. As a side note, it is never a good idea to work in a team with a romantic partner. It can be annoying and awkward for the rest of the team to watch as you and your partner canoodle or bicker. And modern romance such as it is, nothing can

1. https://www.mindtools.com/pages/article/newLDR_86.htm

damage a team quicker than a romantic break-up in the middle of a project.

At the same time, collaborators can become obstacles, requiring constant supervision. In group situations, other students can fail to attend classes or out-of-class meetings; they can ignore your efforts and just focus on their own missions or visions about ways documents should be written. When collaborators do not do their job, they can become an annoyance—just another obstacle rather than a support and an inspiration to colleagues.

The whole truly can be larger than the sum of its parts. Through collaboration, we can produce documents that we alone could not imagine. Collaborators can inspire us, keep us on task, and help us overcome blind spots.

Due to the many potential problems with teamwork, it is crucial at the beginning of any team project to do the following:

- Articulate and clarify team members' qualifications
- Define roles for each member
- Establish responsibilities of each team member

Qualifications

As a first step, you want to identify any strengths and weaknesses. There are at least two ways to think about qualifications: 1. knowledge, skills, and abilities, and 2. personality types.

The first aspect—knowledge, skills, and abilities—is pretty straightforward. The engineer in your group should work on the engineering aspect, the accountant should work on the financials, the lawyer should work on the legal

matters, and you want the marketer to work on PR. When writing proposals for external clients (and sometimes even internal proposals) you may be asked to include résumés of each of the team members. This is to help demonstrate the group's strengths through its expertise and diversity.

The second aspect of qualifications is perhaps a little fuzzier and has to do with interpersonal relations. A recent study by Google found that “psychological safety” – that “team members feel safe to take risks and be vulnerable in front of others” – is the most important characteristic of effective teams.² One can only feel safe in a group if they are comfortable with the other team members' personalities.

Articulating personality skill sets can help divide the work most effectively, and help avoid unnecessary conflict and confrontation. For example, if someone in the group is very social and outgoing, they might be the best person to stop people on campus to ask them survey questions. If someone in the group is a careful listener, they should probably be one of the people who talks to clients or experts. If one of the team members is more studious, or internet savvy, perhaps they should complete more secondary research. The [Meyers-Briggs](#) test activity at the end of this chapter may be a good method to begin to understand personality types and how to best harness their strengths.

Roles

Once the group has completed an honest assessment of its

2. <https://rework.withgoogle.com/guides/understanding-team-effectiveness/steps/identify-dynamics-of-effective-teams/>. This is a great resource to learn more about effective group dynamics.

strengths and weaknesses, you can move on to determine the roles for each member. *Roles* are slightly different from *responsibilities*. Roles describe each individual's general purpose and duty on a team. It designates their main areas of concern. On the other hand, responsibilities refer to the specific tasks each member will complete.

To use a sports analogy – the position you play on a team is your role, but the specific responsibilities during a game will often shift, sometime from play-to-play or even within a play. In football, a wide receiver's responsibilities vary greatly – on one play it is to get open for a reception, on another it may be to cross up the defense to allow another receiver to get open. A wide receiver could be called on to block a defensive player, or in rare circumstance even pass the football. Sometimes a wide receiver must instantly switch their responsibility from offense to defense, and tackle an opponent who just intercepted a pass. But the role of a wide receiver is never likely to be confused with the roles of a center who snaps the ball, or a linebacker who is always looking to tackle the person with the ball.

Every project is slightly different and demands different roles but some common roles include:

- **Leader/Coordinator/Project Manager:** this person is not the boss, but rather the person who makes sure that everything runs smoothly. They do not give orders or make demands, but rather they serve to keep the group operating at its best and sticking to schedules.
- **Monitor:** this member keeps track of decisions and their outcomes and keeps an eye out for any potential flaws or conflicts.

- **Recorder/Note Taker/Secretary:** this person is responsible for keeping the records of the group. They should be able to tell everyone what was agreed and when. They keep the notes (or minutes) of the meetings.
- **Shaper:** this team member often has the big ideas, the drive to see them through, and the assertiveness to steer the group.
- **Investigator/Researcher:** whether it is through secondary or primary research, this person likes to look for answers to the questions driving the project. In a big project, everyone will likely contribute some research, but this person would be the one who dives into the topics the most.
- **Specialist:** often referred to as subject-matter experts (SMEs), this is the person with the deep background on a topic. Often groups will have specialists in more than one area.
- **Editor:** the best writer will often write the least amount of original content in a large project – rather their role will be to edit and improve upon everyone else’s writing. They also help create one voice in documents written by multiple people with multiple writing styles.
- **Designer:** the designer is the person who makes sure any documents, presentations, videos, or websites created by the team look appealing and professional. As the name implies, they are in charge of graphics and design.

For more on some of these common roles, and others,

see “[The Nine Belbin team Roles](https://www.belbin.com/about/belbin-team-roles/).”³. Just like a wide receiver, you might find you have to take on a variety of responsibilities related to your role as well as some responsibilities that seem tangential to your role. You might also find you have to take over unfamiliar responsibilities because someone else “dropped the ball.” Defining roles helps establish accountability in the group and makes it clear who is in charge of what.

Responsibilities and Planning

Once you have articulated the qualifications of each member and established the roles, it is time to assign responsibilities and plan the project. This includes dividing the work, creating a schedule, and anticipating problems (obstacles and conflicts). You should also agree on the main avenue of communication, and create an online document and/or folder that will be shared by all group members.

Capture your team’s roles, responsibilities, and decisions in a simple team-plan document. It can contain the key dates in the team schedule, a tentative outline of the document to be team-produced, formatting agreements, individual writer assignments, word-choice preferences, and so on. The planning stages will often include all or most of the following actions:

- Analyze the writing assignment
- Pick a topic
- Define the rhetorical situation
- Brainstorm and narrow the topic

3. <https://www.belbin.com/about/belbin-team-roles/>

- Create an outline
- Plan the research (primary and secondary)
- Plan a system for taking notes from sources
- Plan any graphics you would like to see in your writing project
- Agree on style and format questions
- Develop a work schedule for the project and divide the responsibilities
- Develop a system for resolving disputes

Much of the work in a team-writing project must be done by individual team members on their own. When dividing the work, aim for these minimum guidelines:

- Have each team member responsible for the writing an equal amount of the assignment.
- Have each team member responsible for locating, reading, and taking notes on an equal amount of sources.

Some of the work for the project that could be done as a team you may want to do first independently. For example, brainstorming, narrowing, and especially outlining should be completed by each team member on their own; then get together and compare notes. Keep in mind how group dynamics can unknowingly suppress certain ideas and how less assertive team members might be reluctant to contribute their valuable ideas in the group context. If you notice this happening, be proactive and ask for everyone's thoughts or opinions – especially those group members who may be hesitant to talk over others – so that good ideas do not remain unheard.

After you divide the work for the project, write a formal chart or calendar and distribute it to all the members.

Scheduling

Early in your writing project, set up a schedule of key dates and deadlines. This schedule will enable you and your team members to make steady, organized progress and complete the project on time. It is a good idea to figure a day and time during the week when all group members are free and can meet, in person or online. Block off that hour every week. Before you meet, write out an agenda that includes all the main topics of discussion, including old business, ongoing business, and new business. The agenda should include a time schedule for the meeting to make sure everything is covered in the time allotted for the meeting. If you find one week that there is no real reason to meet, you can cancel it.

As shown in the example schedule below (Figure 1), your project schedule should include not only completion dates for key phases of the project but also meeting dates and the subject and purpose of those meetings. Notice these details about that schedule:

- Several meetings are scheduled in which members discuss the information they are finding or are not finding. One team member may have information another member is looking everywhere for.
- Several meetings are scheduled to review the project details, specifically, the topic, audience, purpose, situation, and outline. As you learn

more about the topic and become more settled in the project, your team may want to change some of these details or make them more specific.

- Several rough drafts are scheduled. Team members peer-review each other's drafts of individual sections at least twice, the second time to see if the recommended changes have worked. Once the complete draft is put together, it too is reviewed twice.

Individual prototypes due	October 1
Team meeting: finalize the prototype	October 1
Rough-draft style guide due	October 5
Team meeting: finalize style guide	October 5
Twice-weekly team meetings: progress & problems	October 5 - 26
Graphics sketches due to Jim	October 14
Rough drafts of individual sections due	October 26
Review of rough drafts due	October 28
Team meeting: discuss rough drafts, reviews	October 28
Update of style guide due from Sterlin	October 31
Revisions of rough drafts due to reviewers	November 3
Final graphics due from Jim	November 5
Completed drafts to Sterlin: final edit/proof	November 7
Team meeting: review completed draft with final graphics and editing	November 12
Completed drafts due to Julie for final production	November 15

Individual prototypes due	October 1
Team meeting: inspection of completed project	November 15
Project upload due to McMurrey	November 16
Party at Julie's	November 19

Figure 1: A project schedule in the form of a simple table.

Anticipating Problems and Conflicts

Think about how to resolve typical problems that can arise in a team project and document your team's agreements about these matters in a by-laws document:

- **Workload imbalance.** When you work as a team, there is always the chance that one of the team members, for whatever reason, may have more or less than a fair share of the workload. Therefore, it is important to find a way to keep track of what each team member is doing. Periodic group evaluations and self-assessments, including logging hours spent on the project, can help accomplish a good balance of work.

Both during and at the end of the project, if there are any problems, the evaluations and assessments should make that fact clear and enable a more equitable balancing of the workload. Before the end of the project, team members

can add up their hours spent on the project; if anyone has spent a little more than their share of time working, the other members can make up for it. Similarly, as you get down toward the end of the project, if it is clear from the evaluations and assessments that one team member's work responsibilities turned out, through no fault of their own, to be smaller than those of the others, they can make up for it by doing more of the finish-up work such as typing, proofing, or copying.

- Team members without relevant skills. Sometimes a member may claim to have no relevant skills. That could just be an indication of that person's anxiety or lack of interest in engaging in a group project. Each team member in a writing course should contribute a fair share of the writing for a project. However, there are plenty of tasks that do not require technical knowledge, formatting skills, or a sharp editorial eye, for example: typing and distributing the team plan, the by-laws, and the minutes of team meetings; or reminding team members of due dates and scheduled meetings. In fact, except for the anxiety or lack of interest, the self-professed unskilled team member might make the best team leader!
- Disappearing team members. If your team is unfortunate enough to have an irresponsible member who simply vanishes, have a plan for what to do about that, and document it in your team by-laws. One obvious solution is to kick the team member off the team and inform the instructor (if it is a writing course) or the next level of management (if it is a nonacademic

organization). Of course, you want to try to avoid losing a team member, so constant communication is a key ingredient to well-functioning groups. The sample email below (Figure 2) demonstrates that the team leader did all they could to get the disappearing member back in the fold, and is about to give them up as lost.

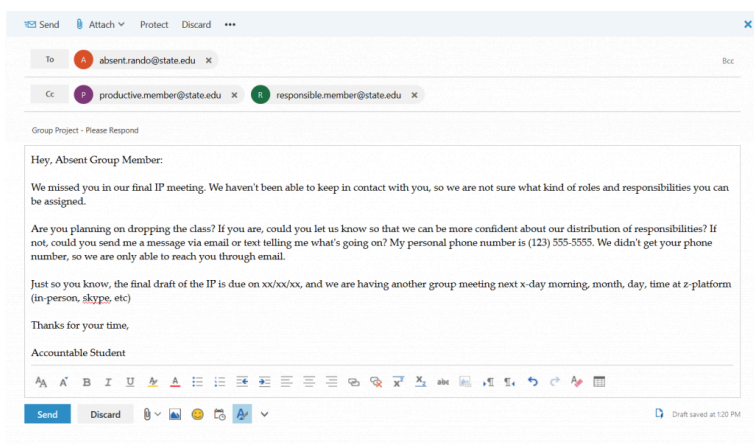


Figure 2: A sample email sent to a disappeared team member.

- Seemingly entrenched team-member disagreements. It is amazing how vehemently team members can disagree on aspects of a team-writing project. Have a plan, written in your team by-laws, how to resolve these matters. Should they be put to a vote? Flip a coin? Should you “escalate” the matter to a neutral or higher-level party? Do you have a group mediator who can be impartial and make judgement calls?

- Radically inconsistent writing styles and format. Because the individual sections will be written by different writers who are apt to have different writing styles, set up a style guide in which your team members list their agreements on how things are to be handled in the paper as a whole. These agreements can range from the high level, such as whether to have a background section, all the way down to picky details such as when to use italics or bold and whether the phrase you group wants to use is “click” or “click on.”

Before you and your team members write the first rough drafts, you cannot expect to anticipate every possible difference in style and format. Therefore, plan to update this style sheet when you review the rough drafts of the individual sections and, especially, when review the complete draft.

One of the best ways to smooth out the different writing styles is to have everyone consistently work on the entire document together. That is, read all the sections and make comments and edits throughout the writing process. Then, at the very end, have one person edit the entire document for consistency and design.

Communication

Good communication is the key to successful team projects. You should decide early on how you will communicate (group text, email, an app, etc) and how you will share documents.

Once the team is formed and work begins, it is imperative that any issues that arise are addressed early. Most group conflicts start as miscommunication and/or

misunderstanding. Everyone in the group should always be a part of any information that is sent between members. Include all members in all communication, even if it does not seem all that important. That is what the cc line is for in emails.

Team projects are generally evaluated on their own merits, regardless of group dynamics and participation. In other words, you cannot tell a client that one of your team members was slacking and that is why the graphics and design does not look so nice. In a professional setting, who did how much work does not matter to the client – they only care about what the team delivers.

Although some members in the group may fulfill different roles and do more or less writing, in a project for a writing class, each member of a group should contribute actual writing and research to the project.

Group work needs to be a collaborative effort. If someone in the group is not pulling their weight, it needs to be addressed right away. Sometimes it is due to simple misunderstanding. Discuss problems with the entire group as soon as possible, but if that does not work, contact your instructor (or supervisor in a professional setting) so you can sort things out before it is too late. There are usually a number of opportunities to evaluate and assess the group as the project unfolds. However, it is not possible to quit the group or kick someone out without serious repercussions. In the workplace, there is no leaving a group project unless you quit your job.

3.3 Completing the Project

Try to schedule as many reviews of your team's written work as possible. Communicate and meet regularly and

read each other's work as often as possible. You can meet to discuss each other's rough drafts of individual sections as well as rough drafts of the complete paper.

A critical stage in team-writing a paper comes when you put together those individual sections written by different team members into one complete draft. It is then that you will probably see how different in tone, treatment, and style each section is. You must, as a group, find a way to revise and edit the complete rough draft that will make it read consistently so that it will not be so obviously written by three or four different people.

When you complete reviewing and revising, it is time for the finish-up work to get the draft ready to hand in. That work is the same as it would be if you were writing the paper on your own, only in this case the workloads can be divided among the group.

3.4 Final Thoughts

Business leaders commonly complain that college graduates do not know how to work productively in groups. In American classrooms, we tend to prize individual accomplishment, yet in professional careers we need to work well with others. Unfortunately, the terms "group work," "team work," or "committee work" can appear to be oxymorons – like the terms "honest politician" or "criminal justice." Many groups, teams, and committees simply do not work, despite the potential of individuals in the group.

It is certainly true that many people waste time in group situations, politicking as opposed to defining tasks and solving problems. In writing classrooms, some students want to slide by, get the grade without doing the

work; others are willing to do the work, but are not sure how to proceed. While working in groups presents unique challenges, your success as a writer, leader, or manager is somewhat dependent on your ability to help others focus, communicate, and collaborate.

Tips for Effective Groups

Follow these tips for nurturing teamwork in group situations. Try experimenting with the following strategies to help ensure the success of group work.

- When the group first meets, select a project manager. This person provides leadership and helps forge consensus and a coherent plan. Being a leader is different from being an autocrat or a dictator. Even if you are selected as the project manager, it is important to remember that you are an equal team member and collaborator who has simply been assigned the task of coordinating the project and ensuring that progress does not fall behind schedule. This does not, in effect, make you the “boss” of all the other team members, so remember to act like a partner rather than an overlord. As team coordinator, your attitude and behavior may help set the tone for the rest of the group.

If you are the leader, be sure to make fair assignments and let others own ideas and parts of the project. If people slack off, talk to them discreetly, giving them fair warning before speaking with other members or your teacher. Be concrete and specific about building consensus regarding shared goals, due dates, and processes.

- All team members need to work to be positive. Be generous. Be respectful regarding members' feelings and needs. Focus on the strengths of the members in your group. Give more than you take. Ideally, collaborative projects should not be about one person being in control. Decisions should be made by the group, not by one individual.
- Respect different ideas and approaches. Listen before talking; be articulate about your position but flexible when others want to go another way.
- Clarify evaluation criteria up front. Understand what your instructor wants, how the documents will be evaluated, and what the due dates are.
- Beyond outlining the project, come up with a project management plan, outlining:
 - Responsibilities for each group member
 - Descriptions of the steps or tasks involved in implementation
 - Timelines for completion
 - Summaries of problems/opportunities you anticipate (and a list of possible solutions/recommendations)
- Draft a document planner for the group project. Write a research proposal and submit it to your instructor/supervisor. Your proposal—which is formal request that will be discussed at length in the Proposal chapter—should identify what you want to do, how you want to do it, and when you can have it done.

- Your instructor (or supervisor) may request that you maintain individual journals or progress reports or keep a log of your contributions to the project. Alternatively, you can log about your collaborative efforts in a wiki, perhaps writingwiki.org. The advantage of using the wiki space is that it enables group members to enter their contributions on the same page. Teachers appreciate the wiki format because each edit to a page is recorded by the wiki software, enabling the instructor to see when particular contributions were made and by whom. Teachers can account for individual efforts when you keep records and perhaps include a one-page summary about what you learned as a result of the collaborative experience. Create a Web portfolio for the project with an index or default page that links to major sections of the group project and relevant appendixes. Report appendixes should include links to the document planner, the document proposal, individual students' journals, and related resources.
- Evaluate your peers' contributions; be sure to copy your peers on your evaluation.

Group work can be difficult, and the amount of time required to complete a group project may very well take longer than if you were tackling the project on your own, but group work can also be a richly rewarding experience with synergistic results that are impossible to achieve otherwise. With a clear understanding of each group member's strengths and qualifications, with clearly

articulated roles and responsibilities, and with a well-defined plan, any group project can be a success.

3.5 Activity

You might consider having everyone in the group take the Myers–Briggs [personality test](http://www.humanmetrics.com/cgi-win/jtypes2.asp) (<http://www.humanmetrics.com/cgi-win/jtypes2.asp>) to get a good sense of where everyone is coming from and where they stand. There are a number of free versions of the test online. The official version from the [Myers and Briggs Foundation](http://www.myersbriggs.org)⁴ is far more thorough and costs money.

The test measures preferences and general attitudes and can help you understand communication and learning styles. In conjunction with the other skills, knowledge, and abilities, it can help determine which roles and tasks are most suitable for each team member.

After taking the test, record your personality type and some of its major attributes. Then meet with your group so you can all share your results and discuss how best to capitalize on the knowledge.

[1] <https://rework.withgoogle.com/guides/understanding-team-effectiveness/steps/identify-dynamics-of-effective-teams/>. This is a great resource to learn more about effective group dynamics.

Attribution

Material in this chapter was adapted from the works listed

4. <https://www.myersbriggs.org/home.htm?bhcp=1>

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Chapter 4: Ethics

Michael Beilfuss

Chapter Synopsis

In this chapter, you will learn about some of the ethical challenges that you may encounter in your professional and academic life, especially when it comes to technical writing. The chapter explains the importance of articulating your own ethical code so you can be prepared when you find yourself in uncomfortable and/or unethical situations. The chapter covers ethical principles, how ethics may affect the presentation of information, and some common ethical problems encountered by technical writers. Much of this chapter is concerned with the appropriate and ethical use and documentation of sources. The chapter provides some practical information on how to make sure your writing is ethical and how to handle ethical dilemmas along with possible legal issues in the workplace.

4.1 Ethics in Technical Writing

You probably think about technical writing in relation to communicating technical information clearly in an accessible format that meets the needs of its audience. These are important aspects of technical writing, to be sure, but they only represent the surface of what you need to know. This chapter will introduce some of the ethical

issues that may arise as technical writers research, write, revise, and produce a technical document.

Like other professionals, technical writers come up against ethical issues regularly and must make decisions about how to move forward with a project in the face of ethical dilemmas. Writers may encounter situations in which they must ask the following kinds of questions: What kinds of support material and sources are ethical to use? Are open web sources just as valid as academic sources for certain topics? Can email communications be used without permission? What if the writer discovers that a company falsified data about the effectiveness of its product? Should they reveal this in their report or should they take other courses of action? How much should a writer adapt to an audience without sacrificing their own views?

Ethics principles provide the basis for deciding whether “x” is ethical, but in reality, ethical issues are complicated—for example, imagine working for a large company that employs substantial numbers of people in your town, where relatively few other employment opportunities exist. Imagine that the company disposes of its chemical waste in a way that could endanger people’s health. While the company may be following the law, it is clear they could dispose of their waste more safely and be more responsible stewards of the neighborhood. However, that would cost the company more money, and may affect profit margins, result in slower growth, and provide fewer jobs for the locals. What do you do? Is quarterly growth and expanding jobs more serious than the risk of future health problems and a degraded environment? Which choice is really more ethical?

Many ethical lapses that occur in the workplace are not so obvious, and they often begin with good intentions

– for example, a manager or owner of a business may commit financial fraud to avoid laying off employees. The intention may be good, but breaching ethics results in a slippery slope – one that often leads to further and larger ethical breaches. Falsifying one report will make it that much more likely the subsequent reports will be falsified, just as neglecting to properly cite one source at the end of a report only makes it more tempting to neglect citing the remainder of the sources.

Acting ethically is rarely rewarded from the outside – you are not likely to be congratulated by your boss and co-workers for passing on an opportunity to undermine the competition in an unethical manner. The “rewards” of acting ethically are often simply internal. It is important to think about ethics and articulate your ethical values *before* you find yourself in a situation where ethics will factor into your decision-making. With a strong set of ethical values, you will be better prepared to make the right decision and stick to your principles when faced with an ethical dilemma.

There is a good chance that at some point in your career you will find yourself in a situation that involves unethical behavior at your workplace. You may be faced with having to decide to go along with unethical actions or behavior, ignore the behavior, or report unethical conduct to the appropriate person (internally or externally). It could be something as simple (albeit pernicious) as harassment, or it could be something as large as major fraud. It may be easier to mind our own businesses and keep quiet, but really the only right thing to do is to stand up, and speak up, for what is right.

We are taught from a young age that you should never “rat” on anyone, and staying silent is often easier than mustering the courage to reveal ethical corruption.

However, sometimes speaking up, and/or notifying authorities is the only right thing to do, as difficult as that may be. [The National Whistle Blower](https://www.whistleblowers.org/index.php) center is a non-profit, non-governmental organization that has many resources available for individuals who may be faced with the difficult situation of doing the right thing (<https://www.whistleblowers.org/index.php>).

You should spend some time examining your ethics and thinking about how and where they may be challenged in your career. What will you do when you are asked, implicitly or explicitly, to compromise your ethics? What will you do when you witness unfair, demeaning, and unethical behavior? In almost every field, there are legal and professional consequences for committing unethical behavior, and often remaining silent about corrupt conduct—whether the action are yours or a colleague's—can implicate you as well.

4.2 General Principles

In day-to-day life, most people have a sort of sliding scale on what constitutes ethical behavior. For example, you might tell your best friend their new haircut looks attractive when in fact you believe that it does not. This lie, though minor, preserves your friend's feelings and does no apparent harm to them or anyone else. Some might consider the context before determining how to act. For example, you might not tell a stranger that they were trailing toilet paper but you would tell a friend. With a stranger, your calculations may include how the stranger might respond to the interruption, and both of you may feel some embarrassment in the exchange. Such calculations may make it easier for you to look away and let someone

else deal with it, but with a friend, you would be willing to risk some short-term awkwardness to do the right thing.

In a far more serious situation, a person might not risk their lives to help a stranger, but they might risk their lives to help a close friend or relative. For example, if you witnessed a stranger attacking someone you do not know on a crowded street, you may be afraid to interfere because you could be injured in the event. Instead, you might stay back and call the police. But if a close friend or a relative was in the same danger, you may be more likely to put yourself in harm's way to protect your friend. In this case, your commitment to loyalty might outweigh your sense of self-preservation. In the former case, if you valued physical courage above all else, you might be willing to step into a fight to protect a victim. In either case, weighing the costs, and having a strong value system would help you feel like you did the right thing, especially upon reflection after the event.

Ethical behavior, including ethical technical communication, involves not just telling the truth and providing accurate information, but telling the truth and providing information so that a reasonable audience is made aware of the behavior. It also means that you act to prevent actual harm, with set criteria for what kinds and degrees of harm are more serious than others. For example, saving someone's life should always outweigh the prospect of financial damage to your company. Human values, and human life, are far more important than monetary values and financial gain. As a guideline, ask yourself what would happen if your action (or non-action) became entirely public, and started trending on social media, got its own hashtag, and became a meme picked up by the national media. If you would go to prison, lose your friends, lose your job, or even just feel embarrassed, the action is

probably unethical. If your actions cannot stand up to that scrutiny, you might reconsider them. Having a strong ethical foundation always helps. However, nothing is ever easy when it comes to ethical dilemmas. Sometimes the right thing to do is the unpopular thing to do. Just because some action enjoys the adulation of the masses, does not necessarily mean it is ethical. That is another reason why it is important to give some serious thought to your own value system and how it may fit into the value systems of the exemplars you admire and respect. That way, you will be better prepared to do the right thing when you are confronted with an ethical dilemma. Internalizing your ethics in such a manner will certainly make you a more ethical writer.

4.3 Professional Ethics

Many organizations and employers have a corporate code of ethics. If you are a technical writer and you join a professional associations such as the Society of Technical Communicators you will need to be aware their codes of ethics, published online (e.g., <http://www.stc.org/about-stc/ethical-principles>). If you are a technical writer researching and writing a report within a specific professional field, you will also need to be aware to that field's codes of ethics. For example, if you are writing a report for a group of physical therapists on the latest techniques for rehabilitating knee surgery patients, you should be aware of the code of ethics for physical therapists so that you work within those principles as you research and write your report.

Look for the codes of ethics in your own discipline

and begin to read and understand what will be expected of you as a professional in your field.

4.4 Presentation of Information

How a writer presents information in a document can affect a reader's understanding of the relative weight or seriousness of that information. For example, hiding some crucial bit of information in the middle of a long paragraph deep in a long document seriously de-emphasizes the information. On the other hand, putting a minor point in a prominent spot (say the first item in a bulleted list in a report's executive summary) might be a manipulative strategy to emphasize information that is not terribly important. Both of these examples could be considered unethical, as the display of information is crucial to how readers encounter and interpret it.

A classic example of unethical technical writing is the memo report NASA engineers wrote about the problem with O-ring seals on the space shuttle Challenger. The unethical feature was that the crucial information about the O-rings was buried in a middle paragraph, while information approving the launch was in prominent beginning and ending spots. Presumably, the engineers were trying to present a full report, including safe components in the Challenger, but the memo's audience—non-technical managers—mistakenly believed the O-ring problem to be inconsequential, even if it happened. The position of information in this document did not help them understand that the problem could be fatal.

Ethical writing, then, involves being ethical, of course, but also presenting information so that your target audience will understand the relative importance of

information and understand whether some technical fact is a good thing or a bad thing.

4.5 Ethical Issues in Technical Writing

There are a few issues that may come up when researching a topic for the business or technical world that a writer must consider. Let us look at a few.

Research that Does Not Support Project Idea

In a technical report that contains research, a writer might discover conflicting data that does not support the project's goal. For example, your small company continues to have problems with employee morale. Research shows bringing in an outside expert, someone who is unfamiliar with the company and the stakeholders, has the potential to impact the greatest change. You discover, however, that to bring in such an expert is cost prohibitive. You struggle with whether to leave this information out of your report, thereby encouraging your employer to pursue an action that is not the most productive. In this situation, what would you do, and why?

Suppressing Relevant Information

Imagine you are researching a report for a parents' group that wants to change the policy in the local school district requiring all students to be vaccinated. You collect a handful of sources that support the group's goal, but then you discover convincing medical evidence that indicates vaccines do more good than potential harm in society.

Since you are employed by this parents' group, should you leave out the medical evidence, or do you have a responsibility to include all research, even some that might sabotage the group's goal? Is it your responsibility to tell the truth (and potentially save children's lives) or to cherry pick information that supports the parent group's initial intentions?

Limited Source Information in Research

Thorough research requires a writer to integrate information from a variety of reliable sources. These sources should demonstrate that the writer has examined the topic from as many angles as possible. This includes scholarly and professional research, not just from a single database or journal, for instance, but from a variety. Using a variety of sources helps the writer avoid potential bias that can occur from relying on only a few experts. If you were writing a report on the real estate market in Stillwater, Oklahoma, you would not collect data from only one broker's office. While this office might have access to broader data on the real estate market, as a writer you run the risk of looking biased if you only chose materials from this one source. Collecting information from multiple brokers would demonstrate thorough and unbiased research. (See [chapter 10](#) for more on research.)

Presenting Visual Information Ethically

Visuals can be useful for communicating data and information efficiently for a reader. They provide data in a concentrated form, often illustrating key facts, statistics or information from the text of the report. When writers

present information visually, however, they have to be careful not to misrepresent or misreport the complete picture.

The graphic below shows two perspectives of information in a pie chart. The data in each is identical but the pie chart on the left presents information in a misleading way (see Figure 1). What do you notice, however, about how that information is conveyed to the reader?

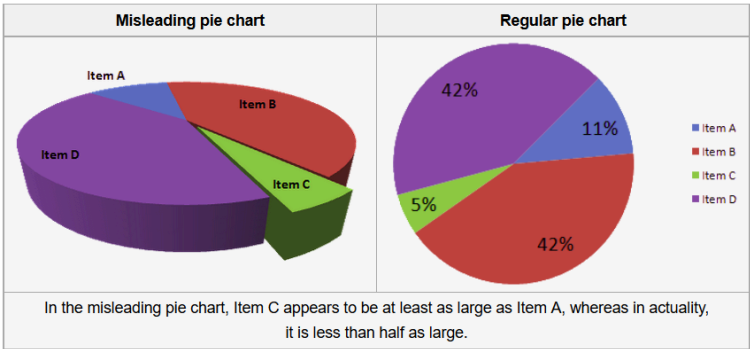


Figure 1: Misleading and regular pie charts

Imagine that these pie charts represented donations received by four candidates for city council. The candidate represented by the green slice labeled “Item C,” might think that she had received more donations than the candidate represented in the blue “Item A” slice. In fact, if we look at the same data in a differently oriented chart, we can see that Item C represents less than half of the donations than those for Item A. Thus, a simple change in perspective can change the impact of an image.

Similarly, take a look at the bar graphs in Figure 2 below. What do you notice about their presentation?

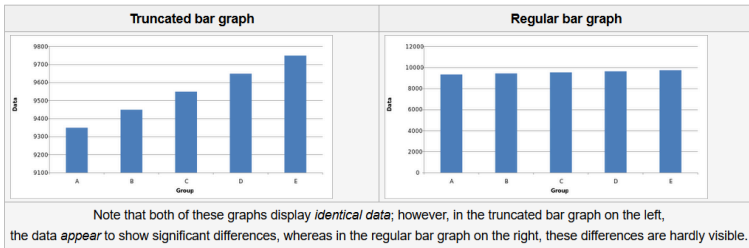


Figure 2: Misleading and regular bar graphs

If the bar graph above were to represent sales figures for a company, the representation on the left would look like good news: dramatically increased sales over a five-year period. However, a closer look at the numbers shows that the graph shows only a narrow range of numbers in a limited perspective (9100 to 9800). The bar graph on the right, on the other hand, shows the complete picture by presenting numbers from zero to 1200 on the vertical axis, and we see that the sales figures have in fact been relatively stable for the past five years.

Presenting data in graphical form can be especially challenging. Keep in mind the importance of providing appropriate context and perspective as you prepare your graphics. You need to be extra vigilant to avoid misleading your readers with graphics. Graphics will usually be the first thing a reader notices about your document; if a reader finds your graphics misleading, your entire document may be called into question.

Additional Concerns

You might notice that most of these ethics violations could happen accidentally. Directly lying is unlikely to be accidental, but even in that case, the writer could rationalize and/or persuade themselves that the lie achieved

some “greater good” and was therefore necessary. This is a slippery slope.

An even more common ethics violation results from the person who designs the information mistakenly believing that they are presenting evidence objectively, without recognizing their own bias in how they presented that information.

Most ethics violations in technical writing are (probably) unintentional, but they are still ethics violations. That means a technical writer must consciously identify their biases and check to see if a bias has influenced any presentation: whether in charts and graphs, or in discussions of the evidence, or in source use (or, of course, in putting the crucial O-ring information where the launch decision makers would realize it was important).

For example, scholarly research is intended to find evidence that the new researcher’s ideas are valid (and important) or evidence that those ideas are partial, trivial, or simply wrong. In practice, though, most folks are primarily looking for support. “Hey, I have this great new idea that will solve world hunger, cure cancer, and make mascara really waterproof. Now I just need some evidence to prove I am right!” This is one version of [confirmation bias](https://en.wikipedia.org/wiki/Confirmation_bias) (https://en.wikipedia.org/wiki/Confirmation_bias) – where people tend to favor evidence that supports their preconceived notions and reject evidence that challenges their ideas or beliefs. (See [chapter 10](#) for more information on ethical research principles.)

On the other hand, if you can easily find 94 high-quality sources that confirm you are correct, you might want to consider whether your idea is worth developing. Often in technical writing, the underlying principle is already well-documented (maybe even common knowledge for your audience) and the point *should* be

to use that underlying principle to propose a specific application.

Using a large section of your report to prove an already established principle implies that you are saying something new about the principle—which is not true. Authors of technical documents typically do not have the time or space to belabor well-known points or common-sense data because readers do not need to read page upon page of something they already know or something that can be proved in a sentence of two. When you use concepts, ideas, or findings that have been established by others, you only need to briefly summarize your source and provide accurate references. Then you can apply the information from your source(s) to your specific task or proposal.

4.6 Ethics and Documenting Sources

The most immediate concern regarding ethics in your technical writing course is documenting your sources. Whatever content you borrow must be clearly documented both in the body of your text and in a works cited or references page (the different terms reflect different documentation systems, not just random preference) at the end. See [chapter 10](#) for more information on appropriately documenting your research.

Including an item only in the source list at the end suggests you have used the source in the report, but if you have not cited this source in the text as well, you could be seen as misleading the reader. Either you are saying it is a source when in fact you did not really use anything from it, or you have simply failed to clarify in the text what are your ideas and what comes from other sources.

Documenting source use in such a way as to either

mislead your reader about the source or make identifying the source difficult is also unethical—that would include using just a URL or using an article title without identifying the journal in which it appears (in the works cited/references; you would not likely identify the journal name in the report's body). It would also be unethical to falsify the nature of the source, such as omitting the number of pages in the works cited entry to make a brief note seem to be a full article.

Unethical source use includes suppressing information about how you have used a source, such as not making clear that graphical information in your report was already a graph in your source, as opposed to a graph you created on the basis of information in the source.

With the ease of acquiring graphics on the internet, it has become ever more tempting to simply copy and paste images from a search engine. Without providing accurate citation information, the practice of cutting and pasting images is nothing less than plagiarism (or theft); it is unethical, and may be illegal if it violates copyright law. Furthermore, it is downright lazy. Develop good habits now and maintain them through practice. Properly cite your images by providing credit to the original creator of the image with full citations. You cannot just slap a URL under a picture, but rather you need to give full credit with an appropriate citation. Any assignment turned in that uses material from an outside source, including graphics and images, needs to include in-text citations as well as a list of references.

What about Open Source Images?

If you need to use graphics from the internet, a good option is to look for graphics that are open source. Open source

refers to material that is freely available for anyone to use. Creative Commons is an organization that has developed guidelines to allow people to “share their knowledge and creativity.” They provide “free, easy-to-use copyright licenses to make a simple and standardized way to give the public permission to share and use” creative work (“[What we Do](https://creativecommons.org/about/)” <https://creativecommons.org/about/>). There are a number of [options](https://creativecommons.org/share-your-work/licensing-types-examples/) (<https://creativecommons.org/share-your-work/licensing-types-examples/>) that a creator has in regards to how they want to set up permissions, but the idea is that these works are free for anyone to use; they are open source.

Graphics created by the federal government, say from the National Park Service, or the FDA, or the EPA, are not under copyright, and therefore can be used without having to go through the sometimes-onerous process of securing permissions. This is particularly helpful for written materials that will be professionally published.

Likewise, you can customize a Google image search so that only images that are open source will come up. If you click on the “Tools” button, you have the option of filtering results by how they are licensed. See Figure 3 below.

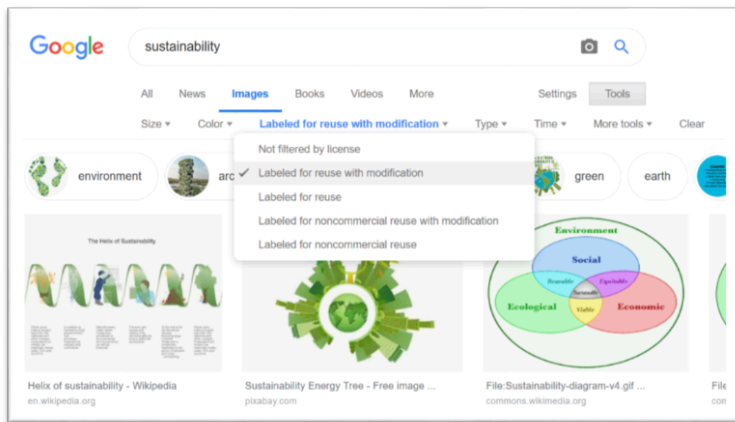


Figure 3: A screen shot from a Google search where the images are filtered by their license.

Regardless of the copyright, you should always keep track of where you found the graphics, and for assignments for your class, you need to record the source so you can cite it. If you use graphics (or anything at all) in an assignment that you did not create, you need to indicate as much. Just because a graphic is open source, does not mean that you can pass it off as your own work, and if you don't cite it, that is exactly what you are doing, whether or not that was your intention.

Many problems in documenting sources occur because the writer is missing the point of source use. Remember, you must clearly distinguish between your ideas and borrowed material; and you must use borrowed material primarily as evidence for your own, directly stated ideas.

Intellectual Property

Patents and trademarks are company names (WalMart), logos (the Target bullseye), processes or slogans (McDonald's "I'm lovin' it") that belong to a person or company. None of these things can be used without proper recognition of or approval from the appropriate company or individual involved. A company uses a TM to show something is trademarked or an ® for something registered with the U.S Patent and Trademark Office. An example would be Nike and their famous swoosh symbol.

This law extends beyond the major companies. Any written document in your own company is copyrighted by law once produced. That means if you are borrowing a good idea from a friend at another company, you must cite them as a source. Also, although not required by law, it is a good idea to cite sources from inside your own company as well. You would not want someone else taking credit for your ideas. Why should you treat others any differently?

The legal consequences are most notable when one considers writing in the professional world. While plagiarizing may give you a failing grade in a class, plagiarizing in the workplace can get you fired, and could result in a costly lawsuit or possibly even jail time. It is not only ethical to follow these rules, it is an enforced law. Make sure you properly document all sources so as not to mislead a reader.

Copyright law includes items whose distribution is protected by law (books, movies, or software). The copyright symbol is shown with a ©. Copyright is different from plagiarism in that it is a legal issue. Only the copyright holder, the person/organization who owns the protected item, can copy it. Spend a few minutes checking out [The United States Patent and Trademark Office](#)

(<https://www.uspto.gov/trademarks-getting-started/trademark-basics/trademark-patent-or-copyright>) for clarification on trademarks, patents, and copyright.

Some considerations made by the court when determining if a copyright law has been violated include:

- The character, purpose of use, and amount of information being used. Was it a phrase, sentence, chapter, or an entire piece of work? Was the information simply copied and pasted as a whole or changed? Was it taken from something published or unpublished? What was it used for?
- If the person using another's material did so to profit from it. Only the copyright holders should profit from material they own. For example, this is why a faculty member cannot use their personal DVD for a movie screening on campus and charge students to attend the viewing.
- If using someone else's property affected the market for the copyrighted work. For example, if you take an item that would cost money to buy and copy it for other people, you are affecting the market for that product since the people you give it to will now not have to purchase it themselves. Therefore, the original owner of the material is denied a profit due to your actions.

When dealing with copyright questions, consider the following tips. First, find out if the item can be used. Sometimes, the copyright holder allows it if credit is given. Second, do not use large amounts of another person's

information. Third, if possible, ask permission to use another person's work. In addition, and most importantly, cite sources accurately so as to give credit to another person's ideas if you are able to use them.

4.7 Ethics, Plagiarism, and Reliable Sources

Unlike personal or academic writing, technical and professional writing can be used to evaluate your job performance and can have implications that a writer may or may not have considered. Whether you are writing for colleagues within your workplace or outside vendors or customers, you will want to build a solid, well-earned, favorable reputation for yourself with your writing. Your goal is to maintain and enhance your credibility, and that of your organization, at all times.

Credibility can be established through many means: using appropriate professional language, citing highly respected sources, providing reliable evidence, and using sound logic. Make sure as you start your research that you always question the credibility of the information you find. You should ask yourself the following questions:

- Are the sources popular or scholarly?
- Are they peer reviewed by experts in the field?
- Can the information be verified by other sources?
- Are the methods and arguments based on solid reasoning and sound evidence?
- Is the author identifiable and do they have appropriate credentials?

Be cautious about using sources that are not reviewed by peers or editor, or in which the information cannot be verified, or seems misleading, biased, or even false. Be a wise information consumer in your own reading and research in order to build your reputation as an honest, ethical writer. See [chapter 10](#) for more information on credibility and evaluating secondary sources.

Quoting the work of others in your writing is fine, provided that you credit the source fully enough that your readers can find it on their own. If you fail to take careful notes, or the sentence is present in your writing but later fails to get accurate attribution, it can have a negative impact on you and your organization. That is why it is important that when you find an element you would like to incorporate in your document, in the same moment as you copy and paste or make a note of it in your research file you need to note the source in a complete enough form to find it again.

Giving credit where credit is due will build your credibility and enhance your document. Moreover, when your writing is authentically yours, your audience will catch your enthusiasm, and you will feel more confident in the material you produce. Just as you have a responsibility in business to be honest in selling your product or service and avoid cheating your customers, so you have a responsibility in business writing to be honest in presenting your idea, and the ideas of others, and to avoid cheating your readers with plagiarized material.

4.8 Ethical Writing

Throughout your career, you will be required to create many documents. Some may be simple and

straightforward, some may be difficult and involve questionable objectives. Overall, there are a few basic points to adhere to whenever you are writing a professional document: a) do not mislead, b) do not manipulate, and c) do not stereotype.

Do Not Mislead

This has more than one meaning to the professional writer. The main point is clear. When writing persuasively, do not write something that can cause the reader to believe something that is not true. This can be done by lying, misrepresenting facts, or just “twisting” numbers to favor your opinion and objectives. Once you are on the job, you cannot leave out numbers that show you are behind or over-budget on a project, no matter how well it may work once it is completed. Be cautious when using figures, charts and tables, making sure they visually represent quantities with accuracy and honesty. While this may seem easy to read about, when the pressure is on and there are deadlines to meet, taking shortcuts and stretching the truth become ever more tempting.

Do Not Manipulate

Do not persuade people to do what is not in their best interest. A good writer with bad motives can twist words to make something sound like it is beneficial to all parties. The audience may find out too late that what you wrote only benefited you and actually hurt them. Make sure all stakeholders are considered and cared for when writing a persuasive document. It is easy to get caught up in the facts and forget all the people involved. Their feelings

and livelihood must be considered with every appropriate document you create.

Do Not Stereotype

Most stereotyping takes place subconsciously now since workplaces are careful to not openly discriminate. It is something we may not even be aware we are doing, so it is always a good idea to have a peer or coworker proofread your documents to make sure you have not included anything that may point to discriminatory assumptions.

The not-for-profit organization [Project Implicit](https://www.projectimplicit.net/) (<https://www.projectimplicit.net/>) has been researching subconscious biases for years and has developed several, free [online tests](https://implicit.harvard.edu/implicit/takeatest.html). (<https://implicit.harvard.edu/implicit/takeatest.html>) The tests can help you understand your proclivities and subconscious biases. Knowing your biases may help you begin to overcome them.

4.9 Addressing Unethical Practices

It is difficult to deal with unethical practices when they surface in the workplace. The hardest part may be simply raising the issue with your co-workers and/or supervisor. In his book [*Technical Communication: A Reader-Centered Approach*](#), Paul Anderson reviews three ways that you can bring your company's practices to the surface. It is easiest to first start asking questions. Simply asking questions can be an effective way of bringing attention to your company's problems. Ask questions about who their decisions are affecting and why they are making those decisions. This will allow you to voice your thoughts without putting you on the spot for being the bad guy.

The second idea Anderson describes is to use facts or reason, instead of accusation. Before you raise questions about your company's unethical practices, make sure you use evidence instead of accusations. Often, accusations are made about situations when people do not truly know the reason those decisions were being made. If you base your concerns on evidence, your company will assume you looked into the situation and will take your thoughts more seriously.

The third helpful way to bring your company's unethical practices to the surface is to remain open to other's ideas. What this allows you to do is base a solution around many different sides instead of just your own. Since people usually have different ethical values, your own stance may not coincide with everyone else's. Make sure you identify possible values of others when considering possible solutions.

Ethics Decision Checklist

- What is the nature of the ethical dilemma?
- What are the specific aspects of this dilemma that make you uncomfortable?
- What are your competing obligations in this dilemma?
- What advice does a trusted supervisor or mentor offer?
- Does your company's code of conduct address this issue?
- Does your professional association's code of conduct address this issue?

- What are you unwilling to do? What are you willing to do?
- How will you explain or justify your decision?

4.10 Legal Issues and Communication

In business, image is everything. Public opinion of a company affects a consumer's views on that company's products. This, in turn, affects the company's public profit, and essentially its standing. When a company is involved in a lawsuit or a recall, the company has to consider the consequences that these issues will have on their business and needs to consider the costs of repairing the company's reputation. These are among the reasons certain documents are carefully reviewed before being sent to their intended readers. To write ethically, you must also identify another group of people: the individuals who will gain or lose because of your message. Collectively, these people are called *stakeholders* because they have a stake in what you are writing. Only by learning who these stakeholders are can you assure that you are treating them in accordance with your own ethical values. When crafting your communication, think about who will be affected by what you say and how you say it.

Under the law, most documents written by employees represent the position and commitments of the organization itself. There are always legal issues to consider when writing a professional document and they reflect in writing style. Professional documents can serve as evidence in disputes over contracts and in product liability lawsuits. Being caught in a lawsuit has many consequences for a company. The money spent on lawyers and the time spent in court takes away resources a company could use for

improving business and products. Lawsuits also have ramifications for a company's reputation. Product recalls can be another legal problem for companies.

There are a number of reasons why a company may face a lawsuit or a recall. One of the main reasons a company gets involved in a lawsuit is because the directions to the company's product were not clear to the consumer. For this reason, the general guideline is that instructions should be understandable, clear and concise at the fourth to sixth grade reading level. Also, when in a lawsuit, a company has to remember that all documents may be subpoenaed. This means that any document from memos and emails to proposals and studies can be subject to revision by a court of law. Another reason a company gets into a lawsuit may be over a recall. Many products are recalled for potential safety concerns, even if no one was actually hurt. To avoid safety recalls, companies need to make sure they consider every possible danger involved with a product. Some dangers may seem to be common knowledge, but companies should be aware of those and label the product accordingly, regardless of assumptions about common knowledge.

Legal Requirements: Protecting Consumers

Documentation should prepare readers to safely use the product. US law stipulates that a manual must list any hazards that may occur “from the intended or unintended but reasonably foreseeable use of its products.” (<https://www.google.com/url?q=http://www.productliabilityprevention.com/images/6-LegallyAdequateWarningLabelsAConundrumforEveryManufacturer.pdf&sa=D&ust=1553803200010000>) You have a legal duty to warn consumers when:

- The product supplied is dangerous
- The danger is or should be known by the manufacturer
- The danger is present when the product is used in the usual and expected manner
- The danger is not obvious or well known to the user

Failure to “adequately” warn consumers opens your company up to lawsuits. What exactly makes a warning “adequate”? Good question. Adequacy is almost impossible to define. It is much easier to define what is not adequate. Here are a few common ways that manuals or instructions fall short:

- Failure to warn users about how to properly use a product
- Failure to warn against risks from proper use of a product
- Failure to warn against any reasonably foreseeable misuses of a product

The key commonality is that everything listed could result in bodily harm or death.

Safety information must also be accessible to your readers. Therefore, warnings should stand out from the rest of the documents, possibly with icons, colored fonts, or bolding. They should also be easy to understand. A confusing warning is just as bad as not warning users at all.

Contract and Liability Laws

Contract Law is an agreement between two entities. It can be written or oral. There are usually two kinds: express warranty and implied warranty. An express warranty is a clearly written or oral statement that the product of what a product is capable of. An implied warranty can be reasonably inferred by the purchaser. How so? How the packaging is done and what is on the accompanying fliers or material can be part of this.

Liability Law helps companies and organizations act responsibly. Therefore, the company or organization is responsible for giving adequate instructions and warning users about the risks associated with the product. They can also be held liable if a consumer is injured or damages occur.

Liability and contract laws can vary by country. European regulations are decidedly strict, and Asian laws are starting to follow suit. If you plan on selling wares internationally, account for various regional requirements. Learn about [liability concerns](https://www.google.com/url?q=http://www.productliabilityprevention.com/images/6-LegallyAdequateWarningLabelsAConundrumforEveryManufacturer.pdf&sa=D&ust=1553803200010000) (<https://www.google.com/url?q=http://www.productliabilityprevention.com/images/6-LegallyAdequateWarningLabelsAConundrumforEveryManufacturer.pdf&sa=D&ust=1553803200010000>) and relevant [international product liabilities](https://corporate.findlaw.com/litigation-disputes/international-product-liability-laws.html) (<https://corporate.findlaw.com/litigation-disputes/international-product-liability-laws.html>) before you publish your manual. As always, consult a lawyer for specific information on how to construct warnings.

Attribution

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Chapter 5: Document Design

Katrina Peterson

Chapter Synopsis

This chapter briefly summarizes fundamental concepts to consider as you craft print and electronic texts. In this chapter you will read about basic principles of document design that allow writers to combine graphic elements with text to convey a message to audiences. Beginning with a discussion of standard conventions (of formatting, language, and style), the chapter then shares some basic guidelines for document design, moving forward to focus on integration of graphics, callouts and captions. Other topics include tables of contents, figures and tables, headings and the well-known CRAP test used by graphic designers. For additional resources, see the activities included at the chapter's end.

5.1 Introduction

A text's visual appeal matters to the reader, so it should also matter to the writer. Letters, reports, and blogs are more than just words on a page or screen. How ideas are arranged and delivered, whether electronically or on paper, can make reading seem intimidating, confusing, or downright unfriendly, even if the content itself is perfect. Conversely, a document's design can draw in readers and engage them with your ideas. Think of the text as a room

for your thoughts. Sometimes you want readers to get in and get out quickly, but often you want them to sit down and make themselves comfortable, put their feet up and stay a while. Regardless of your specific goal, it is important to make deliberate decisions about the design elements that affect audience experience.

As readers, we may seem a bit like TV viewers with remote controls. In a moment, attention may be diverted to another channel if something about the content distracts us. For this reason, a writer must consider carefully how to capture readers' attention and hold it. Good content is a key part of this, of course, but the visual presentation of the content matters too. Reading is a difficult, cognitively demanding task, so if your design helps make readers' journey through the text easier, you will hold their attention longer. Give your audience reasons to linger, and they will.

You already engage in document design practices. For instance, when formatting an academic essay, you center your title and separate the content into paragraphs, which signals to the reader that it is time for a breather, the content is shifting slightly, or you are introducing a new topic. You illustrate blogs, Web pages, and PowerPoint slides with photos and graphics, animations, or videos. Even small elements of your writing help guide readers: indentation, changes in type style (**bold**, *italics*, underline), or punctuation at the end of a sentence. Professional writers, especially those who work for well-funded web sites and mass-market print publications, are fortunate enough to have the services of artists, graphic designers, skilled photographers, and layout experts. But most of us just want to have a cooler-looking blog, a more professional-looking report, or an eBay listing that reinforces our credibility.

In many respects, document design is both a science

and an art. The layout of documents—their content, color scheme, alignment, etc.—is the result of individual choices. It takes a long time to master the finer points of design. As a starting point, this chapter will offer some strategies for making your documents intuitive and audience friendly: easy to scan, search, and read. The goal of this chapter is to familiarize you with a few basic ways of thinking that designers know well. Whether you are typing up a memo on safety policies at work, producing a newsletter for your community, or putting together a booklet describing a new app, the following elements of document design are meant for you.

5.2 Standard Conventions

Appropriate format, language, and style are the basic design elements of all technical documents. A format with a structure that leads readers thorough the text and shows the hierarchical relationships among ideas—from most important to least important—is crucial. Readers should be able to identify the organizational pattern very quickly when scanning a technical document. The document should be reader friendly, or reader-centered rather than writer-centered. Using appropriate language provides readers with a thorough understanding of the document's purpose, how it relates to the individual needs, and any actions readers will need to take. Although it is helpful to examine each element of a document individually, it is also wise to step back and consider the interrelation of elements, or how all components work together to communicate a message to a specific audience. In this sense, everything from language and style to a text's visual

aspects may either contribute to or detract from its overall design.

As discussed previously in the chapter on audience ([see Chapter 2](#)), a document may have one primary reader, several secondary readers, or a combination of both. A primary reader is the person who ordered the report to be written or the person for whom a report is intended. This reader will usually read the entire report. Secondary readers are those who will read only the sections of the report that relate to them, their jobs, their departments, responsibilities, etc. For example, in the case of a report that details funding for different departments, a superintendent may only want to read the section that relates to piping. This is where format, a table of contents, page numbers, the use of headings, etc. is significant in allowing easy access to information. It saves time when the piping superintendent can scan through the document and clearly find the heading that identifies his department.

Similar to formatting and language, there are also specific style conventions, or expectations, associated with different genres of writing. Academic papers, cover letters, résumés, business plans, and other documents tend to follow these conventions—some explicit (stated directly) and some implicit (unstated or indirectly stated). For example, Modern Language Association ([MLA](#)) and American Psychological Association ([APA](#)) styles dictate exactly what academic papers should look like. Associated Press ([AP](#)) style shapes the look of newspaper text, and Institute for Electrical and Electronics Engineers ([IEEE](#)) style governs engineering documents.

For every context in which you write, you will discover that field-specific style guides influence the appearance of a text, the way language is used, the preferred terminology and vocabulary, and the way sources

are cited. Business- and commerce-established firms like Panasonic, IKEA, eBay, Sears, and Trader Joe's have a style too. To preserve their brand identity, firms create recognizable, memorable logos and make sure their documents follow a certain agreed-upon style. Government and civic organizations also have logos and letterhead; even government and military documents are influenced by specific style conventions.

These style conventions matter. For each document design, you will need to know which set of conventions applies to it. For example, a cover letter should generally follow traditional business letter format. Memos and emails will look slightly different; we do not expect to see an address block for the letter recipient on an email because a street address is not needed to reply. Within your program of study and individual classes, the program or the professor will determine style, citation, and formatting conventions like MLA or APA. Style and formatting guides recommended by the World Wide Web Consortium (W3C) still help you when dealing with online publications. In the professional world, you will need to find out field-specific or company-specific style and citation conventions.

Many bemoan the lack of a consistent style on web pages; inconsistency sometimes detracts from readability, can negatively affect the document's/author's ethos, and may create confusion that reduces clarity. We may not know who wrote the text, where it comes from, or when it was produced. Readers may hesitate to assign real credibility to an undated, unsourced blog written by a stranger—and rightly so. This is why sites like Wikipedia demand sources and format all entries exactly the same. The look and feel of Wikipedia is now familiar to people around the world, and it is used as a source in some writing contexts, for good or for ill, precisely because its content

has predictable regularity and its easy-to-navigate entries are popular with readers. However, producing good publications involves much more than following style conventions. There are a variety of concepts to consider and many important choices to make when planning the best method of communicating your message.

5.3 Basic Guidelines

The first step in document design involves identifying the genre and its conventions (as discussed above), which may vary widely based on context, audience, and purpose. Here are some basic guidelines to keep in mind when dealing with business writing:

- **Add and vary graphics.** For non-specialist audiences, you may want to use more graphics—and simpler ones at that. Documents geared toward the non-specialist tend to have more decorative, technical, and detailed graphics.
- **Break up text or consolidate it into meaningful, usable chunks.** For non-specialist readers, you will likely construct shorter paragraphs of around six to eight lines. Technical documents written for specialists will include much longer paragraphs.
- **Use headings and lists.** Readers can be intimidated by dense paragraphs of writing. (Technical writers may refer to a long paragraph that is difficult to scan as “a wall of prose.”) Incorporate headings whenever possible—for

example, when a topic or subtopic is introduced. Also search your document for written lists that can be made into vertical lists. Look for paired listings such as terms and their definitions; these can become two-column lists.

- **Use special typography.** Typically, [sans-serif fonts](#), such as Ariel, are useful for online readers. [Serif fonts](#), such as Time New Roman, are useful for print texts.
- **Work with margins, line length, line spacing, type size, and type style.** For non-specialist readers, you can increase readability by making the lines shorter (adjusting the margins) and using larger type sizes.
- **Include bullet points.** Long lists can often be broken down into smaller bulleted chunks of information for ease of reading. Some genres, like the résumé, place the emphasis on bulleted phrases rather than complete sentences. When using bullet points, keep in mind the following:
 - Use a lead-in to introduce the list items and to indicate the meaning or purpose of the list (and punctuate it with a colon).
 - Check spacing, indentation, punctuation, and caps to ensure consistency.
 - Make list items parallel in phrasing.
 - Confirm that each item in the list is

parallel and grammatically correct.

- Avoid overusing lists; using too many lists destroys their effectiveness.
- Use similar types of lists consistently within the same document.

- **Strive for balance and parallelism among elements.** Keep in mind that items at the top of a document weigh more than those at the bottom, while items on the right side of the page weigh more than those on the left. Text and graphics should work together to create a sense of balance and unity.

In summary, while these basic guidelines may be applied to many different documents, the individual decisions you make will depend on your audience, or who will read your report. From content and language to layout, every aspect of your communication must keep your readers' needs in mind.

In the slide below, which of the principles above have been applied well? It utilizes both headings and subheadings to break materials into useable segments. It also includes bullet points, relying on fragments and phrases rather than full

sentences, which encourages a speaker to elaborate on major points rather than over-relying on reading from the slide. The simplicity of the triangular graphic and color scheme could be said to enhance rather than detract from the main message.

However, some might argue that the weight of the graphic on the right side throws off the visual's balance (since items on the right weigh more than those on the left). A simple adjustment to the graphic's size or placement would adjust the imbalance.

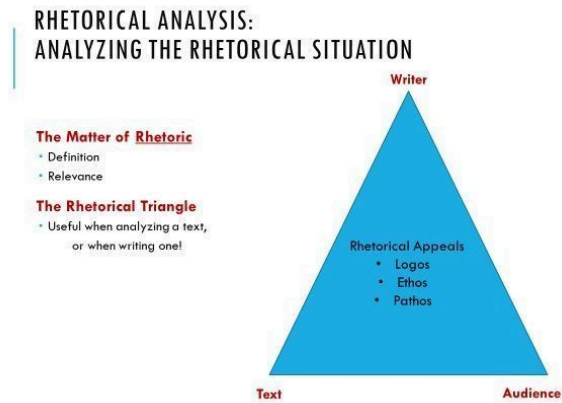


Figure 1: Simple PowerPoint slide with minor imbalance.

5.4 Creating and Integrating Graphics

Technical writers often integrate graphics or visuals to

complement text in a report. Graphics can take many forms—tables, charts, photographs, drawings, to name a few—but their purpose rarely varies: they should help to clarify information presented in the report. They should work together with the text to communicate, rather than replacing the text altogether. Graphics provide an additional benefit. They help to break up a text-heavy report, making the report more visually appealing.

As you begin thinking about possible visuals to include in your document, the first step is to consider which graphics are most appropriate for the message you want to convey. The table below provides some general guidelines on the graphics most suitable to convey specific types of information.

Information to Convey	Visual Type
Numbers, percentages, categories	Tables, charts
Processes	Flow charts
Geographic data	Maps
Chronological or prioritized lists	Numbered lists
Non-chronological lists	Bulleted lists

Preparing Readers for Graphics

When developing graphics, you will want to consider where they should be placed and what information should surround them. Make sure your visuals are appropriate to your audience, subject matter, and purpose. To prepare

readers for the information a graphic conveys, also consider these tips:

- Explain or introduce the information/topic of the graphic in the preceding paragraph.
- For easy reference, give each visual a name.
- Make sure the information within the graphic is clear and easy to understand.
- Whether above the visual or somewhere else in the document, provide source information, references, or citations (if the visual and/or data is not your original work and comes from a secondary source).
- Include a caption or follow-up text after the graphic, such as an interpretation or a final comment about the implications of the visual. If the graphic contains extensive data, you may need to tell your audience what information to focus on.
- Intersperse graphics and text on the same page. Avoid placing graphics on pages by themselves; ideally, no visual should take up more than one-third of a page unless absolutely necessary.
- Include identifying details within the graphics such as illustration labels, axis labels, keys, and so on.
- Leave at least one blank line above and below graphics.
- Place graphics near the text that they are illustrating. If a graphic does not fit on the same page, indicate that it appears on the next page.

- Cite all images that you take from elsewhere. While it is perfectly legal to borrow graphics—to trace, photocopy, scan, or extract subsets of data from them—you are obligated to accurately cite your sources for graphics. Also be aware that some graphics may require extra permissions from the creator based on the type of copyright.

Examples

The graphic below, provided by Wikimedia Commons, follows at least some of the design principles given above. What is done well, and what might be done better? You will notice, for example, that the graphic incorporates a space above and below, along with a descriptive caption. Would readers benefit from also seeing labels that identify key information, or would additional descriptions seem superfluous?



An image of the “fairytale castle” of Neuschwanstein, commissioned by Ludwig II.

Callouts and Captions

Callouts and captions contain information that help readers to interpret graphics; they identify specific elements or features. Whereas captions are short phrases or sentences that describe the graphic, callouts (or labels) are used when parts of the image need to be labeled or each part requires a longer explanation. Captions for graphics should be placed immediately under the graphic; they include the title and any explanatory material. Here are a few starting guidelines when creating captions: place words such as **Figure**, **Illustration**, and **Table** in bold type; italicize caption titles; and treat tables and figures just the same. Good captions guide readers not only to see, but also to understand.

Writing Style for Captions

The following paragraphs share five recommendations for style based on *The Franklin Covey Style Guide for Business and Technical Communication*. First, **use interpretive captions** whenever possible. Interpretive captions provide both a title and explanatory information, usually expressed in a complete sentence, to help readers understand the central point(s) that the writer wants to convey. A graphic and its caption should be clear and understandable without requiring readers to search for clarifying information in the text: “**Figure 23**—Check Valve. The risk of bad air entering the changer is near zero because the check valve permits air flow in one direction only.” This interpretive caption gives the title of the figure and emphasizes that the cabin has a constant temperature—a benefit provided by the feature described in the figure. The caption states clearly what the writer wants the reader to learn from the drawing.

Secondly, **avoid using short or ambiguous titles** to replace interpretive captions. In the past, styles for technical and scientific documents used only simple title captions for visuals. How would the effect of the Neuschwanstein visual change if the caption simply read “Castle”? Such a title makes the caption unnecessary, providing no real information other than the obvious to the reader. Titles that are so short and/or cryptic that they sound telegraphic are not useful.

Thirdly, **number figures and tables sequentially** throughout the document, and place the number before the caption. If an important figure or table is presented twice, treat it as two separate visuals and number each.

Fourthly, **use periods** following interpretive captions but omit punctuation following short captions that are not

complete sentences. Interpretive captions are usually complete sentences and should therefore end with a period. Short captions, like titles and headings, are not usually complete sentences, so they require no punctuation. Captions may appear below or above a visual, but consistency throughout a document is critical. Arguments support both options; choose one, know the rationale for your choice, and be consistent.

Lastly, **put the caption above the visual** for better visibility when captions are used with slides and other project visual aids. Captions placed at the bottom may be blocked by the heads of those seated in front or the limits of the projector/screen. Safety information must also be accessible to your readers. Warnings should stand out from the rest of the documents, possibly with icons, colored fonts, or bolding. They should also be easy to understand. A confusing safety label is just as bad as no warning at all.

To give a warning prominence, you may decide to list it at the beginning of the manual; be sure to also list hazards where the reader might encounter them in your instructions. In the case of technical instructions where action is required, list the safety label before the step to ensure that the reader sees the information in time to prevent mishap. As a preemptive strike against lawsuits, you may be tempted to list every possible hazard that comes to mind. Some companies do this to an extent that the warnings become ridiculous—i.e. “Do not use this rotary drill as a home dentistry kit” or “Do not use your hairdryer while sleeping.” Keep in mind that too many warnings—especially ridiculous ones—make the whole safety section seem silly. Then, no one takes the hazard seriously, not even the real ones. Remember: You only have to inform users when a hazard is “reasonably

foreseeable.” In other words, find the middle ground between not enough warnings and way too many.

Guidelines for Callouts

Here are a few additional guidelines for callouts:

- Determine the number of items to identify in the image.
- Create a consistent visual style.
- Use the same terms on the callout as in the text.
- Place callouts next to the elements in the graphic they identify, using a line to connect the two, if necessary.
- Use a standard font and size for readability.
- Align the labels and callouts for a neater appearance.

The following graphic adopts a consistent visual style in the way that it identifies the parts of a locomotive. Its terms are placed directly next to the graphic, connected by lines. Its title is placed above rather than below the visual for easy differentiation from the callouts.

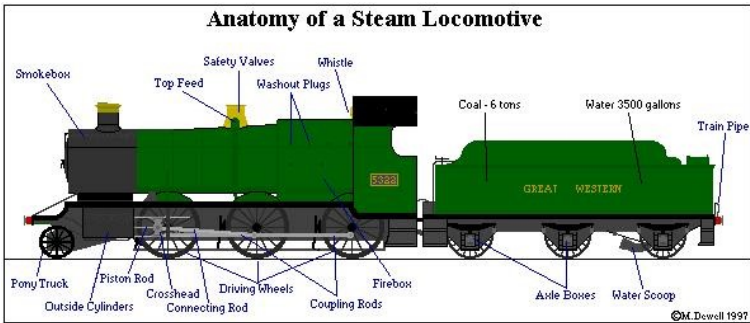


Figure 3: Locomotive graphic with a label and additional callouts.

Types and Placement of Callouts

Callouts typically take one of three different forms: 1) They may be placed directly on the graphic (whereby they become part of the visual), 2) They may be placed around the graphic near lines that point to the relevant element in the graphic, or 3) They may include links or hotspots where more information about the element is displayed on mouse rollover or on another page. The visuals below feature two of the three major label types.



Figure 4 (first type): Map that incorporates labels directly into the graphic, making them part of the visual.

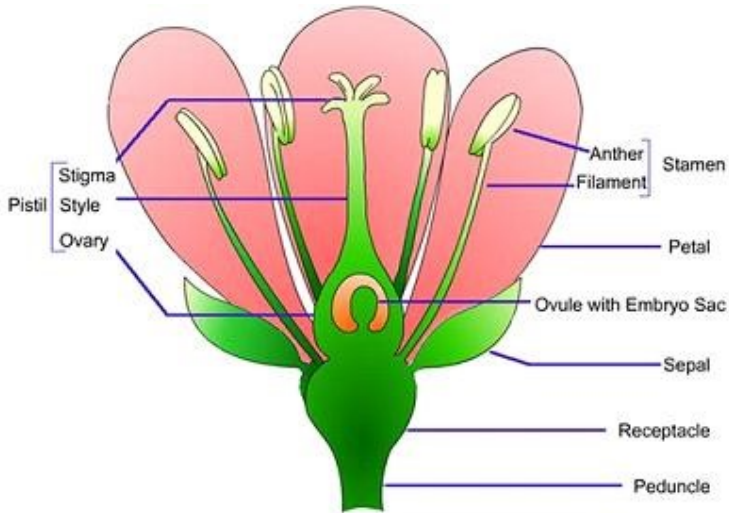
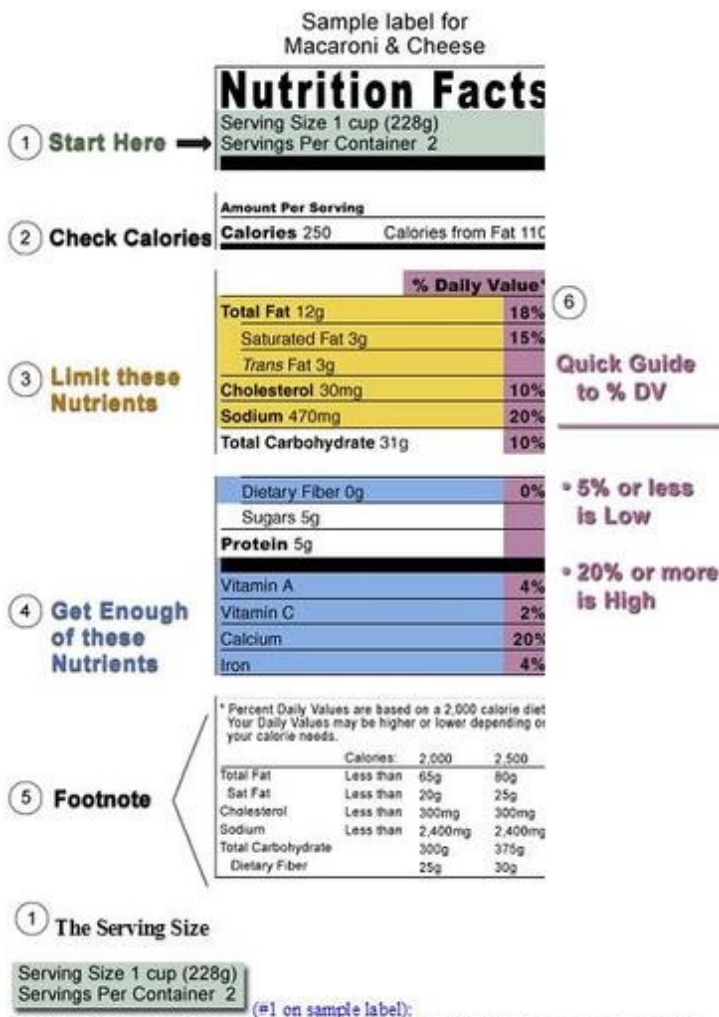


Figure 5 (second type): Illustration that places labels near lines, connected to the graphic.

When to Use Callouts

Callouts are best used when many parts of the image need to be labeled and each part requires a longer explanation. In fact, the label sequence may be in alphabetical or numerical order, as shown in the example below. Ensure that the explanation is near the graphic.



The first place to start when you look at the Nutrition Facts label is the serving size and the number of servings in the package. Serving sizes are standardized to make it easier to compare similar foods; they are provided in familiar units, such as cups or pieces, followed by the metric amount, e.g., the number of grams.

Figure 6: Example with numbered callouts.

5.5 Tables of Contents

Most people are familiar with tables of contents (TOC), but have you ever stopped to look at their design? The TOC shows readers what topics are covered in the report, how those topics are discussed (subtopics), and on which page numbers sections and subsections start. In creating a TOC, you will have to make design decisions having to do with levels of headings, indentation, spacing and capitalization. Such decisions keep the TOC from becoming long and unwieldy; it should provide an at-a-glance way of finding information in the report quickly.

In the illustration below, items in each of the three levels of headings are aligned. Main chapters or sections are written in all capital letters, first-level headings use initial capitals on each main word, and lower-level sections use initial capitals on the first word only. The first-level sections also have extra space above and below, which increases readability. Using the automatic TOC creator in your word processor can help you produce a clean, professional document. If you prefer to make your own, use dot leader tabs to line up the page numbers correctly. See the following example of a table of contents:

TABLE OF CONTENTS	
EXECUTIVE SUMMARY	ii
LIST OF FIGURES AND TABLES	iv
1.0 INTRODUCTION	1
2.0 TECHNICAL BACKGROUND	2
2.1 Functional Units of the House	2
2.2 Standard Home (SH)	
2.2.1 Modeling	
2.2.2 Materials	
2.3 Energy Efficient Home (EEH)	
2.3.1 Modeling	
2.3.2 Energy-efficient strategies	
2.4 Energy Consumption Determination	
2.4.1 Heating and cooling systems	
2.4.2 Electrical systems	
3.0 CONSUMPTION COMPARISONS	
3.1 Gas Consumption	
3.2 Electricity Consumption	
4.0 COST ANALYSIS	
4.1 Determination of Cost	
4.1.1 Construction	
4.1.2 Energy costs	
4.2 Accumulated Cost Analysis	
5.0 RANKING OF ENERGY-EFFICIENT STRATEGIES	
6.0 CONCLUSIONS	
REFERENCES	

Page-numbering style used in traditional report design: lowercase roman numerals for everything up to the body of the report; arabic numerals thereafter.

EXECUTIVE SUMMARY

This feasibility report analyzes a recent study conducted on a 2,450 ft² residential home (referred to as SH or Standard Home) built in Ann Arbor, Michigan. The goal of the study was to determine the effectiveness of employing energy-efficient building strategies to minimize energy consumption and costs in a residential home. The study was done on a 2,450 ft² residential home (referred to as SH or standard home) built in Ann Arbor, Michigan.

The home was modeled using Energy-10, a software package capable of calculating the energy consumed during the use of the home over a 50-year period. While keeping the basic functional units (such as floor plan, occupancy, type and number of appliances, and internal volume) of the home consistent, SH was then modeled to reduce the energy consumption by employing various energy-efficient strategies (referred to as EEH or energy efficient home).

The total life-cycle energy consumption of SH was found to be 15,455 GJ, which consisted of space and water heating and cooling, lighting, ventilation, and appliances. The total life-cycle energy consumption of EEH was reduced to 5653 GJ. The purchase price of SH was \$240,000 (actual market value) and was determined to be \$22,801 more for EEH. The cost analysis performed found that despite a 9.5% increase in the purchase price of an energy-efficient home, lower annual energy expenditures make the present value nearly equal to the more energy-consuming version. The accumulated life cycle costs are higher in EEH until year 48 and are \$1,054 (or 0.1%) less at year 50.

It was found that the most effective strategy for reducing overall annual energy costs is installation of a high-efficiency HVAC system. However, for reducing overall energy consumption, insulation was the most effective strategy followed by high-efficiency HVAC and air leakage control.

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Figure 7: Detailed Table of Contents with leader lines and indented subsections.

5.6 Figures and Tables

If your document has more than two figures and tables, create a separate list of figures. The list of figures has many of the same design considerations as the table of contents. Readers use it to quickly find the illustrations, diagrams, tables, and charts in your report. Complications arise when you have both tables and figures. Strictly speaking, figures are illustrations, drawings, photographs, graphs, and charts.

Tables are rows and columns of words and numbers; they are not considered figures.

For longer reports that contain dozens of figures and tables each, create separate lists of figures and tables. Put them together on the same page if they fit, as shown in the illustration below. You can combine the two lists under the heading *List of Figures and Tables* and identify the items as figure or table as is done in the illustration below.

LIST OF FIGURES	
Figure 1. Natural Gas Use by SH and EEH	7
Figure 2. Annual Electricity Use by SH and EEH	8

LIST OF TABLES	
Table 1. EEH and SH Systems	
Table 2. Energy-10 Simulation	
Table 3. Energy Efficient Strategies	
Table 4. Cost Comparisons for SH and EEH	

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1.0 INTRODUCTION

1.1 Purpose of the Report

This report analyzes the results of using various energy-efficient strategies to determine if such practices actually make a difference in the amount of energy consumed by an average house. Additionally, it analyzes which home system improvements provide the greatest reductions in energy and whether such improvements are cost-efficient in the long run.

1.2 Background of the Report

Annually, 24% of the natural gas and 35% of the electricity in the US is consumed by the residential housing sector. Consequently, 1.3 metric tons of greenhouse gases are emitted annually [6, 7]. Understanding energy consumption and taking measures to reduce it is essential if a systematic and comprehensive reduction of environmental impacts is desired. Reductions in home energy consumption will not only reduce utility costs but also reduce the impact on the environment.

1.3 Scope of the Report

This report provides technical background on the construction of the standard and the energy-efficient house, the energy-efficient strategies used in the latter, energy-consumption rates, construction costs, and other relevant details. Not included in this report are discussions of the receptiveness of the American home-building industry or American home buyers to energy-efficient housing design or of pending legislative to promote energy-efficient housing design.

Note: A basic understanding of terminology for housing constructing, HVAC, and cost analyses is assumed.

Topic overview: Always provide a brief idea of the contents of the report in the introduction.

Audience: Introductions must alert readers about the technical background they must possess to understand the report.

Figure 8: Visual illustration of separate lists of figures and tables placed on the same page.

5.7 Headings

In all but the shortest reports (two pages or less), use headings—titles and subtitles—to mark off the different topics covered. Headings are an important feature of professional technical writing: they alert readers to upcoming topics and subtopics, help them find their way around in long reports, and break up long stretches of straight text. They are also useful for keeping writers organized and focused on the topic. When some writers begin using headings, they are tempted to insert them after writing the rough draft. Instead, take time to visualize the headings before starting the rough draft, and plug them in as you write. Here are helpful tips for headers:

- **Make phrasing self-explanatory:** instead of *Background* or *Technical Information*, be more specific, like *Physics of Fiber Optics*.
- **Indicate the range of topics covered in the section:** if the section covers the design and operation of a pressurized water reactor, the heading *Pressurized Water Reactor Design* may seem incomplete and misleading.
- **Do not use stacked headings** (consecutive headings without intervening text).
- **Avoid pronouns referring to headings:** if you have a heading like *Torque*, do not begin the sentence following it with: “This is a physics principle.”
- **Omit articles from the beginning of headings:** *The Pressurized Water Reactor* can easily be changed to *Pressurized Water Reactor*.

- **Avoid *widowed* headings:** widowing occurs when a heading is placed at the bottom of one page and the text starts at the top of the next page. Keep at least two lines of body text with the heading or place all the information on a new page.

Manually formatting each heading using the guidelines presented above will lead unnecessarily repetitive work. The styles provided by Microsoft Word, OpenOffice Writer, and other software save you this work. You can simply select Heading 1, Heading 2, Heading 3, and so on.

5.8 The CRAP Test

Despite the unfortunate acronym, the major four principles of CRAP are familiar to any graphic designer and they should be familiar to writers as well. This guideline originated with the influential designer and writer Robin Williams; she now regrets the acronym, but not the ideas behind it.

1. C is for Contrast: Use difference to draw readers' eyes to and through your text or publication.

You can see evidence of the most basic aspects of contrast in any web page or magazine. The headline text is always different from the body text. It is often bigger and bolder; it can also be in a different typeface. Headlines make it easy to skip from one story to the next and get a cursory understanding of the news.

Applying strong contrasting elements to your text is important because the human eye is drawn to difference, not necessarily size. When everything looks the same, it is difficult to focus on anything. When things are different,

they are more noticeable. When a document has few or no contrasting elements, nothing stands out. The document is not easy to scan, and it does not invite the reader to jump in and read. It is also difficult for readers to glean information from the text easily and quickly.



Figure 9: What stands out here? Use contrast to make data-gathering easy for readers.



Figure 10: The contrast in this image quickly draws the eye to a central focus.

Some documents, like business letters or academic papers, have fewer contrasting elements, but even line spacing and paragraph breaks help indicate where a related chunk of information begins and ends. Contrast helps draw the reader's eyes to specific elements in your text, and it also helps the reader follow the flow of the information, while assessing which items are most important and require immediate attention. It creates readability. The following elements of a text can help you create a friendly, appealing sense of contrast:

Contrast in size: Your eye moves toward things because they are different, not because they are large or small. Your eye is impressed by novelty more than sheer size or color or any other visual characteristic. There are all sorts of scientific theories about why this is so, but in short, it is not so much that making something bigger makes it more noticeable. A person's height, for example, is not so

noticeable until the principle of contrast comes into effect. There is such a thing as too much size contrast: think of those web sites with huge type or an overly enthusiastic use of the CAPS LOCK key. Less is more, but some size contrast is essential to draw the reader's eye.

Contrast in font size/style/weight: A typeface is a collection of fonts. The distinction between the terms typeface and font stretches back to the days of typesetting: hand-placing individual letters made of wood or metal, inking them, and rolling paper over them. In the digital age, most people use the words typeface and font interchangeably, though the distinction still matters to experts like designers and typographers.

What is important to most people is that we all have a huge variety of typefaces, *or font families, to choose from*: Times New Roman, Arial, Bookman, Georgia, and Garamond are familiar to many of us. It is important to choose a font (a particular size, style, and weight within a typeface) that fits our purpose. Some, like script and handwriting typefaces, are too hard to read and thus inappropriate for body text, for example. Some typefaces work well as headlines: Franklin Gothic Condensed and Caslon are two typefaces often used for newspaper headlines. The “font” chosen (size, weight, style—italic, bold, etc.) will be the designer's choice.

It is also important to distinguish between serif and sans-serif fonts. Sans serif fonts, like Helvetica or Futura, are simple and smooth; the letters do not display the feet and ornamentation (serifs) that serif fonts do. Sans serif fonts are often used for headlines, but serif fonts are more likely to be used for body text. Many typographers think serif fonts (also called Roman fonts) make large blocks of body text easier to read. Some of the preference is really just about tradition.

Gill Sans
Helvetica
Futura

Figure 11: Three common sans serif typefaces/font families

Contrast in Direction (vertical, horizontal, circular, etc.) or position (top, bottom, side): Changing the direction or orientation of text, graphic elements like lines, banners, or screens.

THE "WITCH" SPOON

(Registered Trade-Mark.)

From the old Witch Town of Salem.

AN interesting man, yet one having its useful side as well, is the collecting of odd silver spoons. The idea is to get them from as many different localities as possible, but particularly from places having some special historical interest.

One of the presents received by Dr. Oliver Wendell Holmes on his eighty-first birthday was a gold-lined silver spoon,* the handle of which bears a witch of a broomstick, the word Salem, and the emblematic words you crossed.

It came from a lady as a token of Dr. Holmes's latest poem, the "Broomstick Train."—*Harvard Evening Transcript*

* This was an orange spoon, No. 1.

This pattern is made only in sterling silver and of heavy weight. The design on the handle is raised.

Orange Spoon, No. 1.	Coffee Spoon.	\$1.25
	Coffee Spoon, gold bowl.	1.50
	Tea Spoon.	2.00
	Tea Spoon, gold bowl.	2.50
	Orange Spoon, No. 1.	2.25
	Orange Spoon, No. 1, gold bowl.	2.50
	Dessert Spoons, Sugar Spoons, Almond Scoops, &c.	

We send them on receipt of price, prepaid to any address, subject to return if they prove in any way unsatisfactory or disappointing.

Established 1867. **DANIEL LOW, Silversmith,**
First Church Building. SALEM, MASS.

Figure 12: The spoon's angle adds visual appeal through contrast and avoids monotony.

Contrast in alignment (center, left, right, justified): A change in alignment can create visual interest. For example, headlines are often centered to make them noticeable. Images may be placed in a location on a page (or slide) to draw readers' attention in one direction or another. Consistent alignment with slight variations to provide interest is particularly important in PowerPoint presentations. You will be flipping from one slide to another, and if the text blocks and headlines are not aligned identically, your text and headlines will appear to jump around the screen in a distracting way.

Contrast in graphic elements like photos, banners/bands, pull quotes, or logos: Breaking up huge blocks of text with a variety of graphic elements can really add visual appeal and interest. As with the examples below, less is more. Think of all the publications and web sites you have seen whose designers thought it was awesome to make text

bold AND underlined AND multicolored AND flashing.
With a bright yellow background. And too many animated
GIFs. It repels readers rather than attracting them.

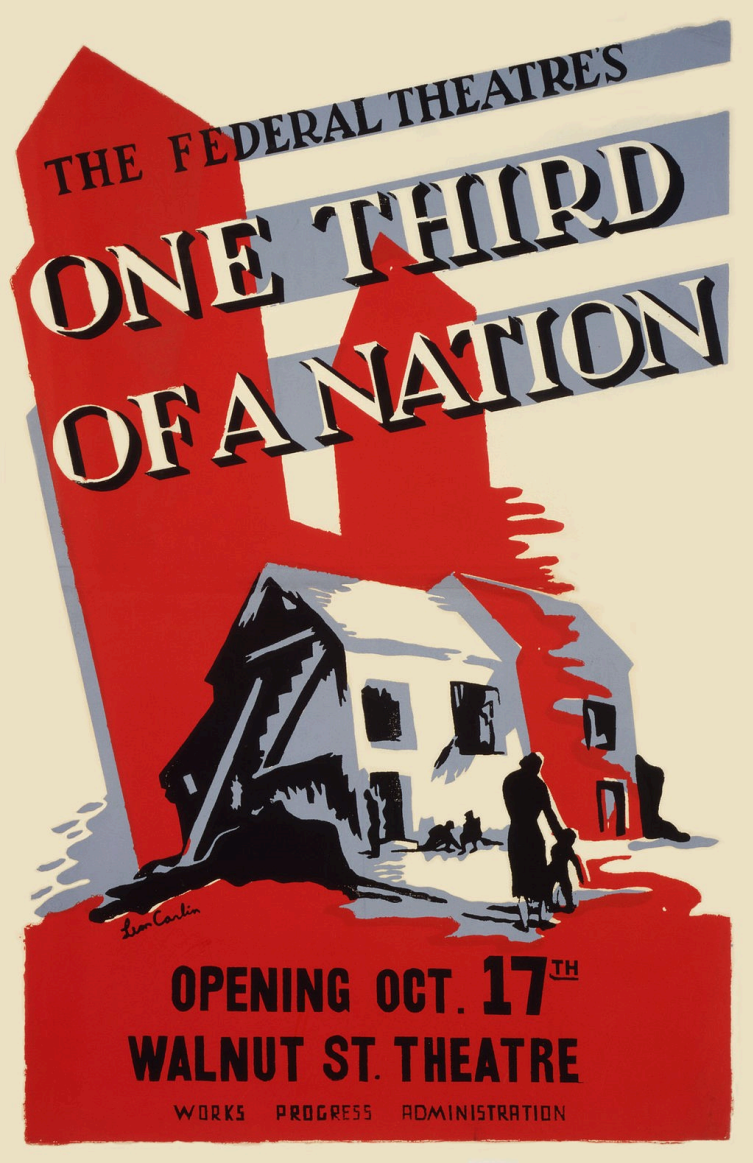


Figure 13: This poster uses contrasting alignment, contrast in text, and simple color contrast to create a dramatic effect. Less really can be more.

Contrast in color (of background, text, graphic elements, etc.): Use color to make certain elements stand out. Create a sense of drama when you contrast one color with another. Make sure you do not use too many colors and your color combinations are easy to read.

Contrast in negative or white space: Sometimes, the best way to attract a reader's attention to a contrast is by using negative space. Negative space, or white space, describes the space around text, images, and other elements in a document. The absence of content draws attention to the content itself. It makes documents of all kinds (digital and print) more readable, more restful-looking, more inviting to the reader, simpler, and more elegant. It is associated with that high-end restaurant or salon menu look.



Figure 14: Case in point. High-end.



Figure 15: Not so high-end visually, but probably still delicious.

2. R is for Repetition: Repeat design strategies throughout your document to provide a sense of connection. The basic rule of repetition means that in any text, visual or textual elements that have similar functions should be formatted similarly to create continuity and show close relationships between the elements. For example, newspapers have consistent ways of labeling different sections, like Sports, that does not change on a daily basis, but there is also design consistency throughout so that you can identify the newspaper. For example, in a

standard newspaper all the column widths utilize consistent spacing, which increases visual appeal through uniformity and repetition. USA Today in particular is notorious for its consistent repeated color-coding and design.



Figure 16: Blue-and-white USA Today color coding.

On a smaller scale, in a résumé most applicants use bullet-pointed sections to list their job duties. Repetition in this context means that all these bullet points should be formatted identically: the same font, size, line spacing, and indentation. Each group of bullet-pointed items should be the same distance from the text above and below. The bullet points themselves should be exactly the same shape and size. Repetition also applies to styles like MLA or APA. All titles are centered. All page numbers are in the upper right-hand corner, after your last name and a single

blank character space. The same typeface is used throughout the paper. All paragraphs have exactly one empty line space between them. And so on.

Repetition means that every line classified as a headline should look like a headline, and headlines formatted to look alike can be identified as having a similar function in the text. The same principle applies to body text. Fonts should not change without a reason. Lines, logos, and other graphic/visual elements should be formatted consistently. This repetition provides a sense of order and continuity that makes the document more readable and professional looking.

Since managing the formatting of multiple elements by hand can be difficult, many software programs provide templates—ready-made layouts into which you can plug your text and photos and thereby produce a variety of documents with a consistent look and feel. Microsoft Word, for example, also allows you to set Styles that will keep formatting choices like size, font, and style (bold, italic, etc.) the same for blocks of text with the same functions (body text, headlines, bullet points, subheadings). Templates for newsletters, résumés, and PowerPoint presentations ensure that basic design elements like font size/style, color, image size and alignment are consistent from page to page. Templates provide a quick, easy way to solve repetition issues. Look at the difference repetition makes in even the most basic of résumés, for example.

3. A is for Alignment: There should be a clear, deliberate arrangement of items on a page.

Alignment can refer to text, as in the left-aligned body text required in MLA style. But in document design, it

means much more; it refers to how the entire document is arranged. Most designers align all their content to some sort of a grid or pattern, creating a distinct, intentional arrangement of items on a page or screen. They use plenty of white space to cushion the items, which makes higher-contrast items pop.

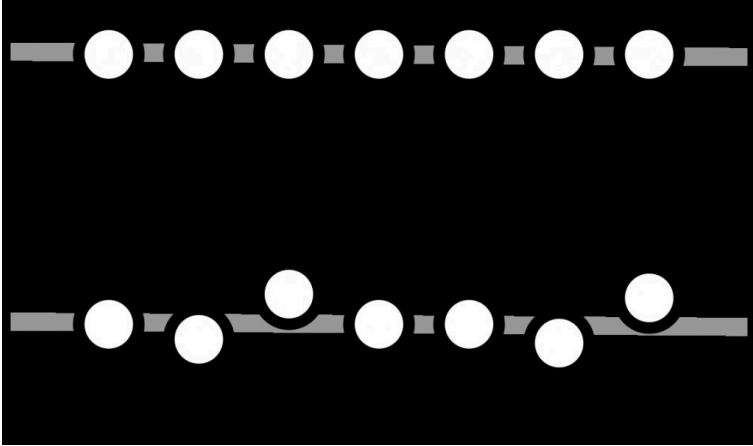


Figure 17: Simple visual illustration of the alignment principle.

In the following sample Table of Contents, not only are the numbers misaligned, but the TOC also lacks leader lines, which detracts from the document’s professionalism (possibly undermining the writer’s credibility with readers).

CONTENTS		
I	INTRODUCTION	5
1	A CHAPTER	6
1.1	A Section	6
1.2	Another Section	6
2	ANOTHER CHAPTER	8
2.1	Yet Another Section	8
II	CONCEPTUAL DESIGN	9

Figure 18: Table of Contents with misaligned numbers.

4. P is for Proximity: Items that have similar functions or purposes should be grouped together.

When we work with pictures and blocks of text, think of this: placing design or text elements next to each other in certain ways helps readers to see the relationship among elements. For example, photos and figures have captions that explain their contents. Nearby images often illustrate the content found in body text. Headlines are placed above body text whose content and focus they describe in briefer form.

Proximity can be especially critical in booklets, newsletters, and brochures, in which certain pages or panels might be grouped together under a subheading. Individual pages can be designed to reflect a larger relationship with the overall theme or subject matter. For example, the themes provided by blogging platforms like WordPress take care of this for you—every page will have a recognizable layout and though individual pages might be slightly different, they will be recognizably related to the

blog's main page. Web sites work the same way, as do book chapters.



Figure 19: Example of confusing proximity.

The principle of proximity even affects white space: equal amounts of white space and equal line spacing indicate that items are related or should be considered as parts of a whole.

The PowerPoint slide above is very confusing. Why are there three different groupings under one headline, and why is each column grouped under a different graphic? Note the two whales

listed in the far bottom right. They are actually types of dolphins, but their relatively distant position (proximity) from the others in their group makes it look as if they are not. There are no headlines or labels here to help us group these lists, and the design strategy is not doing readers any favors.

Planning and adjusting how items are grouped on a page helps you design your text, graphics, and images so that readers can see relationships: what goes together, what

is different, and what is similar. Relationships between items should be clear.

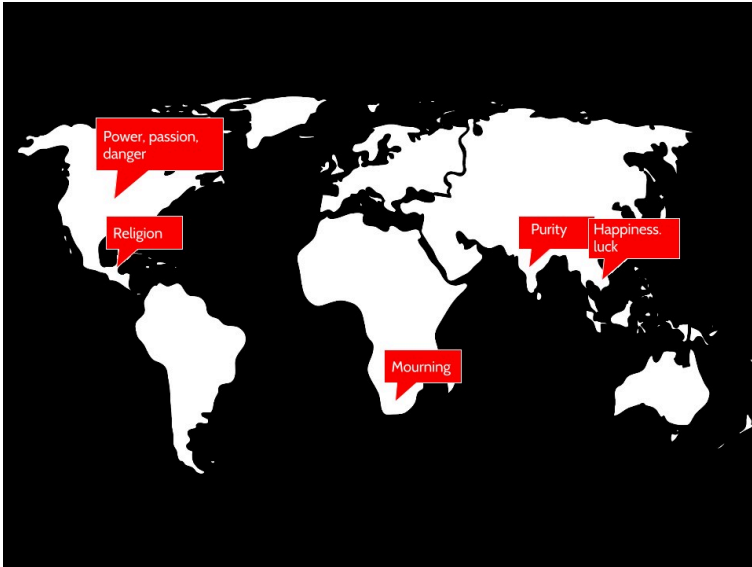


Figure 20: A color's message or emotional connotation can vary across cultures.

5.9 Cross-Cultural Audience Considerations

When creating graphics, it is very important to keep your audience in mind. This relates not just to the content you share, but also how that content appears on the page. Are you aware, for instance, that the same color has different meanings across various cultures? Take a look at the graphic below and notice how the color red means something very different across culture.

Similar differences exist across cultures with other colors, as well, so be aware that the choices you make in

colors for your graphics may communicate ideas you do not actually intend.

Technical writers need to be aware of cultural differences in behaviors, norms, beliefs, and values. According to Edward T. Hall and Mildred Reed Hall, in *Understanding Cultural Differences*, each culture operates according to its own rules (1990, pp. 3-4). Hall and Hall add that problems occur when members of one culture apply the rules to another culture (1990, pp. 3-4). To communicate effectively with other cultures, the technical writer needs to not only be aware of (explicit or stated) rules governing behaviors that can be observed, but also of the not-so-obvious (tacit or unstated) rules. The invisible rules of a culture dramatically impact the acceptance of ideas, plans, and strategies. The Cultural Iceberg below illustrates patterns of world communication, showing indicators of Institutional Culture (the obvious behavior of a culture), which can be clearly seen as the tip of the iceberg, and People Culture (the norms, beliefs and values of a culture), which cannot be seen and which may provide barriers to successful communication. (See Chapter 2 on audience for more information on how to revise with differing cultural expectations in mind.)

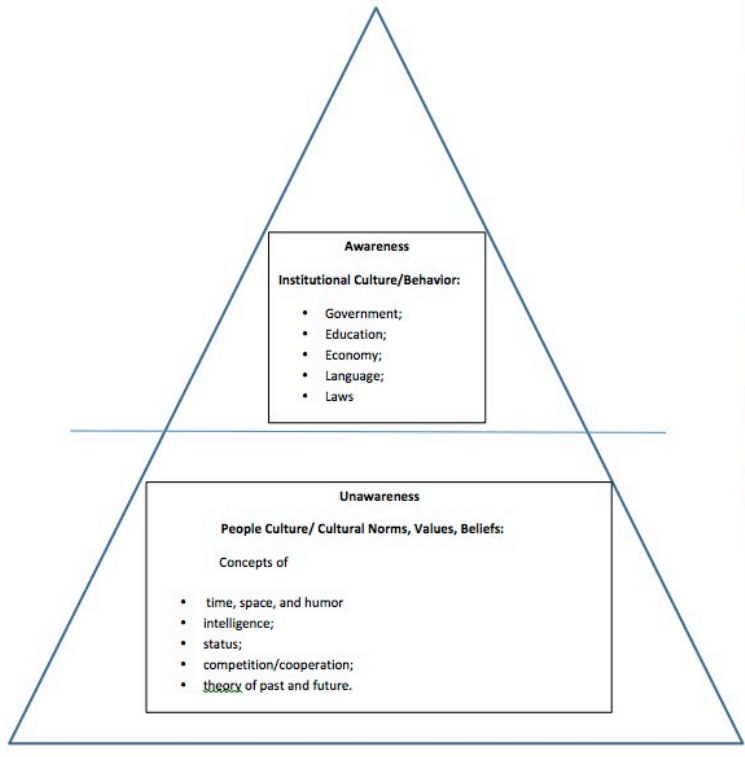


Figure 21: The Cultural Iceberg and patterns of world communication.

5.10 Additional Document Design Resources

Citing Images

- Purdue OWL: https://owl.purdue.edu/owl/research_and_citation/mla_style/

[mla formatting and style guide/
mla works cited other common sources.html](#)

- EasyBib: <http://www.easybib.com/mla-format/digital-image-citation>

MS Word

- <https://www.pcworld.com/article/2146761/word-s-secret-design-sizzle-learn-the-built-in-tools-for-better-looking-documents.html>
- PCWorld: <https://support.office.com/en-us/article/Create-a-document-3AA3C766-9733-4F60-9EFA-DE245467C13D>

Google Slides

- WikiHow: <https://www.wikihow.com/Create-a-Presentation-Using-Google-Slides>
- Using Google Slides: <https://docs.google.com/document/d/1Rxw4DRvWizdHh21CIOrE8sCdV92bQ2GetHFMAp0grC4/edit#>!
- Google Slides Tutorial: <https://www.bing.com/videos/search?q=using+google+slides&view=detail&mid=7FF39D545F709D5DC5FE7FF39D545F709D5DC5FE&FORM=VIRE>

PowerPoint

- Microsoft Office: <https://support.office.com/en-us/article/Create-and-save-a-PowerPoint-template-EE4429AD-2A74-4100-82F7-50F8169C8ACA>
- WikiHow: <https://www.wikihow.com/Create-a-PowerPoint-Presentation>

5.11 Suggested Activities

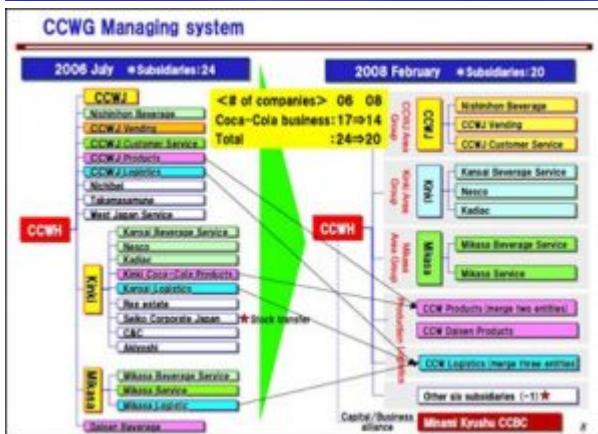
ACTIVITY 1: Go online or take a walk around your town. Find a publication (print or electronic) that conveys messages clearly. Critique it according to the principles in this chapter. Also find an example of a publication that does not achieve its goal. See if you can identify and describe which of principles are not being followed in the second example.

ACTIVITY 2: Check out the poorly designed PowerPoint slides below. Using the principles learned in this chapter, what elements need to be adjusted to increase effectiveness?



Type 2 Diabetes Mellitus

- In type 2 DM (previously called adult-onset or non-insulin-dependent), insulin secretion is inadequate
- The disease generally develops in adults and becomes more common with age.
- Plasma glucose levels reach higher levels after eating in older than in younger adults, especially after high carbohydrate loads, and take longer to return to normal, in part because of increased accumulation of visceral and abdominal fat and decreased muscle mass.
- Type 2 DM is becoming increasingly common in children as childhood obesity has become epidemic: 40 to 50% of new-onset DM in children is now type 2



ACTIVITY 3: Just looking at the front page makes me tired! Discuss texts that you have found intimidating or hard to read because of their layout or appearance. What exactly made the text difficult to read?

Attribution

Material in this chapter was adapted from the works listed below. The material was edited for tone, content, and localization.

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[*ENGL 145 Technical and Report Writing*](#), by the [Bay College Online Learning Department](#), licensed [CC-BY](#).



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II. Genres and Practice

Chapter 6: Emails, Memos, and Texting

Katrina Peterson

Chapter Synopsis

This chapter introduces the basics of email writing and etiquette, also providing information on memos and texting. It offers suggestions about when (and when not to!) use email in business communication. It details the basic conventions of structure: the header/address information, greeting, message body, and closing. It gives an overview of Netiquette, the expectations of online etiquette, which has application for other genres of online communication as well. The chapter concludes with a bulleted list of takeaways and tips, followed by additional teaching and learning resources.

6.1 Email Introduction

Electronic mail, or email, is among the most versatile genres of business writing. It is used to communicate issues ranging from serious to trivial, and its formality level varies greatly based on context and rhetorical situation. It may be used like text, or synchronous chat, and recipients often choose to access email messages on a cell phone. When composing an email, a sender must account for the time constraints readers may face due to high email volume. Recipients, on the other hand, should

plan to answer a business email within 24 hours, or the general time frame that they would respond to a text. Strong subject lines, clear formatting, and concise writing are all characteristics of a well-written email. Emails may also present ethical challenges as the forwarding and carbon copy functions enable communications to be shared with additional recipients.

Email, texting, and microblogs are all workplace tools that are used both internally and externally. Prior to email, genres of business writing were more clearly differentiated based on function: hard copy letters were sent outside the company, and memos were directed to those inside the company. This distinction still exists in some business contexts, but email has largely replaced hard copy letters in external and internal correspondence. Email can be very useful for messages that have more content than a text message, but conciseness remains one of its major features. A clear structure with a greeting, message body, and closing is also expected of this genre.

Many businesses use automated emails to acknowledge communications from the public, or to remind associates that periodic reports or payments are due. The form email is also common; in this case, a recipient chooses from a menu of sentences to make the wording suitable for a specific transaction. Email may be informal in personal contexts, but business communication requires attention to detail, awareness that an email reflects both you and your company, and a professional tone. Although email may have an informal feel, remember that it needs to convey professionalism and respect. Never write or send anything that you would not want to share publicly, or in front of your company president.

6.2 When (and When Not!) to Email

Email is a good way to communicate when:

- You need to contact a person who is difficult to reach via telephone, does not come to campus regularly, or is located in another part of the country or world (for instance, someone who lives in a different time zone).
- The information you want to share is not time-sensitive. Email is instantaneous, but it does not guarantee an instantaneous response. For many people, keeping up with their email correspondence is a part of their job, and they only do it during regular business hours. Unless readers have promised otherwise, assume that it may take a few days for them to respond.
- You need to send someone an electronic file, such as a document for a course, a spreadsheet full of data, or a rough draft of your paper.
- You need to distribute information quickly to many people (for example, a memo that needs to be sent to the entire office staff).
- You need a record of the communication. Saving important emails can be helpful if you need to recall what someone said in an earlier message, provide proof (for example, as receipt for a service or product), or review the content of an important meeting or deadline.
- You are unable to ask a direct question or make a request in person. In this case, frame your

question/request politely, being careful to avoid a demanding tone or the underlying assumption that your request will be granted.

Email is not an effective means of communication when:

- Your message is long (i.e. could not be read in 20 minutes or less), complicated, or requires additional face-to-face discussion. For example, if you want feedback from your supervisor, or if you are asking your professor a question that requires more than a yes/no answer, you should schedule a meeting instead.
- Information is highly confidential. Email is NEVER private! Keep in mind that your message could be forwarded to other people without your knowledge. A backup copy of your email is always stored on a server where it can be retrieved, even when you have deleted the message and think it is gone forever.
- The tone of the message could be misconstrued. If you would hesitate to say something to someone's face, do not write it in an email.
- The information itself is emotionally charged. For example, if you must communicate bad news to someone, it is better to deliver it in person.

6.3 Email Structure

Professional communication requires careful attention to the specific writing context. In addition to its language

and content, the structure of a email should also reflect a writer's understanding of audience and purpose; a well-crafted email helps to establish credibility with an audience by showing awareness of the genre's conventions, or its standard moves and expectations. The principles explained here apply to the educational context as well as business writing, so be sure to use them when communicating with your instructors and classroom peers. Four elements of structure should be considered when composing an email: the header/address information, greeting, message body, and closing.

Header/Address Information

As used here, *header/address information* refers to the subject line and the recipient lines: To, Cc, and Bcc. Make sure you include a clear, brief, and specific subject line. This helps recipients to quickly grasp the essence of a message. Email subject lines are like newspaper headlines. They should convey the main point of your email or the idea that you want readers to take away from it. They may also keep the email from being diverted to a junk mail folder, so be as specific as possible. One-word subjects such as *Hi*, *Question*, or *FYI* are not informative and may undercut the message's importance. Overly long or rambling subjects may result in a similar problem. Instead, consider using a subject line like *Economics Proposal Attached* or *Your English 110 Question*. If the message is time sensitive, it may be helpful to include a date: Meeting on Thurs, Dec 2. Also keep in mind: just as an email's subject line can communicate either professionalism or a lack of it, so also does your own email address. Consider two brief examples: jackjohnson@yahoo.com and bigdaddy2000@gmail.com. The former address is clearly

more professional, including the sender's name for easy recall. In contrast, the latter lacks professionalism, coming across as overly casual and informal.

The email's recipient lines should be given careful thought as well. In general, copying individuals on an email is a good way to deliver your message simultaneously to several people. In professional settings, copying someone else on an email can help get things done, especially if the person receiving the copy is in a supervisory role. For example, copying your boss on an email to a nonresponsive co-worker might prompt the co-worker to respond. Be aware, however, that when you send a message to more than one address using the Cc: (or carbon copy) field, both the original recipient and all the recipients of the carbon copy can see all the email addresses in the To: and Cc: fields. Each person receiving the message will be able to see the addresses of everyone else. Also, while carbon copying supervisors on an email may prompt immediate action from the original recipient, this option may raise important ethical and/or rhetorical considerations. If injudiciously used, it may have the appearance of manipulating recipient(s).

Blind carbon copying (Bcc-ing) emails to a group of people can be useful when you do not want everyone on the list to see each other's email addresses. The only address that will be visible to all recipients is the one in the To: field. If you prefer not to show any of the listed email addresses, you can put your own address in the To: field and use Bcc: for recipients' addresses.

Based on previous discussion, you may be wondering, "In what situations would the Cc: and Bcc: functions be helpful and appropriate to use?" As a student and a professional you will work collaboratively at some

point—for example, on a class project—and need to ask a question of a supervisor or professor, perhaps at the request of group members. You would of course have the option to email the inquiry directly, later sending the response you receive to your group. However, you might also choose to include classmates in the Cc: line of the original email: 1) to keep them in the loop and confirm that you have followed through on their request, 2) to provide the professor with the option of hitting Reply All in order to inform the group directly, and 3) to preclude the need for a separate email if/when the professor responds to the group as a whole. If you do include others in the Cc:, however, you will may want to draw attention to that fact in your email, so that the respondent does not overlook the carbon copied individuals due to high email volume.

The previous information gives a sense of just how useful carbon copying can be—it may offer a means of cutting out an extra step in the communication process, while keeping others informed. However, the Bcc: may be trickier to determine when to use, due to the blind aspect of its communication. As noted, it may be a good option if you wish to deliver information to additional recipients while obscuring their email addresses. Perhaps you did not obtain permission to share their email information with others, but you had offered to send them the information as well. In such an instance, the Bcc: will enable you to be respectful of their privacy, while avoiding sending a separate email.

In other instances, you may be called upon to make a more difficult decision, for example, when working with a challenging co-worker. Perhaps this co-worker has a history of unwise decision-making, like violating company policy or not following through on required procedures. If your supervisors are aware of the situation, they may ask

that you keep them updated on developments as a form of documentation. As part of your job, you might have to remind the individual of a company procedure that has not been followed. Your supervisor may want to know that the individual has been informed of the policy, and you may simultaneously wish to avoid fallout with a co-worker who could misunderstand the supervisors' request for information. Including your supervisors in the Bcc: would be one way to make them aware of the steps you have taken to address a situation or fulfill the duties of your job position.

When drafting a message with sensitive content, you might consider waiting to enter recipients' email addresses to ensure that the email is not sent until after you have edited the document; after all, send is only one click away. The same holds true for the Cc: and Bcc: lines, which raises another important consideration. The instantaneous aspect of email communication can be both blessing and curse. No writer wants to send an email inadvertently, and yet many senders make the mistake of emailing a quick reply when strong emotions have the upper hand. Especially when an individual is on the receiving end of an angry email, anger may seem like the appropriate response. However, such a step is unprofessional and may have serious ramifications. Avoid flame wars. When tempted to send an emotional response, always wait; instead, consider holding off until the message can be phrased in a more objective, professional manner.

Greeting

When first initiating contact by email, open with an appropriate greeting or salutation. Avoid simply starting

with the message body and be sure to include a polite signature. Proper greetings and closings demonstrate respect, also helping to avoid mix-ups in case a message is sent to the wrong recipient. For example, you might consider using a greeting like *Dear Ms. X* (formal, for someone external to the company) or *Hi Barry* (informal, for someone you know well). Unless someone has expressed an individual preference, never use the title Mrs. as you cannot assume a woman is married.

If the gender of a person is not evident, use the entire name, like this: Dear Sam Jones. If you do not know the person well, it may be confusing to identify an appropriate greeting (What do I call my TA/professor?) or closing (From? Sincerely?). When in doubt, address recipients more formally to avoid offending them. Some common ways to address readers are: Dear Professor Smith, Hello Ms. McMahon, or Hi Mary Jane. If a person's name is not available, or if the email addresses a diverse group, try something both generic and polite: To whom it may concern, Dear members of the selection committee, or Hello everyone.

Message Body

When writing an email, here are some tips to ensure that the message is clear and accessible. In general, avoid using all caps since it may have the appearance of yelling. Emojis, though helpful in informal communications like texting with friends, may also be perceived as unprofessional in business contexts. Use bolding, underlining, and italics as needed to increase clarity, but be careful not to overload readers with too much at once. Bullet points may be helpful for sharing listed information,

while included links may permit recipients to access information quickly. Double-check these links before sending, however, to ensure that they work.

State your purpose for writing directly at the email's beginning to provide a context for your message. Reference any included attachments up front as well, so that readers are aware of the additional content and its purpose; in your email state the name of the file, along with the type of document and program needed to open it, for example: "Please see the attached Word document of my essay, *The Many Facets of Richard III*." In the case of an included question, cut and paste any relevant text (for example, computer error messages, assignment prompts, segments of a previous message, etc.) into the email so that the reader has a frame of reference from which to answer. When replying to someone else's email, it may be helpful to either include or restate the sender's message. Conversely, if you are emailing back and forth with the same person, you might delete the previous messages to avoid clutter and make communication more direct.

Use paragraphs to separate thoughts (or consider writing separate emails if you have many unrelated points or questions), and state the desired outcome at the end of your message. When requesting a response, let the reader know what type of response you require (for example, an email reply, possible meeting times, a recommendation letter, etc.). If you request something that has a due date, be sure to place the due date in a prominent position in your email. Ending your email with the next step may be helpful in work settings (for example, you might write "I will follow this email up with a phone call this week" or "Let's discuss this further at the Wednesday meeting").

Closing

An email's closing is extremely important because it identifies the sender and provides contact information. Always include your full name at the end of your email. In an educational context, keep in mind that your professor may be teaching multiple students with the same name, or multiple sections of many students, so including your class/section number along with first and last name is a good idea. When closing, end with something brief but friendly: Thank you, Best wishes, See you tomorrow, or Regards. For a very formal message, such as a job application, use the kind of closing that you might see in a business letter: Sincerely, or Respectfully yours. If you do not know the reader well, you might also consider including your title and the organization you belong to, for example:

Mary Watkins
Senior Research Associate
or
Bain and Company
or
Joseph Smith
UNC-CH, Class of 2009

6.4 Netiquette

Netiquette refers to etiquette on the net, or protocols and norms for online communication. These general guidelines apply to most forms of electronic communication, including email. We may send or post messages, create personal pages, and interact via online technologies as a normal part of our careers, but how we conduct ourselves

will leave a lasting image. The photograph you posted on your Facebook page or Twitter feed may be seen by a potential employer, or a nasty remark in a post may come back to haunt you later. Since the days when the Internet was a new phenomenon, Virginia Shea and others have sought to establish ground rules like the following for online contexts:

- Remember the human on the other side.
- Make an effort to forgive mistakes.
- Avoid assumptions about your readers.
- Ask for clarification and delay judgment.
- Consider possible cultural differences.
- Check your tone before you publish.
- Think of the text as permanent.
- Be aware that jokes and sarcasm may be misunderstood.
- Establish ground rules when working collaboratively.
- Respect original ideas by quoting correctly and asking permission.
- Research your organization's Acceptable Use Policy.
- Respect people's privacy.
- Do not abuse your power.
- Keep flame wars under control.
- Know where you are in cyberspace.
- Respect others' time and bandwidth.

- Create a positive online image.
- Share expert knowledge.

Basically, you should adhere to the same polite standards of behavior online that you follow in real life. Such rules remind us that the golden rule (treat others as you would like to be treated) is relevant in any human interaction. Because basic social conventions for writing and responding to email are continually in flux, miscommunication can easily occur when people have different expectations about the communications that they send and receive.

6.5 Takeaways and Tips

- Electronic mail, or email, is among the most versatile genres of business writing.
- Email has largely replaced hard copy letters in external and internal correspondence.
- Context and the conventions of genre help to determine when/when not to use email.
- A clear structure (header/address information, greeting, body, and closing) is expected.
- Netiquette matters—remember the golden rule in all communications.
- Always proofread for tone, spelling, grammar, and content before hitting send.
- When possible, respond to an email within 24 hours, but account for possible delays in response from others.

- Be aware of the uses and ethics associated with Reply All and Carbon Copy functions.
- Avoid using all caps; use formatting like underlining and bolding to make reading easier.
- Test links before sending, to ensure they work properly.
- Follow up politely when necessary to ensure that the information was received.
- Always remember that electronic communications are not private.

6.6 Sample Emails for Discussion

To: Harriet Adamo, Physical Plant Manager, XYZ Corporation
From: Mel Vargas, Construction Site Manager, Maxim Construction Co.
Sent: Mon 10/25/09 8:14 AM
Subject: construction interruptions

Harriet,

I know employees of XYZ Corp. are looking forward to moving into the new ABC Street building in January, but recently groups of employees who do not have business here have been walking through the building. These visits create a safety hazard, interrupt the construction workers, and could put your occupancy date in jeopardy.

Would you please instruct your staff members who haven't already been moved to ABC Street to stay out of the building? If they need to meet here with someone who has already moved, they should conduct their business and leave promptly via the nearest staircase.

We need to avoid further interruptions so our construction workers can get the building ready for occupancy on schedule. If you have any questions, please call me.

Thanks,
Mel

Melvin R. Vargas
Construction Site Manager, Maxim Construction Co.
1234 Main Street, Big City, USA 98765-1111
(111) 123-4567, ext. 98

Welcome to The [our name] Store

Dear [customer's name]

Thank you for registering with The [our name] Store.

You can manage your personal information from the "My Account" section of the site when you sign in to The [our name] Store.

You can change your contact details and password, track recent orders, add alternate shipping addresses, and manage your preferences and customer profile all in this one convenient location.

Thank you for your interest in The [our name] Store.

We look forward to your next visit.

6.7 Sample Activities

Use what you have just learned to explain why Student 2's email to Professor Jones is more effective than the email written by Student 1. How does the tone of the messages differ? What makes Student 2's email look and sound more appropriate? What are the elements that contribute its clarity? If you were Professor Jones and you received both emails, how would you respond to each one?

Email from Student 1:

hey,

i need help on my paper can i come by your office tomorrow

thx

Email from Student 2:

Hi Dr. Jones

I am in your ENGL 101 class on Thursdays, and I have a question about the paper that is due next Tuesday. I'm not sure that I understand what is meant by the following sentence in the prompt: "Write a 10 page paper arguing for or against requiring ENGL 101 for all UNC freshmen and provide adequate support for your point of view." I am not sure what you would consider *adequate* support. Would using 3 sources be o.k.? Can I come by your office tomorrow at 2:00 pm to talk to you about my questions? Please let me know if that fits your schedule. If not, I could also come by on Friday after 1:00.

Thank you,

Tim Smith

Here are two versions of an email from a supervisor, Jane Doe, to a group of her employees. Which version do

you think is most effective? Why?

Version 1 of Jane Doe's Email:

Subject: tomorrow

As you know, tomorrow afternoon we'll be meeting to discuss the status of all of our current projects. Donuts will be provided. Be sure to arrive on time and bring along the materials you have been working on this week—bring enough copies for everyone. Some of these material might include your calendars, reports, and any important emails you have sent. Also, I wanted to remind you that your parking permit requests are due later this week; you should turn those in to Ms. Jones, and if she is not at her desk when you stop by, you can email them to her.

Version 2 of Jane Doe's Email:

Subject: Materials for Wed. Staff Meeting

Hi, everyone—

For tomorrow's 3 p.m. staff meeting in the conference room, please bring 15 copies of the following materials:

- Your project calendar

- A one-page report describing your progress so far
 - A list of goals for the next month
 - Copies of any progress report messages you have sent to clients this past month
- Jane

6.8 Sample Slides

1. Freewrite (5-7 minutes)*

**Hang on to this information—we'll be using it later!*

A. In the past, what types of situations and/or challenges have you encountered when writing an email? (Focus on 1-2 scenarios that you would be comfortable sharing with the class. Consider situations in daily life, the classroom, jobs, or business dealings.)

B. What sort of emailing challenges/situations/scenarios do you anticipate encountering in future?

C. In this situation/these situations, what would you like to know, or to be able to do well?

2. Email As Genre

- A note about our course goals . . .
 - Know the range of available genres (styles or type of writing).
 - Choose whichever works best, based on context.
 - Be familiar with basic conventions for each.
- Three of these genres: email, letter, memo.
- Why we start with the email:
 - It's extremely versatile (formality level and length vary; used for many different purposes).
 - It's useful for us as both students and professionals (now and later).

3. Genres Side-by-Side

- Letters-used to be written for those *outside* the organization.
- Memos-typically written for those *inside the organization*.
- Emails-very versatile genre (ranges from informal to formal).

4. Professional Emails: Structure

I. Segments (3 parts)

A. Greeting/Intro.

1. Dear (optional)
2. Honorific & Name
3. Punctuation (: v. .)

B. Body

C. Conclusion

1. Thank you,
2. Sincerely,
3. Best regards,
4. Versions of "Best,"
(Best, My best, All the best,)

D. Signature/Signature Block

5. What about ongoing emails?

- Depending on the situation, it may be acceptable to omit a greeting (back-and-forth emails).
- Respond within a reasonable time frame (similar to returning a phone call).
- Streamline the email, by deleting the older messages.
- What information *should not* be included in emails?

Create a Scenario

- Groups of 3: Go back to your earlier freewrite.
 - In your groups, have each person briefly explain one of the challenging email scenarios that they've encountered (both the general situation and why it was challenging).
 - As a group, choose one of the scenarios that was shared.
 - Brainstorm what information you would need to include/exclude in an email for the scenario.
 - Start drafting the email (be prepared to share it with the class!).

6.9 Memo Introduction

A memo—or memorandum, meaning *reminder*—is used for communicating policies, procedures, or related official business. It is less versatile than the typical email in audience and formality level; its recipients usually consist of individuals *within* rather than outside of an organization, and it rarely adopts an informal tone. It tends to be written from a one-to-all perspective (like mass communication), broadcasting a message to multiple recipients, rather than a single individual. A memo must be concise, well organized (following the guidelines given in the next section), and addressed to specific audiences with standard subject lines.

Memos are a place for just the facts, and should have an objective tone without personal bias, preference, or

interest on display. The successful operation of a company may depend on memos—possibly even memos that are sent via email—for communication between the employees of the company. Types of memos include: inquiries, recommendations, problem-solution, etc. The memo's message is direct and follows a preset format for easy access to information. While it may contain a request for feedback, the memo is linear, from the organization to the employees, or from one employee to another. It may be used to update a team on activities for a given project, or to inform a specific group within a company of an event, action, or observance. The memo as a genre may have legal standing, as it often reflects policies or procedures; it may reference an existing or new policy in the employee manual, for example.

All organizations have both informal and formal communication networks. One effective way to address informal, unofficial speculation involves sending a memo that clearly states what the status of a specific issue. If budget cuts are a concern, then it may be wise to send a memo explaining imminent changes. A memo's primary purpose is informational in nature, but it occasionally includes an element of persuasion or a call to action. This call to action does not often require personal spending, but it does represent the organization's interests. Memos may also include statements that align business and employee interest, thereby underscoring common ground and benefit. For example, on February 13, 2009, upper management at the Panasonic Corporation issued a declaration that all employees should buy at least \$1,600 worth of Panasonic products. The company president noted that if everyone supported the company with purchases, it would benefit all.

Memo Format

A memo includes a header or heading block, an introduction, a body, and a conclusion. The header identifies the recipient (To:), the sender (From:), the date (Date:), and the subject of the message (Re: or Subject:). Similarly to the email, the memo's subject is declared in the subject line and should be clear and concise (Oregon 20). If the memo announces the observance of a holiday, for example, the holiday should be named in the subject line—for example, use *Thanksgiving Weekend Schedule* rather than *Holiday Observance*. Again, as with the email, pay particular attention to the title of the individual(s) in this section to ensure accuracy and communicate respect.

The order of the parts of the memo heading block and location of specific part of the block varies, according to different companies' expectations. However, the message body itself has three parts, as noted. The introduction references background information and informs the purpose of the message. The body, consisting of one simple paragraph or multiple paragraphs, communicates the message. The conclusion expresses the action expected of the recipient. The conclusion could consist of one paragraph or several, or it could be simple sentence that asks for the recipient to contact the sender if there are questions.

Sample Memo

The following memo illustrates the format explained above.

Memorandum

To: Bella Jones, Shift supervisor, residential landscaping crew
From: Amber Garcia, owner, Landscaping Pros AG
Date: May 1, 2015
Re: New procedures for dispensing of yard waste

As you may have heard, the city of Redmond has recently added a new facility for collecting community yard waste. This will require only minor changes to our current practices for dispensing of yard waste collected by our residential landscapers.

Effective October 1, all yard waste will be taken to the new facility on County Road 35. Please be sure to let your crew members know of this change.

If you have any questions, don't hesitate to contact me.

6.10 Business Texting

Whatever digital device you use, written communication in the form of brief messages, or texts, is becoming a common way to connect in the business world. It is useful for short exchanges, 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. It can be a great tool for connecting while on the go, but consider your company, and choose words, terms, or abbreviations that will deliver your message clearly. Here are some useful tips for texting within a business context:

- Know your recipient: “? % dsct” may be a clear way to ask a close associate what discount to offer 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 and codes to represent thoughts, ideas, and emotions. Given the complexity of communication, and the useful but limited tool of texting, keep in mind its limitations. Also be wary of using text speak like *lol* and *fyi* that might be considered overly informal.
 - Be aware that contacting someone too frequently can border on harassment. Texting is a tool. Use it when appropriate.
 - Unplug yourself occasionally. Do you feel lost or out of it if you do not have your cell phone and cannot connect to people, even for fifteen minutes? Sometimes being unavailable for a time can be healthy—everything in moderation, including texting.
 - Never text and drive. Research shows that the likelihood of an accident increases dramatically if the driver is texting behind the wheel. Being in an accident while conducting company business would not only endanger your own health; it would reflect poorly on your employer and on your own judgment.
-

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Chapter 7: Applying to Jobs

Katrina Peterson

Chapter Synopsis

Looking for and landing the perfect job may seem like a daunting task. If you are uncertain where to start, know that most successful job applicants feel the same uncertainty at some point. This chapter will walk you through the process of applying for jobs from start to finish. Perhaps most importantly, it will provide you with two distinct tools that can help you to construct the materials for a strong, effective, and successful job application: 1) the résumé and 2) the job application letter. Résumés and application letters are among the most important documents in the employment process. Beginning with an overview of the big-picture process, this chapter moves forward with suggested methods for finding job ads and constructing the genre documents for a job packet. In the résumé section, it discusses the following topics: *Purposes and Goals*, *Types of Résumés*, *Sample Résumés*, *Drafting and Design: Where to Start*, *What to Include/Exclude*, *Optional Sections*, and *Drafting Activities and Resources*. The next section on application letters will share information about deciphering the job description, as well as letter format, structure, and content. The chapter concludes with information on interviews, followed by specific guidelines for the job packet.

7.1 Introduction

Job seeking is a process that involves multiple steps in order to obtain the desired position. Besides the résumé and the job letter, job descriptions, interview questions, writing samples, hiring materials, and the thank-you note sent post-interview are other materials you might find yourself reading and writing as your hiring process moves forward. If the big-picture job seeking process were visualized through a flow chart, it might look something like the following:

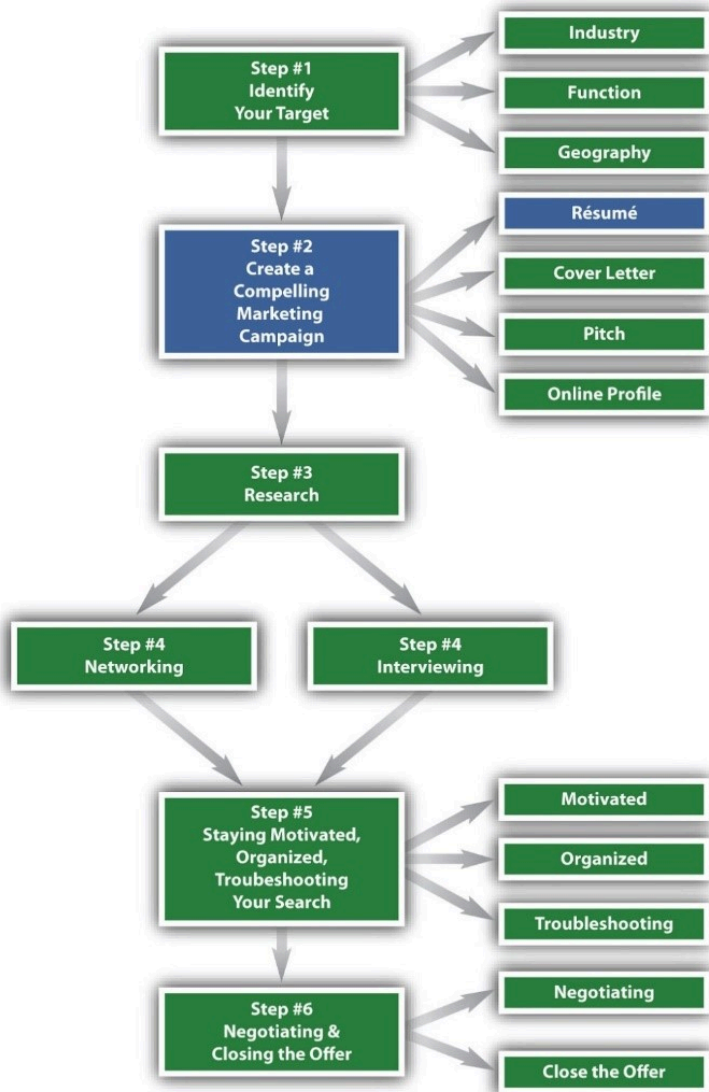


Figure 1: Flow chart that illustrates the job-seeking process.

Most job candidates begin with research to gain a clear picture of their target (see Step #1 above), or ideal job,

along with the company where they would like to be employed. From there, they may think in terms of creating a compelling marketing campaign (Step #2) through a unified job packet. Research (Step #3), of course, will occur throughout this process, all the way up until the interview (Step #4) and through the final stages of negotiating and closing the offer (Step #5). While this graphic helps to visualize both the big picture and some of the individual steps involved, it is only one of many variations of the job application process. This chapter will provide a framework for you to construct your own process (citation clarification: paragraph based on Bay's above graphic and terminology, though written by me). As you research and pursue job choices, keep in mind that the job search process requires a high degree of self-awareness—not only of strengths, but also of weaknesses. In general, most people find it easier to identify and discuss their strengths. However, knowing your weaknesses is just as important to your job search as knowing your strengths. Here are a few reasons to be able to speak fluidly and confidently about weaknesses:

- Employers want to hire individuals who are self-aware, which requires an awareness of both strengths and weaknesses. Being self-aware is the only way to improve.
- During an interview, a prospective employer may ask about strengths and weaknesses. Employers know it takes a certain level of maturity to talk about your weaknesses. They want to ensure you have achieved that level of maturity before extending an offer.

Remember that everyone has strengths and everyone has weaknesses, including every CEO, every president, every manager, and every one of your coworkers. You will be in good company when considering and discussing your weaknesses. The trick, if there is a trick, to your weaknesses lies in your plan to strengthen them. Having a plan to strengthen a weakness is impressive, especially if you have already taken steps to do so.

7.2 Finding Job Openings

Investing the preparation time to write your employment materials, including researching available positions, can save you many headaches in the job process. Finding a suitable opening itself can be time-consuming; if you are serious about finding employment, you have to dedicate the time and energy to make your materials competitive. Here are some resources to get you started:

- **Job boards:** Browse sites like [Indeed](#), [CareerBuilder](#), [Glassdoor](#) and [Monster](#) to search for jobs in your field.
- **Specialty job lists:** Look for lists of jobs in specific industries such as food service ([Poached](#)), nonprofits ([Idealist](#)), or media ([MediaBistro](#)).
- **Company, organization and government web sites:** Visit the employment section on websites of companies you admire; search federal, state, county, and city websites for government job postings.

- **Your own network:** Talk to friends, past employers, and professors or visit [LinkedIn](#) to search for openings at companies in your network. If you are a member of any social media groups that are career-oriented, check for mention of available jobs there.
- **Your college:** Visit your college or university placement office/career center and attend job fairs hosted at your college.
- **Craigslist:** 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. Scams have also been reported on Craigslist job boards, so verify the legitimacy of any posting before providing personal details.

Once you have found a job, be 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. Companies often delete the job posting once they have received sufficient applicants, so it is important that you save your own copy of the document, along with the date and location you found it (this information is often referenced in the job letter); you might also copy and paste the text into a new document, or bookmark the webpage.

7.3 Constructing Modular Materials

It probably sounds like a lot of work to create a new set of employment materials for every job opening you

will identify. While it is true that it takes time and effort to customize application materials for each new job application, you do not have to create a new résumé and cover letter for every job opening. Instead, you can create modular materials with moving parts that can be adapted and reorganized for each job.

For example, if you are a nursing student wanting to work in a different (or indirectly related) field during school, you might consider applying to be an administrative assistant, a medical translator, or a biology tutor. Several different résumé formats are available to you. However, you may choose the functional (skills) résumé format to place more emphasis on a specific set of current qualifications and slightly less emphasis on your education or work experience; you might create three different templates of your résumé that emphasize and expand upon different skill categories: administrative, communication, and educational.

The same holds true with the application letter. Once you have a letter draft, you can work with it as a template for numerous other jobs, keeping the overall format but revising some key sentences. It is quite likely that the final paragraph of your cover letters will change very little if you are applying to multiple jobs within the same career field or industry. The central paragraphs, on the other hand, may undergo substantial revision, depending on how different one potential job is from another. Just make sure to change the name of the potential employer and company for each application; addressing a potential employer by the wrong name is the surest way to remove your materials from consideration.

7.4 Crafting Résumés

The purpose of a résumé is twofold: first, to serve as an overview or quick summary of your skills, experience, and education as they relate to your career objective; secondly, to function as a marketing tool that conveys your personal brand. All of us want our résumés to stand out from the stack. The best way to create an eye-catching résumé is not through gimmicks or flash, but rather through substance and customization. As a marketing document that sells your candidacy, your résumé should have a format that is pleasing to read, efficient in its use of the English language, and very concise. Once you have several years of experience, it is acceptable to have a two-page résumé; the average résumé is now two pages in length, although résumés may range from one to three pages. You should aim for a full page as you are building experience and generating content.

Regardless of your starting point—whether you are unsure you can fill a two-page résumé, or whether you think it will be difficult to fill a single page—this chapter will help you accomplish your goal: designing an exceptional résumé. Remember, as the most critical component of a marketing campaign in which you advertise your professional self, your résumé must be clear, concise, and error free. Most seasoned recruiters scan a résumé in about seven to twenty seconds; because they have many documents to review, they look for reasons to reduce the number of résumés that demand a second look. This means that a single error can be all that is needed to discard your résumé and your candidacy. However, recruiters also have an eye for key details, so they will

quickly recognize a well-constructed résumé and discard one that is poorly designed.

While writing your résumé, it is important that you keep in mind not only its purpose, but also its general goals, which include the following:

- **To make an exceptional first impression.** Your résumé will likely be the first impression a potential employer has of you and your qualifications, so it must hold attention long enough to propel your job search forward.
- **To quantify strengths, responsibilities, abilities, and accomplishments.** Mentioning factual, numerical examples of praiseworthy attributes and skills will allow you to boast without sounding boastful
 - For example, if you reduced errors by 35% and increased profits by 55%.
 - If you have been a student teacher with 35 students and student grades improved by 25%.
 - If you are part of a marketing team that has increased new patient accounts by 10% last
 - If you worked in the school library and the number of lost books has declined by 50%.
- **To argue, in an articulate and polite way, that you are well suited for the job.** Based on the content of the job ad, you will want to address

how your education and/or work experiences (including internships and volunteer work) have taught you both technical and “soft” skills that will help you perform the listed job duties.

- **To represent you when you are not there.** Your résumé can be uploaded to online global job boards like Monster and CareerBuilder. It can be sent to a company’s online database with a push of a button, where it will be shared with dozens of recruiters and hiring managers.
- **To obtain an interview and create talking points.** Listing your accomplishments and quantifying them can create talking points for future interviews. For example, perhaps you bullet point the following: Responsible for intake and outtake of approximately 1,000 books daily, resulting in 80% fewer lost books this year. During an interview, with this example in mind, you can easily talk about using technology to improve processes. You can discuss the team environment of the library staff and how you worked toward decreasing the number of lost books.
- **To show your command of the written word.** You do not have to be an English major to make sure that your résumé is well-written. Your professors, teachers, peers, and family members may be willing to help by answering questions based on their expertise, or even reviewing a résumé draft.

Overall, highlighting specific results in each résumé category will increase your chances of getting your résumé

noticed. Unlike financial investments, past performance is an indicator of future success: include details about your past performance and quantify your accomplishments whenever possible, and future employers will be inclined to believe you can do the same for them. What exactly do you do, or what have you done in the past? Your résumé should answer this question very quickly. The more you quantify your accomplishments using specific details, the more your abilities will be understood.

For example, stating that you “worked in sales” on your résumé does not provide specific proof of your skills—and therefore is not likely to be as impressive—as a statement that quantifies your experiences and provides unique details. Stronger examples of résumé statements might include: “completed an average of 65 customer transactions per hour, setting a company record for the 2019 fiscal year” or “managed national and international supplier accounts with purchase ranges from \$1,000 to \$10,000,000 USD.”

Types of Résumés

Just as work histories come in a variety of forms, so also do résumés. Although career experts debate which style is the best, you must decide which fits your current situation. There are many reasons to choose one format over another. The *chronological résumé* is the most common résumé format. It is best for candidates with a long/uninterrupted work history, in fields where the company worked for is of paramount importance. It is also well suited for those applicants who want to highlight their education, as many jobs will ask for a degree (e.g. BA, JD, MBA, MA, MD, PhD, etc.) in a certain field as a minimum requirement. In contrast, the *functional (or skills) résumé* serves candidates

who are transitioning between fields, who are shifting from a military to a civilian career, or who have gained skills in a variety of different settings (workplace, academic, volunteer). The following information offers an overview of these two best-known formats. Visual examples are given in the section afterwards, followed by suggestions on where to begin a résumé draft or how to develop your current draft further.

1. The **chronological résumé** is a traditional format whose principal section is the *Employment Experience* section. In this section, jobs are listed in reverse chronological order (starting with the most recent positions/schools and working backward), and achievements/skills are detailed underneath each position. The chronological résumé presents experience under headings by job title, company, location, and dates of employment. *Education* is another common category that, like all sections on a résumé, is also in reverse chronological order. While the chronological résumé dedicates the majority of its space to providing relevant details from previous work experience, the education section is often placed above the work section.
2. In contrast, the **functional (skills) résumé**, centers around well-developed *Skills & Achievements* section, in which skills are organized into categories. The functional résumé still includes an *Employment Experience* section and likely an *Education* section, but these sections are streamlined to include only the basic information about each position held or

each school attended. The functional résumé focuses on skills and experience, rather than on chronological work history. It describes responsibilities, accomplishments, and quantifiable achievements under categories in the skills section. The functional résumé typically opens with a brief summary/profile detailing strengths (one to three sentences) and demonstrates how you match the requirements of your potential job by including relevant achievements and accomplishments.

It is worth noting that, especially in the case of advanced positions, many recruiters expect to see a chronological résumé with traditional sections like employment and education. In most cases, it is best to give recruiters the résumé they expect. However, both the college student and the more experienced candidate may choose a functional résumé for these reasons:

- To highlight skills and achievements rather than past employment/companies.
- To minimize a less-than-extensive work experience history.
- To emphasize other achievements, honors, and abilities.
- To de-emphasize gaps in employment or career mobility.
- To include categories like communication, teamwork, and leadership skills, as well as volunteer experience or athletic achievements.

Sample Chronological Resume (check attribution, student sample)

STUDENT NAME		
Email: studentname@gmail.com Phone: (333)-222-1111 Address: 232 President Dr., Apt. 1, Plano, TX, 70074		
EDUCATION		
OKLAHOMA STATE UNIVERSITY B.Sc. Mechanical Engineering	December, 2016 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	ACTIVITIES	AWARDS
Computer Skills: MS Office, VBA, Python, EES	Project Lead - Safe Schools	> OSU Regents Scholarship
Other Skills: Problem Solving, Effective Communication, Public	Project Lead - Slow the flow	> 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 Organization Relationship E-mail	Name, Title Organization Relationship E-mail	

Figure 2: Detailed chronological résumé with original color and design choices, created using Excel.

[Click here to download a copy of the example resume in Figure 2](#)

Sample Functional Résumé

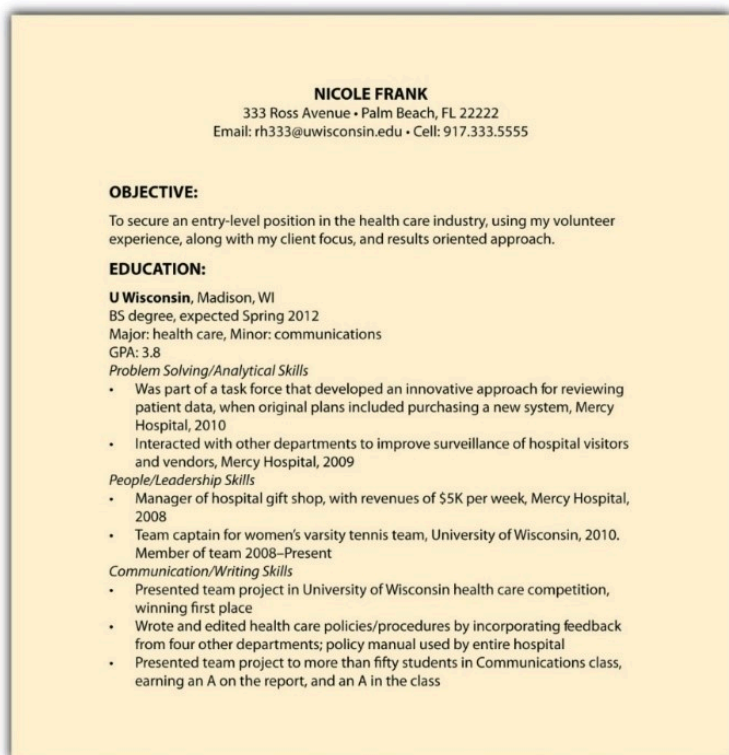


Figure 3: Basic functional resume that emphasizes three skill sets.

Drafting and Design: Where to Start

Concerned about where to begin when drafting your résumé? Here are a few general guidelines and tips. Based on your qualifications, goals, and job ad, first use the information from the previous section to choose from the two major résumé types. You might consider using a template as a helpful starting point. However, if you do

use a common template to help with layout and section format, be sure to modify it in some way so it does not look identical to another candidate's résumé. As you modify your chosen résumé type and template, keep in mind the following information on basic design features and conventions.

Design Conventions

- Use tables to align sections, then hide the borders to create a neat presentation.
- Choose a standard ten-to-twelve-point font such as Times New Roman.
- Use the same font in your résumé and your cover letter to create coherence.
- Choose a font that looks serious and professional and is easy to read.
- When describing work experience (and possibly education), include bullet points. Start your bullet with an action verb describing a skill or achievement. Follow it with the details of that skill or achievement, and then describe the positive impact of your achievement. For example: Developed (VERB) new paper flow procedure (DETAILS), resulting in reduced staff errors and customer wait times (RESULT); Provided (VERB) friendly customer-focused service (DETAILS) leading to a 15% improvement in customer satisfaction and loyalty (RESULT).
- Avoid relying on graphics or ornate design feature. Too many design features may make the

résumé look busy.

- Be strategic and consistent in your use of capitalization, bold, italics, punctuation, and underlining.
- Place more space between sections than within a section to create visual groupings of information. This way your reader will be able to easily distinguish between the key sections of your résumé, and between the items in each section.
- Write in sentence fragments that begin with active verbs and leave out sentences' subjects. Example: "I eliminated the duplication of paperwork in my department by streamlining procedures" would become "Eliminated paperwork duplication in a struggling department by streamlining procedures."
- Place your name at the top of the résumé to make it obvious to readers that *you* are the subject of each verb.
- Learn about field-specific conventions. The conventions in your field or industry will affect your choices in writing your résumé. Length, formality, design, delivery method, and key terms are just some of the factors that may vary across disciplines. Ask faculty or professional contacts in your field about employers' expectations, visit your school's career center, or conduct web research to make informed field-specific choices.
- Quantify your skills and achievements, as explained previously. This means including

references to technologies and equipment you have used; types of documents you have produced; procedures you have followed; languages you speak; technical languages you know; types of clients you have worked with (demographic information that might be relevant in your new workplace); and so on.

- Avoid filler words, or fluff that does not show meaningful skills. Filler words include: team player, results-oriented, fast-paced, and self-motivated. If you **MUST** use these phrases, find concrete examples to back them up. For example, instead of using *team player*, include a time you “collaborated with peers to save the company over \$500/month on delivery methods” or “co-managed a team of six to interview/hire vendors for annual company picnic.”
- Use key terms gathered in your pre-writing, preparation phase (from the job description and research into your field). If your potential employer is using a résumé-scanning program, these key terms may make the difference between getting an interview or a rejection.
- Make sure your résumé is completely error free. Proofread your résumé several times, use spell check, and ask an exceptional proofreader to review it. Always assume that an error lurks somewhere in your résumé and review it until you find that error!

What to Include and Exclude

Despite variations in résumé type, formatting, and design, there are understood rules of thumb on what to include and exclude. Here are a few general guidelines on what to exclude. For example, high schools, no matter how prestigious, should not be included in a résumé. Also avoid including sections with titles like *Hobbies* or *Other*, with interests that may seem irrelevant to the position: golfing for business jobs, video game play for software design jobs, and blogging for PR jobs have little direct bearing on your professional training.

In a North American context, never include information like height, weight, or marital status, as this information is unrelated to your qualifications and might become a source of discrimination. Similarly, although you may have seen résumé samples that include a picture (this may be common in some cultural contexts), it is non-standard and strongly discouraged in the United States to include a photo with the job packet. It may also be a good idea to be apprised of your legal rights when working through the job process, from application to interview. To become more aware of protections guaranteed by federal law, you may want to review a resource like the following, published by the U.S. Equal Employment Opportunity Commission: <https://www.eeoc.gov/facts/qanda.html>.

Now that you know what to exclude, what information should you include in a résumé? As their foundation, most résumés integrate three sections or types of information: the résumé header with contact information, education section, and work experience.

Résumé Headers

First of all, your Résumé Header should include four items: full name, address, email address, phone number, and possibly your professional website or LinkedIn page. If your first name is difficult to pronounce, you could include your nickname in quotation marks or parentheses (e.g., Xioang “Angie” Kim or Massimo “Mass” Rapini). Names are typically bolded and centered on the page, but aligning your name to the right or left is also appropriate, depending on the template or style you have chosen. You may include your school address or your permanent home address, or both. Most recruiters prefer both because, at times, they may need to send information to both addresses at different times of the year.

As noted in the chapter on email etiquette, it is important to choose a professional e-mail address because employers frown upon addresses such as greeneyes2@gmail.com or runningguy62@verizon.net.

Instead, consider using your first name and your last name in a simple email format. If you continue your job search after graduation, you might not be permitted to use your school email address, nor should you once you have graduated. Include only one phone number on your résumé and record a professional voicemail in case the employer calls. Do not play music on your voicemail. If in a loud area, do not answer your cell phone, especially when you do not recognize the number. Allow the call to go to voicemail, listen to it in a quiet place, and return the call as soon as possible. A professional voicemail might sound like the following: “You’ve reached John Smith at 555.555.5555. Please leave a message and I will call you back as soon as possible.” Be sure to check your voicemail on a regular basis.

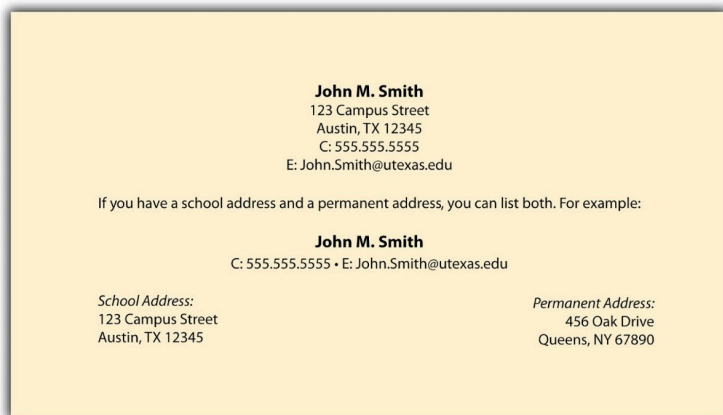


Figure 4: Resume header with contact information, both a school address and a permanent address.

Education Section

Secondly, the Education Section will likely appear before your experience section. Once you are a working professional, you may choose to flip these two sections, in order to emphasize the information that is more important to a particular employer, or to follow the conventions in your field. Within the education section, it is standard to include your GPA, typically if it is 3.0 or better, along with your expected graduation date, major(s), and minor(s). You may include your overall GPA, or you may decide to list the GPA of your major. Certain industries are more concerned with GPA than others, including consulting, investment banking, and trading, which can require a 3.6 or 3.7 and above.

Be sure to research each industry to familiarize yourself with such requirements. If you attended only one

college, only that college should be listed in this section. If you transferred from another college, you should list both schools in this section. The first school you list is the current school you attend, followed by the previous school. If you attend graduate school, law school, and so forth, your postgraduate institution would be listed first. You also have the option of including relevant courses that prepared you for the job you are seeking and any special accomplishments related to school—like projects, offices held, service, and awards or scholarships. If you have many of the latter, you might alternatively consider placing them in their own section marked Honors.

University of Chicago, Chicago, Illinois

Expected graduation date: 2013.

Pursuing a BS in mathematics with honors and with a minor in economics.

GPA: 3.7

Coursework: Honors Calculus IBL Sequence; Honors Analysis; Honors Econometrics; Algebra

Extracurricular Activities: Mathematics Club, Member; Investment Banking Club, Treasurer.

Northwestern University, Chicago, Illinois

2009–2010

Obtained 24 credits toward BS degree before transfer.

Figure 5: Education information showing two universities attended.



Figure 6: Resume header followed by contact information, an objective statement, and education.

Employment Section

Thirdly, the Employment Section should highlight most the most relevant jobs you have held and downplay less significant experience. This section is arguably the most important of your résumé because recruiters often look for past work experience as a predictor of future work experience. The conventional method of listing your work experience is in reverse chronological order (as with your education section). List your most recent job experience first and include the following information:

- The name of the company.
- The city and state and, when outside the United States, the country.
- The years of employment. (If you have had

several jobs at one company, include the overall years of experience; for separate jobs, note specific years of experience.)

- Three to seven bullet points describing your responsibilities and the results of your work, depending on years of experience.

As noted in the section on design, you should use bullet points as a means of clearly and succinctly listing your responsibilities and achievements.

Optional Sections

In addition to contact information, education, and work experience, you may be wondering what other sections to include while developing résumé. Your options are many, but here are a few additional ideas.

- **Objective Statement:** This statement is increasingly controversial—some sources will recommend that you include an objective statement, while others will warn strongly against it. Proponents will tell you that recruiters appreciate clarity, and an objective can help a recruiter understand exactly what you offer or what business would best suit your background. Naysayers argue that the résumé is meant to be scanned in a matter of minutes and the objective statement only slows this process down with details that will likely be explored in the cover letter. If included, objective statements should be very targeted and mention a specific position. Whatever objective you choose, it should be

highly specific in stating what you are looking for and what you have to contribute. It should also be you-centered, showing what you can do for the company in no more than two sentences.



Figure 7: Resume header with contact information followed by an objective statement.

If you are unsure about including an objective statement, or if it would be too vague and general, it is best to omit it altogether.

Here are a few examples of possible objective statements:

- An entry-level accounting position in auditing, allowing me to use my analytical and detail orientation to ensure accuracy in all reports and reviews.
- A communications internship at a top media company that will allow me to use my knowledge and experience to produce and edit clear and effective

communications.

- An entry-level position in the healthcare industry, enabling me to use my business and communications skills to enhance a company's bottom line.

Consider the above examples to be a general starting point. In writing your objective statement, you would want to use the specific job title as it is given in the job ad or on the company website (with proper capitalization), and you would likely want to state the company name as well. This shows your focused intention to apply for a specific job position at a specific company, rather than producing a one-size-fits-all résumé that lacks focus.

- **Skills and Additional Information:** This section of your résumé includes, but is not limited to, the following information.
 - **Computer Skills:** Most employers expect Microsoft Word, Excel, and PowerPoint, but include additional software knowledge (e.g., Dreamweaver).
 - **Language Skills:** Include your honest level of fluency (e.g., Spanish, fluent, French, beginner).
 - **Study Abroad:** Include the name of the university, the city and country, and the coursework.
 - **Community Service:** Include any volunteer work, such as park cleanups,

walk-a-thons for various causes, or fundraising events of any kind. Be specific about your responsibilities and your results including dollars raised, hours spent, leadership position, end-user experience (e.g. fund-raising efforts reached over \$20K, providing for five developmentally disabled students and their parents to travel to Florida to swim with the dolphins).

- Licenses and Certifications:
Individuals can achieve literally hundreds of professional licenses in the areas of health care, finance, real estate, insurance, and so forth. Examples include Chartered Financial Analyst (CFA) Level I or Licensed Real Estate Agent.
-

In constructing this section, be sure to keep in mind your options. If you want to highlight certain information, or if you need to add a lot of detail, you might consider making a separate section for an item, or you might decide to combine similar items within the same section.

SKILLS and ADDITIONAL INFORMATION:

- Computer skills: Fluent in Microsoft Word and Excel. Some knowledge of PowerPoint.
- Language skills: Spanish/Intermediate
- Certifications: CPR, 2009.
- Community service: Member of Fundraising Committee achieving goal of raising \$10K for South Shore YMCA, Spring 2010.
- Interests: Enjoy reading, cycling, and surfing.

Figure 8: A skills section that groups together additional qualifications from computer skills to language.

- **References:** One of the famous last lines of a résumé is References furnished upon request. This is not necessary because employers can simply ask for references when they want them. In fact, if you simply include a references page with your résumé, it may save an interested employer the trouble of having to ask in the first place; a proactive, impressive strategy would be to create a single-page document that includes the following information.
 - Header (that matches the résumé header) to include your name, address, and contact information
 - Reference's name
 - Reference's company and title
 - Reference's relationship to you (e.g., manager, peer, vendor, and so forth)
 - Reference's contact information, including e-mail address and phone

number

Be sure to notify those who have agreed to serve as references that they may be receiving a call or email from a potential employer.

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: jvern@ymca.org

Figure 9: List of three references (a standard number), with applicant’s contact information repeated at the top.

7.5 Writing Job Letters

In the era of social media, the idea of writing an application letter to introduce your résumé may seem outdated. However, the application letter still serves several crucial functions. If the résumé is characterized by breadth (giving a broad overview of your qualifications), the application letter is characterized by depth (choosing a few most significant qualifications to cover in detail). Written in paragraphs rather than bullet points, this letter is the first writing sample your employer will see from you. It offers an opportunity to market your unique qualifications and to show how you will fit with the culture of the company. An effective application letter will create a picture of you as a potential employee and inspire a potential employer to learn more about you. Keep the following tips in mind as you write your cover letter:

- Your letter is essentially an argument for why you should be granted an interview. Make sure to support the claim that you are qualified for the position with evidence.
- Demonstrate your authority by speaking in detail about your qualifications.
- **SHOW** the reader that you have the skills and abilities necessary to do the job at hand. The more detail you offer and the more precise your language is, the more the reader will be able to picture you doing the job.
- Consider your audience carefully as you craft your letter.
- Conduct additional research to help you connect

with the company and to choose the appropriate tone, level of formality, and level of technicality.

At some point you may find yourself asking, “Is it worth writing an application letter knowing it might never be read?” The short answer is yes. Some recruiters go straight to the résumé and make an initial decision, while other recruiters carefully weigh the information in the letter. There is no way of knowing which will be the case, so you are better off putting your best foot forward every time. A well-written application letter is an opportunity to present yourself well and influence a recruiter, so always take full advantage of that opportunity. It can also be viewed as your first conversation with a future employer, so its quality should be exceptional.

When writing an application letter, remember that you have competition. Your audience is a professional who screens and hires job applicants—someone who may look through dozens or even hundreds of other applications on the day yours is received. The immediate objective of your application letter and accompanying résumé is to attract this person’s attention. The ultimate goal is to obtain an interview. As you write your application letter, strive to complete three tasks: 1) catch the reader’s attention favorably, 2) convince the reader that you are a qualified candidate for the job, and 3) leave a lasting impression.

Many people use the terms *application letter* and *cover letter* interchangeably. It is good to keep in mind, however, that they may refer to different business writing genres. The letter of application is much like a sales letter in which you market your skills, abilities, and knowledge. The term *cover letter* may refer to a document of transmittal sent with faxes or emails. It identifies an item being sent, the person to whom it is being sent, and the

reason for its being sent, providing a permanent record of the transmittal for both the writer and the reader.

Deciphering the Job Description

Most job descriptions can be copied from the employer's website. The previous section (Finding Job Openings) shares additional ideas on how to search for job ads. Once you have identified a position that interests you, copy the job description into a Word document. (If you only have a hard copy of the ad, it might be worthwhile to type it into a new Word document, so that you can copy pertinent phrases from the job description into your letter.) You can complete two prewriting steps before writing to decipher the job description: 1) List each skill and qualification on a separate line and 2) Group like with like. If communication skills are listed as important, in addition to giving presentations, list one after the other. An example of a job description and the deciphering process is given below.

Sample Job Description

Entry-Level Sales

The CML Company, a leading provider of recruiting and staffing services, is currently seeking motivated, career-oriented individuals to join our recruiting team. Our recruiters work with our clients and inside sales team identifying, screening, interviewing, and presenting qualified candidates for contract and permanent positions. CML promotes from within. Entry-level sales staff start as recruiters. Once they master that role and have a desire to become a member of our sales team, they can be

considered for promotion. Qualified candidates for the recruiter position will:

- Develop recruiting strategies designed to identify qualified candidates through various recruiting tools.
- Evaluate candidates' strengths compared with clients' requirements by evaluating, screening, and interviewing the candidate.
- Negotiate wage rates and other terms and conditions of employment with candidates and gain commitment from candidates for current and future job requirements.
- Complete necessary pre-employment processes, including reference and background checks and drug tests.
- Work with account executives to identify top accounts, client skill sets, and key market segments, and to assess clients' staffing requirements.
- Interact effectively with others to create a productive team environment.
- Communicate with peers by sharing recruiting best practices and providing accurate, thorough documentation on contract employees in our applicant-tracking system.
- Maintain relationships with industry contacts to provide customer service, gain industry knowledge, and get referrals and sales leads.

Qualified candidates for the recruiter position must also:

- Have a bachelor's degree or related sales or recruiting experience.
- Be available to work before and after typical office hours as work may demand.
- Possess strong written and oral English communication skills.
- Be familiar with Microsoft Word and MS Outlook (or similar e-mail applications).
- Have work experience in a service-oriented business.
- Reflect a desire to learn and advance in a fast-paced sales environment, and be capable of regularly using good judgment and discretion to accomplish goals.
- Be currently authorized to work in the United States for any employer.

Sample Deciphering Process

As you consider the preceding sample, study each component of the job description and how it relates to your skills so that you can apply for and gain an interview for the position. Also simplify the job ad description as you list and group. Your streamlined (second) list of requirements might look something like this:

Requirements:

- Bachelor's degree
- Able to work flexible, long hours
- Strong written and verbal communication skills
- Computer literate
- Desire to learn in a fast-paced sales environment
- Good judgment
- Discretion
- Authorized to work in the U.S.

As you compare your abilities and credentials to your list(s), ask yourself how closely your qualifications match the items are listed. Do your skills match all of these requirements, or the vast majority of them? Highlight the skills that do match and consider where you might reference them directly in your job letter. Your next step might involve identifying and writing down any requirements that are NOT stated directly. For example, the job ad seems to imply: 1) individuals must be motivated, 2) they must have the ability to master the work, and 3) they must have a desire to be a part of the sales team in order to be promoted.

Do not rule yourself out if every requirement does not match. Instead, think of something that is somewhat related. For example, if you have never worked in a fast-paced sales environment, focus on your desire to learn. Highlight the fact that you have observed fast-paced sales environments, and those situations appeal to you. At the very least, you could use the fact that you have always been very proactive in completing tasks as efficiently as possible. Or maybe you have taken a course or two in

economics or marketing that might have provided tangentially relevant knowledge. In contrast, if you are a strong match for most of the requirements, generate specific, results-oriented examples to demonstrate these skills.

Oftentimes, you will not have a clear indication as to which skills are more important than others in the job ad, so use your best judgment call. Treat each skill as if it is the most important. For instance, when considering communication skills have a specific, results-oriented example of your verbal skills and your written skills. At some point, however, you will want to select the three skills you think are most important, match them to your strongest skills, and then write your cover letter. These three skills, if positioned properly, will make the case for why you should be hired.

Format and Structure

Formatting of all business letters—but especially the application letter—must be neat and professional. It is recommended that you use left alignment for all text, since various software programs can wreak havoc with indentations and tabs. Common business letter formats include the block letter, the semi-block letter, the alternative letter, and the simplified letter. Block format, among the most widely used business letter formats, is recommended for application letters. The application letter includes five main sections: 1) heading and greeting/salutation, 2) introductory paragraph, 3) middle paragraphs, 4) closing paragraph, and 5) complimentary close.

The heading contains the writer's address and the

date of the letter. The writer's name is not included; only a date is needed in headings on letterhead stationery. Next comes the inside address, which shows the name and address of the recipient of the letter. This information can help prevent confusion at the recipient's offices. Also, if the recipient has moved, the inside address helps to determine what to do with the letter. In the inside address, include the appropriate title of respect of the recipient, and copy the name of the company exactly as that company writes it. When you do have the names of individuals, remember to address them appropriately: Mrs., Ms., Mr., Dr., etc. If you are not sure what is correct for an individual, do some extra online research and/or consider using the title that the individual prefers. Another standard rule of thumb is to use Ms. if unsure of a woman's marital status.

The **greeting or salutation** directly addresses the recipient of the letter and is followed by a colon. If you do not know the recipient's gender, you may use the full name. Again, the best solution is to do a little extra research, or make a quick, anonymous phone call to the organization and ask for a name. In some cases, you may address the salutation to a department name, committee name, or position name: Dear Personnel Department, Dear Recruitment Committee or Dear Hiring Committee.

In the **introductory paragraph**, you introduce yourself to the hiring manager or recruiter. The paragraph should include these general items:

- Why you are contacting them (to apply for X position—give its specific name).
- How you heard about the position (for example, give the name of the website where you found the ad).

- The date of the ad if applicable.
- What the minimum requirements for the job are and how you meet them (for example, if the job requires a degree and three years of experience, you will want to mention right away that you meet these requirements).
- Optional: Something specific about the company or the job itself that has made you interested in the position (for example, does the company have a good environmental track record? Do they mention on their website that they like to promote from within? Have they won awards? Are they working on any projects that pique your interests?).

**When the
job ad
requires...**

You might write...

Introductory
lab
experience

During the summer of 2016, I interned for Johnson & Johnson, where I acted as the assistant laboratory supervisor. I was tasked with performing gram stain testing, assessing bacterial antibiotic resistance, and completing routine safety checks.

Strong
writing
skills

During fall of 2019, I took Technical Writing at OSU, where I created documents in the following professional writing genres: emails, business letters, technical instructions, internal proposals, and external analytical reports.

The **middle paragraphs** of the cover letter should make the case for why you would be an exceptional hire. Select two to four strengths necessary to excel and assign each strength to a bulleted section or brief paragraph. Boldly indicate your strengths and include your best examples of how you excel at each strength. For a one-page application letter, some candidates have two paragraphs, while others have three. Oftentimes, one of these paragraphs will focus on education and the ways it has prepared the candidate for the position, while another discusses work experience and applies skills learned to the position. Anything listed as a strength in the résumé needs to include visible proof of that strength. For example, if you mention having strong interpersonal skills, be sure to give a concrete example, like writing about a course that required group work to finish a large project. Again, be specific. Show exactly how the event built or showcased the skill you reference.

The **closing paragraph** should reiterate any major points or takeaways that you want readers to remember. It will likely do the following:

- Re-state your interest.
- Highlight how your strengths mesh well with the required skills.
- If applicable, inform them when you will contact them within a certain time period.
- Invite them to contact you (and include contact information, typically your professional email

address).

- Refer them to your enclosed résumé.
- Thank them for their time and consideration.

The Sincerely element of the business letter is called the **complimentary close**. Other common ones are *Sincerely yours*, *Respectfully*, or *Thank you*. Notice that only the first letter is capitalized, and it is always followed by a comma. Usually, you type your name four lines below the complimentary close and—if the letter is a physical copy—sign your full name in between.

Concluding Thoughts

Preparation and practice are critical to every step of the job search process, and the cover letter is no different. Five actions can help make your cover letter compelling:

1. Make a list of your top ten strengths.
2. Make a list of your top five weaknesses (areas you would like to strengthen).
3. Decipher the job description to identify each separate skill and qualification.
4. Compare the two lists to see if they are in alignment. Also identify the gaps—does the job description list something that you haven't done?
5. Highlight your top skills that align with the job description as you will use them in Other strengths and skills could include (in

alphabetical order).

Sample Job Letters

216 Katrina Peterson

Joe Student
555 Campus Center Street
Hadley, MA 55555

Company Name
Company Address
City, State Zip

November 20, 2010

Dear Hiring Manager,

I am writing about the Marketing Summer Internship Program that I researched in my school's career services department. I am currently a junior at Success University with a major in marketing and a GPA of 3.6. I have executed several challenging marketing projects and I'm confident that I can succeed at your internship. Attached is my résumé in addition to my design portfolio.

My professional experience and various educational activities have prepared me well for this internship as I've honed the following skills:

- Research: Last fall, I researched over one dozen potential speakers to select the final list of three speakers that were invited to speak at my school's Women's Leadership Conference, which was attended by over 1,000 students. My team of five successfully invited the local leaders of various art galleries, in addition to other prominent leaders in the marketing field. The formal program featured solid advice given to participants on how to succeed in business with a particular focus on marketing, and we received extremely strong feedback from participants. The speakers also commented upon the overwhelming interest of the audience members and the quality of the students they spoke to directly.
- Creative problem solving: I have created many websites and logos to ensure that the brand image of each was relevant and strong. While working at XYZ Company last month, I designed a visual template for the new website using the research I conducted on potential marketing targets. My manager complimented me on my listening skills as they were critical to creating quality results.
- Communication: I am the lead campus event coordinator for our five "sister" campuses in the Massachusetts area. I've used my clear and transparent communication skills most recently when planning a marketing conference this past April for all five campuses. The entire project took approximately six months to plan, and during the first four months, each coordinator met via a conference call every two weeks. We constructed very clear project plans outlining everyone's responsibilities and due dates. We were vigilant in our communications because it was the only way to ensure success for the 500 participants, and the 10 speakers who attended. The conference received a 90 percent approval rating from participants.

I would like to reiterate my interest in your marketing internship. I am excited about the prospect of working for your company and I'm confident that my above mentioned skills will ensure my success. I will call you next week to follow up. In the meantime, please feel free to reach out to me at the phone number or email below.

Best regards,

Joe Student
Phone
E-mail address

Attachment

Figure 10: Job letter addressed to a general hiring manager (as specified in the job ad) that incorporates bullet points.

218 Katrina Peterson

Jane Smith
555 East 28th Street, Apartment 9E
New York, NY 10022

Company Name
Street
City, State, Zip

September 25, 2011

Dear Hiring Manager:

I would like to express my interest in the full-time position with your company which was posted on your website. I will graduate this spring from Fordham University with a BA in public accounting. My classmate, Alicia Smith, has shared with me her tax internship experience at ABC Company and she spoke very highly of her experience there. I am interested in this position because you have the largest tax practice in the United States, and I excel in large companies with a culture that is both inclusive and proactive.

My previous experiences make me a very strong candidate. I had two summer internships with XYZ Accounting, and partnered closely with my manager to set up the internal control system which helped us to meet regulatory requirements. In addition to improving the efficiency of our process, it saved our company significant time and money.

At EFG Inc., I organized and analyzed large amounts of data using excel and access. This work was shared with all accountants and strategies were created to compensate for areas of weakness. I'm proud to say that these programs and processes are still being used today, even though I worked at the company two years ago.

At Fordham University, teamwork and leadership are critical to our learning. I have been the vice-president of our accounting club for the past year. I managed the budget of \$7K but more importantly, worked closely with other student clubs leaders to hold a successful recruiter's panel discussion, which was attended by over 100 students. The panels resulted in many positive career discussions and will hopefully result in full-time jobs for my fellow students. This successful event would not have been possible without the teamwork of the accounting club, and the partnership we built with Career Services and the companies that were represented.

My experience and skills in addition to my enthusiasm for taxes, will allow me to make an immediate and meaningful contribution to your company. I am very interested in discussing my qualifications with you.

Thank you in advance for your consideration.

Sincerely,

Jane Smith
xxxxx@fordham.edu
(xxx) xxx-xxxx

Attachment

Figure 11: Job letter organized around three body paragraphs that

highlight previous experience, ability to organize/analyze data, and teamwork/leadership.

7.6 Sample Student Job Packet (see proper student attribution)

<h3>Student Name</h3> <p>1234 W. Ave. Stillwater, OK 74074 (000) 000-0000 student.name@okstate.edu</p>									
<h4>Education</h4> <table border="0"> <tr> <td> Oklahoma State University Stillwater, OK <ul style="list-style-type: none"> Bachelor of Science in Animal Science Major: Animal Science – Production </td> <td> Expected Graduation Fall 2020 GPA: 3.42 Minor: Equine Enterprise Management </td> </tr> </table>		Oklahoma State University Stillwater, OK <ul style="list-style-type: none"> Bachelor of Science in Animal Science Major: Animal Science – Production 	Expected Graduation Fall 2020 GPA: 3.42 Minor: Equine Enterprise Management						
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<h4>Work Experience</h4> <table border="0"> <tr> <td> Sales Associate Jo-Ann Fabric and Craft Stores <ul style="list-style-type: none"> Organize store within communicated guidelines Maintain fabric station by cutting fabric and giving fabric advice for different projects Uphold an energetic and approachable attitude throughout shifts </td> <td> October 2018 to current </td> </tr> <tr> <td> Student Development Officer OSU Foundation <ul style="list-style-type: none"> Communicated with diverse group of Alumni, and Friends of Oklahoma State University Fundraised over \$7,000 for diverse funds that help the university Created positive conversation </td> <td> September 2017 to October 2018 </td> </tr> <tr> <td> Extreme Serve Counselor Camp XYZ <ul style="list-style-type: none"> Obtained Seasonal Assistant Certificate from Certified Horsemanship Association Taught ages seven to seventeen horseback riding in western seat Balanced duties between teaching and monitoring personal group of kids Maintained a stable of twenty-six horses with varying age range </td> <td> May 2018 to July 2018 </td> </tr> <tr> <td> Team Member Love's Travel Stop <ul style="list-style-type: none"> Improved time management skills during regular shifts Maintained balance of money drawer for an extensive period Emphasized sale points of merchandise when on promotion Delivered friendly guest service and heartfelt hospitality to customers and co-workers </td> <td> June 2017 to August 2017 </td> </tr> </table>		Sales Associate Jo-Ann Fabric and Craft Stores <ul style="list-style-type: none"> Organize store within communicated guidelines Maintain fabric station by cutting fabric and giving fabric advice for different projects Uphold an energetic and approachable attitude throughout shifts 	October 2018 to current	Student Development Officer OSU Foundation <ul style="list-style-type: none"> Communicated with diverse group of Alumni, and Friends of Oklahoma State University Fundraised over \$7,000 for diverse funds that help the university Created positive conversation 	September 2017 to October 2018	Extreme Serve Counselor Camp XYZ <ul style="list-style-type: none"> Obtained Seasonal Assistant Certificate from Certified Horsemanship Association Taught ages seven to seventeen horseback riding in western seat Balanced duties between teaching and monitoring personal group of kids Maintained a stable of twenty-six horses with varying age range 	May 2018 to July 2018	Team Member Love's Travel Stop <ul style="list-style-type: none"> Improved time management skills during regular shifts Maintained balance of money drawer for an extensive period Emphasized sale points of merchandise when on promotion Delivered friendly guest service and heartfelt hospitality to customers and co-workers 	June 2017 to August 2017
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<h4>Activities and Volunteer Experience</h4> <table border="0"> <tr> <td> Humane Society Delta Delta Delta AG 1011 SAM </td> <td> On the Block Town East-Galloway Animal Clinic Freshman In Transition </td> </tr> </table>		Humane Society Delta Delta Delta AG 1011 SAM	On the Block Town East-Galloway Animal Clinic Freshman In Transition						
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<h4>Scholastic Honors</h4> <table border="0"> <tr> <td> <ul style="list-style-type: none"> Out-of-State Achievement Scholarship Citizen of Potawatomi Full time Student Scholarship Gravelle Scholarship OSU-DFW Brighter Orange Scholarship J Fleming Memorial Freshman Scholarship </td> <td> Current Current 2017-2018 2017-2018 2017-2018 </td> </tr> </table>		<ul style="list-style-type: none"> Out-of-State Achievement Scholarship Citizen of Potawatomi Full time Student Scholarship Gravelle Scholarship OSU-DFW Brighter Orange Scholarship J Fleming Memorial Freshman Scholarship 	Current Current 2017-2018 2017-2018 2017-2018						
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Student Name

1234 W. Ave. Stillwater, OK 74074 | (000) 000-0000 | student.name@okstate.edu

References

Academic

Jean Smith
Professor/Equine Center Herd Manager
Oklahoma State University
321 W McElroy
Stillwater, OK 74078
000.000.000
smith@okstate.edu

Professional

Jim Jones
Permanent Staff/ Barn Manager
Camp XYZ
123 Camp Loop
Rogers, IN 01234
111.111.111
jones@camp.org

Personal

John Nguyen
Owner
Daycare Center
132 Jump Street
Greenville, TX 43210
222.222.222
nguyen@global.net

1234 W. Ave.
Stillwater, Oklahoma 74074

February 19, 2019

Hiring Manager
JOY Ranch Company
768 JOY Ranch Rd.
Wayne, Oklahoma 73095

Dear Hiring Manager:

I would like to apply for the Horse/Breeding Manager position advertised through RanchersWork.com on October 24. My experience with horse breeding in quarter horses as well as my minor in equine enterprise management, which includes finances, would allow me to make a significant contribution to your company.

My education and research as an animal scientist could greatly impact your company. As an Animal Science: Production major at Oklahoma State, I have been studying and researching animal physiology and behavior psychology. Specifically, Professor Salak-Johnson, my livestock behavior handling professor, and my class have studied various species natural behaviors, and social cues. I have also studied and trained foals through halter breaking, saddle breaking, and socialization skills.

I also worked as an intern for Humphrey Quarter Horses for the past two summers, a quarter horse breeding ranch that has an operation in Whitesboro, TX. From your website, I see that your operation of horses consists of mostly performance horses. At Humphrey Quarter Horses the stallions they breed hold backgrounds in the National Reining Horse Association, and so do their prodigy. My work already in the breeding of performance horses would be helpful on the ranch to successfully bring along great foals with impeccable pedigrees.

Finally, my last complimentary skill I would bring to the ranch which is important in the horse industry is a love and compassion for not only the work we do, but the horses that help us do it. My emotional investment with horses goes as far back as my preteens when I was not only injured and recovering but was given a horse who also was recovering from surgery named Murphy. That broad, reining, strawberry roan holds a special place in my heart, as we both worked together to make a full recovery and go on to do great things. With my passion for horses, background and communication skills I would contribute greatly to your operation.

Thank you so much for this opportunity to apply for your opening. I look forward to communicating with you further on this great opportunity. I can be contacted on my cell (000-000-0000) or through e-mail (student.name@gmail.com).

Sincerely,

Student Name

[Click here to download a copy of the Sample Job Packet.](#)

Sample List Created from Job Ad

JOY Ranch Company
Role and Responsibilities

Duties of the
Horse/Breeding Manager, who will see to horses' breeding,
foaling, management, etc.:

- Feed horses
- Care for sick animals
- Administer routine treatments
- Address emergency situations
- Assist medical personnel as needed
- Drive horses to specified locations
- Schedule various appointments
- Order necessary supplies
- Catalog supplies
- Deal with equipment maintenance and operate machines
- Address maintenance needs

7.7 Interviewing

Interviewing for a job position comes with its own set of challenges. However, having made it to this moment in the hiring process means that you have already faced and beat many obstacles. Be encouraged! Even if you do

not receive (or accept) a job offer after interviewing, the interview itself provides valuable preparation for career advancement. Some universities offer mock interviews to help students prepare, so you may want to check with your adviser, department, and career services to be aware of these opportunities. There are ways of preparing for possible interview scenarios—for example, drafting a set of potential questions that you may be asked and writing out or speaking possible responses in advance. Keep your support system involved. Just as you may have asked family or friends to look over job materials, so also might you ask a friend or family member to help you practice responding to interview questions. The following information is not meant to be a comprehensive guide to interviewing; however, it will provide you with information on the types of interviews that you may encounter.

On-Campus Recruiting

If you are participating in on-campus recruiting (when a company comes onto your campus to recruit), three interview scenarios are possible: open, closed, or mixed schedule. The school dictates the type of schedule, and it is important to know in which type you are participating.

- An **open schedule** allows any student to go to the career services office to submit their résumé for the specific position in which they are interested. An open schedule is open to any candidate who wishes to be considered for an interview. The company recruiter will then review all of the résumés and select the top ten or twelve candidates they will interview on

campus. (For example, thirty-minute interview schedules would allow for twelve students to be interviewed, while forty-five-minute interview schedules would allow for nine students to be interviewed.) The company will select the length of interviews when they initially book the schedule with career services.

- A **closed schedule** happens when the recruiter selects all of the ten or twelve individuals they will interview from the résumé book, from interactions they have had on campus, or from a colleague's recommendation. Perhaps they met a student who impressed them at a marketing event. The recruiter could choose to include that student in a closed schedule.
- A **half open/half closed schedule** is a hybrid of the two preceding schedules. Half the students will be selected from students who have submitted their résumés, and the recruiter will select the other half from the résumé book, a recommendation, or a direct interaction with students while they were on campus.

Whether you submit your résumé for an open schedule, or you are selected to participate in a closed schedule, the recruiting cycle is fast-paced and résumés can be easily missed due to no fault of the job seeker and résumé writer. Sometimes recruiters review hundreds of résumés to find the ten or twelve they will pursue, and sometimes résumés can be missed because of something as simple as pages sticking to one another. Should your résumé be one of the many that is not selected, you can write to the recruiter, using your cover letter to make a strong case for why you

should be considered. In some cases, this may work to get you an interview. The recruiting process is not perfect, so it is recommended that you apply for as many positions as possible. Never rely solely on the submission of one résumé. Instead, when on-campus recruiting takes place, apply for all positions that fit your strengths and interests.

Off-Campus Recruiting

Do not limit your search to only on-campus opportunities because off-campus opportunities can also be fruitful. Conducting both an on-campus and off-campus job search increases the number of opportunities you can consider. You may pursue off-campus opportunities for three reasons:

1. Your school does not have a robust career services department that attracts a variety of employers.
2. You are interested in a company that does not recruit on campus.
3. You want to hedge your bets to have as many opportunities as possible, representing a mix of on-campus and off-campus possibilities.

The main difference between on-campus and off-campus recruiting is that in off-campus recruiting, you manage the entire process. You are responsible for getting your résumé into the hands of the company recruiters or hiring managers, along with scheduling the interview and following up on your own. An off-campus job search demands that you are organized and proactive enough to keep things moving. One final thought: After completing

a job interview, always send a follow-up letter thanking interviewers for their time; this additional step demonstrates your professionalism and attention to detail.

7.8 Activities and Resources

As you work on your résumé, you may worry that you have nothing valuable to include, or you may feel that you sound like 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? What sort of technical advice do friends and family members seek from you? Start writing down key terms and action verbs that describe your experiences and accomplishments, but do NOT worry yet about putting them into a résumé format.

Action Verb Activity

Here are some action verbs that may be helpful to use in your résumé sections.

Accomplished	Generated	Shown
Analyzed	Influenced	Standardized
Assisted	Introduced	Structured
Calculated	Investigated	Supplied
Circulated	Joined	Supported
Clarified	Led	Surveyed
Collected	Located	Taught
Conducted	Maintained	Trained
Decreased	Managed	Updated
Directed	Marketed	Used
Distributed	Negotiated	Utilized
Documented	Organized	Verified
Edited	Programmed	Won
Eliminated	Provided	Worked
Expanded	Resolved	Wrote
Expedited	Responded	
Facilitated	Reviewed	

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Chapter 8: Technical Instructions

Michael Beilfuss

Chapter Synopsis

The focus of this chapter is one of the most important of all uses of technical writing—instructions. *Instructions* are step-by-step explanations of how to do something: how to build, operate, repair, or maintain things. For a quick overview of writing instructions, check out this link: “Instructions: [How to Write Guides for Busy, Grouchy People](https://jerz.setonhill.edu/writing/technical-writing/instructions-how-to-write-for-busy-grouchy-people/)” (<https://jerz.setonhill.edu/writing/technical-writing/instructions-how-to-write-for-busy-grouchy-people/>).

The chapter begins with a brief overview of the importance of knowing how to write instructions, followed by some basic guidelines. The chapter goes into some depth in regards to analyzing the rhetorical situation for writing instructions. The rhetorical situation includes the purpose, audience and context for any particular set of instructions. Next, we cover how to plan and organize the writing process followed by information about the content that is typically included in instructions. The chapter ends with some nitty-gritty tips on writing the instructions.

8.1 Introduction

One of the most common and important uses of technical writing is instructions—step-by-step explanations of how

to do things: assemble, operate, repair, or do routine maintenance on something. Many people associate instructions with appliances, computer accessories, products that require assembly (e.g., furniture) and DIY projects. Because we do not find ourselves using them regularly or we come to expect them only in certain contexts, it is easy to forget how important they are. The quality of a well-designed instruction manual may go unnoticed. Yet, when we encounter frustration with putting together a bookshelf or toy, or with trying to figure out how to change or activate a particular appliance setting, the significance of well-written and designed instructions becomes clear.

Although it may seem intuitive and simple to write instructions, it is not always that easy. What follows in this chapter may not be a fool-proof guide to writing instructions, but it will show you what professionals consider the best techniques.

Ultimately, good instruction writing requires:

- Clear, simple writing that utilizes strong, descriptive verbs to reveal the process's discrete actions
- A thorough understanding of the procedure in all its technical detail
- The ability to put yourself in the place of your audience and help them avoid common errors
- The ability to go through the procedure with concentrated attention and to capture that awareness on paper
- The willingness to go that extra distance and test your instructions on the audience for whom they are written

This chapter explores some of the features of instructions that can make them more complex to write, but

easier for the reader to use. It also explains the common elements of instructions and how to write them.

8.2 The Rhetorical Situation

Instructions, like other types of texts, are shaped by a rhetorical situation. The choices technical writers make in regards to content and form depend on the purpose of the instructions, the intended audience, and the context in which the instructions are used. Altogether, the audience, purpose, and context of the instructions make up to the rhetorical situation. As you begin to plan your project, it is crucial to define the audience, purpose, and context for your instructions. Remember that defining your audience means defining its level of familiarity with the topic as well as other such details. (See [chapter 2](#) for the discussion of audiences.)

Most importantly, if you are in a writing course, you will need to create a planning document that identifies the rhetorical situation and how it will inform the composition of your instructions. This will enable your instructor to assess how well your instructions are customized for the intended audience.

When writing your own instructions, consider the following ideas and questions regarding the rhetorical situation.

Purpose

In general, the purpose of a set of instructions is to guide the user through a series of steps that lead to the completion of a task. However, each set of instructions will also have a more specific outcome. Identifying what that specific

outcome is will help you make more effective rhetorical decisions about content and design. Ask yourself:

- What are the specific intended outcome(s) of the instructions, e.g., building a doghouse, installing an air conditioner, etc.?
- Are there other purposes that the instructions serve, e.g., offering troubleshooting advice, teaching users how to accomplish additional, simple tasks necessary for reaching the main objective, defining unfamiliar terms, etc.?

Audience

Creating a profile of your audience (i.e. the primary intended user of the document) is integral for making thoughtful choices about scope, content, and design. For some projects, it is tempting to say your audience is “everyone or anyone,” but you are better off tailoring your instructions for a specific audience. Check out this airline [safety video](#) from Air New Zealand:



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://open.library.okstate.edu/technicalandprofessionalwriting/?p=32#oembed-1>

<https://www.youtube.com/watch?v=qOw44VFNk8Y>

Ostensibly, the audience for the video is everyone and anyone (because just about anyone could be on a flight), but Air New Zealand tailor their instructions to appeal to a

very specific audience (i.e. fans of *The Hobbit*), while also making it accessible to anyone on the flight. Customizing their instructions so specifically allows them to really grab their audience's attention, even if the customization is not grounded on a universal appeal.

In order to draft your instructions to serve your audience, consider these questions before writing:

- Who is the primary audience? Who is the secondary audience?
- What is the primary audience's familiarity or expertise regarding the topic of the instructions?
- What is the audience's general comfort level with learning new skills related to the software, apps, craft, etc.?
- What is your audience's "typical" approach to learning? How will your instructions address the audience's learning style, goals, and task-related needs?

Context

Think of context as the temporal, social, technological, and cultural situation surrounding the creation and use of the instructions. The following questions will help you identify the context:

- How much time will *you* have to complete this set of instructions?
- Are there time constraints the user might encounter when reading the instructions or performing the process?

- Is there a degree of urgency to the rhetorical situation that might dictate the instruction's pace or flow? How will the design of the document contribute to the pace or flow? For example, a guide on how to properly administer CPR might need to anticipate a reader who is under duress and needs information quickly so that they can save someone's life, whereas instructions on how to play "Mary Had a Little Lamb" on the violin will be read by a recreational audience that may not feel the same pressure or exigence.
- What technological constraints must you consider in writing the instructions? Consider your skills with technology and level of access.
- How will your audience gain access to the instructions? For example, your audience may access it online via a company website on a desktop computer or their smart phones. Will they need to print it?
- What additional tools or materials are you assuming the audience already has? Will they have access to the technology or materials needed to follow the instructions? For example, to successfully build a bookshelf, the user will need a hammer, screwdriver, and open work area.
- From what cultural perspective are you writing the instructions? Will the audience share this same cultural context? For example, a German recipe that calls for vanilla sugar, an ingredient not readily available in the United States, may need to be modified for American users.

8.3 Planning and Shaping

Once you have described the rhetorical situation, you can begin drafting your set of instructions. A comprehensive set of instructions contains many components. These are listed in the next section. This section provides a foundation for your draft.

Number of Tasks

How many tasks are there in the procedure you are writing about? The term *procedure* refers 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 making spaghetti and meatballs is a procedure that—while containing dozen of individual steps—can be broken down into three distinct tasks: 1) preparing the meatballs; 2) stewing the sauce; and 3) boiling the pasta.

A simple procedure like changing the oil in a car contains only one task; there are no semi-independent groupings of activities. A more complex procedure such as making spaghetti and meatballs, or constructing a doghouse, contains many semi-independent tasks. For example, constructing a doghouse would include the tasks of: leveling the ground, setting the foundation, building the floor, constructing the walls, adding the roof. The instructions for the [Kobolt Swing Trimmer](#) are organized by tasks – Assembly Instructions and Operating Instructions. The Assembly Instructions include further divisions related to particular parts such as the guard and the front handle.

In Figure 1, the *procedure* is the total sum of the

actions needed to build a doghouse. The introduction and list of tools and supplies is not part of the procedure. In this schematic those sections are represented in gray.

The separate tasks that comprise the procedure are represented by the blue boxes: Level the Ground and Set the Foundation. The steps are the individual actions taken in sequential order and are nested within the tasks.

Building a Doghouse

So you're tired of your dog hogging the bed, and making your partner sleep on the floor. You finally decided to make the beast sleep outside. But you're not completely heartless, so you'd like to build a doghouse. Easy, right? Well it may be a little more involved than you think....

List of tools and supplies

Shovel	Cordless drill
Hammer	Deck Screws
Circular saw	etc

Level the ground

1. Hammer stakes into the ground at each corner.
2. Tie a string between each of the stakes.
3. Use your level the measure the slope of the ground.

Set the foundation

1. Dig a hole at each corner that measures at least 5"x5"x5"

Figure 1: The procedure encompasses all of the actions in your instructions. You might think of it as the title of the process.

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 swing set. There could

be over a 100 steps. That can be daunting. If there are no natural, semi-independent tasks, or if there are too many semi-independent tasks for clearly denoted task sections, you can simply 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.

Returning to the spaghetti and meatballs example, the tasks—1) preparing the meatballs; 2) stewing the sauce; and 3) boiling the pasta—can be broken down further into phases. The task of preparing the meatballs can be divided into several phases—seasoning the meat, forming the meatballs, searing the meatballs—and each of these phases will include multiple action steps. Phases for stewing the sauce might include: dicing onions, dicing garlic, browning the vegetables in the pan, adding herbs, and simmering the sauce. But since there are a limited number of steps within these phases, and the procedure already contains natural, semi-independent tasks, there is no need to add extra phases to preparing spaghetti and meatballs.

For further discussion, see this resource on [task analysis](https://www.prismnet.com/~hcexres/textbook/task_analysis.html) (https://www.prismnet.com/~hcexres/textbook/task_analysis.html).

Groupings of Tasks

Listing tasks may not be all that you need to do. There may be so many tasks that you must group them so that readers can find individual ones more easily. For example, the following are common task groupings in instructions:

- Unpacking and setup tasks
- Installing and customizing tasks
- Basic operating tasks
- Routine maintenance tasks
- Troubleshooting tasks

8.4 Content

The standard sections of instructions include front matter, an introduction, the procedure (a series of numbered steps divided into tasks or phases), a conclusion, and back matter. Some sets of instructions may not use all of these sections or label them in this way. Extensive front and back matter, for example, are often found in longer, more complex manuals.

Most sets of instructions, however, contain an introduction that provides information necessary for completing the steps safely and efficiently. The introduction may include an explanation of who should carry out the task (maybe the user needs to have proficiency in a certain skill), the materials needed, any precautions that the user should take (safety tips or other warnings), and an estimate for how long the process will take, among other elements. It is often necessary to include an explanation of why the user should follow the instructions. For example, instructions for changing the oil in a car may explain why the task is necessary for the proper functioning of the vehicle.

Following this introductory material is the sequence of step-by-step instructions, divided into separate tasks.

See the section below for how to draft clear and effective steps.

Lastly, instructions typically include some closing sections or appendices such as a “Troubleshooting Guide” or a section for “Tips” to help users address common problems that they may encounter while following the instructions or after completing the process.

The following is a review of these different parts you will commonly find in instructions. Most of them should be included in all instructions, but do not assume that all of them always need to be present, or that they must follow this exact order. There are other possible sections that could be included in instructions. However, all instructions should have at minimum an **Opening/Introduction**, a **Body** with numbered steps that are divided into separate tasks or phases, and a **Conclusion** and/or **Closing** sections.

As you read the following on common sections in instructions, check out the sample instructions linked at the end of this chapter. Figure 2 provides a simple schematic of the foundational elements for a set of instructions.

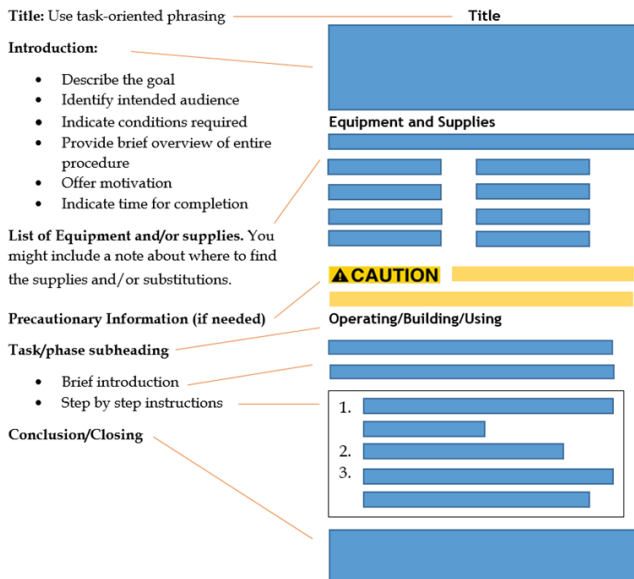


Figure 2: Schematic view of instructions. Remember that this is a typical or common model for the contents and organization — many others are possible.

Introduction/Opening

Before you even get to the introduction, you need to craft a clear title that is easy to understand. You want to be detailed and specific, but also succinct. For example, some good titles would include: “How to Clean a Freshwater Aquarium,” “How to Install Long-Tube Headers on a 1999 Trans Am,” “Cleaning a Bathroom: Instructions for College Students Living on Their Own for the First Time.”

Plan the introduction to your instructions carefully. Just as the title should provide your reader with a good

idea of what the instructions involve, the goal of your introduction is to give your reader general information about the process. What is it? Why should it be done? The introduction should contain an overview of the process and why it is important. Often, the writer lists the benefits of completing the process so that the reader feels good about the task they are about to complete.

The introduction/opening should do the following:

- Include a title
- Describe the goal and/or purpose of the instructions. Richard Johnson-Sheehan^[1] provides the following verbs as possible options:

to instruct

to show

to illustrate

to explain

to guide

to lead

to direct

to train

to tutor

1. Johnson-Sheehan, Richard. Technical Communication Strategies for Today. Second Edition. Pearson, 2015.

- Identify the intended readers and what knowledge and background information or skills they will need to understand the instructions and complete the procedure.
- Indicate the conditions when these instructions should (or should not) be used.
- Give an overview of the contents of the instructions.
- Provide motivation and stress the importance of the task (i.e., what does the audience stand to gain from learning this information? How will it prove useful? Why should the reader follow these instructions? What will happen if they do not?)
- Indicate the time for completion for people of varying skill-levels.

The following sections should be included as part of the opening of the instructions before the tasks begin. They can be folded in as subheadings of the introduction, or they can stand on their own, depending on the rhetorical situation.

Precautionary Statements/Warnings

Instructions must alert readers to the possibility of damaging the equipment, botching the procedure, and injuring themselves or others. For these situations, use [special notices](https://en.wikipedia.org/wiki/special_notices) (https://en.wikipedia.org/wiki/Precautionary_statement) —notice, caution, warning, and danger notifications.

- The “Notice” precaution is the lowest level statement. The standard color for notices is blue. Use it to indicate when there is a risk to damage property or equipment. You can also use it to draw attention to important operational considerations. There is no threat to bodily harm or safety with a notice.
- A “Caution” statement should include the safety symbol of an exclamation mark within a triangle. The standard color for caution statements and symbols is yellow. All the other higher warning should include this symbol as well, in the appropriate color code. It indicates there is a “non-immediate or potential hazard” for minor injury to a user or general public.
- A “Warning” statement appears in orange and indicates that death and/or serious injury could result to users and the public. These signs are not used to indicate property or material damage, but rather the potential for personal bodily injury or death.
- A “Danger” statement is the highest level precautionary statement and should appear in red. It indicates a situation with an immediate

hazard that will result in death or serious injury.
It is not used for property damage.

If any part of the procedure merits a precautionary statement or warning, you must include a statement at the beginning of your instructions, either as part of the Introduction/Opening or as a separate section before the tasks begin. Each of these warnings must always contain the corresponding colors and icons to help them stand out on the page. See the link above for more information. See below for more information about precautionary statements.

Technical Background or Theory

For some instructions you will need to provide a more thorough discussion of background related to the procedure. For certain instructions, this background is critical—otherwise, the steps in the procedure make no sense. 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 are 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.

List of Parts, Tools, Materials, Equipment, and/or Supplies

Most instructions include a list of 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). In instructions, these are typically listed in a simple vertical list or in a two-column list. It may help to notify your reader where they can acquire the equipment or supplies. The audience needs to know and gather all the materials necessary to complete the procedure before they begin any of the tasks.

Step-by-Step Instructions

When you get to the actual writing of the steps, there are several things to keep in mind: (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.

Structure and Format

Normally, we imagine a set of instructions as being formatted as vertical numbered lists, and most are in fact. There are some variations, however, as well as some other considerations:

- **Fixed-order steps:** 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:** steps that can be performed in practically any order. Good examples are those troubleshooting guides that tell you to check this, then check that, when you

are trying to fix something. You can do these steps in practically any order. With this type, the bulleted list is the appropriate format.

- **Alternate steps:** those in which two or more ways to accomplish the same thing are presented. Alternate steps are also used when various conditions might exist. Use bulleted lists with this type, with OR inserted between the alternatives, or the lead-in indicating that alternatives are about to be presented.
- **Nested steps:** in some cases, individual steps within a procedure can be rather complex in their own right and need to be broken down into substeps. In this case, you indent further and sequence the substeps as a, b, c, and so on.
- **“Stepless” instructions:** some instructions really cannot use numbered vertical list and that do little if any straightforward instructional-style directing of the reader. Some situations must be so generalized, or so variable, that steps cannot be stated. Generally, these are not appropriate for a classroom assignment. In your classes, you will need to demonstrate your mastery of the form with more traditional, straight-forward, sequentially numbered steps, otherwise it may begin to resemble a collection of tips or advice.

In any case, remember to divide your procedure into separate tasks or phases. It is easier for your audience to complete the procedure if they can work through it in smaller chunks.

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. When including supplementary information, it should be formatted as a “Note” or “Tip” similarly to how you would format a “Notice.” This type of supplementary information derives from “craft knowledge.” In certain circumstances, especially less formal instructions, it is even appropriate to include personal narrative to help convey your craft knowledge.[\[2\]](#)

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 do not want it buried in a wall of words. There are at least two techniques to avoid this problem: you can split the instruction from the supplementary information into separate paragraphs; or you can bold the instruction. In figure 3, you can see how the supplementary discussion is distinguished from the main action of the step through the use of bold-face type.

How to Change Engine Oil

When you change engine oil, always check the owner's manual to find the correct type and amount of oil needed and the correct oil filter.

1. **Start the vehicle and allow the engine to warm for a minute or two.** Doing so allows the existing oil in the engine to warm up so that it drains out smoothly.
2. **Shut off the Engine and open the hood.**

⚠ CAUTION **Used motor oil draining from the engine may be hot and could burn you. If your engine had been running for an extended time, it is best to let the engine oil cool before draining.**

3. **Locate the oil pan drain plug.** See the owner's manual for its location. Place a used-oil pan directly beneath the drain plug. You might even use a large piece of cardboard on the ground beneath the pan to prevent any spills from soaking into the ground/pavement.
4. **Remove the oil pan drain plug and allow the used oil to drain.** Removing the cap for the oil intake will allow for better flow.

Figure 3: The main action of the steps above is bolded, while supplementary discussion is in regular font. Note also that the precautionary label really stands out in this sample.

Language and Writing Style

The questions about “Audience” and “Context” earlier in this chapter can help guide you in making effective language choices. The following subsections include explanations of common linguistic features of instruction manuals along with tips for writing clearly and concisely in this genre.

Imperative Mood

Instructions, like commands, often use the imperative mood. To write in this way, address the audience directly using active voice and specific verbs. Imperative mood typically leaves out the subject (“you”) and positions the verb first.

The way you actually write the steps, sentence by

sentence, may seem contradictory to what previous writing classes have taught you. However, notice how professional instructions are written—they use the imperative (command, or direct-address) and a lot of the second person. That is entirely appropriate. You want to get your reader's full attention. For that reason, instruction-style sentences sound like these: "Press the Pause button on the front panel to stop the display temporarily" and "You should be careful not to ..."

Which of the following provides the clearest instructional step?

- Press the red button to begin playing the game
- When the red button is pressed, the game will begin
- The operator should press the button

Though a user could probably make sense of any of these sentences, the first one provides the clearest explanation of what action the user should perform because the action is the first thing mentioned. The second, passive construction does not specify who should press the button. The third example refers to a vague subject, the "operator," which may confuse the user.

Word Choice

When writing instructions, a careful consideration of word choice is important because in some cases, the user's safety is at risk. Always strive for clarity and concision. To make effective decisions about word choice, consider your primary audience's level of expertise and cultural background. You may find it necessary to:

- Define complex terms.
- Spell out acronyms the first time they are introduced (e.g., digital single-lens reflex camera, DSLR).
- Avoid using similes, metaphors, slang, jargon (unless it is defined in a glossary) or substitutions that may confuse users. Keep terminology consistent.
- Use plain language. In some cases, serious legal consequences can arise when a set of instructions is unclear. For more on plain language, see the website [plainlanguage.gov](https://www.plainlanguage.gov/index.cfm) (<https://www.plainlanguage.gov/index.cfm>).
- Include translations of the instructions into multiple languages.
- Use brief and informative headings and subheadings.

Consistency and Parallelism

Parallel structure, or parallelism, means using the same grammatical structure to present information or ideas. Parallelism often improves readability and aids consistency.

This numerical list of instructions contains a step that breaks parallel structure. Which of these steps seems different from the others?

1. Remove the screw to open the battery compartment.
2. Insert batteries by following the image on the

battery compartment.

3. Now you may close the compartment, and screw it closed.

Step three breaks the parallel structure of the list because it does not start with a directive verb.

Do the following headings use parallel structure? Why or why not?

- Installing batteries
- Turning device off/on
- How to charge your device

Keep your word choices as accurate and consistent as possible. There is no reason to make your audience wonder if “turn,” “twist,” “screw,” and “tighten” mean the same thing. If they do mean the same thing, do not introduce the synonym simply to vary word choice. If they indicate distinct actions/movements, it may be helpful to explain that, either in a note or a glossary.

Conclusions, Closing Sections, Appendices

After all the steps are completed, you must signal the completion of the task. End the instructions with positive comments about the product and/or the process the user just completed. Congratulate the reader on a job well done. Sometimes there is a phone number for a Help Line if further assistance is needed. You might also describe the finished product or indicate other tasks the reader may now complete with the same set of skills they used to complete the procedure.

The benefits can also be restated but make sure not

to use the exact words from the introduction. Readers do not like to read the same exact words/phrases/sentences in the conclusion as they did in the introduction because it feels like the writer was too lazy to actually work on the document.

Depending on the task completed in the instructions, you should include additional closing sections and/or appendices. For example, the instructions might require trouble-shooting advice, frequently asked questions, clean up and/or maintenance information, product specifications, or sources of additional information. References should be listed at the end as well.

Conclusion Examples

Conclusions for technical instruction reports are designed to provide audiences with additional facts, resources, or information that may be outside the scope of the report's process (or topic, as indicated by the title), but are nevertheless still important to a general understanding of the subject. In many cases, technical instruction conclusions help educate the audience as to what happens *after* the main process has ended.

When providing instructions in the conclusion, don't forget to rely on the verb-first sentence structure used to describe the action steps.

Conclusion Option A: Clean-Up Information

This conclusion style is appropriate for processes that create excessive waste/mess, require specific disposal instructions for hazardous substances (e.g. automotive oil; medical/chemical contaminants; nuclear materials, etc.), or require unique cleaning processes to preserve the integrity of tools, equipment, and/or the environment.

***Example Topic A: How to Make Extra Crispy
Chicken Wings in a BRAND X Air Fryer***
Cleaning-up

1. Remove the Teflon-coated racks and drip tray once your air fryer has cooled (approximately 20 minutes). Wash the trays by hand with a non-abrasive towel or sponge. Alternately, clean racks and trays in the dishwasher.
2. Remove the door of the air fryer by opening to a 45-degree angle, then gently pulling upward; the hinge of the door should release easily. Wipe both sides of the door with a non-abrasive towel or sponge. Do not fully submerge the door in water, and do not place the door in the dishwasher! Doing so may cause water to collect in the door, which can degrade components and decrease longevity.
3. Use a non-abrasive towel or sponge to wipe the interior of the air fryer. For a deep clean, lightly soap the towel/sponge, wipe the interior of the air fryer, rinse towel/sponge until the soap is removed, then wipe the interior of the air fryer again.

**Conclusion Option B: Maintenance or Service
Information**

This conclusion style is appropriate for processes

involving automated machinery, electronics, or other physical components that should be inspected and/or serviced on a regular basis.

Example Topic B: How to Play Three Beginner Songs on Your New Electric Guitar

Maintaining Your Guitar's Sound and Appearance

- Guitar strings will eventually need to be replaced. A general rule is to replace strings every 3 months, or after 100 hours of playing. The material/gauge of your strings, combined with your individual playing style, will determine how quickly your strings stretch and degrade. If you notice your guitar will not stay in tune or sounds dull, these can be indicators that it is time to change your strings.
- When changing strings, use this time as an opportunity to inspect your guitar for loose knobs/screws on the headstock, pickups, pick guard, output jack, bridge, backplate and neckplate. Use a damp cloth with a mild detergent to clean the front and backside of the neck, fretboard, pick guard, and tuning pegs. Oil from your hands can build up in these areas, so regular cleaning will ensure that your guitar plays consistently while also continuing to look visually appealing.

- Store your guitar in an upright position so that the neck is not leaning at a sharp angle. Leaving your guitar at an angle for weeks or months can warp the neck, as can storing your guitar in an overly humid environment. Guitar cases—both soft and hard-shell—protect against humidity and collision damage. If storing in a hard case, do not horizontally stack cases on top of one another; always store guitars vertically.

Conclusion Option C: Frequently Asked Questions (FAQ)

This conclusion style is appropriate for providing audiences with additional information that will allow them to avoid common mistakes, or to answer common questions about the steps, materials, tools/equipment, or the processes' practical applications. This style is often presented in a question/answer format.

Example Topic C: How to Start Pepper Seedlings Indoors Before Transferring to an Outdoor Garden

FAQ

Q: None of my pepper seeds germinated. What did I do wrong?

A: Peppers are notorious for being somewhat difficult to germinate (but not as difficult as eggplants). If after 3 weeks none of your peppers have sprouted, start the process over, but soak your pepper seeds in water for 24 hours before planting.

Additionally, some gardeners find that lightly scouring both sides of the seed with sandpaper or an emery board can improve germination rates.

Q: I don't want my peppers to be overly hot. Is there anything I can do to limit how fiery a pepper will be?

A: Much of a pepper's heat level (or capsaicin content) is a product of genetics, so if a pepper has been bred to be spicy there is no way to remove this characteristic in a single generation. However, watering your pepper plant regularly will help moderate capsaicin production. By contrast, if you want your peppers to be as hot as possible, you should limit watering. If your desire is to produce hot peppers, wait until your pepper plants looks a little droopy—or until the edges of the leaves just start to dry—before watering. The stress on the plant encourages capsaicin production.

Q: What is the difference between a red and a green pepper?

A: Maturity. Most green peppers will change colors as they ripen, eventually, turning red, orange, yellow or even purple. (Peppers are fruits, after all!) In addition to the color change, the flavor of a pepper also develops over time. Peppers become sweeter as they age, and a red, yellow, orange, or purple color typically indicates that sugar content is increasing and chlorophyll decreasing. This means that a mature pepper will taste less “green” or “vegetal” than an immature pepper and, in general, a mature version of the same pepper (e.g. red jalapeño) will be somewhat less spicy than the immature pepper (e.g. green jalapeño) due to the additional sugars.

Conclusion Option D: Troubleshooting Advice

Similar to the FAQ, this conclusion style can provide specific advice for avoiding both common and uncommon mistakes, or for navigating around predictable obstacles that may arise during the process. Be aware that this conclusion style does not replace traditional safety labels (i.e., notice, caution, warning, danger) but should be used in conjunction with them. Troubleshooting advice may also serve to address issues, concerns, or difficulties that might arise toward the end of a process.

Example Topic D: How to Safely Drive a Standard Transmission Automobile**Troubleshooting Driver Frustrations**

- If you're experiencing difficulty mastering the clutch and keep stalling the engine, the solution may be to become more familiar with your clutch. Many cars have clutches that respond somewhat differently underfoot, requiring more or less force to depress. Learning the unique behavior of your car's clutch will help in the mastery of this skill.

Warning: Only practice driving in safe environments, such as empty parking lots.

To gain the needed familiarity, release the emergency brake, start the car and place it in first gear. Keep the clutch depressed. Then, very slowly and without pressing the gas, release the clutch until you feel the car begin to move on its own. Keep the clutch in this mid-way position for a few seconds and make

a mental note of how much you released the clutch to get here. Then fully engage the clutch to slow your momentum. Repeat this until you consistently find the spot in the clutch where the car begins to roll on its own. From this position, slowly depress the gas pedal with your right foot while simultaneously—but slowly—releasing the clutch the rest of the way.

- If after stalling you quickly try to restart the car but turning the ignition does not cause the engine to fire, one of two things may be happening:
 1. You may own a model car that requires the clutch to be fully depressed/engaged when starting the car;

or

2. You may own a model car that requires you to place the ignition in the full OFF position (i.e. cutting all power to the car but not removing the key) before a restart is allowed.
- Driving in mud or snow can prove tricky in any automobile, but some drivers notice that standard transmission cars are more likely to “peel out” in mud or snow. If you’re

experiencing difficulty getting traction in mud or snow when pulling away from a parked location, place the car in second gear. While drivers are generally instructed to begin accelerating from first gear, in some weather conditions starting from second gear may be offer potential for more control.

Conclusion Option E: Sources of Additional Information

This conclusion style provides the audience with additional resources (books, articles, websites, databases, etc.) should they want to satisfy their curiosity and learn more about the process itself.

Example Topic E: How to Pick the Right Winter Resort for Your Family Vacation

Sources of Additional Information

The following channels and websites offer in-depth analytics and reviews of ski/snowboard resorts:

- JB Boudhens
(https://www.youtube.com/channel/UCY&D*D)

This video channel offers reviews of winter resorts using 10 different criteria. Boudhens is an amateur snowboarder who provides casual, unscientific but earnest reviews of resorts with copious Go-Pro footage of Boudhens and friends performing tricks. Boudhens's channel is unique in that he is more

interested in assessing new school terrain parks and stunt features than evaluating backcountry and/or off-piste options.

- Powderhounds
(<https://www.powderhounds.com/>)

The definitive online site for winter resort reviews, Powderhounds uses an eight-criteria scale to assess the overall character of each winter resort. Powderhounds provides reviews of resorts both in the United States and beyond, and is also a reliable site for determining how family-friendly a resort might be. Also offers helpful breakdowns of terrain difficulty percentages.

- OpenSnow (<https://opensnow.com/>)

Because not all winter resorts receive equal snow amounts or storm frequency, ensuring that the resort you're planning on patronizing will in fact have the conditions you are expecting is essential research. OpenSnow provides global resort snowfall totals, base depth, current conditions, as well as storm predictions. Its network of local skier/meteorologists provide reliable daily weather forecasts by incorporating multi-sourced models and imaging tools. Snow estimates are to be trusted as expected minimums, as Open Snow's conservative predictions regularly underestimate snowfall totals.

Conclusion Option F: Product Specifications

When a process focuses on assembling new equipment or machinery, this conclusion style provides technical information such as the final weight of the

assembled product, the dimensions of the assembled product, materials and components of note, energy usage data, warranty information, and any special instructions for transportation/care of the product.

Example Topic F: How to Assemble the Trash-Compactor 1000X

Product Specifications

1. Finished dimensions: 10' x 6.25' x 8.5' (length x width x depth)
2. Finished weight: 2,389 pounds
3. Maximum Capacity: 350 pounds/load
4. Estimated electricity usage/load: 0.3 kWh

Conclusion Option G: Tips and Tricks

The conclusion style provides audiences with general advice that may improve their ability to perform the described process or develop a related skill. This option can also be used to combine elements of other conclusion styles (for example, providing clean-up instructions, maintenance routines, and troubleshooting advice in the same conclusion), or to address variations on the process that might allow the audience to make adjustments and changes (e.g. adding optional ingredients to a recipe; altering fermentation temperatures used by breweries and distilleries to achieve different ester profiles).

Example Topic G: How to Forage Edible Chanterelle Mushrooms

Tips and Tricks

Finding chanterelle mushrooms can be difficult enough, but cleaning them is another story. The

advice below will help make the process efficient while also ensuring that the quality, taste, and integrity of your mushrooms is not compromised. Handle your mushrooms gently; they are both rare and fragile, and should be treated as such.

1. Do not wash or clean mushrooms until you are ready to consume them.
2. Store unwashed mushrooms in a paper bag in the refrigerator.
3. Do not fully submerge chanterelle mushrooms in water when washing them. Most mushrooms absorb water readily, which can affect the way they cook and their final taste/texture.
4. Use a toothbrush or medium-stiff bristled paint brush to dust away any dirt that has accumulated in the chanterelle's false gills, on the cap, and along the stem.
5. Wipe mushrooms down with a damp paper towel to remove grit.
6. Wet a second toothbrush/paintbrush in a bowl of water and clean the false gills a second time.
7. Wipe a second time with a damp paper towel, then place on a dry towel until ready to cook.

8.5 Graphics

Probably more so than in any other form of writing (except maybe comic books), graphics are crucial to instructions. Sometimes, words simply cannot clearly explain the step without the assistance of images. Illustrations are critical to readers' ability to visualize what they are supposed to do. Your reader will need graphics to refer to and act as a guide through the process. Remember to label the graphics as Figure 1, Figure 2, and so on, and then title each graphic so readers know what they are looking at. Graphics can never fully replace text, and they **MUST** be referred to within the step-by-step part of the instructions, e.g., “Tighten the bolt located to the left of the main shutoff valve (see Fig. 5) by turning the socket wrench clockwise.”

In a technical writing course, instructions usually require you to include illustrations or other kinds of graphics—whatever would normally be used in the instructions. The problem of course may be that you do not have access to graphics that would be suitable for your particular instructions, and that you do not feel wildly confident in your artistic abilities. There are ways to overcome these problems! Take a look at these suggestions about [graphics](https://www.prismnet.com/~hcexres/textbook/graphics.html) (<https://www.prismnet.com/~hcexres/textbook/graphics.html>). You will see not only suggestions for creating graphics, but also requirements on their format. (See [chapter 5](#) for more information on graphics and design.)

Given the ubiquity of smart phones, and the increasing quality of the cameras they include, it should be no problem to produce high quality graphics for your instructions for a class project. If you are creating instructions as part of your job, you may need to hire

a professional photographer or illustrator, and/or rely on drawings by engineers. In any case, it is crucial that you do not simply copy and paste images from internet search. (See [chapters 4 and 10](#) for the ethical practices regarding the use of graphics.)

8.6 Design

Document design refers to the way information is organized and presented. Because visual elements require less time to process, users will typically notice—and respond to—quality of design before quality of content. Minimally, design includes making choices about layout, order of information, font size, typeface, headings, color, and white space. Design elements should guide the user through the instructions smoothly. This means making the document scannable; a scannable document allows users to navigate through the content to locate specific information. As with any document, decisions regarding design should consider the audience, purpose, and overall ease of use. (See [chapter 5](#) for more information on document design.)

Consistency/Repetition

Using design elements in a uniform way throughout the entire document guides users by giving them a sense of what to expect (e.g., the same typeface and size for all headings; the same layout from page to page).

Contrast

Use design elements to highlight specific information or

features of the instructions (e.g., capitalizing a word for emphasis; placing a box or border around an item; changing colors for emphasis). Contrast is primarily effective when a document uses consistency overall. If there is a lack of consistency, it is more difficult to create contrast.

Alignment

Organizing items on a page with horizontal and/or vertical alignment creates hierarchy and structure, and can help achieve balance, contrast, or consistency.

Balance

Distribute items evenly across a given space. To achieve this, each item's weight--that is, the tendency of the eye to gravitate toward an item--should be considered. For example, since an image weighs more than text, decisions about image placement should consider how to balance its weight against other items in order to prevent visual confusion.

White Space

Use white space to create a professional, balanced document. Rather than indicating the color of the space, this design element refers to an absence of images and text. White space helps distinguish between individual items and groups of items (i.e., sections of the manual) and makes scanning documents easier.

Grouping/Proximity

Place related images or content close to one another. For example, grouping together images of all the materials needed to complete the given task.

Color

Select colors to create contrast and emphasis, to guide readers across space, and to design a visually pleasing document. You should consider the document overall in order to create a consistent color scheme. For example, if you want to use blue in your document, you will want to ensure that it is used consistently and complements other document colors. This is particularly important when integrating color graphics and/or images.

Headings

In your instructions, make good use of headings. Normally, you 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. Take a look at the examples at the beginning of this chapter. See [headings](https://www.prismnet.com/~hcexres/textbook/headings.html) (<https://www.prismnet.com/~hcexres/textbook/headings.html>) for common requirements.

Lists

Similarly, instructions typically make heavy 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. See [lists](https://www.prismnet.com/~hcexres/textbook/lists.html) (<https://www.prismnet.com/~hcexres/textbook/lists.html>) for common requirements.

Number, Abbreviations, and Symbols

Instructions also use plenty of numbers, abbreviations, and symbols. Follow the link for [guidelines](https://www.prismnet.com/~hcexres/textbook/gram2.html#numbers) (<https://www.prismnet.com/~hcexres/textbook/gram2.html#numbers>) on these areas.

Precautionary Statements/Warnings

You must alert readers to possibilities in which they may damage their equipment, waste supplies, cause the procedure to fail, injure themselves or others—even seriously or fatally. Companies have been sued for missing, poorly written, and out-of-place warnings. Figure 4 provides an example of a clear precautionary statement.

Mount the NID

Follow these instructions to mount the network interface device (NID) on the wall.

⚠ WARNING Always wear safety goggles when using hand tools. Misuse of the tool or ricochet from power tools can result in eye injury, including blindness.

1. Select the location for the NID. This should be close to an electrical ground and locate in a place where the ISP's wire will reach the NID. The electrical ground can be identified as a copper wire coming from the electric company's equipment on the exterior of the home.
2. Drill the NID into place using the screws. You will need to drill screws into the slots on the top and bottom of the NID.

Figure 4: The precautionary statement stands out and comes before any steps are taken. The warning is placed at the beginning, before any of the steps, because missing the warning could result in material damage or bodily harm.

All procedures that require warnings must also have precautionary statements at the beginning as part of the introductory material. Warnings must also be dispersed throughout the procedure. It is especially important to include warnings *before* a step where damage or injury could occur. Do not create instructions where the user has already completed the process and injured themselves before the warning comes. If someone is injured as the result of misplaced, hidden, or omitted warnings, the technical writer can be held accountable. Notices, on the other hand, including user information and tips, are typically placed after a step (see figure 5 below).

Replace the Guitar Neck

If you followed the previous steps, your fretboard is now scalloped. The only thing left to do is put your guitar back together. To put it back together, follow these steps:

1. Remove the tape from the frets.
2. Insert the neck back into the body.
3. Put the metal panel back in its place and insert the screws.

Notice: Make sure that you put each screw firmly back in place. The screws keep the neck secure inside the body. If the screws are not installed correctly, the guitar could develop intonation problems.

4. Restring the guitar.

Figure 5: In this example, the notice is indented and follows the step because the information in the notice does not concern material or bodily harm.

Also, remember legal and ethical obligations. It is the writer's job to protect the reader from harm or damage. That being said, any set of instructions needs a careful balance of warnings strategically placed throughout the document. If the writer overuses them, there is a risk of scaring the user. Alternatively, a reader may become numb to the warnings if there are too many of them, and may start ignoring the warnings.

If the writer under-uses warnings, there is a risk of someone getting injured. Strike a balance.

There are standard precautionary statements that are color-coded and used for danger, warnings, cautions, and notes or notices (see above, or you may review them here: [Precautionary Statements](https://en.wikipedia.org/wiki/Precautionary_Statement)) (https://en.wikipedia.org/wiki/Precautionary_statement) . You will be expected to incorporate information from this link into the instructions you create for the course.

8.7 Revision Checklist

As you reread and revise your instructions, watch out for problems such as the following:

- Make sure you provide real instructions—explanations of how to build, operate, or repair something.
- Write a good introduction—in it, indicate the exact procedure to be explained, indicate audience requirements, and provide an overview of contents.
- Make sure that you use the various types of lists wherever appropriate. **In particular, use numbered vertical lists for sequential steps.**
- Use headings to mark off all the main sections and subheadings for subsections. Remember that no heading "Introduction" is needed between the title and the first paragraph.
- Use precautionary statements as appropriate.
- Use graphics to illustrate any key actions or objects.
- Provide additional supplementary explanation of the steps as necessary.
- Remember to create a section listing equipment and supplies, if necessary.

8.8 Student Samples

Below are links to a number of sample sets of instructions written by students at Oklahoma State University.

- [Breadboard and Soldering Basics: Making an Electron Harmonix LBT - 1](#) by Austin Johnson
- [Driving Motor with an Ultrasonic Sensor: An Arduino Project](#) by Emilie Jenkins
- [How to Create a PID DC Motor Position Controller](#) by Diego Colon Serrano
- [How to Record Vocals in Ableton Live 9](#) by Daniel Rodriguez.
- [How to Solve a Rubik's Cube](#) by Nick Burt

8.9 Activity – Sample Technical Instructions Analysis

Find a set of sample instructions. Look in your junk draw, under the refrigerator, or wherever those instructions end up after you have finished setting up the product. As a last resort you can look online.

The sample you find should be a set of instructions, not specifications or a procedure. The main difference between instructions and specifications is that specifications are written for experts in a particular field. Instructions are typically for novices. User manuals are a separate category that often contain instructions within them. If you find a manual for this assignment, be sure to concentrate on the instructions part.

Use the questions below to analyze the sample instructions you find. Note that professional instructions do not always use the same headings as those below. For example, they almost never use a heading of “Introduction,” but rather include introductory information under other headings.

Introductory Sections

Analyze the content of the introductory sections. Identify and explain each of the elements of the introduction (see above). Are there any left out? Why? Is there anything in the introduction that does not seem to be covered by the elements described above? What is their purpose? Are there any other features that are especially noteworthy? Who is the audience for these instructions? Include analysis of any precautionary statements here.

Body Sections

Analyze the body sections. Identify and explain how the instructions meet (or fail to meet) the requirements for the body section identified in this book. Do the instructions contain anything not mentioned in this chapter? What and why? Are there any other features that are especially noteworthy?

Conclusion Sections

Analyze the conclusion sections. How do the sample instructions measure up to what is described above? What types of information is contained in the conclusion? Is

there anything not mentioned here? Any other noteworthy features?

Graphics and Design

Analyze the design and graphics. (See [chapter 5](#).) Briefly explain how the instructions measure up to what you learned in the design chapter. How do they adhere, or how do they miss the mark? Explain. Do they use a variety of graphics? Are there enough? Too many? Anything else noteworthy about graphics or design?

[1] Johnson-Sheehan, Richard. *Technical Communication Strategies for Today*. Second Edition. Pearson, 2015.

[2] See Van Ittersum, Derek. “Craft and Narrative in DIY Instructions.” *Technical Communication Quarterly*, vol. 23, 2014, pp.227-246.

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Chapter 9: Proposals

Staci Bettes

Chapter Synopsis

This chapter defines when, where, and how you should use a proposal. Before drafting, you define some preliminary qualities, including if the proposal is written for internal or external audiences, is solicited or unsolicited, and if you are proposing a known or unknown solution. Next, the chapter discusses further considerations for your audience, followed by a breakdown of common sections present in most proposals. As proposal content can vary depending on the type and purpose and audience, a section is included with additional, project-specific sections which could be included in your proposal, such as client analysis and implementation. The standard design and format of a proposal is discussed, with emphasis on adaptability for the reader. The end of this chapter contains a revision checklist for proposals.

9.1 Introduction

This chapter focuses on the *proposal*—a type of document that gets you or your organization approved or hired to complete a project, or requests time and resources to study difficult problems. The proposal is your opportunity to pitch your idea for change (oftentimes an improvement) within an organization, or to draft a research plan to

investigate an issue that is of concern to your institution. Proposals often demonstrate that a problem or opportunity exists that needs attention, and addresses a very specific audience, one with the authority to move your suggestions forward.

A *proposal* is an offer or bid to complete a project for someone. They may contain other elements—technical background, recommendations, results of surveys, information about feasibility, and so on. But what makes a proposal “a proposal” is it asks the audience to approve, fund, or grant permission to do the proposed project. It should contain information that would enable the reader to decide whether to approve a project, to approve or hire you to do the work, or both. To write a successful proposal, put yourself in the place of your audience—the recipient of the proposal—and think about what sorts of information that person(s) would need in order to feel confident having you complete the project.

It is easy to confuse proposals with other kinds of documents in technical writing. Imagine that you have a terrific idea for installing some new technology where you work, and you write up a document explaining how it works, showing the benefits and then urging management to install it. All by itself, this would *not* be a complete proposal. This is a feasibility report, which studies the merits of a project and then recommends for or against it. However, all it would take to make this document a proposal would be to add elements that ask management for approval for you to go ahead with the project. A main difference between a proposal and other documents is that a proposal will sell the *writer* (or the writer’s organization) as the one to complete a future project.

In a technical writing course, the proposal assignment is an opportunity for you to present an idea you have

to improve a certain aspect of a company, organization, center, or other business. It is written to a specific, known reader, who has the power to approve or deny your project. A good proposal often leads to conducting research and creating a report; therefore, whatever topic you choose, you must be able to conduct research on it, which will be integrated into that final report. In addition to primary research such as interviews and surveys, if your technical writing course requires that you integrate scholarly research into your final report, choose a topic for which you can readily find such material.

Not all research topics are appropriate for technical writing. Topics that are based on values and beliefs do not fall into the category of *technical*. Historical and literary topics do not qualify. For example, a proposal on the topic “*Gone with the Wind* is the best book ever written” would not be appropriate, as you cannot prove and verify an opinion—everyone has their own taste. However, you could write a proposal to research the feasibility of declaring *Gone with the Wind* the “official novel” of Atlanta, Georgia.

9.2 Types of Proposals

Consider the situations in which proposals occur. A company may send out a public announcement requesting proposals for a specific project. This public announcement—called a request for proposals (RFP)—could be issued through websites, emails, social media, newspapers, or trade journals. Firms or individuals interested in the project would then write proposals in which they summarize their qualifications, project schedules and costs, and discuss their approach to the

project. The recipient of all these proposals would then evaluate them, select the best candidate based on the plan which best suits the company's needs, and then work up a contract.

But proposals can also be less formal. Imagine that you are interested in doing a project at work (for example, investigating the merits of bringing in new technology to increase productivity). You met with your supervisor and tried to convince her of this. She might respond by saying, "Write me a proposal and I'll present it to upper management." This is more like the kind of proposal you will write in a technical writing course.

There are several aspects of the proposal that you need to determine before drafting. Identifying these factors are vital to creating a proposal which will be accepted—whether the proposal is written for *internal* or *external readers*, the proposal is *solicited* or *unsolicited*, and if the solution is *known* or *unknown*.

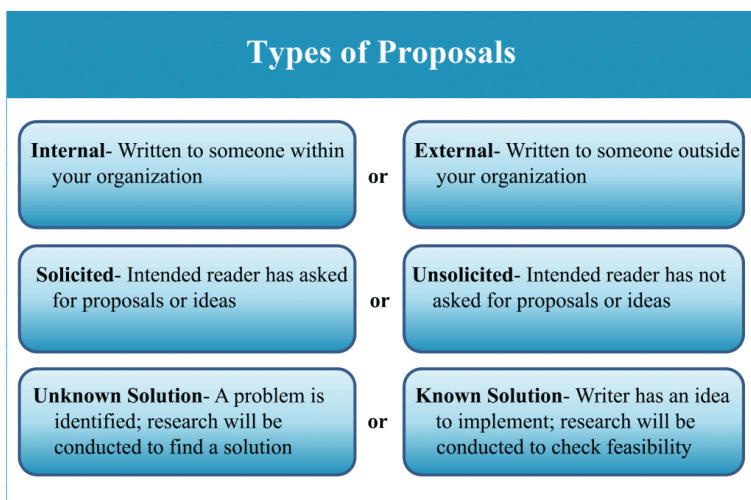


Figure 1: Types of Proposals

Internal or External

- **Internal:** A proposal written to someone within your organization (a business, a government agency, etc.). With internal proposals, you may not have to include certain sections (such as qualifications) or as much information in them. For example, if your manager asks for ideas to improve the average time it takes to return customer inquiries, you would create an internal proposal.
- **External:** A proposal written from one separate, independent organization or individual to another such entity. With an external proposal, you will need to not only persuade the reader that you have a solid plan, but establish your credibility with the reader. The typical example is an independent consultant proposing to do a project for another firm.

Solicited or Unsolicited

- **Solicited:** The recipient has requested the proposal. If you have been asked to submit a proposal, it is considered solicited. The solicitation may come in the form of a direct verbal or written request, but normally solicitations are indirect, open-bid to the public, and formally published for everyone to see. A request for proposal (RFP), request for quotation (RFQ), and invitation for bid (IFB) are common ways to solicit business proposals for business, industry, and the government.

Proposals can also be solicited on a local level. For example, you could be explaining to your boss about a new software you think should be installed in the office; your boss might get interested and ask you to write up a proposal that offered to do a formal study of the idea.

- **Unsolicited:** The recipient has not requested your proposal. With unsolicited proposals, you sometimes must convince the recipient that a problem or need exists before you can begin the main part of the proposal. Unsolicited proposals are the “cold calls” of business writing. They require a thorough understanding of the market, product and/or service, and their presentation is typically general rather than customer-specific. They can, however, be tailored to specific businesses with time and effort, and the demonstrated knowledge of specific needs or requirement can transform an otherwise generic, brochure-like proposal into an effective sales message.

Getting your tailored message to your target audience is often a significant challenge if it is unsolicited. Unsolicited proposals are often regarded as marketing materials, intended more to stimulate interest for a follow-up contact than make direct sales. A targeted proposal is your most effective approach, but you should recognize the importance of gaining company, service, or brand awareness as well as its limitations.

Known Solution or Unknown Solution

- **Unknown Solution:** You can identify a problem, but are unsure what the solution is without further inquiry. Your proposal will focus on describing the problem, showing need for improvement, and planning research to discover the most effective solution. With an unknown solution, you may have a *hypothesis*—an idea that you think will solve the problem. However, this “educated guess” needs to be proven or disproven through research. The findings and recommendations will be included in a future report (e.g. recommendation report). For example, you notice that the office computers are lagging and crashing often, but are unsure why. You would propose research on making the computers more efficient.
- **Known Solution:** Instead of focusing on a problem that needs research, your proposal focuses on feasibility—i.e. can a specific solution resolve the problem, and what is the best way to implement the specific action, item, or idea? You propose research on areas such as cost, effectivity, location, and other factors connected to your solution. An example of a known solution is proposing your department replace a dozen 2016 Dell computers with the newest MacBook Pro model in an effort to improve computer speed, decrease user frustration, and increase employee productivity.

9.3 Proposal Purpose and Audience

Remember that, in a technical writing course, the proposal assignment serves several purposes:

- It gives you some experience in writing formal requests.
- It gets you started planning your major assignment.
- It gives your instructor a chance to work with you on your project, to make sure you have a viable topic.

For the second and third reasons, you need to include specific elements in your proposal (as noted in your assignment sheet), some of which may not seem appropriate in a real-world proposal.

The proposal is often the beginning of a weeks-long research and writing process that goes through many stages until it gets to the end point: the recommendation report. In this case, you only submit the proposal once during this process; in a real-world setting, you may have to submit a proposal multiple times—making corrections, adding details to your research plan—before you receive approval to move forward with the project. And even after submitting the proposal and receiving permission, you may need to write and submit additional documents along the way such as: a progress report, an outline, an annotated bibliography, a graphics draft, a recommendation report draft, and a final recommendation report. Be careful to use the term *proposal* only if you are specifically referring to the proposal stage of your project.

Another point to keep in mind relates to the audience

for different kinds of documents that may be produced for the same project. Consider the example of a proposal written to a supervisor at a solar power company suggesting the creation of a policy manual for residential installers. The proposal's audience may be an executive, whose knowledge of the technicalities is very broad. Let us imagine the executive approves the proposal and requests completion of the manual, which will be produced well after the proposal. The manual's audience is the technicians, who may have more specialized knowledge than the executive. The content and language used for these two different audiences will need to be adjusted to fit the writing situation. (See chapter 2)

To write for the specific document's audience, it is a good idea to define your reader and sketch out some qualities about them before you begin drafting. This information will help you effectively persuade the reader to approve your proposed project, and help you stay on task writing for that reader. It can also help you shape your proposed research strategy and guide the type of information you include in your proposal.

Ask yourself:

1. **Who is your reader?** Your reader should be someone with decision-making authority over your problem. Theoretically, they could implement any changes you ultimately suggest. They are an action-taker in a corporation, organization, business, or agency.
2. **What type of reader are they?** Expert, technician, executive, gatekeeper, and/or non-specialist?
3. **What is their background and knowledge**

level on the topic? What are their needs and interests? What will likely persuade them to approve your proposed idea? Wants? Values? For example, if you want to request time and resources to investigate whether changing your company's workweek schedule from a standard five days to four extended work days, you would want to frame the idea in terms that management would be interested in—increases in productivity, savings in building upkeep and utilities, and so on.

9.4 Common Proposal Sections

The following provides a review of the sections you will commonly find in proposals. Do not assume that these sections must be in every proposal you write, nor that they have to be in the order they are listed. Refer to the assignment sheet provided by your instructor (or if on the job, review all content and submission requirements) and consider other kinds of information unique to your topic that should be included in your particular proposal.

Most proposals include the following sections: Introduction; Description of the problem, opportunity, or situation; Background of the problem; Method and procedure; a Schedule; Cost and required resources; Benefits and feasibility; Conclusion; and References.

Common Proposal Sections

Introduction

**Description of the
Problem**

Background

**Method and
Procedure**

Schedule

**Costs and
Required Resources**

Benefits and

Figure 2: Common Proposal Sections

Introduction

Plan the introduction to your proposal carefully. Make sure it contains all the following rhetorical moves (but not necessarily in this order) that apply to your particular proposal:

A) *Define the subject.* Make it clear to the reader what the topic will be.

B) *State the purpose* of the document. The purpose of proposals is typically to request time and resources to study a problem, develop a new product, or investigate previously proposed solutions, etc.

C) *State the main point* of the document. The main point is often to convince your reader (usually a supervisor or client) that the proposed project is deserving of approval. Be clear and concise about why you wrote the proposal and what action you want the reader to take.

D) *Stress the importance* of studying this problem or implementing your solution. The importance may relate to the topic's urgency.

E) Develop at least *one brief motivating statement* that will encourage the recipient to read on and to consider approving the project (especially if it is an unsolicited or competitive proposal).

F) *Forecast the organization* of the proposal. Give an overview of the contents in the document.

Description of the Problem, Opportunity, or Situation

Often occurring just after the introduction, this section

discusses what has brought about the need for the project—it introduces, then states and discusses the problem—what problem, what opportunity exists for improving things, what the basic situation is. It is helpful to cover the 5 W's of the problem (*who, what, where, when, and why*). For example, management of a chain of day care centers may need to ensure that all employees know CPR because of new state mandate. You would explain the mandate, that all employees are not yet properly trained, and how this can affect child safety and state licensing.

Background of the Problem

You may also want to include background on the problem. While a known audience for the proposal may understand the problem very well, writing the background section is useful in demonstrating your particular view of the problem. In these cases, you can give background information as part of the description of the problem, the causes of the problem, previous solutions to the problem, and the consequences—both short and long term—of leaving the situation unaddressed. On the other hand, if the proposal is unsolicited, a separate background section is almost a requirement—you will need to convince the audience that the problem or opportunity exists, has urgency, and should be addressed in a timely manner.

Method and Procedure

In most proposals, you will need to explain how you will go about completing the proposed work. This acts as an additional persuasive element; it shows the audience you have a sound, thoughtful approach to the project. Also,

it serves to demonstrate that you have the knowledge of the field to complete it. Often, the method and procedure section begins with several, tangibly stated research goals before being divided into three or more individual *phases*. For example, you might state that you want to “compare OSU’s dining options to those of other universities” or “interview at least two professional experts in the field.” The individual phases then outline how research will be performed as a way of creating a comprehensive approach to the topic. (See chapter 10 for different types of research) For each phase, you will identify the type of research you will perform and any critical details associated with it (e.g. Why is a certain database or website reliable? Who aggregates the information, how long have they been doing so? Do they have an agenda? Or why was a certain person chosen to be interviewed? What can you disclose about their professional background that will convince the reader of your proposal that this is an appropriate person to interview and a good use of your time?). In addition to these major and minor details, you will also want to reveal the deliverables or outcomes expected, and justify your research decisions.

Schedule

Most proposals contain a section that shows not only the projected completion date but also key milestones for the project. If you are doing a large project spreading over many months, the timeline would also show dates on which you would deliver progress reports. (See chapter 11 for Progress Report content and style) It is often helpful to *back plan* your schedule—work backwards from your due date to set important deadlines. If you cannot cite specific dates, cite amounts of time for each phase of the project.

Costs and Required Resources

Most proposals also contain a section detailing the costs of the project. With external projects, you may need to list your hourly rates, projected hours, costs of equipment and supplies, and so forth, and then calculate the total cost of the complete project. Internal projects, of course, are not free, so you should still list the project costs—hours you will need to complete the project, equipment and supplies you will be using, assistance from other people in the organization, and so on. These costs and resources are based on your needs to complete the research, not for implementing your solution—that information will appear in the report.

Benefits and Feasibility of the Proposed Project

Most proposals briefly discuss the advantages or benefits of completing the proposed project. This acts as a type of argument in favor of approving the project. There is little reason why your proposal should be accepted if there are no meaningful benefits. Thus, be sure to show that your solution will result in substantial benefits for the organization. Some proposals discuss the likelihood of the project's success. In an unsolicited proposal, this section is especially important—you are trying to sell the audience on the project, so your stated benefits should appeal to the reader's wants, needs, and values.

Conclusion

The final paragraph or section of the proposal should bring readers back to focus on the positive aspects of the project.

In the final section, you can urge them to contact you to work out the details of the project (provide contact information, even if listed at the beginning of the document), remind them of the benefits of doing the project, and maybe make one last argument for you or your organization as the right choice for the project.

References

The reference page is a separate page where you list any and all source information used in your proposal, properly formatted, using a standard format in your field. List information sources—citations for specific books, articles, reference works, and other kinds of sources used in your report.

Project-Specific Sections

The preceding sections are typical or common in written proposals, not absolute requirements. Always ask yourself what else might your audience need to understand the project, the need for it or the benefits arising from it, your role in it, and your qualifications to do it. What else do they need to see in order to approve the project and to approve you to do it? Some special project-specific sections are listed in the next section.

9.5 Project-Specific Sections

Depending on the writing situation, your proposal may need to include other specialized sections. Your supervisor might ask you to include any of the following sections:

Audience or client analysis, Solution, Method of operation, Description of proposed work/Project results, Research, Implementation, Team management, Risk management, Legal clauses, and/or Appendices.



Figure 3: Project-Specific Sections Which May Appear in Your Proposal

Audience/Client Analysis

Describe the audience of the final recommendation report (which may be different than the audience for the proposal, especially if the proposal is an *internal document* [requesting time and permission from someone within the organization] but the final report is an *external document* [the recommendation can only be put into action by someone outside the author's organization]). You may need to discuss for whom the report is designed, their titles and jobs, their technical background, and their ability to understand the report.

Solution

If you are writing a known-solution proposal, you may want to include a section which focuses on your solution. To create this section, you will need to do some research on topic and use published source information. This section will not *present* the solution to your problem. However, it will discuss similar problems and solutions that have been attempted in the past. This research will provide information that may be used to formulate a solution relative to your specific problem.

Methods of Operation

In known-solution proposals, this section will tell how the solution will fit into and be used as a functional part of the day to day operation of the company/business. Detail the date you expect to launch the solution into the operation the company, the place from where the solution will operate, how it will operate, and who will be involved (identify their responsibilities, duties, and any titles, certifications, degrees, etc., needed).

Description of the Proposed Work (Results of the Project)

Many proposals describe the finished product of the proposed project. In a technical writing course, this means describing the written document you propose to write (a.k.a. recommendation report) as well as its audience and purpose; providing an outline, and discussing items such as length, use of graphics, binding, and so forth. In this scenario, there may be other work such as conducting

training seminars or providing an ongoing service. At this early stage, you might not know all that it will take to complete your project, but you should at least have an idea of some of the steps required.

Research

Provide research on your topic. Your sources should be current, within the last two (2) or three (3) years if possible. It may be helpful to focus on research journals or newspapers for published articles, published interviews, published speeches, etc. for topics which need then newest statistics and information. You will need at least three or four documents that address a problem similar to the one you have chosen. Although you will not find your exact situation/problem, you will find documents about similar problems. These documents should have similar populations, environments, workforces, etc. For example, if you propose to implement a shuttle bus service from the parking lot to your work place for efficiency, you may find documents from other workplaces, with similar circumstances, which experienced similar problems and solved them by providing shuttle bus services. The research will provide you with information that validates your topic as a problem and your solution, as well as validating your proposed implementation, methods of operation, costs, and benefits as credible.

Implementation

In known-solution proposals, you may describe when, why, and how the solution will be used for the first time. This is similar to the Methods of operation section; however, it

focuses on a trial period to see if the solution is feasible as planned. Thus, you will pick a time that does not impact the normal operation of existing programs/patterns of operation/etc. In addition, describe the logics: the location, who will be involved, costs, what is expected to happen, the date and time, the duration, and so on. Explain why you chose this time for implementing the solution. Identify how you will observe and record the progress during this trial.

Team Management

If working in teams, this section addresses four main points: a) *When, where, and how frequently* will your group meet to discuss the ongoing progress of the project? b) When not meeting in person, what methods and technologies will the group use to communicate with one another? c) How will conflicts between group members be resolved? d) What roles will your group members serve in the group structure? (See chapter 11 for information on team roles and management)

Risk Management

This section lists possible issues that could occur during the implementation of your proposal plan, with means to overcome these issues. Information will include possible roadblocks and what you will do to overcome these setbacks. These can be technical hurdles, research-based issues, scheduling obstacles, budgetary limits, or even problems implementing your solution.

Legal Clauses

Some proposals include legal clauses which outline any legal or contractual agreements made for the project. In the workforce, agreements are often made based on performance, meeting deadlines, and/or quality of work, which can affect payment or incur fees. Additionally, your company may have boilerplate legal clauses to accompany all written documents. These are common in many private industries and governmental departments.

Appendices

Appendices contain any information that may be interesting to the reader, but which are not completely necessary to the proposal content. They may include full summaries and responses, a problem analysis, and any information that is meaningful to the proposal. For example, a list of potential survey or interview questions to be asked, common statistical data on the topic, or other more in-depth information that helped shaped the project. Appendices are generally usually labeled with letters (Appendix A, Appendix B, etc.) and are the last components of the document. (See [chapter 11](#) for more detail on appendices content)

9.6 Proposal Design and Style

Your proposal should be visibly attractive, but also easy to read and follow standard format for the type of document used. The most important part of any proposal is for the

reader to easily find the information they need to approve your project.

Most proposals follow a standard block format—one inch margins, single spaced text, skip one space between paragraphs, with no paragraph indentation. You also need headings and subheadings to identify and group areas of content and specific sections. The headings levels should contrast with one another, while remaining consistent throughout the document. You may also have graphics in your report, which should be designed to create a consistent style with the text. Last, even though most of your proposal is formatted in block paragraphs, you still need to consider the major elements of design—contrast, repetition, alignment, and proximity (CRAP). (See [chapter 5](#) for more information on document design)

Proposals are written in a professional, but not bureaucratic, style. Think of this as a plain (non-literary) style, but with some appeal to emotion (pathos). Make sure you use terms that are easily understood by the audience and define terms where necessary. Be as clear and concise as possible.

A professional appearance is a basic requirement. If your document is less than professional, you can count on its prompt dismissal. There should be no errors in spelling or grammar, and all information should be concise, accurate, and clearly referenced when appropriate. Information that pertains to credibility should be easy to find and relevant, including contact information. If the document exists in a hard copy form, it should be printed on a letterhead. If the document is submitted in an electronic form, it should be in a file format that presents your document as you intended. Word processing files may have their formatting changed or adjusted based on factors you cannot control—like screen size—and information can

shift out of place, making it difficult to understand. In this case, PDF format may be used to preserve content location and avoid any inadvertent format changes when it is displayed.

9.7 Revision checklist for proposals

As you draft and revise your proposal, check for the following:

- **Make preplanning decisions:** Identify what kind of proposal you will be writing (internal/external; solicited/unsolicited; known or unknown solution) and identify the audience type, skill level, needs, and interests.
- **Use the right format:** Often, proposals follow a block format, but check with your instructor or the proposal submission guidelines to insure you are using the format requested. If there are samples provided, use them for visual comparison.
- **Check submission guidelines:** How should the proposal be submitted? What types of follow-up documents or actions are connected to your proposal if accepted? Who will these document address, and when are they required?
- **Draft your proposal:** Make decisions about the type of content/sections to include in your proposal to meet the submission requirement, the requirements for the type of proposal, and the most effective way to present your idea to the reader.

- **Style and Design:** Ensure that the sections of your proposal are in a logical, natural order and that you use sub-headers and bullets (and any other formatting styles) correctly.
- **Revise, revise, revise:** A less than professional, grammatically-incorrect proposal can be rejected. Ensure you have included all content necessary, and revise and edit to ensure clarity and correct style of the audience.

9.8 Proposal Example (Internal, Solicited, Unknown Solution)

9.8 Proposal Example (Internal, Solicited, Unknown Solution)



Victoria Bauer, Morgan Dunker,
Alex Whitnah, Maria Hernandez
(123) 456-7890
meattoyou@gmail.com

Date: March 5, 2018
To: Mrs. Smith, Professor
From: Victoria Bauer, Alex Whitnah, Morgan Dunker, and Maria Hernandez
Subject: Increasing Awareness and Sales of Unconventional Cuts of Meat at Elite Meats

MEMORANDUM

In this proposal, we will explain a problem that local butcher shops are facing in modern small-town America: the lack of sales for meats that are “unconventional” in the American diet, such as gizzards, offal, and oxtail. We also wish to research ways to reduce waste and maximize profits for the local butcher shop, Elite Meats, through new marketing strategies that will appeal to the community. Our purpose is to describe our plan to research to improve the efficiency and eliminate waste in butcher shops and convince you this project is worth an investment in time and resources. We are passionate about the idea that every part of the animal should be used for human consumption and that local—owned businesses should operate in the most efficient and cost-effective way possible. One way to do so is to develop ideas that would make alternative cuts of meat more appealing to consumers.

PROBLEM DESCRIPTION

Elite Meats is a local business that markets a variety of cuts of beef, pork, and lamb. Although the most popular cuts include ground beef, t-bone, and sirloin, Elite Meats also provides cuts such as tongue and oxtail. However, these meats are not marketed and kept in the back of the shop. They are often thrown away or ground into dog food as not many customers purchase these cuts. This is an issue for several reasons, including:

- This goes against the ideals of the company, which include, “helping its neighbors and reducing waste” (Elite Meats, 2018).

- Unconventional cuts do not usually have a place in a Midwestern American diet, but are still edible and used in a variety of cultural dishes.
- The wasted meat is a drain on Elite Meats' resources and takes away from the revenue of the business.

We plan to conduct research to see why these meats are not usually bought and what methods, if any, could be used to market these unconventional cuts effectively, so that edible and usable parts of the animal are not wasted. If this issue is not remedied soon, these parts of the animal will continue to go to waste when they could be used instead for human consumption at a reasonable price. Losing these sales will also continue to be an irreconcilable cost for Elite Meats.

CLIENT ANALYSIS

Our proposed project targets Elite Meats, but more specifically, the owner Adam Freeman. Adam Freeman is a local to the community. After graduating from Oklahoma State University with a Bachelor of Science in Electrical Engineering, Mr. Freeman joined the army for two years. Upon returning to the States, he spent some time thinking about what he wanted to do for a career—he decided to open a local butcher shop with his father. With "limited exposure to agriculture" (Krebs, 2017), Mr. Freeman has overcome many struggles with owning and operating a butcher shop, and is still learning about the different aspects of agriculture, from the farms to the shop to the customers' homes. The community and his business are constantly shifting, and he is up to the challenge to adapt and find new ways to provide his customers with wholesome and healthy meat products.

RESEARCH PLAN

In order to learn about how best to market and encourage the purchasing of offal and variety meats, we propose research into these areas:

Research Goals

- To survey current and possible customers to learn purchase practices and perceptions of alternative meat cuts.
- To define and analyze 1907's current advertising strategies and identify possible changes the current system
- To research how other butcher shops reach their customers and sell unconventional cuts of meat.

Research Phases

Phase I—How can local butcher shops better reach their customers regarding alternative cuts of meat?

We will survey customers of Elite Meats to see what their perception of these alternative cuts is and their willingness to buy and use them. We will ask what factors are considered in their purchasing choices, as well as if they are aware that Elite Meats offers cuts of meat that are not as popular with customers. Along with this, we will collect feedback from the general community, to learn if there are certain factors that make individuals more likely to purchase these meats. Be it economical or cultural preference, this knowledge base will allow us to form a strong collection of data. From these surveys, we will be able to determine how to best appeal to the customer regarding unconventional cuts of meat. We will also research online to find recipes for these meats, as Elite Meats often provides recipes for its products at the shop.

Phase II—What are the current methods used for advertising these unconventional cuts, and what can be changed to increase awareness?

We will interview a current employee of Elite Meats to ascertain the current marketing strategies regarding unconventional cuts of beef, pork, chicken, lamb, and bison. We will also focus on what kinds of customers, if any, currently purchase these products and if there are any other uses for these cuts of meat within the business. We will ask what the employee believes will increase sales of these meats, while decreasing waste and maximizing profit. This information will give us an inside perspective of Elite Meats' current practices and an employee's view of customers and marketing strategies.

Phase III—What are other successful local butcher shops doing to increase awareness about these unconventional cuts of meat and how are they successfully able to maximize profits?

We will interview local butcher shops in the Oklahoma City and Tulsa area to see how they go about selling these unconventional cuts of meat. We will interview butcher shops outside of Oklahoma to see if there is a difference in customer preference and/or different or new ideas on how to better utilize these cuts. We will also learn how these butcher shops deal with the sales and usage of unconventional cuts of meat. This information will give us a good insight into how Elite Meats could consider changing their marketing methods to better sell to this community.

RESEARCH SCHEDULE

Date	Task Completed	Person in Charge
03/05	Employee Interview	Maria
03/09	Compile Surveys	Victoria and Morgan
03/16	Coordinate Benchmarking/Contact Other Butcher Shops	Alex
03/16	Interviews/Surveys Completed	Everyone
03/16	Complete Online Research	Morgan
03/30	Proofreading/Editing of Final Report	Everyone, mainly Maria
04/03	Submit Raw Data/Interview Transcripts	Everyone
04/04	Submit Final Report	Victoria

TEAM QUALIFICATIONS AND RESPONSIBILITIES

Name	Qualification	Responsibility
Victoria Bauer	<ul style="list-style-type: none"> Electrical Engineering Major Grew up in Germany Experienced with alternative cuts of meat CEAT Marketing Committee and IEEE Publicity Director 	<ul style="list-style-type: none"> Conducting and compiling surveys Turning in all necessary paperwork Bi-weekly Activity Reports
Morgan Dunker	<ul style="list-style-type: none"> Animal Science Major, Pre-Vet President of FTI (Freshman in Transition) Has many contacts Inexperienced with unconventional meat (great for polling questions) 	<ul style="list-style-type: none"> Organization and time management Conducting and compiling surveys Go-to question gal
Alex Whitnah	<ul style="list-style-type: none"> Works in butcher shop and as a cook Animal Science Major, Pre-Vet Experienced different cultures through travel 	<ul style="list-style-type: none"> Contacting other local butcher shops Benchmarking Go-to meat/butcher shop guy
Maria Hernandez	<ul style="list-style-type: none"> Agribusiness Major Stickler for grammar Avid carnivore Public speaking and interview experience Speaks for the cattle 	<ul style="list-style-type: none"> Conducting and compiling interview(s) Editing and grammar help Go-to beef gal

TEAM MANAGEMENT

The team will meet twice weekly in person and utilize Google Drive for project documents. Any conflicts or disagreements about performance and procedure will be resolved via vote, with a pro/con list tie breaker. The majority of the tasks will be completed as a group, with each member in charge of specific areas of research (see responsibility list above). The main goal of our team management system is to comply with due dates while creating a well-prepared research proposal.

RISK MANAGEMENT PLAN

Individuals may be hesitant to discuss their purchasing habits, especially for what could be perceived as a marketing and advertisement study. If we cannot get enough feedback via our surveys, a focus group of Elite Meats' current clients may be more likely to answer purchasing questions than those taking an anonymous survey online.

Time and resource allocation could be an issue with this project. If one person is not able to meet his/her deadline due to various reasons, the solution could be each person has a partner to proofread what has already been done and then pick up where the person has left off.

Last, interviews with local butcher shops could hold less than helpful results. The shops may not want to release their own marketing ideas or how they use these products. If unable to interview local competitors, we will continue to contact other, more distant butcher shops to get information, as well as conduct on-line research to supplement the data.

RESEARCH NEEDS AND PROJECT COSTS

The resources required to complete our research mainly involves surveys and investigation. We will be researching how to increase awareness and sales of unconventional cuts of meat at Elite Meats. The phone calls to various butcher shops will be free of charge. The surveys will be taken from customers of Elite Meats as well as families, students, and the general community using free or easily accessible supplies found on campus. The group communicates effectively through GroupMe and Google Docs, so no cost will be necessary for meetings.

BENEFITS AND FEASIBILITY OF RESEARCH

The benefits of this research are far reaching. Of course, the research outcomes will immediately benefit Elite Meats, with increased sales and/or new innovations to use their underselling products more efficiently. In addition, the local economy and community will be affected by the business's increased sales and revenue, leading to a more stable economy. Last, the Stillwater community may have improved quality of life, if we can uncover tactics to persuade community members to use these cuts of meat that are cheaper and often more nutritious than the more popular cuts.

As we are focusing our research on local groups and businesses, our research is feasible. As seen in the Research Needs and Project Costs section above, our current research plan does not require any outlandish costs or specialized equipment; therefore, there is a lower chance of issues arising due to our plan. Additionally, possible issues with research have been addressed in the Risk Management section.

CONCLUSION

We thank you for your time and enthusiasm in allowing us to investigate product preferences and aspiring to help the community see the unconventional types of meat just as appealing and accessible as popular choices. We are interested to hear any further ideas you have to help the community of Stillwater and Elite Meats. Through enlightening the business and its customers with our findings, we hope to create a bigger market for the unconventional cuts of meat and to make their image more acceptable. Please contact us at meattoyou@gmail.com if you have questions or need further information.

References

- About us (2018). *Elite Meats*. Retrieved from <https://www.Elitemeats.com>
- Krebs, C. (2017). Stillwater meat shop offers craft butchering. *Farm Speak*. Retrieved from http://www.farmspeaknewspaper.com/news/stillwater-meat-shop-offers-craft-butchering/article_9b24d356-c3d2-11e7-83df-437a2e9c8855.html

[Click here to download a copy of the Sample Proposal above](#)

9.9 The Elevator Pitch

On the job, you may be asked to create smaller, more

concise proposals, often limited to a single page or, when spoken, a few minutes. Busy decision-makers may not have time to read a lengthy report, and want your proposal parred down to the key points. These reports must focus on capturing the audience's attention and delivering the information as concisely as possible. Any extraneous information is a waste of precious time. Clear and concise proposals serve the audience well and limit the range of information to prevent confusion.

One type of brief report you may need to create is the *elevator pitch*. An elevator pitch is a concise, oral proposal, used to persuade the audience in a short amount of time—often less than one minute. An elevator pitch might be used by a salesperson to convince a local business owner to stock her product, or by a screenwriter trying to convince a movie executive to fund his film.

The elevator pitch usually contains the following information:

1. **Introduce yourself and provide your qualifications.** People want to work with the person, not the idea. Making a good impression is key.
2. **If you are pitching to a general audience, describe your ideal client.** This is not necessary if you are speaking to a single person, but you can let them know why you are pitching the idea to them, specifically.
3. **Grab the reader's attention.** Include a good story, relevant quotes or epigrams, startling statistics, personal anecdotes, and rhetorical questions that engage the audience's participation or imagination. These grab the

reader's attention, but also, people tend to walk away from a presentation remembering a story more than straight facts. Stories also make the audience more emotionally connected to the speaker.

4. **Summarize and describe your idea in a single sentence.** Sometimes this summary might include a memorable slogan or motto.
5. **Include three compelling reasons why the audience might be interested.** Remember to think about your audience's needs, wants, and values.
6. **Mention how your idea is special or unique.** Why is your idea superior, more necessary, or needed now, as opposed to other ideas? You can also include benefits of the idea once implemented.
7. **End with a memorable statement about yourself.** Like in Step 1, creating a personal link so the audience will want to work with you in the future. If possible, leave them with contact information, such as a business card or a handout of your pitch's highlights.

(See [chapter 12](#) for tips on public speaking to help you pitch your idea effectively)

Attribution

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Chapter 10: Research

Staci Bettes

Chapter Synopsis

In this chapter, you will learn how to plan for conducting different types of research, depending on your research goals. The chapter starts by giving information on creating a hypothesis and research questions to guide your research. After, you will learn about conducting both primary and secondary research and when to choose one or the other. Different kinds of primary and secondary research are discussed, to help you decide which is best for your specific project and needs. Information for creating your own survey and interview questions is included, as well as tips for evaluating secondary sources.

10.1 Introduction

With the abundance of research available today, often the hardest part of research is deciding on the best type of research for a specific project, and evaluating its validity and effectiveness. What does it mean to be information literate? Simply stated, information literacy is the ability to locate, evaluate, and implement information efficiently.

In college, you typically find, evaluate, and use information to satisfy the requirements of an assignment. Assignments often specify what kind of information you need and what tools you should use or avoid in your

research. For example, your professor may specify that you need three peer-reviewed academic articles and that you should not cite Wikipedia in your final paper. However, in life beyond college—especially the work world—you may not have that kind of specific guidance. You may also be asked to create your own data using techniques such as interviews, surveys, and analysis, instead of using published sources. Using research in the portions of your document that require evidence can strengthen your argument and help answer your research questions. At other times, even if research is not actually necessary, it can be persuasive and sharpen the points you want to make.

Research is much more than doing a simple search engine query and reviewing the first ten results it returns—you need to be information literate in order to plan and perform your own research efficiently, effectively, and with the needs of your audience in mind. You must also be able to incorporate unbiased, reliable data for your projects.

10.2 Hypothesis and Research Questions

In the technical field, you may be asked to complete research for several reasons. Research can be used to confirm theories (hypotheses), gather information over a topic and necessary services, describe a population, find a solution to a problem, and/or to provide background information. You will likely perform research for most, if not all, the documents you create in class or the workplace. For example, you may do background research on a group of people to revise a document for that audience, such as to tailor your résumé for a position at a specific business. Or, you may research a problem in order to provide a

solution and present that research in a report. Depending on the genre, you may need a specific type of research, or a combination of several types. The type(s) of research you choose should be based on your purpose, audience, and, often when completing a research project, your *hypothesis* and *research questions*.

Hypothesis

It can be difficult to decide where to start researching for your task, especially if you are not given specific guidelines. Most scientific or medical research begins with a *hypothesis*. A *hypothesis* is tentative, testable answer to a question. It is based on your current knowledge of the situation or topic; therefore, it is a “guess” of what the outcomes will be. For example, a pharmaceutical company creates a new prescription strength sunscreen for people with an elevated risk of melanoma. They theorize that daily use of the sunscreen, applied every three hours with normal sun exposure, will lower the risk of skin cancer by 75%. This is a classic example of a hypothesis. You may or may not be asked to create a hypothesis for a research topic. It depends on the purpose and topic, or the type(s) of research you need to produce.

When you create a hypothesis for your problem or topic, it is always written as a statement. It is predictive in nature and typically used when some knowledge already exists on the topic. In the sunscreen example above, scientists in the pharmaceutical industry should have knowledge on how the product and individual compounds work before it goes to clinical trials. Based on your hypothesis, you can collect data, analyze it, use it to support or negate the hypothesis, and (eventually) arrive at a conclusion at the end of the research.

Hypotheses work to limit the scope of your research. A complete hypothesis should include *the variable, the population, and the predicted relationship between the variables*. For example, some limits on the sunscreen example are the number of applications per day and a “normal” amount of exposure (as opposed to working outside all day without protective clothing). A hypothesis also applies to a specific population—in this case, people with elevated melanoma risk. Once established, a hypothesis will guide your research for credible outcomes.

Research Questions

Whether or not you create a hypothesis, you will often create *research questions* to help direct your research. These questions need to be answered through your research for you to thoroughly investigate and analyze a topic. What are the major questions that need to be answered for you to create a solid conclusion about your topic? For example, imagine you are asked to research the effect of final exams on student academic success. There are many areas you could choose to focus on—student mental or physical health, knowledge attainment and/or recall, effectiveness of timed exams, cumulative exams versus application of materials, and so on. As there are so many aspects of this topic, you will most likely not have time to adequately research all of them. Establishing research questions will help you focus your research on specific areas of the topic.

How do you decide which areas are the right areas to research? Base your decision on factors such as:

1. What is your area(s) of interest?
2. What will be most likely to persuade the reader?

(Did they ask for a specific type or area of research? What is their main goal for the research? What do they want to alter, improve, or disprove? Which of the audience's needs, wants, or values might help guide your research?)

3. What areas can you feasibly research within the time frame or any other limitations you have?
4. Are there any areas where research seems to be missing or underdeveloped on the topic?

Once you decide on a few areas of focus, you can construct research questions to help guide you. Normally, three or more questions are standard for a topic. They should be written in the form of a question and must be inquisitive in nature. A properly written question will be clear and concise, and contain *the topic being studied (purpose)*, *the variable(s)*, and *the population*. If you were doing research on the final exam example above for a university's Student Affairs office, your research questions might be:

- What is the current system for final exams, and what are the reason(s) for its structure and schedule?
- How does the current system compare to other similar universities, including scheduling, exam grades, GPA, and overall graduation rates?
- Have any connections been proven between the final exam system and student academic success or failure?

The type of question you choose depends on the best way you can study your topic and your hypothesis. The

following list includes the six main types of research questions:

- **Comparative questions:** look for the similarities and differences between multiple variables.
- **Causal questions:** look for relationships between two or more occurrences.
- **Descriptive questions:** seek out a description and explanation for a specific situation.
- **Exploratory questions:** help try to better understand something through observation.
- **Predictive questions:** determine what will happen in the future or if a change happens.
- **Interpretive questions:** gather feedback on a topic or perception without altering the outcome.

After creating your questions, you will need to decide the best type(s) of research to help you answer them.

Types of Research Questions Practice
<p>Some students have concerns when enrolling for classes under the University's current enrollment system, which includes setting up meetings with advisors, prerequisite class checks, and enrollment through an online system. For some, the system has led to frustration, missed classes, or even delayed graduation. Imagine you are researching this topic.</p> <p>Below is a list of six research questions you could use to research this topic. What kind of research question is each of the following: Comparative, Causal, Descriptive, Exploratory, Predictive, or Interpretive?</p> <ol style="list-style-type: none">1. Does an advisor's input affect the successful enrollment of students at the university?2. How and why do current students utilize the online enrollment system?3. What is the difference or similarity between the Education College and the Agricultural College's process for freshmen enrollment?4. What changes would occur to enrollment statistics if the university allowed students to enroll online without advisor input?5. How do students enroll for classes each semester, to fulfill their major's required coursework?6. How would a completely online, self-enrollment system thrive if implemented on campus?

Figure 1: Types of Research Questions Activity

10.3 Choosing Research Types

There are numerous types of research and source types available to complete your research. The type of research you choose should be based on the rhetorical situation of the document, as well as the assumptions you make about the main audience. For example, for a basic argumentative essay, you generally use secondary research from published, peer-reviewed sources. However, with technical documents, the type of research will often vary. For instance, if you are creating a proposal on a community issue, you may incorporate local news sources stories about the topic and community demographics, in addition to creating a community survey.

No source type is better or worse than others. What matters is that it addresses the following areas for your specific topic, genre, and audience. Does it:

- Help you learn more background information?
- Answer your research question?
- Convince your audience that your answer is correct?
- Describe the situation surrounding your research question?
- Report what others have said about your research question(s)?

Source types are generally divided into two main categories—*primary research* and *secondary research*. *Primary Research* is research that you collect and create yourself. This can include activities such as observing your environment, conducting surveys or interviews, directly recording measurements in a lab or in the field, or even receiving electronic data recorded by computers/machines. *Secondary Research* is research that uses data and ideas that have been collected and analyzed by other individuals and published for others' use.

Data Triangulation

For your research to be considered valid, it is often recommended that you *triangulate* your data. By *triangulate*, we mean that you include information from three different kinds of sources. For example, if you were researching the possible environmental effects of a new chemical plant built near a local river, you may choose to interview environmental biologists about the potential risks of the plant's location, research national incidences of plant constructions near large bodies of water, and compare official water quality analytics from before and after the

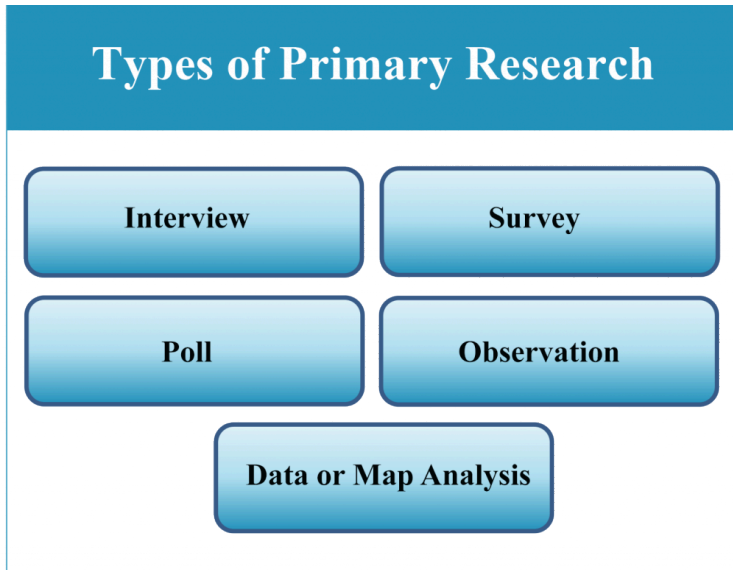
chemical plant appeared. Using three types of data is standard in academic publishing and scientific research; varied types of information work together to create a complex, larger argument. This also makes you, the author, appear more credible and your research more thorough.

As you begin your research process, keep a few ideas in mind.

1. Choose your research type based on what will yield data for your research question(s).
2. Ensure you have enough time to feasibly deliver your research in the time you have to complete a project.
3. Choose research and data that is ethical. (See [chapter 4](#) for more information on ethics and research)

10.4 Types of Primary Research

Sometimes, the information you need is not yet written or published. For example, if you are creating a report over the feasibility of implementing a food pantry on your college campus, you will not likely find published data on how many enrolled students would actively contribute to the pantry. In these situations, you need to create your own data to back up your argument or answer your research question. These sources—where you create your own data—are known as *primary sources*. Below are details on several common types of primary research: interviews, surveys, polls, observations, and data or map analysis.



Interview

Interviews are one-on-one conversations between the interviewer and a person who has unique insight into the topic. Most of us use people as sources in our private lives, such when we ask a friend for a restaurant recommendation or whether a movie is worth watching. While we may ask people for their input daily, interviews are a formal way of gathering insider information on a topic we may otherwise lack. There are several factors you must consider when doing an interview for research purposes.

When choosing an interviewee, think about what type of information you need. Who can give you this insight? Who has the details? Can one person answer, or do you need multiple interviews? “Experts” are not just researchers with

PhDs doing academic work. People can speak with authority for different reasons. They can have subject expertise (having done scholarship in the field), societal position (a relevant work title), or special experience (living or working in a particular situation). An up-close, firsthand view of the situation gives them the authority to speak as an expert on the topic.

There are several types of interviews to choose from. Choose the type based on the topic, the type of person(s) you wish to interview, and what is convenient for the interviewee. Some interview types include:

- **Individual face-to-face:** The standard interview, used for non-shy participants willing to share their thoughts on the topic.
- **Telephone:** A good option when travel is not possible, but it can be difficult to fully document the conversation.
- **Email:** A good option when schedules are conflicting; it allows for interviewee to respond at their convenience.
- **Focus Group:** Useful when a solo participant is hesitant or when you want to ask the same question(s) to multiple people.

In an interview, you want to ask questions to get insider details, unique observations, and experiences with the topic or current situation. Encourage the telling of stories and

anecdotes. The best way to get insider information and detailed answers to is ask *open-ended questions*, or questions that ask for extensive details as opposed to single-word answers. (See section [10.5](#) for tips on writing open-ended questions) These details can add depth and insight to your topic, and sometimes even direct you to other areas you had not thought to research. Do not be surprised if an interview takes you off in completely new directions, one that turns out to be much more interesting than the direction you were following before.

Of course, interview content must be evaluated just like any other. Like any other source material, the answers and data you gather could be biased. Keep that possible bias in mind when using the information. That is part of exercising the critical thinking that research assignments are famous for producing. Potentially biased or not, sometimes a source's firsthand experience is best, and recognizing what they offer can help you open up to diverse ideas and worldviews that you would otherwise miss. Use good interview techniques, such as putting the interviewee at ease, using active listening techniques to encourage them to talk, asking follow up questions, and thanking them at the end of the interview.

Survey

Paper or electronic surveys provide answers to questions related to the topic. But be aware that answers are often limited by the survey author, meaning the data gathered is only as good as the questions asked. Surveys are used to learn more

about a specific group of people (also known as a *sample*), and include localized information such as attitudes, habits, or need for change.

You must first decide what type of information you need to know. What is the purpose of the survey? Who and what do you want to know more about? Surveys will target a certain group of people with specific characteristics. For example, if you wish to research the effectiveness of a new policy in the workplace, you would want to get responses from all departments that are affected by the policy—not just from one department. This group of people is called a *sample*. Your sample may have broad or limited characteristics, but it is important to target those who have the characteristics you desire.

The main categories of surveys are hardcopy (paper) and electronic. Your choice will depend on the topic and the sample—where and how are the best places to target your intended sample of people? In the above example, if you focus on employees of the business, you may get more responses by handing out paper surveys in the break room or by going desk-to-desk if you have a fairly mobile or collaborative workplace. However, if the workplace is more reserved or work is individual, an emailed electronic survey may be more effective. More often, people choose electronic surveys for convenience and distribute them via listservs, company email lists, and social media. On the job, your company may provide access to paid software, but there are many free

options available, such as Google Forms, SurveyMonkey, and SurveyGizmo.

Unlike an interview, with surveys you want to mainly ask *closed questions*—questions where you offer a limited amount of responses to choose from. You can use some open questions, but most often you will provide the answer options (e.g., “Do you consider the following statement true or false?” or “How many times a week do you work out: a) 1-2 times; b) 3-4 times; c) 5-6 times; d) 7 or more times?”; e) Never).

For a successful survey, you will usually need two types of questions: *demographic questions* and *content questions*. *Demographic questions* ask for general characteristics of the respondent, such as age, location, or gender. The type of demographic questions you ask will depend on the sample for the survey. *Content questions* are questions about the topic you are researching. (See [section 10.5](#) for tips on writing closed-ended questions) These give insight into the respondent’s feelings and knowledge of the topic you are researching.

Poll

Similar to a survey, a poll is a single, closed question asked of the target sample. The goal of a poll question is to gauge user’s feelings toward an idea, usually in one simple question—who is interested? Who has heard of this topic? Would the audience be interested in implementing a certain change? For example, perhaps you wish to know how many people in your workplace would prefer four day per week work schedule, you could easily

create a poll question to get this information. You will not receive in-depth information with a single poll question; therefore, poll questions should be used in conjunction with other forms of research when used for professional research.

Observation

Observation is watching and describing an issue first hand, to create colorful descriptions and detail. Observation is a good choice when you want to learn more about the situation as it naturally occurs. Observe the issue when it is happening, based on prior knowledge. You will want to observe the issue more than once (preferably vary dates and times) to see if any patterns develop, if the magnitude of the problem differs from your original assessment, or if the problem is connected to other areas you may have not considered.

Observation should focus on recording details and creating detailed descriptions of the event. First-person observation is best, though you can get *some* insight from recorded images. The drawback of prerecorded images is that you only get information from one perspective, and may miss out on other observable sensory input; therefore, it is better to observe and make notes first hand.

The data needs to be verifiable—not just general impressions. Focus on specific incidents and conversations, describe the setting, and provide other concrete details that can be verified or observed via instrumentation. Record and describe your impressions in the moment; do not

rely solely on memories. For example, a common issue across the university campus is crowding in the Student Union during lunch. Observing and recording details during lunch would allow you to describe the issue, identify different aspects of the problem, and later provide solutions based on your observations. However, you must make observations in a reliable way. If you wanted to determine whether there was sufficient seating in the Student Union during the lunch hour, it would not be enough to simply describe the dining area as “busy” or “crowded” around lunchtime. Instead, scientifically determine how busy and crowded the dining area is, perhaps by counting how many seats opened up within a given time period, or by count how many people ate their meal standing or sitting on the floor.

Data or Map Analysis

If your group has a topic that involves paperwork, data sheets, maps, or other document types, you may incorporate their analysis into your primary research. If you are doing research on specific issues in a building or business (number of available outlets, renovation or expansion plans, lack of office space for new employees, etc.), you could analyze blueprints, maps, or data spreadsheets. Imagine you are researching outlet availability in the campus library. You could consult maps of the library to see the current outlet locations and wiring accessibility. You could compare these maps to older versions of the library setup, or compare to maps of similar libraries to see how they provide enough outlets for students.

If possible, use at least three similar documents for analysis to show a trend.

10.5 Creating Interview and Survey Questions

To prepare for several types of primary research (mainly interviews, polls, and surveys) you will need to create questions. The content of the questions should align with your research goals. These questions can be divided into two types—*open-ended questions* and *closed-ended questions*.

Before you begin drafting your surveys, interviews, or polls, you should learn as much about the topic—and your sample—as possible. Conducting secondary research on the topic and sample can help you get a solid foundation for your primary research. This will help you construct questions that glean solid data and help you tailor the research to the respondent(s). Then, construct your interview, survey, and poll questions to help “fill in the gap” created by missing or incomplete research on the topic.

Writing Open-Ended Questions

Open-ended questions are structured to encourage detailed responses which focus on the respondent’s experiences or feelings. The point is to encourage a lengthier answer; these questions should be asked in a way that requires more than a “yes/no” response. Open-ended questions are

especially important for interviews. For example, you may ask someone, “What do you think about the candidates running for mayor?” This is an open-ended question that encourages a detailed response. To create open-ended questions, it is helpful to begin the question with words and phrases such as *explain*, *describe*, *tell me about*, or *walk me through your experience with...*

Writing Closed-Ended Question

Closed-ended questions are structured to limit the available responses, usually to a single word, number, or phrase option. In the case of survey and poll questions, you can limit the response even further by providing answer choices. A closed-question version of the mayor example above is, “Which candidate for mayor do you like the most?” with the candidates’ names listed as answer options. Or “Do you believe the current campus dining options provide enough variety for vegetarian diners?”

Question Types

When you create closed questions for a survey or poll, you will also make decisions about the type of questions you use. There are several types of common questions types to choose from, including but not limited to: Ranking Scales, Agreement Scales, Yes/No Questions, Multiple Choice, and Check All That Apply.

Common Closed Questions

Yes/No

Do you think it should be legal to take food from supermarket dumpsters?

Yes No N/A

Multiple Choice

In what form do you usually see or hear advertisements for local businesses? (Select all that apply)

- | | |
|-----------------|------------------------------------------------------|
| a. Social Media | e. Personal Recommendation (word of mouth) |
| b. Newspaper | f. Travel Websites (Google, Yelp, TripAdvisor, etc.) |
| c. Television | g. Other |
| d. Radio | |

Agreement Scale

How much to do you agree with the following statement?

My commute to work each day is pleasant.

Highly Agree / Agree / Neutral / Disagree / Highly Disagree

Ranking Scale

Listen to the following voices. Rank the voices in order of how far you believe the person lives from your location (#1 lives closest to you, # 6 lives furthest from you).

- | | |
|-------------|-------------|
| ___ Voice A | ___ Voice D |
| ___ Voice B | ___ Voice E |
| ___ Voice C | |

Check All

Which of the following changes would you like to see at our store (Check all that apply):

- | | |
|-------------------------------------------|-------------------------------------------|
| <input type="checkbox"/> Rewards Program | <input type="checkbox"/> Daily sale items |
| <input type="checkbox"/> Lower prices | <input type="checkbox"/> Priority parking |
| <input type="checkbox"/> Delivery service | <input type="checkbox"/> Other _____ |

The type of question you choose will depend on the type of information you want to know. Below are two similar questions and answer options; however, the type of data gathered will be different. Imagine you are researching different types of campus improvements. If you ask students to “Check all that apply,” you can see which ideas are generally popular or unpopular. If you ask the students to “Rank” the ideas, you can use the data to infer which is the most popular, second most popular, and so forth. It is a slight distinction, but can make a difference during data analysis.

Similar Questions, Different Data Results	
<p>Which of these would you like to see on campus (check all that apply):</p> <ul style="list-style-type: none"> <input type="checkbox"/> More laundry facilities <input type="checkbox"/> Late night dining options <input type="checkbox"/> Underwater basket weaving class <input type="checkbox"/> Later class start times <input type="checkbox"/> Other _____ 	<p>Please rate the following campus improvement ideas 1- 4, 1 being the best idea, to 4 being the worst idea:</p> <ul style="list-style-type: none"> ___ More laundry facilities ___ Late night dining options ___ Underwater basket weaving class ___ Later class start times ___ Campus does not need improvement

Figure 4: Comparing Question for Different Data Results.

Creating Answers

You must give appropriate response choices for all closed questions. The type of responses will vary according to what type of info you need to know, how you can get as much variation/good data as possible, and also the type of question you ask.

You should include at least one *null* answer option for most questions. For example, *no answer*, *prefer not to answer*, or *other*. This option allows respondents to answer questions when their option is not provided and/or continue the survey if a question makes them uncomfortable.

Common Issues

Regardless of whether you create an open or closed question, you should avoid *negatively worded questions*, *double-barreled questions*, and *biased questions*.

- **Negatively worded questions:** ask for negative data. For example, if you asked, “How many times per week are you unable to access the door lock after hours?” you are asking for how many times something does *not* occur. This type of phrasing can confuse some respondents, which could lead to bad data. It is best to revise these questions to ask for a positive amount, such as “How many times per week are you *able* to access the door lock after hours?”
- **Double-barreled questions:** ask about two or more ideas, such as, “How many times per week do you speak with staff and administration when you have a problem?” This question asks about two different ideas—speaking with staff and speaking with administration. The amount of contact per week could vary greatly between these two groups. In cases such as these, revise the question to address only one topic or split into multiple questions.
- **Biased questions:** make assumptions about the

respondent or lead the reader to an answer. For example, “How many times a week do you encounter the terrible seating situation at the Student Union?” will encourage your audience to view the seating situation as “terrible” even if they had not previously considered the situation to be problematic. It can be difficult to not implant ideas, confuse the participant, or compile misleading information. For example, imagine you work for an ice cream company, and need to prove that chocolate ice cream is the most popular flavor. You ask in your survey, “Do you like chocolate ice cream?” Respondents will probably say “yes.” However, this is not a complete survey. Just because a person likes chocolate ice cream does not mean it is the most popular flavor. Instead, you should ask several questions, one of which might specifically ask respondents to reveal their favorite ice cream flavor.

At other times, you may lead the respondent with phrasing or make assumptions of how the respondent answered earlier questions. For example, if you are doing research over extending library hours, you could ask:

- Do you think the library should extend their hours?

Yes / No / Maybe / NA

- When should they extend they extend their hours?

4-6am / 12-2am / Open 24 hrs

- What technology do you want to improve at the library?

printers / more computers / more outlets

In the above example, the second question is written as though the answer to the first question will be *Yes*, but that may not be the case. What if the person answered *No* or *Maybe* to the first question? The second question has no option to allow for dissent or disagreement. Also, question three assumes that the respondents want to improve something technology-related (without them saying so), and the responses limit the answers to only three areas of technological improvement.

Once you have decided on the type of information you need from your surveys or interviews, make sure you go back and revise your question structure and phrasing to avoid bad data through negatively-worded questions, double-barreled questions, and biased phrasing.

10.6 Performing Secondary Research

When conducting primary research, you gather and create new data. With secondary research, you utilize established, published data created by another author(s). While it may seem a bit “simpler” to use secondary research, there are many aspects to consider when choosing and incorporating these sources. You must make choices about the source’s validity, biases, author and publication credibility, and information quality.

In today’s complex information landscape, just about anything that contains information can be considered a potential secondary source. For example, most know about books, websites, journals, and newspapers. However, other

possible sources include research reports, conference papers, field notes, photographs, websites, and television programs. With so many sources available, the question usually is not whether sources exist for your project, but which ones will best meet your information needs? Categorizing a source helps you understand the kind of information it contains, which is a clue to whether it might meet your information needs and where to look for it and similar sources.

A source can be categorized by whether it contains quantitative (numerical) or qualitative (descriptive) information or both; whether the source is objective (factual) or persuasive (opinion); whether the source is a scholarly, professional, or popular publication; and the source's format. As you may already be able to tell, sources can be in more than one category at the same time because the categories are not mutually exclusive.

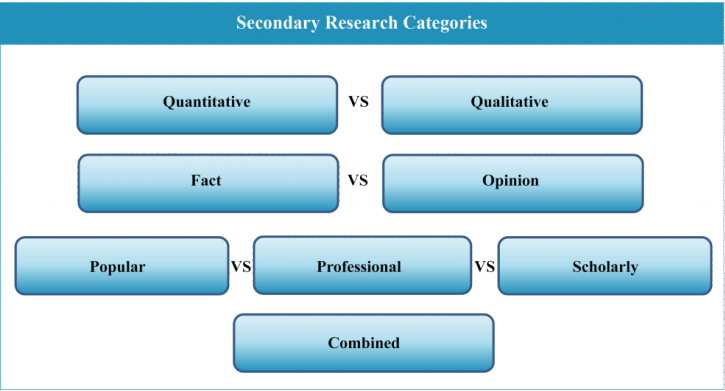


Figure 5: Secondary Research Categories.

Quantitative or Qualitative

Information from a secondary source can be quantitative or qualitative, which is a key way to categorize sources. Some sources contain either quantitative information or qualitative information, but sources often contain both. *Quantitative information* involves a measurable quantity—numbers are used. Some examples are length, mass, temperature, and time. Quantitative information is often called *data*, but can be things other than numbers. *Qualitative information* involves a descriptive judgment using concept words instead of numbers, such as descriptions of a situation and interview data. For example, if you were researching how to improve your local library, quantitative information could include government documents with statistics on current usage and advertisements for library activities at similar libraries. Qualitative information could be published case studies on library use or a local newspaper story with interviews of library patrons.

Fact or Opinion

An author's purpose can influence the kind of information they choose to include in a source. Think about why the author produced a source, because that reason dictated the kind of information they include. Depending on that purpose, the author may have chosen to include factual, analytical, and objective information. Or, it may have suited their purpose to include subjective, and therefore less factual and analytical, information. The author's reason for producing the source also determines whether they included multiple perspectives or just their own. For

example, a blogger may review a movie based on personal opinion (e.g., they liked the action scenes or thought the main actor was dreamy), while, a professional movie critic would approach their review differently (e.g., scene composition, musical score, and other quantifiable elements).

Popular, Professional, and/or Scholarly

We can also categorize information by the expertise level of its intended audience. Considering how “expert” one has to be to understand the information can indicate whether the source has sufficient credibility and thoroughness. There are varying degrees of expertise:

- **Popular:** Popular newspaper and magazine articles (*The Washington Post*, *The Wall Street Journal* and *Rolling Stone*) are meant for a large general audience, are generally affordable, and are easy to purchase or free. They are written by staff writers or reporters, and are often about news, opinions, background information, and entertainment. They are visually attractive with catchy titles, artwork, and advertisements, but no footnotes or references. They are published by commercial publishers and content is approved by an editor.
- **Professional:** Professional magazine articles (*Plastic Surgical Nursing* and *Music Teacher*) are meant for people in a particular profession. Staff writers or other professionals write at a level and with language understood by those in the profession. They are about trends and news

from the targeted field, book reviews, and case studies. Articles are often less than 10 pages and may contain footnotes and references. These are usually published by professional associations and commercial publishers, and like popular publications, are published after approval from an editor.

- **Scholarly:** Scholarly journal articles (*Plant Science* and *Education and Child Psychology*) are meant for scholars, students, and the general public who want a deeper understanding of a topic. Researchers and scholars write these articles to present new knowledge and further understanding of their field. They contain findings of research projects, data and analytics, and case studies. They are often long (over 10 pages) and include footnotes and references, and are usually published by universities, professional associations, and commercial publishers. Content is approved by peer review or the journal's editor.

Combined Purposes

Sometimes authors have combined purposes, as when a marketer decides he can sell more smart phones with an informative sales video that also entertaining. Authors often have multiple purposes in most scholarly writing. For example, scholarly authors want to inform and educate their audiences, but they also want to persuade the reader that what they report and/or postulate is a true description of a situation, event, or phenomenon, or a valid argument that their audience must take a particular action. In this

blend of purposes, the intent to educate and inform is considered to trump the intent to persuade.

Intent Matters

Author intent matters in how useful their information can be to your research, depending on which information need you are trying to meet. For instance, when you look for sources that will help you answer a research question or evidence for your answer, you will want the author's main purpose to be to inform or educate. With that intent, they are likely to use facts where possible, multiple perspectives, little subjective information, and seemingly unbiased, objective language that cites where they got the information. This kind of source will lend credibility to your argument.

Common Secondary Research Types

- **Books:** usually a substantial amount of information, published at one time and requiring great effort on the part of the author and a publisher
- **Magazines/Journals:** published frequently, containing articles related to some general or specific professional research interest; edited
- **Newspapers:** daily or weekly publication of events of social, political and lifestyle interest
- **Websites:** digital items, each consisting of multiple pages produced by someone with technical skills (Or have the ability to pay someone with technical skills.)

- **Articles:** distinct, short, written pieces that might contain photos and are generally timely (*Timeliness* is when something is of interest to readers at the point of publication or something the writer is thinking about or researching at a given point of time.)
- **Conference papers:** written form of papers delivered at a professional or research-related conference (Authors are generally practicing professionals or scholars in the field.)
- **Blogs:** frequently updated websites that do not necessarily require extensive technical skills and can be published by virtually anyone for no cost to themselves other than the time they devote to content creation (Usually marked by postings that indicate the date they were written.)
- **Documentaries:** visual works such as a film or television program, presenting political, social, or historical subject matter in a factual and informative manner (Often consists of actual news films or interviews accompanied by narration.)
- **Online videos:** short videos produced by anybody, with a lot of money or a little money, about anything for the world to see (Common sites for these are YouTube and Vimeo.)
- **Podcasts:** digital audio files, produced by anyone and about anything, and are available for downloading (Often by subscription.)

10.7 Evaluating Secondary Sources

Evaluating sources for relevance and credibility is important to establish the validity of the data and ideas within. There is never a 100% perfect source. You will need to make educated guesses about whether the information is good enough for your purpose. Critical thinking is a necessary skill your professors and employers will expect. Learning to evaluate sources can also keep you from being duped by fake news and taken advantage of by posts that are ignorant or simply scams.

To help evaluate the quality of a source, ask yourself the following questions about each source:

- **Authority:**

Question: Is the person, organization, or institution responsible for the intellectual content of the information knowledgeable in that subject?

Indicators: Formal academic degrees; years of professional experience; active and substantial involvement in a particular area; awards and recognition.

- **Accuracy:**

Question: How free from error is this piece of information?

Indicators: Correct and verifiable citations; information is verifiable in other sources from different authors/organizations; author is authority on subject; information has

been properly edited to display professional care.

- **Objectivity:**

Question: How objective (unbiased) is this piece of information?

Indicators: Multiple points of view are acknowledged and discussed logically and clearly; statements are supported with documentation from a variety of reliable sources; purpose is clearly stated; the organization's "About" statement reveals a commitment to truth; the organization's readership cannot be easily divided along common demographic lines (e.g., gender, political affiliation, age, etc).

- **Currency:**

Key Question: When was the item of information published or produced?

Indicators: Publication date; assignment restrictions (e.g., you can only use articles from the last five years); your topic and how quickly information changes in your field (e.g., technology or health topics will require more recent information to reflect rapidly changing areas of expertise).

- **Audience:**

Question: Who is this information written for or this product developed for?

Indicators: Language; style; tone; bibliographies.

10.8 Citing Sources

If you create your own research data using primary research (interview, survey, etc.), you do not need to provide a formal citation for that data—because you created it, you own it. However, you must properly cite any information you use from all secondary sources.

Direct Quote

Researchers document anything that is directly quoted. This can be a phrase, sentence, paragraph, or longer section taken from a source. Make sure to place quotation marks (“ ”) around the borrowed material to show that it is exact phrasing used in the source. You must also provide a correct citation at the end of the sentence containing the borrowed information and create a full reference at the end of the document on a reference page.

Paraphrase and Summary

Paraphrased or summarized information also needs to be documented using a citation. Paraphrasing is restating ideas taken from someone else and putting those ideas into your own words. The language used needs to be original and fresh. You cannot simply switch a sentence around or use a thesaurus to swap out a few words. You must completely put the source’s ideas into the writer’s own word (this is usually done by turning away from the source

material and rephrasing the author's statements from memory). Quotation marks are not used, but you must use a citation to give credit to the original source. It is also helpful to add attributive tags to the paraphrase.

If you have difficulty deciding if you should choose a direct quote, a paraphrase, or a summary in your document, think about the following rules:

- **Use a direct quotation:** if the wording is very eloquent or clear, or if changing the wording would make the quote lose its impression. You can also directly quote an authority on a topic to add credibility.
- **Use a paraphrase:** if the idea is more important than the wording. Also use a paraphrase to change the emphasis of an idea, change the style of wording, show your understanding of complex ideas, condense lengthy ideas into more concise explanations, or link together ideas that might otherwise be separated by lengthy paragraphs or pages of supporting documentation.
- **Use a summary:** when you need to simplify or condense a larger work into the basic points.

Visuals

Any visuals, graphics, and pictures which you did not create yourself need to be cited. Often, individuals think they can snag an image from Google and copy and paste it into a paper or presentation without citing it; this is plagiarism. Anything that was not created in whole by the writer needs to be cited. You may also wish to limit image

search results to open source images only before selecting a graphic to use, to avoid copyright issues. (See [chapter 4](#) for instructions to limit your online graphics search)

Overall

Always give credit to another person's ideas or work; never pass them off as your own. There are numerous format styles available, such as MLA, APA, CSE, and AMA. If you are not given a specific format to use in your document, choose a style used in your field and ensure you are using it correctly. Guides are available online for every style, as well as detailed published manuals for when you need to get more in-depth. A few websites that may help you with citations include: Reference@ite Quick@ite (<https://www.cite.auckland.ac.nz/2.html>), The Owl (https://owl.purdue.edu/owl/purdue_owl.html) , Citation Machine (www.citationmachine.net), and Cite This for Me (<http://www.citethisforme.com/>).

And of course, your university library has many format and style guides, both electronic and print format, to help you with basic citations and more specific, stylized aspects of format. (See [chapter 4](#) for information on ethics and citation).

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Chapter 11: Analytical Reports

Staci Bettes

Chapter Synopsis

The standard components of the typical analytical report are discussed in this chapter, including preliminary choices, audience and purpose considerations, common sections of reports, and format. As you read and use these guidelines, remember that these are “guidelines,” not commandments. Different companies, professions, and organizations have their own varied guidelines for reports—you will need to adapt your practice to those as well the ones presented here. In addition to the content and style of a standard report, the end of the chapter included details on two specific subgenres of reports that you may need to write during your education and beyond—*Progress Reports* and *Internship and Co-op Reports*.

11.1 Introduction

Analytical reports have specifications as do any other kind of project. Specifications for reports involve layout, organization and content, format of headings and lists, design of the graphics, and so on. The advantage of a required structure and format for reports is that you or anyone else can expect them to be designed in a familiar way—you know what to look for and where to look for it. Reports are usually read in a hurry. People want to get

to the information they need—key facts, conclusions, and other essentials—as quickly as possible.

For example, you might find reading a journal articles none too stimulating. Nevertheless, journal articles and reports are important and carefully crafted. The rigid format and objective style lend them a universal utility so readers from various disciplines can readily access and use the complex information. Your professors will confirm that busy academics rarely read reports and articles linearly—many readers cut right to Results and Discussion or look over the tables and figures before reading anything, then jump around to those bits of the report that are most relevant to their needs. Often, their goal is to rapidly exclude information they do not want or need.

The same can be said for any type of report. It is especially important for you to write reports in a fashion acceptable for your audience and topic, where they can easily locate the desired information. As you prepare technical reports for your classes, you have built-in template in which to put your information, and you can plug in to a tried and proven template that has evolved over many years. Understanding and conforming to this template will help you to organize complex information as well as meet your reader's specific needs.

When you write technical reports, notice how repetitive some sections are. This duplication has to do with how people read reports. They may start with the executive summary, skip around, and probably not read every page. Your challenge is to design reports so that the readers encounter your key facts and conclusions, no matter how much of the report they read or in what order they read it.

11.2 Types of Reports

Reports are a common and important part of communication in the working world. They can update readers about progress on a project, inform of some activity, show research on an item, make recommendations to the reader, document a problem, request funding, or submit a call to action. These are only some examples of what a report can do. There are several types of reports you may encounter in your classes or in the workforce, including:

- **Scientific reports:** record and explain information found through scientific inquiry; proposes a hypothesis that is often proved right or wrong.
- **Informational reports:** carry information from one part of the company to another; such as finances, employee statistics, etc.
- **Project-completion reports:** resolve an issue, and often used to evaluate the success of a project; created at the end of a project.
- **Research reports:** condense and highlight research completed on a topic.
- **Recommendation reports:** present research to recommend a specific action(s) to resolve a problem.
- **Feasibility reports:** assess and discuss the viability of a specific action or change.

The purpose of all report types is the same—to clearly

and accurately describe something that has happened or is happening.

11.3 Report Purpose and Audience

In a technical writing course, the report assignment serves several purposes: a) it gives you some experience in writing a report; b) displays your research on a topic; and c) shows how you came to your conclusions on that topic. The report is often the conclusion of a weeks-long research and writing process that goes through many stages until it gets to the end point.

Another point to keep in mind relates to the audience for different kinds of reports. Consider the example of a report written to a supervisor at a solar power company over the effectiveness of the solar panels currently used at a location. The report's primary audience may be an executive, whose knowledge of the technicalities is very broad. The executive will read the report and understand the profits and losses, but will need to consult a technician to understand the technical aspects of panel usage. The content and language used for these two different audiences will need to be adjusted to fit the writing situation. (See [chapter 10](#) for details on revising for multiple audiences)

To help write for the specific document's audience, it is a good idea to define your reader and sketch out some qualities about them before you begin drafting. This information will help you persuade the reader to accept your research and conclusions, as well as help keep your own writing on task. It can also help you decide what research to include or eliminate from the report, how best

to visually display your data, and other considerations to get your conclusion and/or recommendations accepted.

Ask yourself:

1. **Who is your reader?** Your reader should be someone with decision-making authority over your topic. They could implement recommended changes or just need the information you provide. They are action-takers in a corporation, organization, business, or agency. In some situations, the reader of a report may also be a *client*—a person who hired you to compile the research and write the report.
2. **What type of reader are they?** An expert, technician, executive, gatekeeper, or non-specialist?
3. **What is their background and knowledge level on the topic?** What are their needs, interests, and culture and values? What will likely persuade them to implement your idea? For example, imagine you researched the merits of four-day versus five-day workweeks for maximum productivity. Your research led to the conclusion that four-day workweeks would increase company revenue and employee satisfaction in several areas. You will want to frame your ideas for improvement in terms that management will be interested in, such as productivity, savings in building upkeep and utilities, and performance. Otherwise, they may be unconvinced that your solution will alleviate the burden of the problem.

The type of report you create will depend on the purpose

of the document and who will read it. For example, you may wish to create a report to persuade them to make recommended changes, or perhaps you were asked to compile a report over current events or statuses at a company. The level of formality will also be a factor in your decisions over content and format.

There is several aspects of the report that you need to determine before drafting. Identifying these factors is vital to creating a report that will be accepted by the reader—whether the report is written for *internal* or *external* readers, and if the report is *solicited* or *unsolicited*. (See [chapter 9](#) for a more details on interval vs external and solicited vs unsolicited documents. Below is a brief synopsis)

Internal or External

- **Internal:** A report to someone within your organization (a business, a government agency, etc.). For example, if you submit a report to your supervisor that recommends improvements to more effectively reply to customer inquiries, you would create an internal report.
- **External:** A report that is written from one separate, independent organization or individual to another such entity. With an external report, you will need to not only persuade the reader to accept your conclusions on the topic, but also establish credibility. The typical example is an independent consultant writing a report on company productivity for another firm.

Solicited or Unsolicited

- **Solicited:** The recipient has requested the report. The solicitation may come in the form of a direct verbal or written request, but it is not uncommon for solicitations to be an indirect, open-bid to the public, and formally published for everyone to see. For example, a city government will advertise for an independent contractor to reinforce the structural integrity of several local bridges. The city may announce the project's budget and solicit contractors to submit a report outlining what repairs they could make in exchange for the advertised budget.
- **Unsolicited:** The recipient has not requested your report. With unsolicited reports, you must convince the recipient that a problem or need exists in addition convincing them to accept your conclusions and/or implement change.

11.4 Common Report Sections

There are several common sections in a report, including a submittal letter, cover page, abstract or executive summary, table of contents, introduction, literature review, experiment/method/procedure, results, discussion, recommendations, conclusion, acknowledgments, references, and appendices. At first glance, these sections may seem a bit overwhelming. However, you have likely had some contact with basic reports structure with journal articles and other assigned class readings. Reports follow the same basic structure, referred to as IMRaD (Intro,

Method, Results, and Discussion). Of course, the length and locations of these sections will vary, and some sections may be entirely eliminated, based on the purpose and audience of the report. In some industries, reports even use Excel files and other types of untraditional formats. The sections of a report can be easily categorized into three major groups—front matter, the report’s body, and back matter.



Figure 1: Common Report Sections

Front Matter

The front matter is made up of sections that introduce, provide context, and guide usage of a report. In most cases, it will include a submittal letter to the reader, an abstract or

executive summary, a table of contents, and a list of figures and tables (if your report contains graphics).

Submittal Letter

The submittal letter is either attached to the outside of the report with a paper clip or is bound within the report. It is a transmittal document—used to explain the content and context of the report to the reader. It has a similar function to the cover letter in your job packet—they both explain the enclosed content. It is a communication from you—the report writer—to the recipient—the person for whom you created the report—who may even be paying you for your expert consultation.

Essentially, it says, “Here is the report that we agreed I’d complete by such-and-such a date. Briefly, it contains this and that, but does not cover this or that. Please let me know if it meets your needs.” The submittal letter explains the *context*—the events that brought the report about. It contains information about the report that does not belong in the report itself, and could be viewed as a form of metadiscourse—a self-referential document that refers back to the main document to provide context.

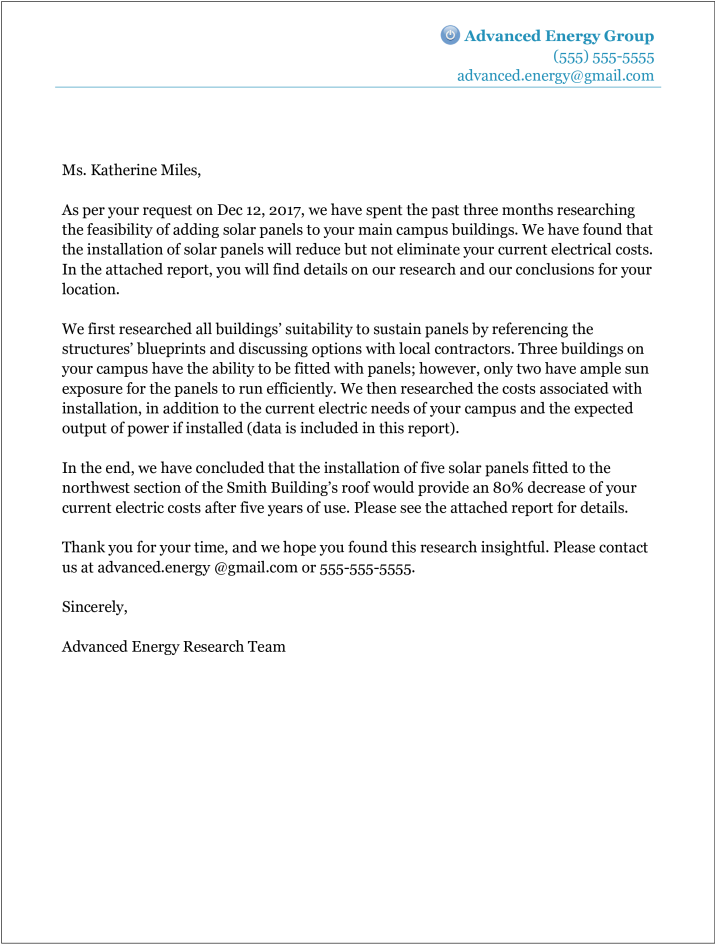


Figure 2: Submittal Letter Example

Submittal letters often follow standard business letter format. If you write an internal report, use the memorandum format instead. In either case, the content and organization are the same:

- **First paragraph:** cites the name of the report,

putting it in italics. It also mentions the date of the agreement to write the report.

- **Middle paragraph:** focuses on the purpose of the report and gives a brief overview of the report's contents.
- **Final paragraph:** encourages the reader to get in touch if there are questions, comments, or concerns. It closes with a gesture of good will, expressing hope that the reader finds the report satisfactory.

As with any other element in a report, you may have to modify the contents of this letter (or memo) for specific situations. For example, you might want to add another paragraph, listing questions you would like readers to consider as they review the report.

Cover Page

Be sure to create a cover page for your report. It is a step that some writers forget. Without a label, a report is anonymous and gets ignored. The best way to create a cover page is to use your word processing software to design one on a standard page with a graphic box around the label information. Not much goes on the label: the report title, your name, your organization's name, a report tracking number (if any), and a date. There are no standard requirements for the cover page, although your company or organization may have its own requirements.

- **Design:** The cover page should be clear and easy to read, but can have some graphics or design interest to attract to the reader. However,

do not go overboard on the “frills,” like rainbow-colored letters or extraneous clipart. A disorganized or overly decorated cover page could lessen your credibility as a respectable writer.

- **Title:** It is necessary to have a highly concrete title consisting only of words that contribute directly to the report subject. Be sure that the title contains no filler and includes few abbreviations or acronyms, yet includes enough detail so the reader fully understands the content. “Sol Gel Method” is clearly incomplete compared to “The Synthesis of NZP by the Sol Gel Method.” Of course, it is possible to overdo specificity as well: “The Role of Solid Oxide Fuel Cells in the Important Scientific Search for Energy Alternatives as Necessitated by the Recent Middle East Crisis and America’s Energy Consumption” is painfully excessive and should be reduced to its essential elements. However, “The Importance of Solid Oxide Fuel Cells Research for Alternative Energies” is much more appropriate.

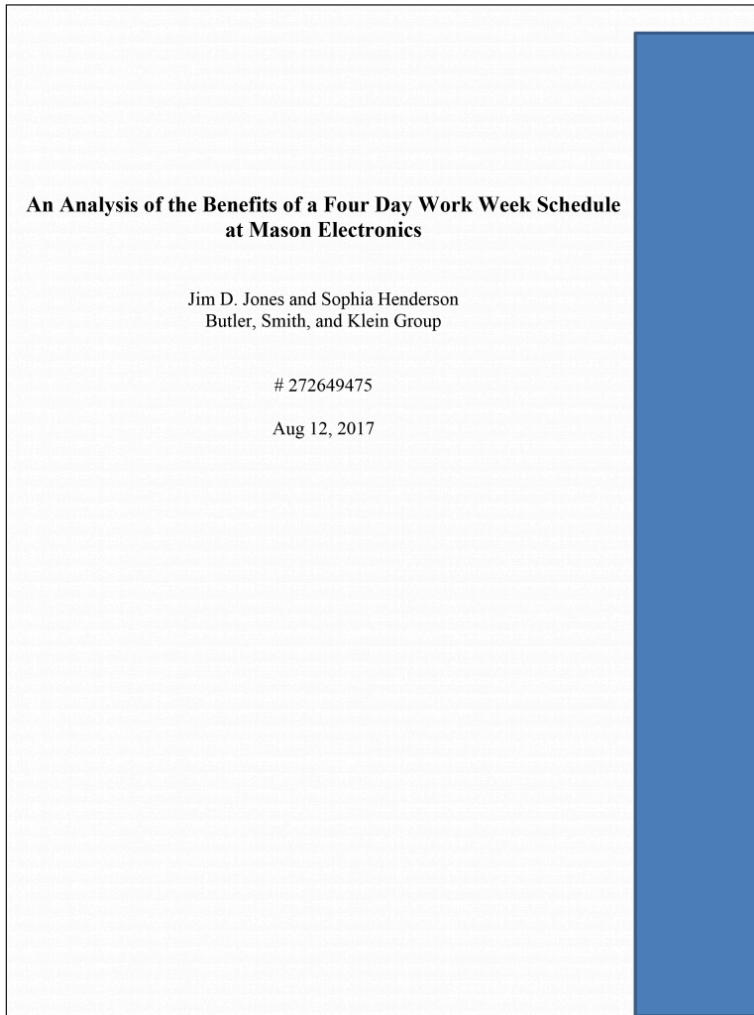


Figure 3: Good, Clear Cover Page



Figure 4: Cluttered, Not-So-Great Cover Page

Abstract or Executive Summary

Most technical reports contain at least one abstract—sometimes two, in which case the abstracts play

different roles. Abstracts summarize the content of a report, but the different types do so in different ways.

- **Descriptive abstract:** This type provides an overview of the purpose and content of the report. In some report designs, the descriptive abstract is placed at the bottom of the title page. In others, it appears on its own page. Descriptive abstracts are a concise, specific, and repetitive overview of the entire report. They highlight important content so that your supervisor or other researchers can determine whether the report is relevant to their interests and needs. The format and length of an abstract can vary depending on the business or field, though it is often around 100-300 words, depending on report length. In general, abstracts should follow the same chronological order as the report, contain brief but specific information from each section, and use phrases and sentences pulled directly from the report without changing the language. Your abstract may vary somewhat from the list below depending on the sections of your report. An abstract will generally contain the following information:

- Topic or problem
- Information on the participants (if any)
- Brief review of methodology (what you did)
- Statistical analyses
- Results of the study

- Implications of the study (the conclusions)

Executive Summary: Another common type is the executive summary, which also summarizes the key facts and conclusions contained in the report. Think of this as if you used a yellow highlighter to mark the key sentences in the report and then siphoned them all out onto a separate page and edited them for readability. Typically, executive summaries are one-tenth to one-twentieth the length of reports 10 to 50 pages long. For longer reports, ones over 50 pages, the executive summary should not go over two pages. The point of the executive summary is to provide a summary of the report—something that can be read quickly.

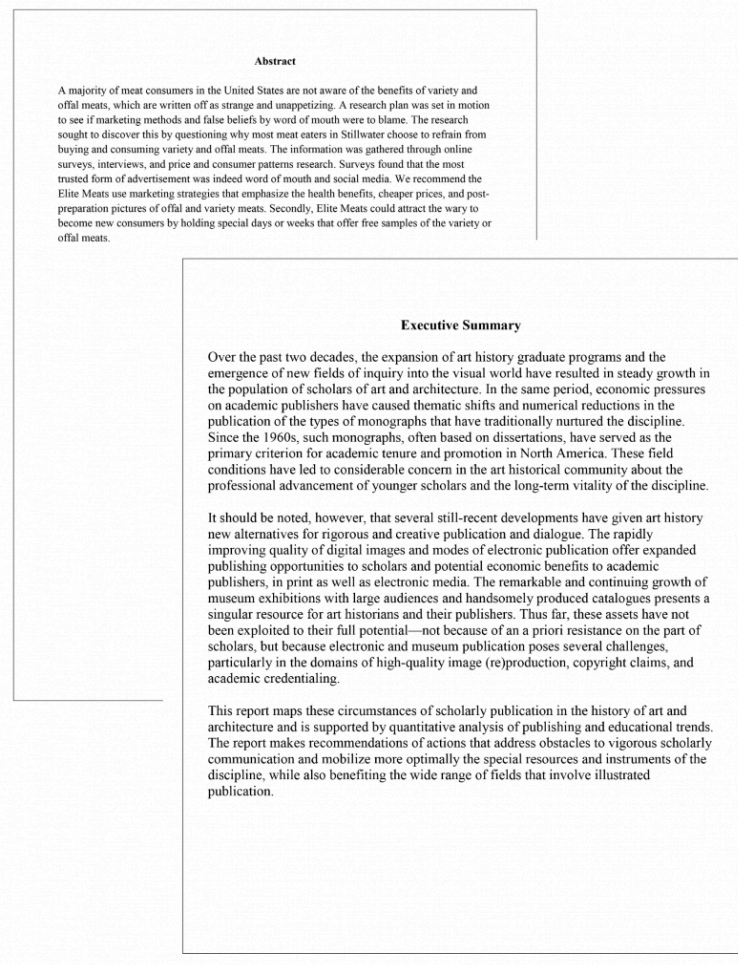


Figure 5: Abstract and Executive Summary Examples

If the submittal letter, executive summary or abstract, and introduction strike you as repetitive, remember that readers do not necessarily start at the beginning of a report and read page by page to the end. They skip around—they may scan the table of contents, and then skim the executive summary for key facts and conclusions. They may carefully read

only a section or two from the body of the report, and then skip the rest. For these reasons, reports are designed with some duplication so that readers will be sure to see the important information no matter where they dip into the report.

Table of Contents

You are familiar with tables of contents (TOC) but may never have stopped to look at their design. The TOC shows readers what topics are covered in the report, how those topics are discussed (the subtopics), and on which page numbers those sections and subsections start.

In creating a TOC, you have a number of design decisions:

- **Levels of headings:** In longer reports, consider including only the top two levels of headings. This keeps the TOC from becoming long and unwieldy.
- **Indentation, spacing, and capitalization:** Items in each of the three levels of headings should be aligned with each other. Page numbers are right-aligned with each other. Main chapters or sections are all caps; first-level headings use initial caps on each main word; lower-level sections use initial caps on the first word only.
- **Vertical spacing:** First-level sections have extra space above and below, which increases readability.
- **Leader dots:** Leader dots horizontally connect the descriptive headings on the left to the page numbers on the right.

Make sure the words in the TOC are the same as they are in the text. As you write and revise, you might change some of the section headings, so do not forget to change the TOC accordingly.

List of Figures and Tables

If your document has more than two figures or tables, create a separate list of figures. The list has many of the same design considerations as the table of contents. Readers use the list of figures to quickly find the illustrations, diagrams, tables, and charts in your report. Complications arise when you have both tables and figures. Strictly speaking, *figures* are illustrations, drawings, photographs, graphs, and charts. *Tables* are rows and columns of words and numbers; they are not considered figures.

For longer reports that contain dozens of figures and tables each, create separate lists. Put them together on the same page if they fit, as shown in the illustration below. You can combine the two lists under the heading, “List of Figures and Tables.”

Table of Contents	List of Figures
FRONT MATTER1	Figure 1. Work Week Preference 5
INTRODUCTION.....1	Figure 2. Employee Non-work Responsibilities 6
RESEARCH METHODS.....2	Figure 3. Managerial Response to Extended day..... 8
Phase 1: Employee Survey..... 2	Figure 4. Electric Use per Week Comparison 12
Phase 2: Manager Focus Group..... 2	
Phase 3: Analysis of Upkeep and Other Building Costs..... 3	
Phase 4: Benchmarking..... 3	
RESULTS4	
Employee Survey Results..... 4	
Manager Focus Group Results..... 8	
Building Costs Analysis Results..... 10	
Benchmarking Results..... 12	
DISCUSSION14	
RECOMMENDATIONS AND CONCLUSION17	
REFERENCES.....19	
APPENDICES20	
Appendix A20	
Appendix B21	
Appendix C22	
	List of Tables
	Table 1. Work Week Sick and Vacation Leave Statistics 6
	Table 2. Competitor Output and Gains..... 12
	Table 3. Competitor Workday Hourly Configurations 13

Figure 6: Table of Contents and List of Figures and Tables Example

Report Body

The report’s body contains the report’s content. In these sections, you will introduce your topic, tell us what research you found and how you obtained the information, discuss the significance of your findings, and conclude with your overall assessment of the topic, problem, or information gathered. It follows the IMRaD format and should leave the reader with a full understanding of the issue.

Introduction

An essential element of any report is its introduction. Make sure you are clear on its real purpose and content. In a technical report, the introduction prepares the reader to

read the main body of the report. The introduction should offer immediate context for the reader by establishing the importance of the topic and by describing its nature and scope. You should describe your specific approach to the problem and establish how your investigative work meshes with the needs of the field or with other work that has been done. The “funnel system” of organization—moving from a broad approach to a gradually narrowed scope—is recommended. Present tense is preferred. An effective introduction will usually include the following rhetorical moves, in any order.

- Define the subject of the report
- State the purpose of the report, preferably in one sentence
- State the report’s main point
- Stress the importance of the subject, especially to the defined audience(s)
- Offer background information on the topic
- Forecast the organization of the report

Depending on which type of report you’re writing, the purpose and main point may vary greatly. For example, for external analytical reports that propose a solution to an investigated problem, the purpose is to convince the client to take some sort of action, and the main point is that the proposed solution will remedy the problem. In reports that are persuasive, it’s best to think of the main point as the report’s thesis.

For a non-argumentative research report, however, the purpose may be to present an organized and coherent overview of the topic with corresponding graphics, and

the main point may simply be to provide others with an educational resource. (Imagine an encyclopedia entry as a type of non-argumentative research report.)

Introductions range from one to several pages in length, and must always include a clearly worded account of the report's objective; usually at the end of the introduction (Some writers even include a short separate subsection labeled "Objective"). However, the content and intent of the objective and purpose statement tend to overlap. It is always important to state your final conclusion, recommendation(s), or action you want the reader to take in the introduction, as it is the "main point" of the report.

The content of a report's introduction is similar to the introductions of proposals and other professional correspondence. The extent of which you incorporate this content depends on the purpose and the audience. For example, if your report is internal (written for your own supervisors), you may spend less space on background information (they likely know about the situation or problem), or if the report is solicited (you were asked for the report), you may not need as much emphasis on the importance. Conversely, if you write an unsolicited report advocating for a specific change, you will need to emphasize both the background information (to explain the problem) as well as the importance (to show a need for change). These are all considerations to make based on the type of report and the audience.

Your introduction may benefit from the addition of some data or research. You may want to provide statistics about the current situation to show importance or to establish your credibility. If you choose to include research in the introduction, focus on paraphrases or specific statistics—you do not want to bog down your introduction

with heavy quotations or “filler” information. You will include more extensive research in the body of the report, so it is not needed here. The introduction should be to-the-point and revised to have maximum effect on the audience.

Literature Review

A literature review is most often found in published academic journal articles and scientific reports. It is a discussion of previously published research on the topic. It can contain theory, content of similar studies, and/or studies that led to your current research. In technical reports, an entire section of your paper may be devoted to a literature review. Literature reviews range from exhaustive searches to mere summaries of articles, but the fundamental objective is always the same—to establish the history of the problem investigated by summarizing the *what*, *how*, and *why* of the work that has already been done. Writing a literature review requires you to establish relationships among findings from other researchers and to condense many pages of published material into shorter segments. Your ability to assimilate material is critical.

Stylistically, literature reviews are often written in the past tense, but many authors favor the present tense if the research is recent. Passive voice may seem tempting to use, but active voice is preferred, because you can smoothly place the names of authors into the subject slot of the sentence: “Yoldas and Lloyd (1999) propose a chemical polymerization technique for the preparation of NASICON gels.”

Literature Review

Genre scholars state that “there are too few studies on written business communication in particular business discourse communities” (Flowerdew & Wan, 2006, p.134). Scholars such as Flowerdew & Wan (2006), Rutherford (2005), and Killoran (2006) have attempted to fill this void by studying genre and its effects in documents found exclusively in the corporate world. Flowerdew and Wan’s ethnographic study proved that classic genre analysis is applicable to newer genres such as tax computation letters. Rutherford’s (2005) study of British OFR’s yielded evidence of subgenres and the “Pollyanna effect” occurrences in these documents to assure struggling companies’ stakeholders, while Killoran (2006) discovered a genre’s ability to thrive in a new medium, in this case electronic, is based on adaptation and the capability to take on new genre applications.

Genres found in the medical community have been analyzed as well to contribute to the corporate business communication subset. While some would disagree that the medical community is “corporate,” it is a high money making entity and is ran much like any other corporation. Dunmire (2000) studied the temporal nature of genre activity by analyzing medical and patient interactions, while Varpio et al (2007) visually analyzed optometric forms.

While these efforts have certainly contributed to defining and understanding the underlying constructs for some business communications, these studies have only focused on texts which appear in corporate, white-collar occupations, limiting the scope of analysis to a marginal group within certain, often inclusive, types of genre. If scholars are to answer the call of Flowerdew and Wan (2006), analysis on business communication documents found outside the corporate world must be addressed to more fully understand genre conventions.

Figure 7: Literature Review Example (Excerpt)

Experiment / Method / Procedure

Any of the above titles are common names for this section. The goal is to summarize the *what*, *how*, and *why* behind your specific experiment or research design, with particular emphasis on the *what* and *how* so that other researchers can repeat your procedures if they desire. This section includes a description of the relevant apparatus and materials used. Photographs and diagrams can be used, sparingly, to help clarify the procedures. This section often contains the following information:

- A short overview of your research goal and rationale for why you chose the research type(s)
- Research goals (What you plan to achieve through your research)

- Types or phases of research completed (Survey, secondary research, poll, etc.)
- Purpose of the research (What did you want to find out?)
- Information on the participants/subjects, if any and why you chosen (Biographical sketches, major demographics, numbers, agreements or payments, and/or statements of ethical principles)
- Materials, apparatus, or measures used (Physical aspects)
- Procedures followed (The process)

Stylistically, passive voice and past tense verbs are sometimes used in this section, but be sure that your sentences are written efficiently and contain simple subjects and verbs when possible. The basic form of directly stating “what was done; why it was done that way” should be used repeatedly in this section.

Results

The Results and Discussion work together to present the findings of your research. The Results will be directly related to your Method. However, take care not to include your experimental methods here—that is the job of the previous section. Focus on *what* you found, not *how* you found it.

The main difference between the Results and Discussion is that the Results contains raw data as it was reported or discovered. It must be objective, unbiased, emotionless, and free from judgment. The Discussion

interprets and explains the significance of the data, forming an argument by declaring what you think certain data means and how it fits together. Imagine your report is a puzzle. By the end of the report, you want the reader to see the complete picture. In this scenario, the Results are your puzzle pieces. The Discussion is where you assemble the pieces for the reader.

For most readers, the Results is an important section of the report—your readers must easily find your data in order to interpret it. You straightforwardly present the results of your experiment, usually with minimal discussion. Naturally, the use of tables, graphs, and figures is especially important here, as are explanations of how data were derived. Your Results will likely contain the following content:

- Brief introductory summary of you major results
 - At least one detailed paragraph for *each* of the major findings or ideas
 - Data displayed using charts, graphs, and tables for reference
 - Brief concluding statement of major findings
 - Transition to the Discussion

The Results should include solid data you found through research. If you are writing an informational report, the data is crucial for the report's purpose—to give statistics and other data to the reader. With other types of reports, such as recommendation or feasibility, your data will inform the reader, but also lay the groundwork for an eventual conclusion or recommendation. You may not necessarily include *all* the data you found on the topic, but

you must include all *relevant* data. Include the information (or areas of information) that will be of interest and applicable to the report's audience and purpose. What does the reader need to know to trust your interpretations or recommendations later in the report? What was interesting, surprising, or significant in shaping your analysis or opinions?

When drafting and revising this section, your style should focus on showing that you are reporting the information, not interpreting it (yet). Avoid terms such as *seems*, *appears*, *means*, *looks as if*, *indicates*, *suggests*, *we believe*, *we think*, and descriptor words that indicate positive or negative results such as *excellent*, *worse*, *better*, *great*, etc.

Discussion

In the Discussion, logical deductions are made, errors of or ambiguities in the data should be discussed, and causal relationships must be confirmed. It is important not to rely on a table or figure to do the work for you—you must concisely interpret and explain the meaning of your results. Remember, this is where you put your puzzle together for the reader. Beware of making sweeping generalizations or unfounded statements. Do not be afraid to discuss results and data from different sections together if doing so helps you develop a stronger argument than viewing these pieces of information separately. Your Discussion will likely contain the following content:

- Brief introductory paragraph with overall statement about your content
- Explanations for the conclusions you have about the research (What do they mean? Why do you think that is? Explain your reasoning.)

- References to the data in the Results (You will not discuss any *new* data—explain the data you have already written about.)
- Brief summary of the main points and transition to the Recommendations or the Conclusion

You may feel like the Discussion is repetitious, as you refer to information established in other sections of the report. The key difference is that the Discussion *analyzes* the information and *displays* what it all means for the reader, which is why the Discussion commonly stands alone. In your future career, there could be some situations where you are asked to combine the data and interpretation into a “Results and Discussion” section, or combine the “Discussion and Conclusion” (such as with journal articles). If such combinations occur, it is important not to minimize or reduce the analysis and critical thinking components of the Discussion. However, in most scenarios, a stand-alone Discussion is the most effective way to present your analysis and interpretation to persuade the reader. You may also consider referring back to the key literature of your introduction or literature review, if these sections are included in your report. You can enlighten your readers (and elevate your work) by discussing your data in relation to the published results of others.

Passive voice may seem tempting, but active voice is valuable, especially as you make logical assertions and claims based on your interpretation of the data. As a rule, use past tense to summarize your actual results (“Ninety five percent of respondents stated...”); use present tense to present established facts or present your interpretations (“The helium sintering data show...”).

Recommendations

The Recommendations follows the Discussion, if your report's purpose is to recommend a specific action or change, or to give an overall assessment of a situation, such as with feasibility, recommendation, or project-completion reports. This section should be concise and to the point. Recommendations should be based on your data, and all recommendations should link to research found in the Results and Discussion. Your Recommendations will likely contain the following content:

- An obvious transition using signal phrases and headings
- Restatement of the report's main points (What did your study show/demonstrate? What did you prove/disapprove/not prove?)
- Statement of recommendations (Identify 2-5 actions that the reader should follow. Consider using bullets to contrast your recommendations and make them easy to find on the page.)

The Recommendations and Conclusion can be combined into one section, or be divided into two separate sections. The choice depends on the type of document, the purpose, and the audience.

Conclusion

In most forms of writing, we use the word *conclusion* to refer to that last section or paragraph of a document. The Conclusion should provide the exact conclusions you have arrived at as they relate to your experimental objectives.

Conclusions may be listed and numbered, and it should be made clear how they contribute to the understanding of the overall problem. In a sense, you are going back to the big picture provided by your introduction, incorporating your conclusions into that picture.

Like the Recommendations, this section should be concise and to the point. This section may be short—often about the same length as the abstract. If the Method looks legitimate, the Results appear thorough, and the Discussion does a clear job explaining how it fits together, then your Conclusion should be well received without extras.

There are at least four ways to conclude a report: *a summary*, a *true conclusion*, a combination, and *nothing*. More often than not, the final section is some combination of the first two ways of ending the document.

- **Summary:** Review and summarize the high points. If your report is rather long, complex, heavily detailed, and if you want your readers to come away with the right perspective, a summary is in order. For short reports, summaries can seem absurd—the reader thinks “You’ve just told me that!” Summaries need to read as if time has passed, things have settled down, and the writer is viewing the subject from higher ground.
- **“True” Conclusion:** A “true” conclusion is found in most types of documents. For example, in the body of a report, you might present conflicting theories and explore the related data. Or you might have compared different models and brands of some product. In a “true” conclusion, you would present your resolution of the conflicting theories, your choice of the

best model or brand—your final conclusions.

For most reports, you will need to include a final section. When you plan the final section of your report, think about the functions it can perform in relation to the rest of the document. A conclusion does not necessarily just summarize a report. Instead, use the conclusion to explain the most significant findings you made in relation to your report topic.

VIII. SUMMARY

This report has shown that as the supply of fresh water decreases, desalting water will become a necessity. While a number of different methods are in competition with each other, freezing methods of desalination appear to have the greatest potential for the future. The three main freezing techniques are the direct method, the indirect method, and the hydrate method. Each has some advantage over the others, but all three freezing methods have distinct advantages over other methods of desalination. Because freezing methods operate at such low temperatures, scaling and corrosion of pipe and other equipment is greatly reduced. In non-freezing methods, corrosion is a great problem that is difficult and expensive to prevent. Freezing processes also allow the use of plastic and other protective coatings on steel equipment to prevent corrosion, a measure that cannot be taken in other methods that require high operating temperatures. Desalination, as this report has shown, requires much energy, regardless of the method. Therefore, pairing desalination plants with nuclear or solar power resources may be a necessity. Some of the expense of desalination can be offset, however...

Figure 8: Summary Conclusion Example

VII. CONCLUSION: FUTURE TRENDS

Everyone seems to agree that the car of the future must weigh even less than today's down-sized models. According to a recent forecast by the Arthur Anderson Company, the typical car will have lost about 1,000 pounds between 1978 and 1990 [2:40]. The National Highway Traffic Safety Administration estimates the loss of another 350 pounds by 1995. To obtain these reductions, automobile manufacturers will have find or develop composites such as fiber-reinforced plastics for the major load-bearing components, particularly the frame and drivetrain components. Ford Motor Company believes that if it is to achieve further growth in the late 1980's, it must achieve breakthroughs in structural and semistructural load-bearing applications. Some of the breakthroughs Ford sees as needed include improvements in the use of continuous fibers, especially hybridized reinforced materials containing glass and graphite fibers. In addition, Ford hopes to develop a high speed production system for continuous fiber preforms. In the related area of composite technology, researchers at Owens Corning and Hercules are seeking the best combination of hybrid fibers for structural automotive components such as engine and transmission supports, drive shafts, and leaf springs. Tests thus far have led the vice president of Owen Corning's Composites and Equipment Marketing Division, John B. Jenks, to predict that hybrid composites can compete with metal by the mid-1980's for both automotive leaf springs and transmission supports. With development in these areas of plastics for automobiles, we can look forward to lighter, less expensive, and more economical cars in the next decade. Such developments might well provide the needed spark to rejuvenate America's auto industry and to further decrease our rate of petroleum consumption.

Figure 9: "True" Conclusion Example

- **Combination:** In practice, the preceding ways of ending reports are often combined. You can analyze final sections of reports and identify elements that summarize, elements that conclude, and elements that discuss something related but at a general level.

Below are some possible combinations for a mixed conclusion:

- Provide a brief, general look to the future; speculate on future developments
- Explore solutions to problems that were discussed in the main body of the report (refer to the Recommendations, if any)
- Discuss the operation of a mechanism or technology that was described in the main body

of the report

- Provide some cautions, guidelines, tips, or preview of advanced functions
- Explore the economics, social implications, short and long-term consequences, problems, legal aspects, advantages, disadvantages, benefits, or applications of the report subject (but only generally and briefly)
- **Nothing (No Conclusion):** It is possible to end a document with no conclusion (or *final section*) whatsoever. However, in most cases, that is a bit like slamming the phone down without saying good bye. The *nothing* conclusion will likely be used in cases where you were asked to compile the data for another person(s), such as in an informational report. The data may be used in order for others to make decisions, such as managers or other departments within a company. For example, if you wrote an informational report on a new ionic-polymer metal composite on the market, you would write about usage, applications, and current research, but skip the conclusion, as your manager or the physical testing department would make the decision whether or not to start using it.

Back Matter

The back matter of your report contains sections that give additional information about and attributions for the report's content. It contains acknowledgments and

references, as well as appendices with more data to help the reader fully understand the report's informational basis.

Acknowledgments

If appropriate, briefly recognize any individual or institution that contributed directly to the completion of the research through financial support, technical assistance, or critique. In a thesis, this section may appear just before the introduction.

References

Documentation styles vary according to professionals and fields. For a technical writing class, you may be using either MLA or APA style, while engineers use the IEEE system.

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Figure 10: Reference Page Example.

Document all secondary sources (sources created by other authors) used in the report, whether you directly quote, paraphrase, or summarize. Whether it comes from a book, article, a diagram, a table, a web page, or a product brochure—it is still borrowed information. If you create your own data through primary research (conducting your own interviews or surveys, for example), you do not need

to include these on the reference list, but all secondary sources must be properly cited. (See chapter 4 and 10 for information on citing sources)

Appendices

An “Appendix” presents supplementary material that was not included in the main body of the report because it would have detracted from the efficient or logical presentation of the text, usually either by sheer bulk or level of relevance. As with figures and tables, appendices should be numbered or lettered in sequence; i.e., “Appendix A, Appendix B,” and so on.

What do you put in an appendix? Anything that does not comfortably fit in the main part of the report, but cannot be left out of the report altogether. The appendix is commonly used for large tables of data, interview transcripts, large chunks of sample code, fold-out maps, background that is too basic or too advanced for the main text, or large illustrations that do not fit in the body of the report. It could also contain a list of organizations relevant to the material of the report, questions for surveys conducted, or the derivation of an equation that was used in the text but could not be referenced because it did not originally appear in a text that could be correctly cited. Anything you feel is too large or lengthy, or that you think would be distracting and interrupt the flow of the report, is a good candidate for an appendix.

Appendix A: Survey Questions

The purpose of this survey is to see what types of meat people usually purchase/consume on a daily basis. This survey should take approximately 5 minutes and will give us a good understanding as to why people do or do not purchase/consume unconventional cuts of meat.

Unconventional cuts of meat for example are but not limited to: Organs, variety-uncommon muscles such as oxtail, beef tongue, and jowl, and skin.

Offal is defined as the entrails, organs, and insides of the animal (including muscles) that is edible, also known as variety meats

****We define meat to include all cuts of animals INCLUDING fish****

1. What is your gender?*

- a. Female
- b. Male
- c. Prefer not to say

2. What is your age range?*

- a. Under 18
- b. 18-24
- c. 25-35
- d. 36-50
- f. 65+

3. Do you eat meat (fish included)?*

- a. Yes
- b. No
- c. Other

4. How often do you eat meat (fish included)?*

- a. Daily
- b. A few times a week
- c. A few times a month
- d. Very rarely
- e. I don't eat meat
- f. Other

5. Check off the three most common types of meat you buy*

- a. Chicken (breast, thighs, etc)
- b. Bacon
- c. Ground Beef
- d. Oxtail
- e. Ham Hock
- f. Fish
- g. Pork
- h. Sausage
- i. Game (venison, duck, goose, pheasant, , etc)
- j. Gizzards, livers, hearts, etc.
- k. Steak
- l. Whatever is on sale
- m. I don't eat meat
- n. Other

8. At first glance, how would you describe this picture of meat? How does it make you feel?



- a. Looks delicious, would definitely eat it
- b. Looks gross, would not eat
- c. Indifferent
- d. Other

9. If a friend cooked you a meal and it included offal (non-traditional cuts of meat/lesser used parts of the animal), would you eat it?*

- a. Absolutely not
- b. Yes, of course!
- c. Yes, if I didn't know what it was
- d. No, I don't eat meat
- e. Maybe, depends on how it is prepared
- f. Other

10. Do you feel as though you stay inside the bounds of meat other than offal because that is what you ate growing up?*

- a. Yes
- b. I never looked at it that way
- c. No, not at all
- d. Other

11. Do you think you would be more receptive to offal if your family favored it?*

- a. Yes!
- b. Maybe every once in a while
- c. No, never!
- d. Other

12. Do you follow 1907 Meat Co. on any of these social media sites? (Select all that apply)*

- a. Facebook
- b. Twitter
- c. Instagram
- d. 1907meat.co
- e. N/A
- f. Other

6. Check off the three most common types of meat you eat when going out*

a. Chicken (breast, thighs, etc)

b. Bacon

c. Ground Beef

d. Oxtail

e. Ham Hock

f. Fish

g. Pork

h. Sausage

i. Game (venison, duck, goose, pheasant , etc)

j. Gizzards, livers, hearts, etc.

k. Steak

l. Whatever is on sale

m. I don't eat meat

n. Other

7. On a scale of 0 to 4, how likely would you be to try these types of meats? (0 being absolutely not and 4 being definitely yes)*

a. Beef Tongue: 0 1 2 3 4

b. Oxtail: 0 1 2 3 4

c. Pork Cheeks (Jowl): 0 1 2 3 4

d. Beef Liver: 0 1 2 3 4

13. In what form do you usually see or hear advertisements for local businesses? (Select all that apply)*

a. Social Media

b. Newspaper

c. Television

d. Radio

e. Personal Recommendation

f. Travel Websites (Google, Yelp, TripAdvisor, etc)

g. Other

14. Which form(s) of advertisement are you more likely to trust?*

a. Social Media

b. Newspaper

c. Television

d. Radio

e. Personal Recommendation

f. Travel Websites (Google, Yelp, TripAdvisor, etc)

g. Other

Figure 11: Appendix of Survey Questions Example.

11.5 Design and Format

Technical reports (including handbooks and guides) have various designs depending on the industry, profession, or organization. This chapter gives an overview of traditional

design. If you are taking a technical writing course, ask your instructor for any design specifications they have for your documents. The same is true if you are writing a technical report in a science, business, or government context. Organizations very often have their own stylesheets on which all organizational document designs are based, so make sure the design presented in this chapter is acceptable. This is especially true if you are writing a report for publication—each journal provides its own guidelines for submission.

In general, reports should be typed, double or single spaced on 8-1/2 x 11 paper on one side of the page only, and letter-quality print or better is expected. The spacing and margins are often dictated by the audience and genre. For example, in technical fields, single spacing is often preferred, while some classroom instructors may prefer another size. Refer to your guidelines or examples of similar reports to ensure you use correct spacing.

You will likely have several pages of Front and Back Matter in your document, such as the transmittal letter, cover page, table of content, and reference page. (See section 11.4 of this chapter for information on the design of these specific pages) The information below discusses design considerations for the main body of the report.

Headings

Use headings to mark off the different topics and subtopics covered. Headings are the titles and subtitles you see within the actual text of professional scientific, technical, and business writing. Headings are like the parts of an outline that have been pasted into the actual pages of the document.

Headings are an important feature of professional

technical writing; they alert readers to upcoming topics and subtopics, help readers find their way around in long reports and skip what they are not interested in, and break up long stretches of straight text. They also keep you (the writer) organized and focused on the topic. The following are some helpful tips for incorporating headings in a report:

- **Use self-explanatory headings:** Instead of “Background,” make it more specific, such as “Physics of Fiber Optics.”
- **Make headings indicate the range of topic coverage:** Do not exclude major section concepts or descriptions for brevity.
- **Avoid “stacked” headings:** Avoid two consecutive headings without intervening text.
- **Avoid pronoun reference to headings:** If you have a heading “Torque,” do not begin the sentence following it with something like, “This is a physics principle.....”
- **Omit articles from the beginning of headings:** For example, “The Pressurized Water Reactor” can easily be changed to “Pressurized Water Reactors.”
- **Avoid headings as lead-ins to lists or as figure titles:** Always include text that describes and provides context for lists and subtitles.
- **Avoid “widowed” headings:** Keep at least two lines of body text with the heading, or force it to start the new page.

Page Numbering

Page numbering style used in *traditional* report design differs from *contemporary* report design. Check with your instructor or employer to ensure you are following the correct format. Below is a list of general page number requirements:

- **Traditional:** Use lowercase Roman numerals in front matter (everything before the introduction) (i, ii, iii). All pages in the report (within but excluding the front and back covers) are numbered; unless the format style of the field states otherwise.
- **Contemporary:** All pages throughout the document use Arabic numerals (1, 2, 3). On special pages, such as the title page and page one of the introduction, page numbers are not displayed.

Page numbers can be placed in one of several areas on the page. Usually, the best and easiest choice is to place page numbers at the bottom center of the page (remember to hide them on special pages).

Bulleted and Numbered Lists

In the body of a report, use bulleted, numbered, and/or two-column lists where appropriate. Lists help emphasize key points, by making information easier to follow, and by breaking up solid walls of text. Always introduce the list so that your audience understands the purpose and context of

it. Whenever practical, provide a follow-up comment, too. Below are some tips for using lists in a report:

- Use lists to highlight or emphasize text or to enumerate sequential items
- Use a lead-in to introduce the items and indicate the meaning or purpose of the list
- Use consistent spacing, indentation, punctuation, and caps style for all lists
- Use parallel phrasing
- Ensure each item in the list reads grammatically with the lead-in
- Avoid using headings as lead-ins for lists
- Avoid overusing lists; using too many lists destroys their effectiveness
- Use similar types of lists consistently in the same document
- Following up a list with text helps your reader understand context for the information distilled into list form

(See [chapter 5](#) for more information on document design)

Graphics

In technical report, you are likely to need drawings, diagrams, tables, and charts. Display data that is relevant to your topic and goals, interesting or surprising, or complex data that can be clarified by a visual. These not only convey certain kinds of information more efficiently but also give your report an added look of professionalism and authority.

If you have never put these kinds of graphics into a report, there are some relatively easy ways to do so—you do not need to be a professional graphic artist. Common software such as Microsoft Word, Excel, and Google Docs can create effective charts and graphics for a report, while freeware such as Inkscape and Gimp are available online.

Tables and figures should be numbered consecutively throughout the text, and, in a thesis or long report, separate lists of tables and figures are normally included at the beginning. Tables and figures should always have descriptive captions, and if they come directly from sources then the sources must be properly credited. Never present tables and figures without some useful interpretation of them in the text. In other words, graphics should clarify the information in the text, while the text should explain and support the graphics. Always ensure your graphics are ethical and display honest data. (See [chapter 4](#) for information on ethical graphics)

11.6 Revision Checklist for Analytical Reports

As you review and revise your proposal, check for the following:

- **Make preplanning decisions:** Identify what kind of report you will be writing (internal/external; solicited/unsolicited), and identify the audience type, skill level, needs, and interests.
- **Use the right format:** Often, reports follow a block format, but check with your instructor or proposal submission guidelines to insure you are

using the format requested. If there are samples provided, use them for visual comparison.

- **Check submission guidelines:** How should the report be submitted? What types of follow-up documents or actions are connected to your proposal if accepted? Who will these document address, and when are they required?
- **Draft your report:** Make decisions about the type of content/sections to include in your report to meet the requirements of the submission, the requirements for the type of report, and the most effective way to present your idea to the reader
- **Check each section's purpose:** Report sections can seem redundant; however, each section's content varies due to its purpose (For example, the Results should give data, but the Discussion has data *and* interpretation. The Submittal letter provides context while the Abstract has a concise summary of the report's content). Check each section to see that it fully fulfills its purpose.
- **Style and Design:** Ensure that the sections of your report are in a logical, natural order, you include all front and back matter relevant to the report's message, and that you use sub-headers and bullets (and any other formatting styles) correctly.
- **Revise, revise, revise:** A less than professional, grammatically-incorrect report can be rejected. Ensure you have included all content necessary, and revise and edit to ensure clarity and correct style of the audience.

11.7 Example Analytical Report

11.7 Example Analytical Report



Victoria Bauer, Morgan Dunker,
Alex Whitnah, Maria Hernandez
(123) 456-7890
meattoyou@gmail.com

Stillwater, OK

Mr. Adam Freeman,

Contained within this project are our findings and recommendations to increase sales and lower the waste of the untraditional meats sold at your business. Our group has spent eight weeks performing research online and completed surveys and interviews in order to develop potential new marketing and advertising strategies for offal and variety meats.

We found that most consumers were not aware that Elite Meats offered these cuts of meat. Additionally, we found multiple ways that these parts of the animal could be used, advertised, and sold for a profit. Included in this report is our method of research, results from our findings, discussion of our results, and recommendations for developing new marketing strategies. We hope that after reading this you will be able to utilize the information and recommendations we have provided to better serve your customers through new marketing ideas. In turn, we hope to help you increase the sale of these unconventional cuts of meat, which will reduce waste and maximize profits.

Thank you for your time, and we hope you found this research insightful. If you wish to contact our group, you can reach us at meattoyou@gmail.com.

Sincerely,

Victoria Bauer, Morgan Dunker, Alex Whitnah, and Maria Hernandez

* Note: Business names and some urls have been changed for privacy.

**Offal and Variety Meats: A Detailed Study Into the Sale and
Consumption of Unconventional Cuts at Elite Meats**

April 12, 2018

Report Presented by:
Victoria Bauer
Morgan Dunker
Alex Whitnah
Maria Hernandez

Abstract

A majority of meat consumers in the United States are not aware of the benefits of variety and offal meats, which are written off as strange and unappetizing. A research plan was set in motion to see if marketing methods and false beliefs by word of mouth were to blame. The research sought to discover this by questioning why non-vegetarians choose to refrain from buying and consuming variety and offal meats. The information was gathered through online surveys, interviews and research of prices and consumer patterns. Surveys found that the most trusted form of advertisement was indeed word of mouth and social media. We recommend Elite Meats use marketing strategies that emphasize the health benefits, cheaper prices, and post-preparation pictures of offal and variety meats. As well, Elite Meats could attract the wary to become new consumers by holding special days or weeks that offer free samples of the variety or offal meats.

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Elite Meats is a local butcher shop that specializes in locally-sourced beef, chicken, pork, lamb, and bison. Several conventional cuts of meat are available through Elite Meats, such as short rack ribs, sirloin, and tenderloin. Elite Meats strives to be cost efficient, so any meat that has reached its shelf life in the front counter is rotated to the back kitchen for use in the restaurant area of the business. This butcher shop also strives to utilize all parts of an animal, so nontraditional cuts of meat such as tongue, oxtail, and heart are also available for sale. Despite the efforts of Elite Meats, these aforementioned cuts often go to waste or are ground into dog food.

Variety meats are not traditionally included in a Midwestern diet and can be described as “repulsive” in their uncooked form (Bulletproof Staff, 2018). However, variety meats are often included in traditional cultural dishes or used for means other than food. If handled and cooked properly, offal can be a delicious and nutritious addition to any diet. Variety meats tend to also be much more budget friendly than their traditional meat counterparts. In this way, all of the animal, whether it cattle, pigs, or chickens, can be put to use. Despite this, these unconventional cuts of meat are the least demanded at Elite Meats. Although freezing these types of meat is sufficient for now, there could be a few ideas that can be implemented to ensure that all parts of an animal are put to use in a cost and labor—efficient way for Elite Meats.

Several suggestions can be made to improve advertising and marketing of non—traditional cuts of meat. One of these is to use several forms of advertising other than the social media platforms that Elite Meats already utilizes, to reach the target demographic of middle aged community members that consistently purchase and consume meat. Additionally, Elite Meats could post recipes and uses for unconventional cuts of meat on their website, Elitemeats.com, as they already do with traditional cuts. These new methods of marketing and advertising would increase consumer awareness of the cuts of meat that are available through Elite Meats, as well as the potential benefits of purchasing and consuming non-traditional cuts of meat.

The remainder of this report describes the method followed to complete this research, results of the research, and a discussion. After, we conclude with recommendations to promote the sale of these meats and to cut costs at your business.

Method

Our research goals were to discover the reasons for specific meat products purchased by consumers and the current marketing strategies used by Elite Meats. The research targeted meat consumers, specifically those who visited Elite Meats to purchase their meat. The research sought to gauge why people might oppose certain offal and variety meat, such as if it does not seem appetizing or because they simply have not tried these types of meats before. In order to generate and obtain data, we sent out online surveys, interviewed an Elite Meats employee, completed online research, and coordinated benchmarking with other locally—owned butcher shops. This research helped create better marketing tactics and strategies.

Phase I- Survey of Consumers

We surveyed customers of Elite Meats to see the consumers' perception of these alternative cuts and their willingness to buy and use them. We asked what factors were considered when purchasing products, as well as if they were aware that Elite Meats offers other cuts of meat that are not as popular with customers. Additionally, we asked them about their interactions with advertising and Elite Meats' social media accounts. Along with this, we reached out into the general public via social media and received feedback from families, college students, and adults within the community to see if there were certain consumer backgrounds that were more likely to purchase this meat than others. Pictures of oxtail and comparisons to more popular cuts of meat were provided in the surveys to help gauge the receptivity of the meat consumers in the area. The questions in the online survey targeted the consumers' reasons for their meat selection and purchasing habits, and were valid for our research to what affects the consumer's choice of meat consumption. A full list of survey questions can be found in Appendix A.

Phase II- Interview Elite Meats Employee

We interviewed a current employee of Elite Meats in order to ascertain the current marketing strategies for unconventional cuts of beef, pork, chicken, lamb, and bison. We also focused on what kinds of customers, if any, currently frequent the business. We asked what the employee believes will increase sales of these meats, demand of these products, and if there are any other uses for these cuts of meat within while decreasing waste and maximizing profit. This information gave us an inside perspective of Elite Meats and an employee's view of customers and marketing strategies.

Phase III- Online Research into Benefits, Benchmarking, and Promotion

We interviewed other local butcher shops in the Oklahoma City and Tulsa area to see how they went about selling these variety meats. We interviewed butcher shops outside of Oklahoma to see if there was a difference in customer preference and/or different or new ideas on how to better utilize these cuts. In addition, we asked how these butcher shops dealt with the sales/usage of unconventional cuts of meat. We also compared the price differences between different shops to see if that could have been a potential problem. This information gave us a good insight into how Elite Meats could consider changing their marketing methods to better sell these types of meat in the Stillwater area. Furthermore, we researched online for recipes or other uses for unconventional cuts of meat, in addition to benefits and potential downsides that can be derived from purchasing and consuming these cuts of meat.

Results

In this section, we will report the results of the survey we conducted through Google Forms to friends, family, and consumers of Elite Meats. We will also report information garnered through the interview of an Elite Meats employee and online research into the behaviors of meat consumers as they make their meat purchasing decision. The secondary research conducted in this study will convey the health and economic benefits of consuming unconventional cuts of meat versus the more renowned choices.

Survey Results

We received survey results from personal interviews, electronic surveys, social media surveys, and surveys distributed to community members and customers of Elite Meats. All surveys were conducted and recorded through Google Forms. We did not target any specific group or individual once they were inside the store. A total of 185 responses were recorded for our surveys. The survey consisted of 14 questions focused on unconventional cuts of meat and the possible factors responsible for swaying the consumer away from buying those unconventional cuts of meat, versus the more traditional and typical types of purchases of meat (see Appendix A). The survey reached a good sample size of 185 people; we were able to gain a greater understanding on the buying behaviors of a wide variety of meat consumers in the community. After the survey, we looked to specifically develop better marketing strategies for Elite Meats and their offal and variety meats, whether targeting a certain demographic or the general public.

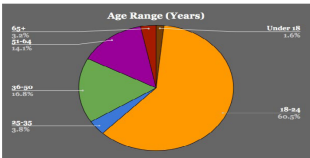


Figure 1: Age of Respondents

Figure 1 shows the age ranges of the responders. This statistic shows that 1.6% of those surveyed were under the age of 18, 60.5% were of the ages of 18 to 24, 3.8% were in the age range of 25 to 35, 16.8% were in the age range of 36 to 50, 14.1% ranged from 51 to 64 years. This question had the intention of discovering the driving age range for the purchasing choices with in the community. The majority of survey respondents demonstrated to be within the age range of 18 to 24 years old, which makes sense, as the community is currently a majority of students attending Oklahoma State University.

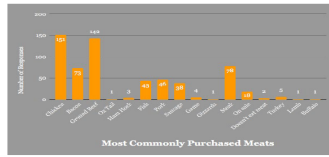


Figure 2: Community Purchasing Habits

Our next batch of questions focused on consumer purchasing habits and meat preferences. The top three purchased meats were chicken breasts and thighs (81.6%), ground beef (76.2%), and steak (41.6%). Among the least purchased were cuts such as oxtail and gizzards. Figure 2 shows a more detailed breakdown of responses when those surveyed were asked to list the three most common types of meat they purchase when grocery shopping. This information can help us to recognize the top selling cuts of meat and then research the marketing methods and appealing factors to the meat consumers in the community.

Respondents were not likely to try unconventional cuts of meat. Figures 3, 4, and 5 demonstrate how we asked the respondents to gauge how likely they would be to try beef tongue, pork cheeks (jowl), and oxtail. The willingness of the respondent to try these meats was rated on a scale of 0 to 4, with 0 being absolutely not and 4 being “definitely yes.” The responses showed a 15% chance of “yes, definitely” trying pork cheeks; this was the highest 4 level rating of all meats that were presented for rating.

On the flipside, beef tongue had the most responses recorded as “absolutely not”, with 77 of 185 respondents rating it as 0. These responses were not surprising. America Midwest culture has shaped people to only eat the most common types of meat like chicken and beef, as was seen in figure 2.

To ask about oxtail, the question included a picture of a prepared dish. Figure 5 illustrates the responses as to whether this prepared dish of oxtail, was appealing or not at first glance. Of the respondents, 55.14% chose “definitely would eat”, 11.9% thought the dish was “gross, would not eat”, 31.4% were indifferent. The majority of those surveyed believed this offal cooked looked appetizing.

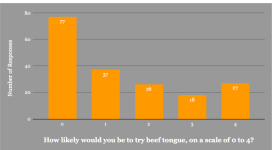


Figure 3: Likelihood to Try Beef Tongue

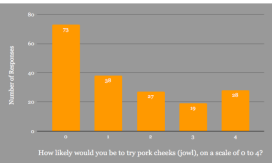


Figure 4: Likelihood to Try Pork Cheeks

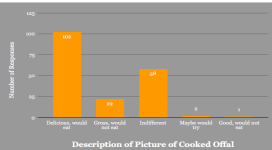


Figure 5: Likelihood to Try Oxtail (with Picture)

The other questions in the survey focused on advertising strategies. Respondents were first asked what form the respondents usually see or hear advertisements for local business. Social media and personal recommendation were by far the most trusted advertisements. The results were 65.3% for social media, 22.4% for newspaper, 40.8% television, for 36.7% for radio, 65.3% for personal recommendation (word of mouth) and 22.4% for travel websites (Google, Yelp, etc.- see a full list in Appendix A). (see Figure 6).

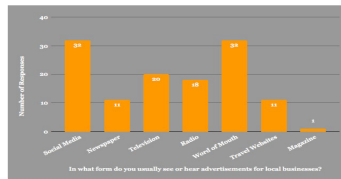


Figure 6: Advertising Trends in Community

Personal recommendation is by far the most trusted form of advertisement. Figure 7 reveals which form(s) of advertisement the respondents were most likely to trust. The options were the same as in figure 5 plus a magazine option and resulted in 22.4% trusted social media the most of available choices, 18.4% trusted television ads, 14.3% trusted radio spots, 12.2% trusted newspaper advertisements.

The vast majority, 85.7%, trusted personal recommendation (word of mouth), while the next popular decision, travel websites such as Google and Yelp, was selected by 20% of respondents. By far, the most trustworthy form of advertisement to those who responded to the survey was personal recommendation and word of mouth.

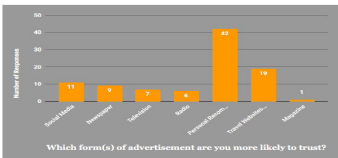


Figure 7: Trusted Advertisements

Interview Results

We interviewed a part-time employee of Elite Meats that usually works at the front meat counter as a cashier. At the front counter, she frequently interacts with most of the customers and oversees transactions when meat is purchased. Because of her responsibilities, she was able to answer several of our questions in-depth. After meeting with this employee, we were better able to understand the processes for purchasing, storing, and selling unconventional cuts of meat and offal, as well as the types of customers that generally buy this type of meat and parts of the animal. Furthermore, we learned what happens to these parts if they are not sold. The questions that were asked in the interview can be found in Appendix B.

The employee also explained exactly what kind of meats and products are available for purchase from Elite Meats. In the front counter that have a definite and short shelf life, she explained that Elite Meats has “all cuts of meat, pork, beef, lamb, chicken, and bison.” She also confirmed our belief that the business sold offal such as beef tongue and oxtail, and also added that Elite Meats sells marrow bones and liver, as well as pig ears that are primarily smoked and used for dog treats. She also divulged

that they are not able to market all parts of an animal, as Elite Meats is “partnered with” OSU’s Food and Agricultural Products Center, and states, “Sometimes, we can’t get everything in due to their regulations of what they have to legally dispose of.”

The employee was able to give us a valuable insight into the customers of Elite Meats. Generally, she said that while college students from Oklahoma State University do come in at times, they do not make up the majority. She stated that “a lot of our custom orders or any larger meat purchases are from age of 25 to 40,” she approximated. She mentioned that there may be some “over and under,” and that typically, consumers visit the store and make purchases after work.

The employee also gave valuable insight into the customers that buy unconventional cuts of meat, such as beef tongue, buy them for “cultural reasons.” For example, she stated, “a lot of Hispanic people come in and buy beef tongue,” perhaps because “tongue tacos are really popular.” When asked to go more in-depth as to who buys specific unconventional cuts of meat, she said that while Hispanic and Indian cultures were the main groups that buy this kind of meat, veterinary students and the elderly also make these purchases from time to time. She tells of a time that a few vet students came in and each asked for beef tongue in order to “practice suturing on.” Furthermore, she said that the “older generation...likes beef liver.”

When asked about the marketing and advertising strategies in place for variety meats and non-traditional cuts, the employee explained, “There’s not much of a marketing strategy behind those specific cuts,” likely because these types of meat are purchased are for cultural meals and dishes. Cuts such as tongue and liver are kept in the freezer until “the customer initiates [the purchase].” If a cut of meat that a customer requests is in stock, but is not readily available for purchase, the employee stated, “we can place an order for it.” She also suggested that a reason that these cuts are not in high demand is that they are not on the typical grocery list, but rather consumed for “a special occasion,” “trying a new recipe,” or “something like that.” For products kept in the front counter, their primary advertising platforms were “Instagram or Facebook, pictures of [meat products] to advertise.”

Since the employee explained that unconventional cuts of meat are not typically purchased, we then asked what the typical shelf life of these types of meat were, and how they were disposed of when they reached the end of that shelf life. She answered that most of these cuts are frozen and kept in storage, so they have “an indefinite shelf life because it’s packed airtight.” Since Elite Meats “doesn’t get that many carcasses,” they do not have many livers or tongues to sell, so it is not “a huge deal if we do or don’t sell it.” She also added that while pig ears are primarily smoked for dog treats, they are available “unsmoked” upon request, but marrow bones are always smoked, because “we do try to use everything we can.”

Since these cuts of meat are not “necessarily on [customers’] radar”, Elite Meats does not heavily advertise or post recipes on their website. Since offal and variety meats are in short supply and low demand, she says that these kinds of meat are not “something that’s dragging us down if we don’t sell it,” and that if they are able to sell it and remove a product from the freezer, “it’s a plus because we do get to use all the part [of an animal] and that’s something we try to do.”

Online Research and Benchmarking Results

Research was performed online into the monetary and nutritional benefits and downsides of offal, and called other butcher shops to see if and how they marketed non-traditional cuts of meat. The definition of unconventional cuts of meat, or “offal,” that is used throughout this research is variety, pluck, or organ meats. Offal is all of the edible organs, entrails, bones, and muscle from an animal.

Nutrition and Monetary Benefits

Offal or “organ meats” are high in vitamin A. Vitamin A is capable of many good deeds for the body: reducing inflammation, fighting off disease and infection, promoting eye health, fighting against anemia, helping with a healthy pregnancy, and more. The type of vitamin A offal provides is a convenient type of vitamin A because it does not need to be converted to anything else to be used by the body; therefore, it is convenient and healthy for the body to absorb (Bulletproof Staff, 2018). The nutritious benefits to eating offal are only one reason to choose to expand one’s

horizons to offal meat. Not only with the advantageous addition of vitamin A to a meal can one fight off bacteria and viruses, while also promoting healthy growth in the body, one can at the same time cut out the expense of buying vitamin supplements (Edwards, 2018).

Speaking of cutting out expenses, the prices of the beloved steaks average at \$15.79 at our local butcher shop Elite Meats in Stillwater, Oklahoma (Fresh Meat Menu, n.d.). This habit can easily be strenuous on anyone's wallet. However, opening one's eyes to the world of offal meat will be not only a great experience for the taste buds, but a great break to the wallet. Offal such as oxtail at Elite Meats can be bought in any proportion chosen by the customer ahead of time. Oxtail runs at a price of \$6.99 per pound, they are generally sold in proportions around one to two pounds, so the price is most commonly sold as about \$12.99 (Fresh Meat Options, n.d.). The prices of offal range from \$2.99 to \$12.99 on average from a professional butcher shop online, Preston's Master Butchers (Preston's, n.d.). The organs and entrails are responsible for the lower costs ranging in the single digits. The comparably higher priced variety meats are honeycomb tripe and oxtail, as they are more popular with consumers. Given prices of the honeycomb tripe and oxtail from "professional" butchers are \$12.99 and \$11.99 respectively, which still compares lower than the \$15.79 average price (Preston's, n.d.) of most steaks at a local butcher shop, offal is still a smarter choice for your wallet.

Potential Downsides

The words "offal" and "organs" themselves seem very off-putting, and getting people to buy them, let alone try them, can be relatively difficult. American culture, especially after World War II and the Cold War, has focused itself on "name-brand" and easy-to-get meats that are quick, easy to cook, and visually appealing. People are under the assumption that meats MUST already look appealing when bought raw, so the idea of buying a heart makes people uncomfortable. Some organ meats are also an acquired taste, like stomachs, which can turn people away permanently if they happen to have one bad experience (Bulletproof Staff, 2018). Americans want visually appealing meat to be cooked in a short amount of time; however, some offal requires more time cooking to become tender. For example, the widely popular Hispanic soup menudo requires that you simmer the tripe and honeycomb for a few hours. Additionally, the delicious pork osso buco takes a significant amount of time

to prepare, as the pork shanks must be braised for a few hours so that all the bone marrow is pulled from the bone and thickens the sauce into an umami flavor bomb (Fresh Meat Menu, n.d.). Though some chefs may be dedicated to the dish and have time to prepare it, the typical American now are looking for quick, ready-to-eat meals, which is quite the opposite.

Benchmarking

To get a better idea of how other butcher shops handle their offal, we contacted a handful of shops locally—as well as from other regions—to try and discover if there were regional differences in purchase preference as well as possible new ideas that might not be known here. One of the shops willing to talk about products was The Meat Hook, a Brooklyn-based butchery in New York. This east coast butcher shop had some creative ideas on how to handle offal, but admitted that these ideas were not original to them and that many others are finding new ways to keep food waste to a minimum and promote the sale of offal, even if the customers are not exactly aware that they are eating it. Many butcher shops sell more than just raw meat; it is common for shops to sell chili and sauces to help increase profit. This is where they discovered one way to get rid of their amassing amounts of pig skin. In one butcher's famous Italian pasta sauce, pig skin is simmered to give the sauce a very silky texture and is a great way to utilize the product. Another example they gave was that they turn a lot of their beef hearts into jerky, as people will buy jerky but rarely will they buy a heart the size of your head.

Most of the butcher shops we were able to get in contact with had very similar ideas; every shop used bones, tendons, and dehydrated pig skins to make dog treats in an attempt to bring in some extra dollars. Along those same lines, many shops who could not sell enough organ meat often used the meat to make specialty raw dog food, yet many said they wished they did not have to make dog food because the labor usually outweighs the profit. Lastly, some of the butcher shops in bigger cities, such as New York City, are able to sell their offal in the form of charcuterie. Often, expensive charcuterie is known for being a delicacy, and people are willing to spend upwards of \$30-\$40 per pound for what are mostly offal ingredients (Mylan, 2011). Common charcuterie options are pâté, terrines, and dried meats encased in bung or other animal stomach/intestinal tissue.

Discussion of Results

The results from the survey showed that a majority of the respondents who purchased meat are female and within the range of 18 to 24 years old, with the next highest ranging from 36 to 50 years old. This statistic shows us that the marketing strategies can be tooled towards female buyers and those specific age demographics. However, when speaking with an employee of Elite Meats, we were informed that while this age range is among the customers of the business, the majority of consumers fall between the ages of 25 and 40 years old. Therefore, it may be more productive for Elite Meats to market specifically to that age range.

Advertising the nutrition benefits seen in offal and variety meat can help ease more consumers into them. For example, variety and offal meat contain vitamin A, a specific kind of vitamin which does not need to be converted to anything further in your body before benefits can be derived. Vitamin A is known to fight off infection, help support healthy eyes, support a healthy pregnancy and more (Edwards, 2018). This can be explained to consumers in addition to the economic benefits found in our research. The average cost of one of the most expensive unconventional meats (offal) is less than the average price of the most purchased meat among those surveyed, steak (Preston's, n.d.). The most common age group of respondents suggests they could still be college students and would appreciate the new lower costs of buying meat, as would any member of the community that is looking to shop in a more economically efficient way.

The graph provided in figure 5 demonstrated the responses to a picture of prepared oxtail. Barely half of the respondents chose the response of "looks delicious, would eat it." This showed the respondents were receptive to the aesthetics of the dish; however many free responses were along the lines of "looks good, but not willing to try it." Maybe the respondents are less receptive to offal and variety meat because of an idea that the meat tastes bad, rather than knowing than for sure that they dislike the taste or texture. A majority of respondents even stated they would definitely try the dish if prepared, but they must know how it was prepared. This could correlate to the idea of offal or variety meat coming from "strange parts" of an animal and therefore seem unappetizing to see before it is fully prepared. The important aspect to note is the majority vote declined oxtail only when it was known that it was "oxtail" by the

name, and therefore followed by the common idea that it is gross. Many responses noted the picture looked okay or even good, but they were wary to try it. From this new information, Elite Meats can try to conquer the idea of all unconventional meat tasting and looking gross by advertising the pictures of prepared meals possible with offal and variety meat, or by providing samples of prepared meat.

One of the responses stated that the consumer only bought the more conventional cuts of meat because they did not know of any other kind available for sale. Large corporations such as Walmart may not have offal and variety meats readily available for purchase, but Elite Meats has a wider assortment of unconventional meats available. Elite Meats can take the newly found information of most popular and most trusted forms of advertisement for their customers and use it to market recipes and a variety of meats to their target demographic. The most recognized forms of business advertisement were social media and personal account (word of mouth). Social media can show the benefits and possibilities of unconventional meat in many ways. The majority of respondents hears or sees advertising from social media and personal recommendations, which could be a result of the majority of respondents falling in the age category of 18 to 24 years, and even more age groups joining social media. A possible suggestion to marketing strategies for Elite Meats could be to utilize social media with appetizing pictures of prepared offal and variety meats while also stating the more favorable price and fun fact health benefits.

Information from the interview suggests that these unconventional cuts of meat are bought only by a specific group of people and for special occasions or cultural reasons. Because of this lack of demand, unconventional cuts of meat are usually kept in the freezer, and are available usually only upon request of the customer. However, butcher shops from across the nation use offal and less demanded cuts of meat in pasta sauces and snack foods; this way, all parts of the animal are used, with nothing going to waste.

Conclusion and Recommendations

In conclusion, many are not aware of the true taste and benefits of offal and variety meat at Elite Meats, and this may not change. Many have an idea already set in their minds that offal and variety meat are gross; however, there is hope for the gain in favorability of unconventional cuts of meat. Marketing techniques targeting social media and word of mouth can help to emphasize the selling of unconventional cuts of meat through mentioning all the benefits they have to offer to individuals and society, as several of the following recommendations would cost nothing extra, but would provide extra income if non-traditional cuts of meat are sold.

Unfortunately, we do not believe Elite Meats can utilize variety meats in the case of charcuterie. There is complicated licensing required because of the use of nitrates and nitrites, but also because the consumer base may not be interested enough for the expenditures. Charcuterie is much more expensive than the common cuts of meat because of the time of labor and aging that the products require. Several shops in bigger cities utilize charcuterie as a portion of their profit, but in Stillwater, Oklahoma, where the population fluctuates aggressively multiple times of the year, we do not think this route should be sought, at least not on a large scale.

Our recommendations are as follows:

- **Try-a-meat:** Buyers will most likely be more receptive if Elite Meat holds a "meat try" of the week/month to get customers to be more receptive to trying new variety meats
- **Community Education:** Use existing social media accounts to promote the benefits of offal and variety meat, as well as posting potential recipes. This would provide a free and wide-reaching platform to better market these types of meat
- **Customer Promotions:** 1907 Meat Co. could encourage days to bring in friends/more people for deals or discounts, or provide discounts via social media

- **Advertisement:** Unconventional cuts of meat be heavily advertised, or possibly discounted, on holidays or special occasions when they are usually found on the table or in a traditional dish
- **Continue Preservation Practices:** It would not be a waste of parts of the animal or a drain on finances to continue to vacuum pack and freeze these cuts of meat until requested by a customer

In a time and society where waste is being produced and disposed at exponentially increasing rates, it is becoming even more important to use all parts of an animal that has been slaughtered. This is the mission of Elite Meats, and the increased sale and use of unconventional cuts of meat and offal can help to fulfill the goals of this business, as well as provide numerous benefits to consumers.

We thank you for your time and hope you take our recommendations into consideration. If you have any comments or questions, you can contact us at meattoyou@gmail.com or (123)-456-7890.

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Appendix A: Survey Questions

The purpose of this survey is to see what types of meat people usually purchase/consume on a daily basis. This survey should take approximately 5 minutes and will give us a good understanding as to why people do or do not purchase/consume unconventional cuts of meat.

Unconventional cuts of meat for example are but not limited to: Organs, variety-uncommon muscles such as oxtail, beef tongue, and jowl, and skin.

Offal is defined as the entrails, organs, and insides of the animal (including muscles) that is edible, also known as variety meats

****We define “meat” to include all cuts of animals INCLUDING fish****

1. What is your gender?

a. Female

b. Male

c. Prefer not to say

2. What is your age range?

a. Under 18

b. 18-24

c. 25-35

d. 36-50

f. 65+

3. Do you eat meat (fish included)?

a. Yes

b. No

c. Other

4. How often do you eat meat (fish included)?

a. Daily

b. Few times a week

c. Few times a month

d. Very rarely

e. I don't eat meat

f. Other
5. Check the three most common types of meat you buy

a. Chicken (breast, thighs, etc)

b. Bacon

c. Ground Beef

d. Oxtail

e. Ham Hock

f. Fish

g. Pork

h. Sausage

i. Game (venison, duck, goose, pheasant , etc)

j. Gizzards, livers, hearts, etc.

k. Steak

l. Whatever is on sale

m. I don't eat meat

n. Other

6. Check off the three most common types of meat you eat when going out.

a. Chicken (breast, thighs, etc)

b. Bacon

c. Ground Beef

d. Oxtail

e. Ham Hock

f. Fish

g. Pork

h. Sausage

i. Game (venison, duck, goose, pheasant , etc)


j. Gizzards, livers, hearts, etc.

k. Steak

l. Whatever is on sale

m. I don't eat meat

n. Other

7. On a scale of 0 to 4, how likely would you be to try these types of meats? (0 being absolutely not and 4 being definitely yes)*
- a. Beef Tongue: 0 1 2 3 4
 - b. Oxtail: 0 1 2 3 4
 - c. Pork Cheeks (Jowl): 0 1 2 3 4
 - d. Beef Liver: 0 1 2 3 4
8. At first glance, how would you describe this picture of meat? How does it make you feel?
- 
- a. Looks delicious, would definitely eat it
 - b. Looks gross, would not eat
 - c. Indifferent
 - d. Other
9. If a friend cooked you a meal and it included offal (non-traditional cuts of meat/lesser used parts of the animal), would you eat it?*
- a. Absolutely not
 - b. Yes, of course!
 - c. Yes, if I didn't know what it was
 - d. No, I don't eat meat
 - e. Maybe, depends on how it is prepared
 - f. Other
10. Do you feel as though you stay inside the bounds of meat other than offal because that is what you ate growing up?*
- a. Yes
 - b. I never looked at it that way
 - c. No, not at all
 - d. Other
11. Do you think you would be more receptive to offal if your family favored it?*
- a. Yes!
 - b. Maybe every once in a while
 - c. No, never!
 - d. Other
12. Do you follow Elite Meats on any of these social media sites? (Select all that apply)*
- a. Facebook
 - b. Twitter
 - c. Instagram
 - d. 1907meat.co
 - e. N/A
 - f. Other
13. In what form do you usually see or hear advertisements for local businesses? (Select all that apply)*
- a. Social Media
 - b. Newspaper
 - c. Television
 - d. Radio
 - e. Personal Recommendation
 - f. Travel Websites (Google, Yelp, TripAdvisor, etc)
 - g. Other
14. Which form(s) of advertisement are you more likely to trust?*
- a. Social Media
 - b. Newspaper
 - c. Television
 - d. Radio
 - e. Personal
 - f. Travel Websites (Google, Yelp, TripAdvisor, etc)
 - g. Other

Appendix B: Employee Interview Questions

The purpose of this interview is to gain an inside perspective of Elite Meats, and to get a better understanding of the marketing and advertising strategies that are already in place. We will be asking questions concerning unconventional cuts of meat such as beef tongue, oxtail, and liver. Additionally, we are trying to get an idea of the types and characteristics of customers that purchase these cuts of meat. This interview should take about 10 to 15 minutes. This information will be included on a report that may or may not be presented to your employer, Mr. Adam Freeman.

1. Could you describe the kind of customers you interact with while working?
2. Tell me about the products Elite Meats sells.
3. What kind of unconventional cuts does Elite Meats offer?
4. Describe the strategy or process in place to market or sell unconventional cuts of meat.
5. What cuts and kinds of meat do you keep in your front counter, and why those specifically?
6. Who, if anyone, buys unconventional cuts of meat such as beef tongue and oxtail?
7. What are some non-typical cuts of meat that are available from Elite Meats?
8. What are the most popular cuts with customers?
9. What's the typical shelf life of untraditional cuts of meat? If they aren't sold within that shelf life, what happens to them?

[Click here to download a copy of the Sample Report](#)

11.8 Special Report: Progress Reports

Progress reports inform a supervisor, associate, or customer about progress you have made on a project over a certain period of time. The project can be the design, construction, or repair of something, the study or research of a problem or question, or the gathering of information on a technical subject. You write progress reports when it takes several weeks or even months to complete a project. In the progress report, you explain any or all of the following:

- How much of the work is complete
- What part of the work is currently in progress
- What work remains to be done
- What problems or unexpected things, if any, have arisen
- How the project is going in general

Function

Progress reports have several important functions—they reassure recipients that you are making progress, that the project is going smoothly, and that it will be complete by the expected date. They provide recipients with a brief

look at some of the findings or work of the project. They also give recipients a chance to evaluate your work on the project and to request changes. They can force you to establish a work schedule so that you will complete the project on time, and project a sense of professionalism to your work and your organization. As well, if the project is not going smoothly, the progress has halted, or the project is not likely to be completed on deadline, the progress report can give you a chance to discuss problems in the project and thus to forewarn recipients. They can be an opportunity to establish the need to reassess or reevaluate the scope, methods, or timeline with someone who has the authority to intervene, revise group hierarchies/roles, and extend deadlines.

Timing and Format

In a year-long project, there are customarily three progress reports, one after three, six, and nine months. Depending on the size of the progress report, the length and importance of the project, and the recipient, the progress report can take the following forms:

- **Memo:** A short, informal report to someone within your organization
- **Letter:** A short, informal report sent to someone outside your organization
- **Formal Report:** A formal report sent to someone outside your organization

Organizational Patterns or Sections

The recipient of a progress report wants to see what you

have 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.

In other words, the following three sections are key in any progress memo or progress report: a) Work accomplished in the preceding period(s); b) Work currently being performed; and c) Work planned for the next period(s).

In order to adequately discuss this content, your progress report should contain the following three main sections, as well as any of the optional sections below which are relevant to your project:

Main sections:

- Introduction that reviews the purpose and scope of the project
- Detailed description of your project and its history
- Overall appraisal of the project to date, which usually acts as the conclusion.

Optional sections:

- Summary of the project
- Specific objectives of the project
- Scope or limitations of the project
- Research gathered
- Overall assessment or appraisal of the project at this time

When creating a progress report, there are several elements to keep in mind. Make sure you use the right format. If

this is for a course, check with your instructor; if it is for a work place, check with your supervisor. Write a clear opening paragraph reminding your recipient of the project you are working on and that you are providing progress on that project. Use headings to mark off the different parts of your progress report, particularly the different parts of your summary of work done on the project. Do not be afraid to use lists as appropriate—in fact, they are helpful so the reader can easily hit the highlights of your current progress. Provide specifics—avoid relying on vague, overly general statements about the work done on the final report project.

Date: February 25, 2019
To: Ms. Bettes
From: Emily King
Subject: Research Project Progress Update

This is an update on my progress in gathering materials for my current project. So far, I have gathered a few pieces of professional writing by contacting my professors over email.

However, the documents I have collected are all the same type of writing. I may have to look for another way to collect samples, rather than requesting them through email, in order to gather different types of writing.

As a result of reaching out to my Professors, I have received five published articles to analyze. Four of them are around eight pages long, while one is a total of twenty-nine pages long. These pieces will allow me to analyze the type of writing that Electrical Engineers use to publish their research. I have also been told by multiple professors that knowing how to write in this format is invaluable, yet students are not formally taught how to as a part of our required courses.

I referenced the notes posted to D2L—“External Analytical Report Assignment Sheet,” “EAR Front and Back Matter,” and “Style and Design EAR”—to base my comparison. The general material these articles and EAR cover, as well as the order in which the material is covered, is more or less the same. However, there are some sections in EAR that are not in the articles. Four of the articles I have collected were published in an IEEE Periodical, so they all follow the same formatting guidelines. The last article I collected was published elsewhere, and its format is the most similar to EAR.

I would like to search for technical instruction or research proposals if possible. A reliable place to gather this information is the IEEE website. IEEE stands for Institute of Electrical and Electronics Engineers, which is an internationally recognized professional organization. I could look through their digital library.

In conclusion, I have gathered five published articles from my professors, and I will continue to look for other types of professional writing. Throughout the next two weeks, I will start analyzing the pieces of writing I do have and look for major elements I have learned from class, such as structure, design, and content. Looking forward to the next progress check-in!

Figure 14: Progress Report Example

11.9 Sub-genre: Internship and Co-op Reports

Typically, you are required to write a report about your work at the completion of an internship or co-op. Although

an internship or co-op might not be linked directly to a class, the act of writing the report—which is often achieved in the final weeks of the experience or in the semester following the work—is a writing-intensive experience.

Function

The document provides a simple means for you to report to your faculty supervisor on both the content and value of your work assignment, and, more importantly, gives you a chance to reflect on the work you have done in both a personal and professional manner.

You should think of your report as both a formal academic assignment and as a personal opportunity to use and enhance your skills as a communicator. Just as successful people thrive by blending their formal education and experience with critical self-assessment, you can use your report to review what you have learned, detail what you have accomplished, and gauge your personal growth. Also, you might offer your report as a writing sample to a potential employer.

Timing and Format

Frequently, you will be given guidelines for writing your report from a faculty supervisor, and it is critical that you follow these guidelines. It is also important that you treat these guidelines as starting points rather than ending ones. For instance, if you are posed with three questions to consider in a particular section of your report, your responses to these questions should be thoughtful and expansive rather than just simple one-sentence answers. Further, you should see these questions as starting points

that will lead you to other related questions of your own design. The bottom line is this: Any report guidelines you are given should be viewed as a substantive framework that awaits your interpretation and elaboration, not as a simple Q-and-A or fill-in-the-blank exercise.

One important note about your report: Your report should be reviewed by the employer before turning it in to your advisor. Your employer's role here is proprietary, i.e., the employer should be considered the "owner" of the report's content. You must be certain that your employer will allow the content of your report to become public, and the employer's review of your report is standard practice—just as a project manager reviews and endorses the written work of his or her team members. As such, do not include trade secrets, sensitive data, or copyrighted information in your report.

Report Content

As a complement to any guidelines you are given, the following sections will aid you in generating detail, making your report stylish, and treating it as a professional product. Keep in mind that internship and co-op reports are typically built around specific majors or programs. Therefore, advice you find on the web for one program might not be correct for another, even within the same school. Always check within your program or department office to ensure you are following the appropriate, most up-to-date guidelines.

The specifics of your report content will vary based on the guidelines provided by your faculty supervisor. However, all faculty supervisors will be interested in reading about three main subjects: *your employer*, *your duties*, and *your evaluation of the work experience*.

Your Employer

Describe the employer you worked for in thorough detail. As you do so, consider including the following elements:

- Introduce the employer's connection to you by providing an overview of your position, including where you worked, for how long, and how the position fit into your education.
- Describe the nature of the position you held in relation to the employer—what is the position's value to the company? Why does the company hire interns?
- When appropriate, quote key company literature—e.g., a brochure, a mission statement, a web page—to summarize the company's values and culture.
- Give an overview of the employing organization's size, structure, and commitment to internship/co-op positions. Use the company literature or web page to help you generate detail, but avoid simple cut-and-paste composing.
- Detail how the position fit into the overall company organization.
- Outline some of the employer's key goals and challenges, highlighting those problems or projects with which you were specifically charged.

Your Duties

Outline your specific responsibilities and tie them into any larger projects with which you were involved. Detailed accounts should be given of such issues as the following:

- Your specific day-to-day responsibilities and activities. Turn here to your daily routine activities, record keeping methods, and any job description provided by the employer.
- Duties you took on or were assigned beyond the standard job description.
- Activities in coordination with project teams or co-workers.
- Specific technical functions of your position.
- The academic background necessary for any project you worked on.
- The goals of any project you were involved in.
- Key data, equations, or software that you generated or used.
- Names and functions of machinery or instruments that you operated.
- Analysis and application of data to your particular project.
- Documents, reports, or presentations that you were required to complete.

Your Evaluation of the Work Experience

The evaluation is important not just for your faculty

supervisor, but for your academic department, your peers, and for you personally. As a way to evaluate your experience, elaborate on areas such as the following:

- The assessment others made of your work, especially if you were given a written evaluation.
- Contributions that the work experience made to your career development, goals, and growth.
- Contributions of the work experience to your selection of future coursework, either because you foresaw new needs due to the work or because a co-worker made recommendations.
- Assessment of courses you completed that were the most or the least applicable to your internship/co-op. Note specific courses and principles studied in these courses.
- Noteworthy distinctions between your education and on-the-job experience.
- Whether the internship/co-op made good use of your technical background.
- Your level of personal satisfaction with the internship/co-op and whether or not you would recommend it to others.
- Your assessment of how the internship/co-op could be improved for others.

Report Style

No one expects you to emulate Shakespeare as you write your report (in fact, you had better not do so). Instead, your

readers will expect your information to be clear and your ideas to be fluid. Therefore, as you compose your report, employ the following stylistic benchmarks:

- Pay special attention to subject/verb agreement and verb tense, the two most common sentence-level problems in technical writing.
- Favor short paragraphs over long ones.
- Consciously build your paragraphs around topic sentences, even very simple sentences such as “My daily activities fell into three categories.” It will help keep you focused.
- Selectively use transition words at the beginnings of pivotal sentences and paragraphs. Transition words provide simple ways for you to guide the reader’s thinking. Opening a sentence with a word such as “Specifically” tells the reader that you are about to elaborate, while a transition such as “Clearly” implies writer contemplation.
- Use active voice more than passive.
- Exploit active verbs, especially as you describe your accomplishments. As with a résumé, think in relation to things you *demonstrated*, *performed*, *defined*, *improved*, *mapped*, *programmed*, *organized*, *presented*, etc.
- Use an honest, upbeat, sincere tone, especially in the conclusion of your report when you assess the internship or co-op’s value to you personally.

CMT 3322
Braeden Fields
Woodruff Construction
Hampton House / Davis Rent Houses
Davis, Ok

Internship Report

Working for Woodruff Construction has been a wonderful experience and I enjoyed working for Mr. Woodruff very much. The business, established in 1990, focuses on housing contracts and has a small workforce, which is the type of business I wish to have some day. Since I previously worked for him last summer, returning was an easy transition because I already knew how he operates his business and manages his team. It is very inspiring to know that you can successfully run your own business in the construction industry.

This experience has been eye opening and very helpful to my knowledge of the construction industry. Last year working for Woodruff Construction as a hired hand, my duties only required physical labor. Even though I was technically still just a "hand" this summer, I was able to study the ways Mr. Woodruff runs his business in addition to performing my physical duties. Since I aspire to run my own business someday, it is useful to know how to do daily tasks such as keep up with licensure, follow local and state building codes, how to keep a log book, and how to set up employee pay.

Mr. Woodruff runs a very tight ship when it comes to his business. He only does the best work. He pays attention to detail and puts his whole effort into making sure corners are never cut at the expense of the customer. For example, when building cabinets, we would glue together all joints, and then nail the joints to secure them. Once they were nailed, we would punch in every nail hole and fill them, even if these holes would never be seen. This is just one small example of how he used craftsmanship to make sure the builds were done to the best of our abilities. There was never a time when I doubted the procedure or method that Mr. Woodruff used in a situation. I firmly believe that he knows the best methods for every aspect of the construction process.

Working for Woodruff Construction benefitted me in many ways. Aside from familiarizing myself with construction practices, methods, terminology, and materials, I was able to learn safety procedures while performing everyday tasks like using saws, routers, sanders, and tools. You must constantly be aware of your surroundings. Even though I plan to go into home building, which is often not as dangerous as commercial

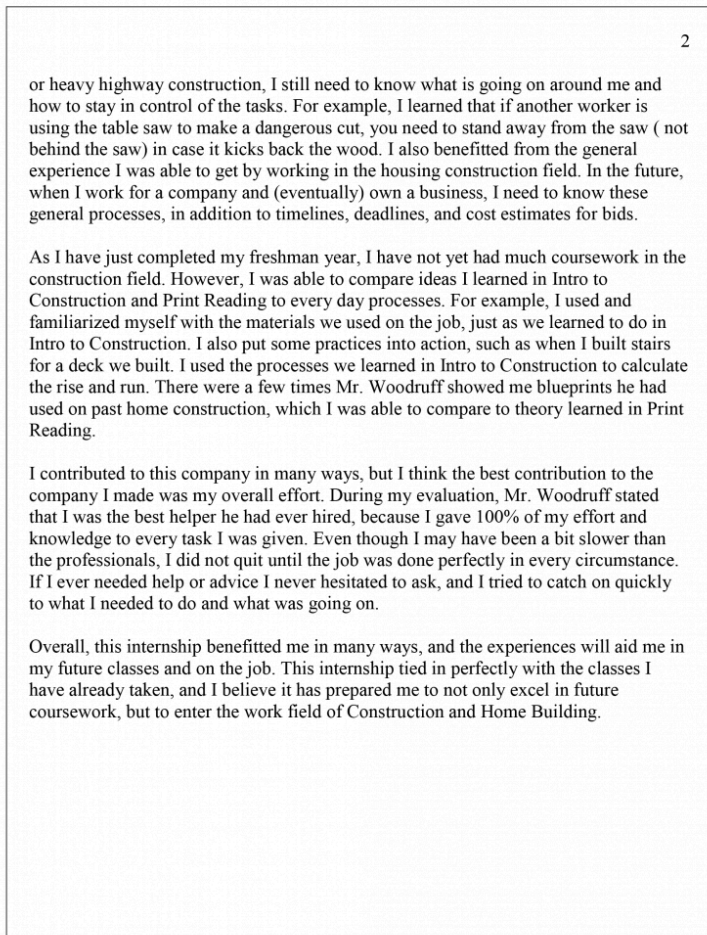


Figure 15: Internship Report Example

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Chapter 12: Oral Reports

Katrina Peterson

Chapter Synopsis

This chapter shares basic principles for the preparation and delivery of oral reports. It gives an overview of expected structural conventions: how to set up an introduction, body, and conclusion. Since presentations often include a visual component, the chapter offers guidelines for creating an effective PowerPoint, Prezi, or Keynote. It includes tips for developing effective slides, while acknowledging the drawbacks of presentation software. It also offers suggestions to help speakers prepare well, overcome anxiety, and consider their speaking context. The chapter concludes with thoughts on presentation delivery.

12.1 Introduction to Oral Presentations

Increasingly, employers report that they require excellent communication skills, not just in print but also in person. Your employer will likely call on you to deliver an oral report at some point in your career. Whether you are an engineer or a writer, a professional or a student, a business person or a scientist, you will need to communicate well with supervisors, colleagues, clients, and the public. For most, this includes at least an occasional formal presentation. Formal presentations in the workplace usually take one of three forms: 1) informational, 2)

persuasive, or 3) instructional. Informational presentations are useful for reporting on research or giving a project update. Persuasive presentations can be used to make pitches to clients or supervisors. Instructional or how-to presentations are formatted to teach, explain, or train. In each instance, you will have a chance to showcase your skills, often hybridizing or combining different modes of communication based on your past training. For example, a how-to presentation would connect your ability to write clear technical instructions with your ability to present well. Your goal as a speaker will differ based on context, but the best presentations share certain characteristics that you will want to consider.

In technical presentations, like most other genres of technical communication, good visual information design is essential. (See [Chapter 5](#) on document design for additional tips and guidelines.) Visual aids are useful for increasing audience understanding of both the subject and the organization of a presentation. Presenters should remember they have an array of options for visuals, from live demonstrations and interactive activities to old fashioned white boards; however, presentation software is the most commonly used option. Of the presentation software choices, PowerPoint is widely used in the workplace and in educational settings. Other software like Prezi or Google Slides are becoming more popular and present may of the same opportunities and challenges. As you think through your options, be aware that each choice has its strengths and weaknesses. For example, PowerPoint can be a very effective tool for students and professionals if used appropriately, but effective use of this tool is not as intuitive as one would think. The following sections will help you to structure your presentation well and to consider the pros and cons of each design choice.

12.2 Presentation Structure

A clear presentation structure is an essential aspect of speech preparation. Similar to the academic essay and other genres of writing, a speech has three parts: an introduction, a body, and a conclusion. Each of these three parts includes certain patterns or rhetorical moves that the speaker should incorporate.

When structuring your presentation, it may be helpful to first draft an outline. This method enables you to determine essential content and main points, while excluding information that is not strictly relevant to your big-picture goals. You have different options to ensure that all the essentials are included; for example, you can place your major points on slides and then illustrate with examples you have prepared. Other options include carrying notecards or an outline to the podium, depending on the setup.

As you make these decisions, always consider who you are as a speaker, or your unique speaking style and challenges. If your hands tend to shake a bit, it may be helpful to hold something to steady them, but if you are concerned about the possibility of holding multiple materials (and possibly dropping them), you can confine memory aids to a single sheet of paper. It may be wise to carry a brief outline of major points with you to offset the possibility of omitting important information. This strategy also helps to avoid losing main points in the case of a technology malfunction if you will be referencing slides.

Introduction

Introductions and conclusions are points of emphasis; psychologically speaking, we tend to remember information presented first and last more clearly than

information that is buried in the middle. The first words you say will also set the tone for the rest of your speech. There may not be any one best way to start a speech, but the following are some helpful guidelines that will make starting a speech much easier.

Perhaps most importantly, capture the audience's attention as you introduce the topic. If you do not engage the audience at the outset, it will become more difficult to do so as you continue speaking. Starting a speech with "Hey everybody. I'm going to talk to you today about soccer" already sounds boring and will not engage audience members who are not soccer fans. If your audience has deemed your speech to be boring, trying to inform, persuade, or entertain them becomes exponentially more difficult. Instead, consider utilizing some of the techniques suggested below.

When selecting an opener, you want to make sure that the option you choose is appropriate and relevant to your specific audience. Different audiences will have different backgrounds and knowledge, so you should first determine whether specific information you plan on using would be appropriate for them. For example, if you are giving a speech on family units to a group of individuals over the age of 65, starting your speech with a reference to the television show *Gossip Girl* may not be the best idea because the audience may be unfamiliar with that show. Also choose an attention-getting device appropriate for your speech topic. Ideally, your attention-getting device should have a relevant connection to your speech.

For easy reference, here are some common devices used as speech openers:

- **An anecdote or reference to current events**
engages an audience with a brief account or

story. Notice the emphasis here is on the word “brief.” A common mistake speakers make when telling an anecdote is to make it too long. The anecdote should be short and have a clear point. For example, consider this attention getter for a persuasive speech on frivolous lawsuits: “On January 10 of this year, Scott Anthony Gomez, Jr., and a fellow inmate escaped from a Pueblo, Colorado, jail. During their escape the duo attempted to rappel from the roof of the jail using a makeshift ladder of bed sheets. During Gomez’s attempt to scale the building, he slipped, fell forty feet, and injured his back. Gomez then filed a lawsuit against the jail for making it too easy for him to attempt an escape.” In this case, the speaker is highlighting a news event that illustrates what a frivolous lawsuit is, setting up the speech topic about a need for change in how such lawsuits are handled. Your speech topic is the purpose of the attention getter, not the other way around, so be sure to avoid any material that seems overly personal or does not fit the subject.

- **A startling statement/statistic/fact** can engage your audience with relevant information about your topic. If your speech is about oil conservation, you could start by saying, “A Boeing 747 airliner holds 57,285 gallons of fuel.” A speech on the psychology of dreams might begin with this thought: “The average person has over 1,460 dreams a year.” Although startling statements are fun, it is important to use them ethically. (See [Chapter 4](#) on ethics for more information on ethics and professional

communication.) Make sure that your opening statement is factual. The internet is full of startling claims that are simply not accurate, so when you find a statement you would like to use, you have an ethical duty to ascertain its truth (and cite it correctly) before you use it.

- **A rhetorical question** may be a good way to draw your audience into your topic. For example, a speaker talking about the history of Mother's Day could start by asking the audience, "Do you remember the last time you told your mom you loved her?" In this case, the speaker does not expect the audience to shout out an answer, but rather to think about the question as the speech continues.
- **A direct reference to your audience** may be an excellent method to engage them. Your audience is the single most important factor in crafting your speech, so it makes sense that you might acknowledge them in some way. Here is an example: "As students at Oklahoma State, you and I know the importance of selecting a major. In today's competitive world, we need to choose a major that will lead to employment and provide us with fulfilling careers. That's why I want you all to consider majoring in communication." In this example, the speaker reminds the audience of their shared status as Oklahoma State students and uses this common ground to acknowledge the importance of selecting a major.
- **An opening quotation** is another way to capture your listeners' attention. Maybe you will

find an interesting quotation in one of the articles or books you read while researching your speech. Quotations may add an element of fun to a speech: “As the late actress, fashion icon, and social activist Audrey Hepburn once noted, ‘Nothing is impossible. The word itself says I’m possible’!” As with this example, be sure to credit the source first if you use a quotation as your attention getter.

- **Humor** can be a great way to engage an audience, but it is a double-edged sword. If you do not wield the sword carefully, you can lose your audience very quickly. One of the biggest mistakes a speaker can make is to use some form of humor that the audience either does not find funny or, worse, finds offensive. Think about how incompetent the character of Michael Scott seems on the television program *The Office*, in part because of his ineffective use of humor. As with other attention-getting devices, your humor must be relevant to your topic and must respect your audience’s sensitivities.

This list of opening devices represents a starting point for beginning your speech. As indicated, your selection of attention getter is not only dependent on your audience, your topic, and the occasion, but also on your preferences and skills as a speaker.

Body

As with the other sections of the presentation, keep in mind the importance of audience engagement. In general, the more interactive the presentation, the better; the more you know your audience, the better. Remember that each person’s learning style differs from the next, so do your

best to engage your audience in different ways, possibly by including details that appeal to the five senses (sensory details). You might also include audio, tactile, and/or kinesthetic components in addition to your chosen visual.

With experience, you will learn to gauge your audience's level of engagement and make small adjustments that help them to stay involved. Depending on context, it may be appropriate to include some movement; perhaps you ask your audience to engage with one another in small groups, which causes a small spatial shift, or perhaps you yourself take a few steps closer to a whiteboard. Integrating props or relevant hand gestures may achieve a similar effect. Our eyes naturally follow movement, so something as simple as walking across the room can serve to include more members of the audience and help them to re-engage. The techniques you can employ within the body of a presentation are many and various, but as above all, know yourself and know your audience. (See [Chapter 2](#) for additional information on audience.)

Conclusion

The conclusion has three specific elements that you will want to incorporate. Given the nature of these elements and what they do, these should generally be incorporated into your conclusion in the order they are presented below.

1. **Signal the end.** A good conclusion should clearly signal the end of a speech. You may be thinking that telling an audience you are about to end is a no brainer, but many speakers do not prepare their audience for their conclusion. When a speaker just suddenly stops speaking, the audience is left confused and disappointed. Instead, give listeners a clear signal so that they

can mentally organize and catalog all the points you have made for further consideration later.

Generally, the easiest way to forecast the end of your speech is to include a verbal signal that is meta-discursive (or self-referential in some sense, referring back to the speech itself). Within a public speaking context, periodic meta-discursive references help an audience to track a speaker's progress from introduction to conclusion. Common formulations include phrasings like *in conclusion*, *in summary*, and *to conclude*. Depending on your audience, you may choose a more conversational or creative method of signaling; you will want to make sure that the framing does not sound too cliché. You have many options, but it should be clear to everyone that you are about to conclude. Also be aware that some of the common formulations (and saying them more than once) can have an unintended negative effect. The audience may decide you are finished and tune out, like how movie-goers get up and leave during the credits in a movie. If this is a concern, you can instead go straight to the summary explained further below.

2. **Restate main points.** In the introduction of a speech you delivered a preview of your main points; in the conclusion you will likely deliver a review. Repetition is especially important in oral communication; include planned redundancy, but avoid being overly redundant. Just as you discussed and made transitions to your main points during the body of the speech, be sure to review the main points in the

conclusion. These steps increase the likelihood that the audience will retain your main points after the speech is over.

As you review, avoid introducing new material or ideas. For example, if you said, “There are several other issues related to this topic, such as...but I don’t have time for them,” the audience may wonder why you did not address those in the body section. If you were giving a persuasive speech on wind energy and ended with “wind energy is the energy of the future, but there are still a few problems with it, such as noise and killing lots of birds,” you are bringing up a counter-argument that should have been dealt with in the body of the speech. The conclusion is not the place for new material.

3. **Include a clincher.** The third element of your conclusion is the clincher, a memorable ending sometimes referred to as a concluding device. Make these words count, since they are the last you will include in the speech. In a sense, you could think of your speech as a nice dinner at a fancy restaurant: the introduction is the appetizer that gets everyone ready for the main course, the body section is the “meat and vegetables,” and the conclusion is like dessert. But have you ever had a nice meal that ended with an unappetizing dessert? Regardless of how good the rest of the meal was, you probably walked away with a negative final impression.

The clincher is like the inverse of the attention-getter. You want to start the speech strong, and you

want to end the speech strong. There are a number of ways you can make your clincher strong and memorable. You can conclude with a challenge, or a call to action. In a speech on the necessity of fund-raising, a speaker could challenge the audience to raise 10% more than their original projections. In a speech on eating more vegetables, a speaker could challenge the audience to increase their current intake of vegetables by two portions daily, asking audience members to take a specific action or make a change. Challenges can be aspirational and they can be inspirational, but they should always be reasonable; the audience should see the challenge as attainable.

12.3 Presentation Options

Quite often, you will have to prepare visual materials to accompany your talk. You might prepare handouts, but it is even more probable that you will need to prepare materials that can be projected on a video screen. The classic version of these projected materials is the overhead transparency, a thin sheet of clear plastic that you can run through a laser printer or write on with special markers; this medium is quickly disappearing, although it still surfaces. Sometimes, you might be able to project paper documents to a screen via a document camera, but doc cams are becoming less common, and they can only present static images.

Instead, you will most likely be asked to create a dynamic presentation using software such as PowerPoint, Prezi, or Keynote. Many other programs exist, including what Google has to offer, but these are among the three most common presentation programs. Each program has

its own special abilities and strengths; however, they all share common basic principles that you can use to create memorable, effective, and interesting presentations. The following information will help you with selecting an effective presentation format.

Three Major Presentation Formats

For a presentation using PowerPoint, Prezi, or Keynote, you can choose from three general formatting options: 1) bullet points, 2) illustrated points, and 3) speaker's prop. The format you choose should fit your audience and your presentation's subject.

Bullet Points. The bullet points format is the default layout for most PowerPoint users and viewers. Slides created in this format commonly include a title across the top and a cascading series of bulleted lines of text inside a slide's main text box. Here is an example of this kind of slide:

What's HTML?

- HTML is an initialism:
 - HyperText Markup Language
- It uses "tags" to tell the browser how to display content onscreen.
 - Tags don't show up onscreen.
- The World Wide Web Consortium develops standards for HTML.
 - Its current version is HTML 5.

Figure 1: Slide organized around a cascading series of bulleted lines of text.

Bullet points format presentations have several benefits. First, they are easy to prepare. (Just type, press Enter for a new line, and hit Tab to create a smaller bullet or Shift+Tab to make a larger bullet.) Secondly, they are useful for highlighting important words or naming concepts that an audience needs to learn. Finally, they project a serious tone and sense of professionalism.

As you consider these options, keep in mind that bullet points format presentations may be boring unless precautions are taken to keep the audience engaged; an overload of words may also make your audience cringe or lose interest. You have probably endured at least one bad PowerPoint in your life, and odds are, that bad presentation used the bullet points format.

Illustrated Points. The illustrated points format is similar, but slides created in this type of presentation focus on pictures, and text appears in a supporting role. An example of this kind of slide appears below.

External CSS – Example

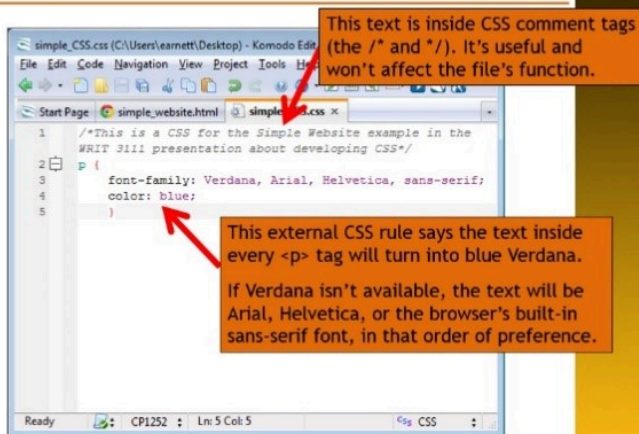


Figure 2: Slide that utilizes illustrated points format, emphasizing pictures with text in a supporting role.

Illustrated points format slides have several benefits. They are excellent for showing conceptual relationships or demonstrating physical relationships between objects. People often respond positively to pictures, so illustrated points format slides also tend to capture viewers' interest more than all-text presentations do. These slides require more detailed preparation, however, and they tend to be more visually busy. If your audience has problems concentrating, if you need to highlight important words, or if you need to move quickly through the information on the slides, you may want a more text-based approach. Illustrated points format slides can also be combined with bullet points format slides inside the same presentation.

Speaker's Prop. The speaker's prop format is similar to the illustrated points format, but a speaker's prop almost entirely consists of simple pictures that flash onscreen in

rapid sequence. Any text that appears is very short, uses a large font, and only appears for a moment. A speaker's prop is appropriate for abstract subjects (e.g., the nature of free will), and if it is done well, it can be fascinating and will engage an audience. However, this type of presentation is often more complex and time-consuming to prepare than a presentation in the other formats, and you run the risk of making it so entertaining that the audience may remember the presentation but forget what you said. An example of a speaker's prop presentation appears in the YouTube video below:



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://open.library.okstate.edu/technicalandprofessionalwriting/?p=40#oembed-1>

(https://www.youtube.com/watch?feature=player_embedded&v=RrpajcAgR1E).

Whichever format you choose, remember that the presentation software is your servant; do not let it tell you what to do, and always modify a template to suit your needs. As an excellent example of what not to do, consider Peter Norvig's classic Gettysburg PowerPoint: (<https://norvig.com/Gettysburg/>).

It serves as a satirical example of how an excellent speech—in this case, Abraham Lincoln's famous Gettysburg Address, widely considered one of the classic speeches in the English language—can be ruined by using

presentation software default settings and following a built-in template without modifying it.

12.4 Slide Design Tips

The guidelines in the design chapter—CRAP in particular—will help you create consistent, helpful, and visually appealing slides. But all the design skill in the world will not help you if your content is not tightly focused, smoothly delivered, and visible. Slides overloaded with text and/or images will strain your audience's capacity to identify important information. Complex, distracting transitions or confusing (or boring) graphics that are not consistent with your content are worse than no graphics at all. Here are some general tips:

- **Think simplicity.** Use a small number of high-quality graphics and limit bullet points and text. Also avoid thinking of a slide as a page that your audience should read; instead, elaborate on major points with examples to keep the presentation interesting and pare down text as much as possible. Remember: even if you are presenting a slideshow, you want the audience to pay more attention to your words than to the slides themselves. Too much text will make the audience concentrate on reading slides instead of listening carefully to the verbal information.
- **Break up your information.** Organize the information into small chunks of text—phrases rather than complete sentences—to make sure your presentation flows well. Some experts recommend having no more than five bullet

points per slide. If you do have more than five, you may want to set up the bullet points to appear a few at a time (in order, on separate slides, or in different columns) to avoid the distraction of a longer list.

- **Have a consistent visual theme.** Some pros advise that you avoid using the stock PowerPoint templates, but the Repetition and Alignment aspects of CRAP are so important that the templates may be your best starting point.
- **Choose a simple color scheme.** In general, three to six colors should provide variety without overloading readers. Be consistent in how you use the colors. For example, if you use red font for the first 12 slides, you should probably not switch to blue font in the last 12 slides unless there is a clear and logical reason for doing so.
- **Choose your font carefully.** Make sure the text is readable from a distance in a darkened room. Many guidelines suggest that you use at least a 24-point font. Contrast is also important; place dark font on a light background or vice-versa.
- **Practice your presentation.** Software is only a tool, and the slide projector is not presenting—you are in charge. Realizing this is half the battle.
- **Use graphics.** In general, substantive slides should present a graphic that illustrates or supports your main point. Instead of the typical topic and bullet point slide layout, a more

effective strategy for PowerPoint presentations slides may involve offering a claim backed by visual support in the form of a photo, graph, illustration, chart, etc.

- **Be careful not to overload the slide** (with either too much text or too many graphics). There is not necessarily one rule of thumb for how much is too much, but be deliberate with choices.

12.5 Pitfalls of Presentation Software

Since Microsoft introduced PowerPoint in 1990, the conference room has never been the same. Millions were amazed by the speed with which a marketing professional or an academic could put together a consistent, professional-looking slide presentation. And then . . .

At some point, somebody with critical thinking skills asked a great question: “Do we really need all these slide shows?” The stock images of arrows, business people in suits, stick figures scratching their heads, and the glowing, jewel-toned backgrounds eventually looked tired and failed to evoke the “wow” reaction presenters desired.

Microsoft is attempting to refresh the design options for PowerPoint, and there are dozens of good alternatives, some of them free (Keynote, Slide Bureau, Prezi, SlideRocket, Easel.ly, Emaze, Slidedog). But the fundamental problem remains—text-heavy, unfocused, long presentations are the problem, not the software. If you are sure that a visual presentation will provide something necessary to your audience, keep the number of slides and the amount of text on each slide to a bare minimum. Think of a slide presentation as a way of supporting or

augmenting the content in your talk; the slides should not replace your content.

Above all, do not read the slides to your audience, which is considered one of the single most annoying things a presenter can do; it also makes the presenter seem unprepared. Excessively small text and complex visuals (including distracting animations) are also frequently cited as annoyances. Instead, make sure that viewers can read slides easily from the back of the room. Also try to design your slides so that they contain information that your viewers might want to write down. For example, good presentations often contain data points that speakers cannot just rattle off or quick summaries of key concepts that viewers will not be able to make up on the fly. If you cannot explain how the slides add value to your presentation, it might be best to avoid using them altogether.

To get a feel for what may annoy your audience, try Googling “annoying PowerPoint presentations.” Also consider designing your presentation to allow for audience participation instead of passive viewing of a slideshow—a good group activity or a two-way discussion is a far better way to keep an audience engaged than a stale, repetitive set of slides.

In summary, a tool is only as effective as the person using it. Presentation software like PowerPoint does not make students stupid and professors boring; rather, poor use of this tool makes for ineffective presentations and can lead to laziness in both the audience and the presenter. Many of the problems with presentations result from readily accessible tools being used by individuals untrained in rhetorical and visual design. Fortunately, students of technical communication can implement a change of strategy to make presentations more effective.

12.6 Presentation Preparation

Research shows that public speaking rates among people's top fears; some surveys suggest that it ranks above fear of surgery, or even death. Why do so many people dislike public speaking? This is a complex question, and the answer is tied to factors both personal and psychological, ranging from past experience and training to culture and context. The term glossophobia combines the Greek words for "tongue" and "fear or dread" to reference a severe fear of public speaking. People who suffer from glossophobia tend to freeze in front audiences. This fear may surface in situations such as responding to a professor in class or having to interact with a stranger, not just giving formal speeches.

Here are some strategies to help overcome anxiety as you prepare for your presentation. In addition to planning the details of content and delivery, be sure to prepare physically. Adequate sleep and rest are crucial. You might be thinking such a thing is impossible in college or in a demanding full-time job, where sleep deprivation and late nights come with the territory. However, research shows the extreme effects a lifestyle of limited sleep can have, far beyond yawning or dozing off in class. Energy levels (and your ability to be alert during the speech) will be affected by lack of sleep.

As you prepare, you may want to eat something that is protein-based before speaking. In other words, cheese or peanut butter on whole grain toast, Greek yogurt, or eggs for breakfast would be preferable to more sugary options. Also wear clothes that are comfortable but meet the context's formality requirements. Wear the same outfit when you rehearse the presentation so that you will feel

comfortable walking and moving in that attire. Comfortable, professional shoes will give you a firm base for your posture. You might consider utilizing some stretching or relaxation techniques that will loosen your limbs or throat. Tightening and stretching your hands, arms, legs, and throat for a few seconds before speaking can help release some of the tension. Also, bring something to drink to prevent dry mouth, and take several deep breaths (to release stress and steady your voice) before climbing on stage. People tend to speak faster and at a higher pitch when they are nervous and giving a presentation. Make an effort to speak at a comfortable pace and avoid letting your voice rise too high. Do not apologize before you give your presentation; being nervous is normal, and although you may feel jittery, chances are your audience will not mind or will not even notice.

Contextual Preparation

The more you can know about the venue where you will be speaking, the better. Whenever possible, check out the space in advance. For example, if you were required to give a short talk for a job interview, you would want to know what the room will be like, if there is equipment for projection, how large the audience will be, and how seating will be arranged. Consider practicing your presentation in a room that is similar to the actual space where you will deliver it. The best advice for contextual preparation is to be on time, even early. If you have to rush in at the last minute, it will be difficult to stay calm and focused for the speech. If you are early, you may be able to make sure equipment is working, or even converse with the audience as they enter. Professional speakers often do this to relax themselves, build credibility, and gain knowledge to adapt their presentations to the audience. Being on time will help

you create a good first impression and thus enhance your credibility before the actual speech.

Procrastination and Preparedness

Procrastination is the great enemy of preparedness. Fluid, articulate public speaking requires repeated practice before the actual delivery. The first time that you say the words should not be when you are in front of your audience. Practicing is the best way to feel confident and in control of the words you speak. As you practice, time yourself to be certain that your speech meets the time limit; speaking within the expected time is a cardinal rule of public speaking. Practice aloud, preferably with someone to listen, while using your visual aids. If you can record yourself in order to analyze gestures and delivery, you will be able to fine-tune and adjust elements of your speaking style. The most effective way to gain a reputation as someone who does not respect an audience (or someone who should not be allowed to run meetings) is to talk longer than the allotted time. Not only will practice help you to feel comfortable with presentation delivery, but it will also ensure that you do not upset your audience by running over the time limit.

Final Note: If you are an audience member, you can help speakers to feel more comfortable, at least a little bit. Be an engaged listener from beginning to end. You can imagine that a speaker is going to be more nervous if the audience looks bored from the start. A speaker with less anxiety will do a better job and be more interesting, so give the speaker your full attention, nod along to main points, ask questions where appropriate, and stay off your phone unless you are using it to take notes.

12.7 Delivery Tips

What follows are some general tips you should keep in mind, but they all essentially derive from one very straightforward premise: practice your speech beforehand, at home or elsewhere, the way you will give it.

- Practice your speech aloud. This technique enables speakers to learn the words and be prepared, but it also lets them know of any potential problems. Sentences on paper do not always translate when spoken. Practicing out loud allows speakers to identify and fix issues with pronunciation and delivery before getting up in front of the audience.
- Avoid excessive body movements. This includes nervous or unnecessary hand motions, unnecessary tapping of feet or hands, etc. But also avoid standing stock still; some hand gestures can keep the audience engaged.
- Eliminate filler words such as “uh” and “um.” Recording yourself, or asking a friend to listen to your speech, can help you to identify this tendency. In some cases, it may be possible to integrate meaningful pauses in the place of filler words to reduce their frequency.
- Project your voice. Soft-spoken speakers may have to speak louder to ensure that everyone can hear, while avoiding the appearance of shouting or reaching an awkwardly squeaky pitch. If you will be using a microphone, practice in advance how you will hold it and the volume you will

use.

- Articulate sentences clearly. Again, be aware of your own tendencies. If you tend to elide words, or if you have a regional accent that differs from your audience's, you may need to slow down and practice enunciating in a way that sounds natural rather than forced.
- Add inflection and expression. Presenters who speak in a monotone will have difficulty keeping an audience engaged.
- Refuse to become flustered. In many cases, an apology is unnecessary and will only draw undue attention to minor oversights, whether perceived or actual. Instead, take a breath, re-focus, and move on with the speech.
- Make eye contact. If it feels awkward to maintain direct eye contact, look around the room at forehead level, or a point slightly above viewers' heads, making sure to include the entire audience.
- Maintain an open body posture. Crossed arms, for example, can make a speaker seem closed off to the audience. In contrast, open hand gestures that are not excessive tend to communicate a corresponding openness to audience engagement and ideas.

There is no preset pattern for perfect delivery. However, with practice everyone can improve. For a few additional tips and suggestions, check out this amusing TedX talk on YouTube by Will Stephen:



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://open.library.okstate.edu/technicalandprofessionalwriting/?p=40#oembed-2>

(<https://www.youtube.com/watch?v=8S0FDjFBj8o>).

As you practice your presentation skills, remember that each speaker is entirely unique, and we each embody different experiences and interests. This means that all speakers must find their own most effective style.



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Breadboarding and Soldering Basics

BREADBOARDING AND SOLDERING BASICS: MAKING AN ELECTRO-HARMONIX LPB-1

WARNING: Soldering Irons can start fires or burn you if not handled with care. Put the iron on a stand when not in use, and unplug it when you are finished soldering.

WARNING: Solder smoke is toxic and should not be inhaled. It is advised that you use lead free, rosin core solder.



LPB1 POWER BOOSTER

- plugs into instrument or amp.
- variable linear boost
- 3x max
- switch to pass or boost
- increases sustain
- 3 yr. guarantee—\$14.95

PARTS LIST:

- Soldering Iron and Stand
- Solder
- Damp Sponge or Paper Towel
- 2N5088 or 2N5089 Transistor
- Breadboard
- Breadboarding Wires
- 9V Power Supply
- 9V Supply Compatible Jack
- Quarter Inch Input and Output Audio Jacks
- 100K Ohm Potentiometer
- 2X 100nF Capacitor
- 2X 1M Ohm Resistor
- 1X 390 , 10K, and 100K Ohm Resistors
- Computer with Internet Connection
- 2 Quarter inch guitar cables
- Guitar and Amplifier

Figure 1 – Photo from <https://www.ehx.com/products/lpb-1>

Breadboarding and soldering are vital for pedal prototyping and production. Breadboards are especially useful as they don't require you to solder all of the circuit components to a board. This means you will only need to solder components such as potentiometers and jacks. This guide will teach you how to breadboard one of the best simple boost pedals, the Electro Harmonix LPB-1 Linear Power Boost, and the basics of soldering. As long as you can handle a soldering iron safely, you should not need any outside experience to complete this, unless one of your components differs from the ones shown in the figures. It is suggested that you free up an hour and a half to complete this circuit.

SECTION I: SOLDERING AND BREADBOARDING BASICS

WARNING: Be careful when using a soldering iron. The soldering iron can burn you and start fires. Do not touch the soldering iron, and always use a stand when it isn't in use.

This section covers the basics of soldering and breadboarding. If you have anything to practice soldering on before you solder the components of the pedal, it wouldn't hurt to do so. However, this isn't completely necessary as you're only soldering components, and not working close on something like a PCB.

1. Prepare the soldering iron.

- a. Set up the stand in a place that it won't melt.
- b. Plug in the iron.
2. Tin the tip of the iron.
 - a. Wipe off any solder stuck on iron when it is sufficiently heated.
 - b. Put a small amount of solder onto the tip, verify that the tip is shiny.
3. Use the tip to heat the component, then touch the solder to the component. Refer to the Figures 2 and 3.

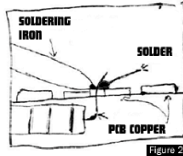


Figure 2

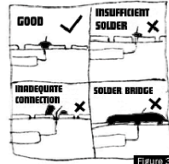


Figure 3

4. Remove the iron as soon as there is a sufficient amount of solder.
 - a. Using too much solder or overheating the component could be risky. A semiconductor device could break if overheated, and pooling too much solder can create a bridge.
5. Wipe the excess solder off of the iron.
6. Unplug the iron and set it on the stand until it has cooled.
7. Once the iron has cooled, put it away.
8. Familiarize yourself with the way a breadboard functions. Refer to figures 4, 5 and 6.
 - a. Breadboards use metal to allow components to all connect. See the graphic to understand where the strips are and how to make connections. Note that connecting a component to the same strip will not make a proper connection.

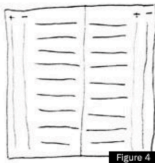


Figure 4

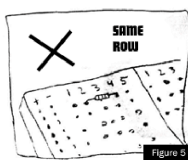


Figure 5

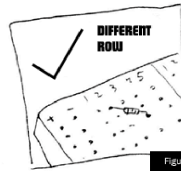


Figure 6

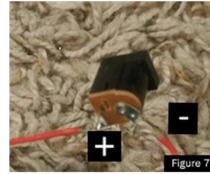
This concludes the basics of both soldering and breadboarding. With this knowledge, you are now able to make the Electro Harmonix LPB-1.

SECTION 2: SOLDERING COMPONENTS

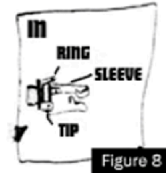
WARNING: Be careful when using a soldering iron. The soldering iron can burn you and start fires. Do not touch the soldering iron, and always use a stand when it isn't in use.

This section will guide you in soldering wires to each of the components that need to be connected to the breadboard.

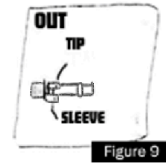
9. Solder a wire to both the positive and negative terminals of the power jack.
 - a. Figure 7 demonstrates the positive and negative of one type of power jack. If your power jack is different, find a datasheet that matches on the internet.



10. Solder a wire onto the Ring, Sleeve, and Tip of the Input jack as shown in figure 8.



11. Solder a wire onto the Tip and Sleeve of the Output jack as shown in figure 9.



12. Solder a wire to each of the 3 pins on the potentiometer.



After completing step 12, all of the necessary components should have wires attached to them. This concludes all the soldering you will have to do for the LPB-1.

SECTION 3: BREADBOARDING COMPONENTS

NOTE: Be careful before connecting power to your circuit. Powering a circuit with a transistor, operational amplifier, or any semiconductor device that is not properly connected could result in the device breaking. Although this is not dangerous, it is less than preferable to have to replace a component in the circuit.

Now that all of the soldering is completed, you only have to breadboard the circuit.

13. Familiarize yourself with the circuit diagram shown in figure 11.

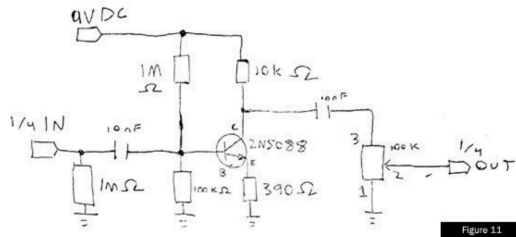


Figure 11

14. Connect the power source as demonstrated in figure 12.

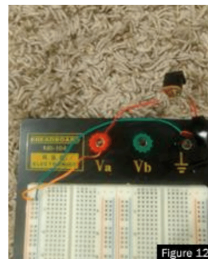


Figure 12

15. Find the Emitter, Base, and Collector of the transistor, or EBC. Use figure 13 or find a datasheet online if it is a different type.

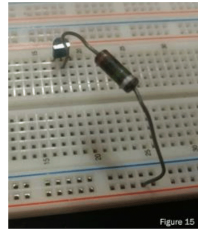


Figure 13

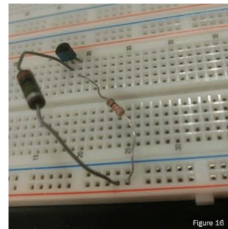
16. Start with the transistor. Put it in a place with plenty of spots to connect to.



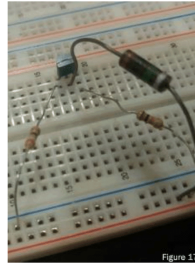
17. Place a 1M resistor from the Base to the power (+) of the breadboard.



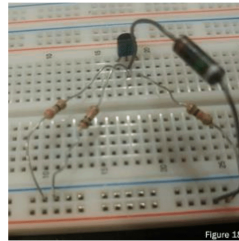
18. Place the 10K resistor from the Collector the the transistor to the power. (+)



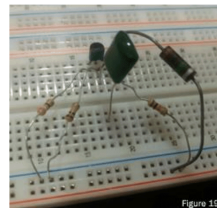
19. Place the 390 Ohm resistor from the Emitter to ground. (-)



20. Place a 100K from the Base to the ground. (-)



21. Connect the first 100nF capacitor from Base to a spot on the board.
You'll connect the input jack to this later.



22. Place a 1M resistor from the capacitor to ground.

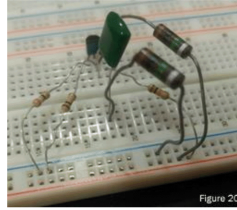


Figure 20

23. Place the 2nd 100nF capacitor from the Collector to an empty spot on the breadboard.

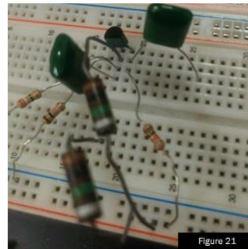


Figure 21

24. Connect the potentiometer to the 2nd capacitor

- a. Find which pin is which on your potentiometer. Refer to the figures 22 and 23, or find a datasheet online.



Figure 22

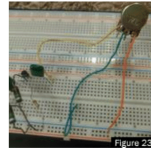


Figure 23

25. Connect the input jack to the first capacitor as in figure 24.
Connect the tip wire as input, and ground the sleeve and ring.

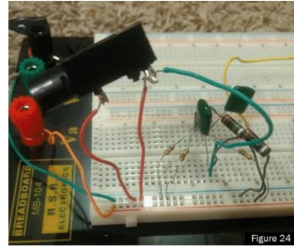


Figure 24

26. Connect the output jack to the potentiometer as in figure 25.
Connect the tip as output, and ground the sleeve.

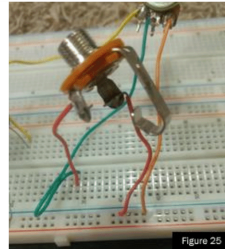


Figure 25

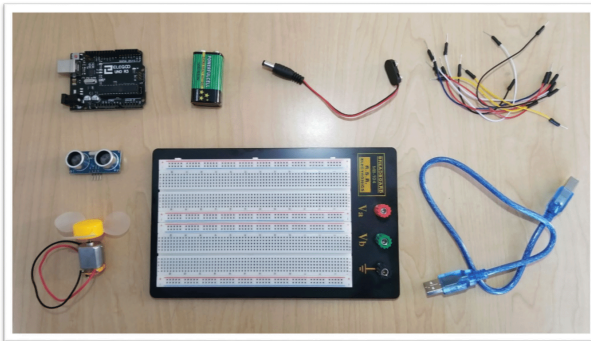
27. Verify that your breadboarded circuit matches the schematic. Again, an improper circuit could result in a broken transistor, which will have to be replaced.
28. Connect the first guitar cable from the guitar to the pedal input.
29. Connect the second cable from the pedal output to the amplifier input.
30. Connect the 9V power supply to the power jack. The pedal should now be on.

With the potentiometer at maximum, you should notice a definite boost in volume. The LPB-1 can boost the signal of your guitar by about 20db. If you swap the 2N5088 for a 2N5089, you should notice a higher output, and more distorted sound. You can use the skills you learned to make any pedal you can find a schematic for. If you like the LPB-1 enough, you can purchase an enclosure and a PCB, and use your newfound soldering skills to make the pedal in a more permanent structure.

Driving Motor with an Ultrasonic Sensor: An Arduino Project

DRIVING MOTOR WITH AN ULTRASONIC SENSOR: AN ARDUINO PROJECT

EMILIE JENKINS



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Introduction

The purpose of this instruction manual is to provide those with limited Arduino experience a step-by-step tutorial on how to properly drive a DC motor using an ultrasonic sensor and an Arduino Uno. An ultrasonic sensor uses sound waves to measure the distance between two points, therefore interfacing ultrasonic sensors and motors is common practice in autonomous robotics where you may need to follow a wall without getting too close. This document will act as a guide through completing the hardware, writing the software and disconnecting from the computer. It is important to follow the directions in this manual carefully so you do not damage the sensor, motor, or Arduino. This process should take less than an hour to complete, however times can vary based on experience and the number and types of errors. Product specifications for the Arduino and the ultrasonic sensor can be found in the Appendices beginning on page 10.

Required Equipment

- 3-6V DC Motor
- 9V Battery
- Arduino Uno
- Battery Snap Connector
- Breadboard
- 5 Male-to-Male Connector Wires
- HC-SRO4 Ultrasonic Sensor
- Laptop
- USB Connector

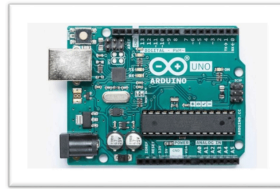


Figure 1: Arduino Uno

Key



Tip - Helpful information that will make the process easier and help prevent errors.



Warning – Failure to follow warnings could result in damage to the hardware.

Instructions

Hardware

This section will instruct you on how to properly connect the ultrasonic sensor to the Arduino Uno. At the end of this section, all components except the battery should be connected and ready for the software to be downloaded. Be sure to reference Appendices A and B for more information on pin layouts and product specifications.

1. Insert the pins of the ultrasonic sensor into the breadboard so all pins are in different rows.
2. Connect a wire from the ground (GND) pin on the Arduino to the ground column on the breadboard, delineated by a blue line.
3. Locate the breadboard row containing the ultrasonic sensor's ground (GND) pin.
4. Connect a wire from this row to the ground column on the breadboard.



Warning 1: Be sure to connect voltage supply to the correct pins. Failure to do so can result in burned out pins.

5. Locate the breadboard row containing the ultrasonic sensor's supply (V_{cc}) pin.
6. Connect a wire from this row to the 5V supply pin located on the Arduino.



Tip 1: Use different colored wires to connect the pins. This will help you differentiate them if you need to troubleshoot.

7. Locate the breadboard row containing the sensor's trigger (Trig) pin.
8. Connect a wire from this row to one of the digital pins on the Arduino. Figure 2 on page 4 shows the trigger pin connected to pin 12.
9. Repeat steps 5 and 6 for the sensor's echo pin, connecting it to pin 13 on the Arduino as pictured in Figure 2.
10. Connect the ground wire (usually black) on the DC motor to the ground column on the breadboard.

11. Connect a wire from the DC motor's supply wire to one of the digital pins on the Arduino. For this example, we will use pin 8.
12. Use the USB connector to connect the Arduino to a USB port on your laptop.

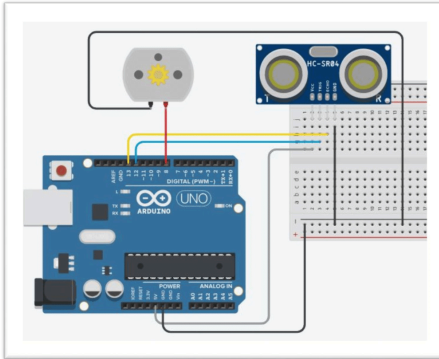


Figure 2: Complete wiring for the Arduino, Ultrasonic Sensor, and Motor.

Software

In the software portion of these instructions, you will learn where to find the open source example programs in the Arduino Interactive Development Environment (IDE). You will also learn how to modify them to properly drive the motor and sensor. By the end of this section, you should be able to start and stop the motor by moving your hand in front of the sensor. To start this section, be sure to have completed the hardware portion and have connected the Arduino to your laptop via USB. A full reference program can be found in Appendix C on page #.

1. Download the Arduino IDE. This software is available to download for free on all operating systems at <https://www.arduino.cc/en/Main/Software>.

2. Click on the file named “Ping” under File > Examples > Sensors.



Tip 2: The example programs are a great way to get started if you are new to using the Arduino library.

3. Select the listed port under Tools > Port.
4. On line 25, set the constant int pingPin equal to the number of the Arduino pin you connected the sensor's trigger pin to. In our example, it was pin 12.
5. Copy the line of code you just modified, and paste it onto the two lines directly below so you have three variable declaration statements.
6. On line 26, change the variable name to echoPin.
7. Set echoPin equal to the number of the Arduino pin you connected the sensor's echo pin to. In our example, it was pin 13.
8. On line 27, change the variable name to motorPin.
9. Set motorPin equal to the number of the Arduino pin you connected the motor's signal wire to. In our example, it was pin 8.
10. On line 45, change the delay time from 5 to 10 milliseconds.
11. On line 51, rename the variable from pingPin to echoPin.
12. Repeat step 11 on line 52.
13. On line 63, insert the code provided in Figure 3. This code turns the motor on when something is detected within 10cm of the sensor. Once, nothing is detected within that range, the motor will turn off.

```
pinMode(motorPin, OUTPUT)

if (cm < 10)
{
    digitalWrite(motorPin, HIGH);
}
else
{
    digitalWrite(motorPin, LOW);
}
```

Figure 3: This code checks to see if motor should be on or off.

14. Make sure the Arduino is connected to your laptop by checking to see if the status light on the Arduino is green.
15. Click the checkmark in the upper left-hand corner to compile the code.
16. If your code successfully compiles, click the arrow directly to the right of the verify button to upload your code to the Arduino.



Tip 3: Something not working? A Common Issues section has been included in the conclusion.

17. Open the serial monitor by clicking on the magnifying glass in the upper-right hand corner.
18. Move your hand in front of sensor and check to see if the distance reported in the serial monitor is reasonable.
19. Check to make sure when your hand is within the distance set in step 13, that the motor turns on, and when your hand is outside the range, the motor turns off.

Disconnecting from the Computer

At this point, you are practically done, however you might not always want your Arduino assembly to be attached to the computer. Luckily, once we have uploaded the code to the Arduino, it is only a matter of finding a power source to run it that stands between us and a mobile assembly. In this section, you will learn to connect the battery and perform final checks. Make sure your sensor is giving accurate readings, and your motor is behaving properly before beginning this section.

1. Remove the USB cable connecting the Arduino and the computer.
2. Snap the battery connector onto a 9V battery.
3. Plug the battery connector into the Arduino.
4. Perform the same checks illustrated in steps 18 and 19 of the Software section in order to confirm the final product is working.



Figure 4: 9V Battery Snap Connector

Conclusion

If you are now able to turn the motor on and off using your hand, you have successfully completed this tutorial! Now that you have learned how to use an ultrasonic sensor to drive a DC motor, you are well prepared to interface many other types of sensors with many other types of motors, as the process described in this document is essentially universal. The best way to improve with Arduino programming is to continue taking on small projects, and to help in this endeavor, links have been provided in the Additional Information section below.

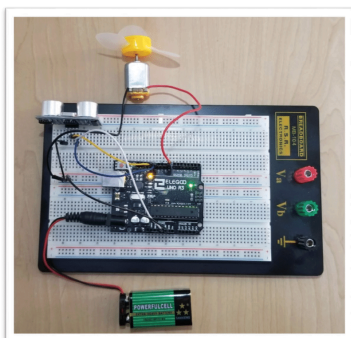


Figure 5: Completed Project

Additional Information

The following websites are resources for learning more about the Arduino. Use these resources to help you with this or future projects.

<http://forum.arduino.cc/>

The Arduino Forum is a place where you can browse frequently asked questions or ask your own if you can't find what you're looking for.

<https://hackr.io/tutorials/learn-arduino>

Hackr.io features free and paid tutorials for learning how to use the Arduino.

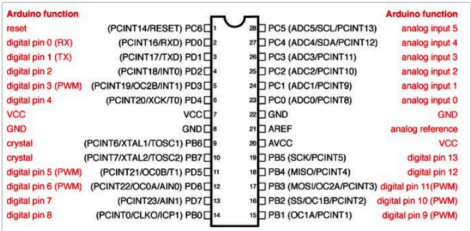
Common Issues

If you are having issues with your project, try checking the following things to make sure your problem doesn't have a simple fix. If your problem persists, try checking the Arduino forum provided in Additional Information to see if there is solution there.

- Code won't compile.
 - Go to File > Preferences > Show verbose output during; and check both boxes. Compile the code again and read the output on the bottom of the screen to see where the compiler is running into problems.
 - Common Coding Problems
 - Forgot or added an extra semi-colon.
 - Misnamed variables.
 - Incorrect Capitalization or formatting.
- Code won't upload to the Arduino.
 - Check to see if the green status light is lit to indicate the Arduino is connected to the computer. If not, check to make sure both sides of the USB adapter are firmly attached.
 - Check to make sure you have selected the correct port under Tools > Port.
- Sensor is only reading 0 distance.
 - Check all wires to make sure they are secure.
 - Check to make sure you have wired the sensor's pins to the same pins you indicated in the code.
- Motor turns on, but won't turn off.
 - Check to make sure you have wired the sensor and the motor to the correct pins.

Appendix A – Specifications for Arduino Uno

Pin Layout

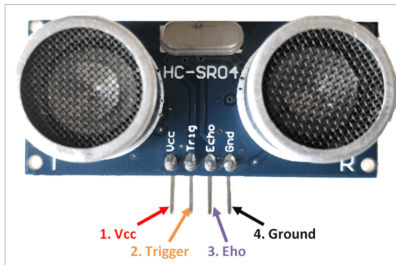


Technical Specifications

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
LED_BUILTIN	13
Length	68.6 mm
Width	53.4 mm
Weight	25 g

Appendix B – Specifications for Ultrasonic Sensor

Pin Layout



Technical Specifications

HC-SR04 Sensor Features

- Operating voltage: +5V
- Theoretical Measuring Distance: 2cm to 450cm
- Practical Measuring Distance: 2cm to 80cm
- Accuracy: 3mm
- Measuring angle covered: $<15^\circ$
- Operating Current: $<15\text{mA}$
- Operating Frequency: 40Hz

Appendix C – Software

Complete Code

```
// this constant won't change. It's the pin number of the sensor's output:
const int pingPin = 12;
const int echoPin = 13;
const int motorPin = 8;

void setup() {
  // initialize serial communication:
  Serial.begin(9600);
}

void loop() {
  // establish variables for duration of the ping, and the distance result
  // in inches and centimeters:
  long duration, inches, cm;

  // The PING))) is triggered by a HIGH pulse of 2 or more microseconds.
  // Give a short LOW pulse beforehand to ensure a clean HIGH pulse:
  pinMode(pingPin, OUTPUT);
  digitalWrite(pingPin, LOW);
  delayMicroseconds(2);
  digitalWrite(pingPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(pingPin, LOW);

  // The same pin is used to read the signal from the PING))) : a HIGH pulse
  // whose duration is the time (in microseconds) from the sending of the ping
  // to the reception of its echo off of an object.
  pinMode(echoPin, INPUT);
  duration = pulseIn(echoPin, HIGH);

  // convert the time into a distance
  inches = microsecondsToInches(duration);
  cm = microsecondsToCentimeters(duration);

  Serial.print(inches);
  Serial.print("in, ");
  Serial.print(cm);
  Serial.print("cm");
  Serial.println();
}
```

```

pinMode(motorPin, OUTPUT)

if (cm < 10)
{
  digitalWrite(motorPin, HIGH);
}
else
{
  digitalWrite(
}
}
delay(100);
}

long microsecondsToInches(long microseconds) {
  // According to Parallax's datasheet for the PING))) , there are 73.746
  // microseconds per inch (i.e. sound travels at 1130 feet per second) .
  // This gives the distance travelled by the ping, outbound and return,
  // so we divide by 2 to get the distance of the obstacle.
  // See: http://www.parallax.com/dl/docs/prod/acc/28015-PING-v1.3.pdf
  return microseconds / 74 / 2;
}

long microsecondsToCentimeters(long microseconds) {
  // The speed of sound is 340 m/s or 29 microseconds per centimeter.
  // The ping travels out and back, so to find the distance of the object we
  // take half of the distance travelled.
  return microseconds / 29 / 2;
}

```

References

Intro

Figure 1:
Arduino Uno Rev3, store.arduino.cc/usa/arduino-uno-rev3.

Key

Robot:
i4p4n. "Standing Robot." *Openclipart*, 8 Mar. 2018,
openclipart.org/detail/297959/standing-robot.

Danger:
Enolynn. "Danger Panel." *Openclipart*, 29 Jan. 2015,
openclipart.org/detail/213291/danger-panel.

Instructions

Figure 4:
"9V Snap Connector." *SparkFun Electronics*, www.sparkfun.com/products/91.

Appendix A

Pin Layout:
"PinMapping168." *Arduino*, www.arduino.cc/en/Hacking/PinMapping168.

Technical Specifications:
Arduino Uno Rev3, store.arduino.cc/usa/arduino-uno-rev3.

Appendix B

Pin Layout and Technical Specifications:
"HC-SR04 Ultrasonic Sensor." *Components101*, components101.com/ultrasonic-sensor-working-pinout-datasheet.

Technical Specifications:
Arduino Uno Rev3, store.arduino.cc/usa/arduino-uno-rev3.

Conclusion and Appendix C

All Images in these sections are original to this document.

Figure 2 was made using TINKERCAD.

How to Solve a Rubik's Cube

How to Solve a Rubik's Cube

This set of instructions can be used by anyone who wants to learn how to solve a Rubik's Cube. The only thing you need to complete this set of instructions is a Rubik's Cube. You can buy one on the internet or google a Rubik's Cube and use one online for free. This set of instructions is broken down into seven different sections. If you follow each section closely and don't move onto the next section until you complete the previous one you will be able to solve a Rubik's

Cube upon the completion of these instructions. To solve a Rubik's Cube there are five algorithms that you will need to learn. An algorithm is a specific set of moves that you need to complete on the cube to further your completion of the cube. Each algorithm is written and highlighted in the section of the instructions in which they are used. Below are terms used in the five algorithms with a description of how to complete these moves. If you get stuck at any time during these instructions, there is a troubleshooting section at the end of the instructions that may be able to help you continue solving the Rubik's Cube.

Algorithm Move Instructions:

Right Up- turn the right side of the cube up.	Right Down- turn the right side of the cube down.
Left Up- turn the left side of the cube up.	Left Down- turn the left side of the cube down.
Top C.W. – turn the top side of the cube Clockwise.	Top C.C.W. – turn the top side of the cube Counterclockwise.
Bottom C.W. – turn the bottom side of the cube Clockwise.	Bottom C.C.W. – turn the bottom side of the cube Counterclockwise.
Front Right- Turn the side of the cube facing you to the right.	Front Left- Turn the side of the cube facing you to the left.

Section 1: The Green Cross

For this section of the instructions start with an unsolved Rubik's Cube and follow these instructions to complete the green cross. The green cross is complete when the green middle cube and the exterior green middle cubes are aligned and match.

1. Start with the blue middle cube facing up.
2. Adjust the exterior middle green cubes until they form a cross around the blue center cube. See **Figure 1**.



Figure 1.

3. Rotate the top of the cube until a cube adjacent to one of the exterior middle green cubes aligns with its corresponding middle cube. See Figure 2 .
4. Rotate the exterior middle green cube with the matching adjacent cube twice in the same direction so that the green cube is now aligned with its middle green cube. (Note: look at the bottom side of the cube to see that the exterior middle green cube is aligned with its center green cube.)
5. Repeat steps 3 and 4 for the other 3 exterior middle green cubes.
6. Observe that you have completed the green cross and that each cube adjacent to the exterior middle green cubes matches their corresponding middle cube. See Figure 3 .



Figure 2: Notice how the white middle cubes are aligned.



Figure 3

You have now completed the green cross and the adjacent cubes to the exterior green middle cubes are aligned with their matching middle cubes. You are now ready to move on to the next section of the instructions.

Section 2: Completing the Green Side

Before starting this section of the instructions make sure that you have completed the green cross and that the two middle cubes closest to the green side on all 4 sides are aligned. In this section you need to perform Algorithm 1 to complete the green side of the cube and the row closest to the green side of the cube. Algorithm 1 is stated below.

• **Algorithm 1: Right Down, Bottom C.W., Right Up, Bottom C.C.W.**

- Note: To successfully move a green corner cube the cube you are trying to move must be on the right side of the cube in the column closest to you. It can be located anywhere in this column.

1. Turn the whole cube so that the green cross is facing up. (Note: For this whole section the green cross should stay facing up.)
2. Locate a green corner cube on the bottom 1/3 rd of the side or on the very bottom of the cube. (Note: If no green corner cubes meet

these criteria perform Algorithm 1 one time on the green corner cube you are trying to move, and it will move to the bottom.)
3. Turn the bottom side of the Rubik's Cube until the adjacent two corners of the green corner cube match with their corresponding middle cubes. See Figure 4 .
4. Perform Algorithm 1 until the green corner piece matches with the green cross. (Note: if you completed step 3 correctly the 2 sides connected to the green corner cube will match with their corresponding middle cubes.)
5. Repeat steps 2, 3, and 4 for the remaining 3 green corner cubes.



Figure 4: Note how the yellow and orange sides of the corner cube are in-between their matching middle cube.



Figure 5: Green side is solved and also the first row of each side color.

Upon completing step 5 you will have solved the green side completely and the closest layer of each color (excluding the blue side) to the green side. See **Figure 5**. You are now ready to move to the next section of instructions.

Section 3: Solving the Middle Corner Pieces

Before beginning this section of the instructions make sure you have completed the green side and the first row of the sides. The purpose of this section of the instructions is to solve the middle corner pieces on the side of the cube. Upon completion of this section you will have completed the green side of the cube and the first two rows on each side.

Algorithm 2:

- 2A. Top C.C.W., Left Up, Top C.W., Left Down, Top C.W., Front Right, Top C.C.W., Front Left
- 2B. Top C.W., Right Up, Top C.C.W., Right Down, Top C.C.W., Front Left, Top C.W., Front Right

1. Turn the cube so the green side is facing down. (Note: Green side should stay facing down for this section.)
2. On the side locate a top middle cube of any color (excluding blue) and turn the top of the cube until the top middle cube aligns with its corresponding middle cube.

3. Once the top middle and middle cube are matched observe what color the adjacent cube is on the very top. See Figure 6 and Figure 7 .
4. Taking into account the color of the top cube locate its corresponding middle cube. If the middle cube is to the left perform Algorithm 2a. If the middle cube is to the right perform Algorithm 2b. (Note: you only have to do this algorithm for the exterior middle cubes that do not match.) See Figure 6 and Figure 7 .
5. Repeat steps 2, 3, and 4 until the middle row is complete for every side color. (Note: if the very top cube is blue you can complete the algorithm so that a different color will appear.) See Figure 8 .



Figure 6: Note that the top cube is yellow and the yellow side is to the left, so use Algorithm 2A.



Figure 7: Note that the top cube is white and the white side is to the right, so use Algorithm 2B.



Figure 8: Upon completing Step 5 the bottom 2 rows are complete.

You have now solved for the middle corner pieces and have completed the first two rows on the sides of the cube.

Section 4: Solving the Blue Cross

Before beginning this section of the instructions make sure that you have completed the green side of the cube as well as the first two rows closest to the green side for all the sides (excluding the blue side). For this section you will need to perform Algorithm 3 which is listed below. Also for this section make sure the green side of the cube is facing down.

- **Algorithm 3: Front Right, Right Up, Top C.W., Right Down, Top C.C.W., Front Left**
 - Note: Green side should stay facing down for this section.



Figure 9:
Position 1

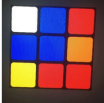


Figure 10:
Position 2



Figure 11:
Position 3



Figure 12:
Position 4

1. Determine what position your cube is in.
 - a. Position 1: Blue Dot- Perform Algorithm 3, move to position 2. See **Figure 9**.
 - b. Position 2: Backwards L- Perform Algorithm 3, move to position 3. See **Figure 10**.
 - c. Position 3: Blue Line- Perform Algorithm 3, this will complete the blue cross. See **Figure 11**.

d. Position 4: Blue Cross- Move to the next section. See **Figure 12**.

- Note: You will notice that performing one algorithm will move you to the next position.
- Note: Before performing each algorithm for a position make sure the cube is oriented as in the photos.

You have now completed the blue cross and are ready to move onto the next section of the instructions.

Section 5: Completing the Side Crosses

Before beginning this section of the instructions make sure you have completed the green side of the cube, the first two rows closest to the green side and the blue cross. For this section you will use Algorithm 4, which is listed below, to complete the side crosses of the cube. Keep in mind that for this section the green side should still be facing down.

- **Algorithm 4: Right Up, Top C.W., Right Down, Top C.W., Right Up, Top C.W., Top C.W., Right Down**

- Note: Green side should stay facing down for this section.

1. Rotate the top side of the cube until:
 - a. 2 side crosses are completed on opposite sides. – go to step 2. See **Figure 13**.
 - b. 2 side crosses are completed adjacent to each other. – go to step 3. See **Figure 14**.
 - c. All 4 side crosses are complete. – Move to the next section.
2. If condition A, turn the whole cube so that one side cross is facing you and the other is facing away from you, then complete Algorithm 4. (Note: this will move you to position B.)
3. If condition B, turn the whole cube so that one side cross is facing right, and the other is facing away from you and perform Algorithm 4.
4. Upon completing step 3 turn the top side of the cube C.W. one time to complete all 4 side crosses. (Note: If all 4 side crosses are not complete go back to step 1 of this section.)



Figure 13: White side cross is complete and so is the one opposite the white side.



Figure 14: Two side crosses are complete adjacent to one another.

You have now completed all 4 side crosses of the cube and are ready to move to the next section of the instructions.

Section 6: Adjusting the Top Corners

Before beginning this section of the instructions make sure you have completed the green side of the cube, the blue cross on top of the cube, all 4 side crosses of the cube and the bottom corners of the cube closest to the green side. In this section you will use Algorithm 5, which is listed below, to adjust the top corners of the cube so that they are aligned with their correct side colors. The green side of the cube should still be facing down for this section.

- Algorithm 5: Top C.W., Right Up, Top C.C.W., Left Up, Top C.W., Right Down, Top C.C.W., Left Down
- Note: Green side should be facing down for this entire section.

1. Observe all three sides of the 4 top corner cube to see if any correspond to their respective side colors. See Figure 15 .
2. If none correspond perform Algorithm 5 until all 3 colors of one corner corresponds to their respective side crosses. (Note: they do not have to match perfectly, but just contain the same colors as their 3 side colors.)
3. Turn the whole cube so that the corner cube that corresponds to the right side colors is on the bottom right side of the top cube. (Note: blue cross should still be facing up.) See Figure 16 .
4. Perform Algorithm 5 until all 4 corner cubes correspond to their matching side colors. (Note: You should only have to do this 1 or 2 times, if they still do not match go to step 1 and start again.)



Figure 15:
Notice how the top corner cube doesn't match with its sides colors.



Figure 16:
Notice how all 3 sides of the top corner cube correspond to the right colored sides: Red, Yellow, and Blue.

You have now adjusted all 4 top corners of the cube so that they are aligned with their respective colors. You are now ready to move on to the last section and complete the Rubik's Cube.

Section 7: Finishing the Rubik's Cube

Before beginning this section of instructions make sure that you have completed the green side of the cube, the blue cross, all 4 side crosses, the bottom corners closest to the green side, and

that you have adjusted the top corners so that they correspond to the right colors. In this section you will use Algorithm 1, which is listed below, to solve the top corners of the cube. In this section make sure you follow the instructions exactly as listed or your cube will not be solved and you will have to start over.

- **Algorithm 1: Right Down, Bottom C.W., Right Up, Bottom C.C.W.**
- Note: Green side should be facing down for this entire section.

1. Turn the whole cube so that an unmatched blue corner is on the bottom right side of the top section of the cube. See Figure 17 .
2. Perform Algorithm 1 until the blue corner matches with the blue cross.
3. Rotate the top of the cube C.W. to the next unmatched blue corner piece.
4. Repeat steps 2 and 3 until the blue side is complete.
5. Rotate the top and bottom sections of the cube until all sides match and the cube is complete. See Figure 18 .



Figure 17:
Unmatched blue corner is on the bottom right side of the top section.



Figure 18: Cube is now complete.

Congratulations you have now completed a Rubik's Cube! If you continue to practice these instructions, you will soon be able to complete a Rubik's Cube without needing to look at the instructions. You can now show off your new skill to your friends and impress them.

Troubleshooting Advice:

- In Section 1: The Green Cross, try moving the cube in every direction to complete the green cross around the blue middle dot.
- In Section 2: Completing the Green Side, make sure that the green corner cube you are trying to move is in the right column closest to you. The green corner cube can be located anywhere in this column to move it successfully.
- In Section 3: Solving the Middle Corner Pieces, if there is a blue cube in the way of where another cube should be you can perform either version of Algorithm 2 to move the blue cube so that another colored cube will take its place.
- In Section 4: Solving the Blue Cross, make sure the "L" is backwards when you perform the algorithm, and that the blue line is horizontal when you perform the algorithm.
- In Section 6: Adjusting the Top Corners, remember that the corner cubes do not have to match exactly, but just that they contain the same 3 colors as their adjacent sides.

How to Record Vocals in Ableton Live 9

HOW TO RECORD VOCALS IN ABLETON LIVE 9

Ableton Live 9 is a world-class, studio Digital Audio Workstation (DAW) aimed toward live-performances and DJs, but can also be used to record, mix, and master any audio project including solo artists or bands. Recording properly is an important aspect of achieving a quality outcome for your musical projects and will help your audio sound professional. This manual will guide you through the process of setting up and recording vocals into Ableton Live 9.

TOOLS NEEDED:

- Ableton Live 9 software
- Computer (*See System Requirements*)
- Microphone
- Microphone stand
- Pop filter
- Audio interface
- Headphones
- XLR cable(s)
- Various other cables



Image Source: Nejr0N / 123rf.com

ABLETON LIVE 9 SYSTEM REQUIREMENTS:

(Information retrieved directly from Ableton User Manual".)

Windows:

- PC with Windows 7 (with SP 1), Windows 8, or Windows 10
- Multicore processor
- 4 GB RAM
- 1024x768 display
- DVD drive or broadband internet connection for installation

Mac:

- Intel® Mac with Mac OS X 10.7 - MacOS 10.13
- Multicore processor
- 4 GB RAM
- 1024x768 display
- DVD drive or broadband internet connection for installation

Connecting to the Computer

Your audio interface is the bridge that connects the microphone to the computer. Without this, Ableton will not acknowledge your audio input. This section will guide you through connecting an audio interface to a computer and microphone. Let's get started!

1. **Connect audio interface to computer**

Power on the interface if necessary. Refer to the audio interface manual for more information.

2. **Open Ableton Live 9**

3. **In Windows, click Options; in OS X select the Live menu**

See figures 1.1 and 1.2 below.

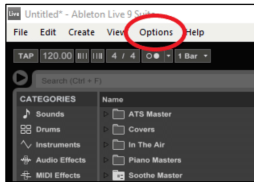


Figure 1.1: Windows Options

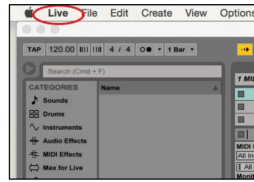


Figure 1.2: Mac OS Live Menu

4. Choose Preferences tab

5. Click on Audio

See figure 2

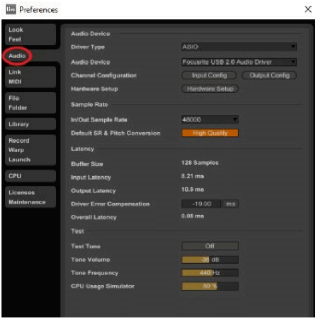


Figure 2

Note: Ableton Live 9 has an audio setup wizard that will direct users through setting up audio interfaces and other devices compatible with Ableton. If you have any problems during this step, the audio setup wizard can be very useful.

6. Select driver type ASIO from the drop down menu

See figure 3

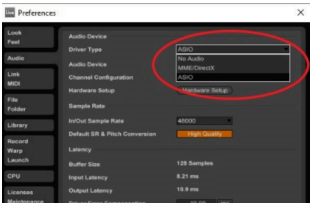


Figure 3: ASIO is listed in the drop down menu just above the Audio Device menu

7. Use Audio Device drop down menu to select your audio interface

If you do not see your device, please refer to the Troubleshooting Guide.

8. Enable Test Tone and adjust volume so that you can hear the tone

See figure 4

9. Increase CPU Usage Simulator to 80%

10. Adjust Driver Error Compensation so that Overall Latency is as close to 0ms as possible without causing glitches or audio artifacts

11. Disable Test Tone

12. Exit Preferences

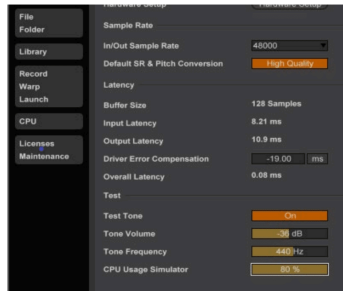


Figure 4: Test tone is On and CPU Usage Simulator is set at 80%

You Are Connected!

Your audio interface is now optimized and connected to Ableton Live 9. Driver Error Compensation is now set as low as possible on your PC or Mac, which allows for the smoothest audio playback experience possible with your hardware. Now, let's set up the microphone.

Setting Up the Microphone

Proper setup of the microphone is crucial to capturing good quality audio. Generally, a condenser microphone is used to capture vocal takes, though a dynamic microphone is also suitable. Pop filters will assist in removing unwanted plosives. The following will assist you in a general setup for recording vocals.



Standard Condenser Microphone – Notice the diaphragm visible underneath the wire mesh

While dynamic microphones need only be plugged in for use, a 48-volt phantom power supply is needed for a condenser microphone to function. Your audio interface may include one. Please refer to your audio interface manual for this information.

1. Place microphone on microphone stand so that it resembles figure 5
2. Attach pop filter to microphone stand near microphone



Figure 5: Condenser mic with shock mount on a boom-style stand



Figure 6: Pop filter (seen with screw attachment) is

connected close to mic for mobility

3. Position pop filter approximately 4-6 inches from the microphone as shown in figure 7



Figure 7 (Left): The pop filter should be placed between vocalist's mouth and microphone with the mesh facing the talent. For more information about using a pop filter, consult the Helpful Tips section at the end of this manual.

4. Adjust height of stand and position of microphone to a comfortable level for talent

5. Connect microphone to audio interface using XLR or 1/4" cable



ure 8 (Right): One end of an XLR cable. These and 1/4" TRS jacks are the most common cables used for microphones. XLRs are handy because they are usually balanced, providing a cleaner signal by reducing unwanted noise.

Your Mic is Set!

Your microphone should now be set up and ready to use. You may run into sound issues later while recording. If this happens, refer to the Troubleshooting Guide. For advice about placement, see the Helpful Tips section.

Recording a Vocal Take

After the microphone and audio interface are connected to Ableton, you are ready to record. In this section, you will set Ableton ready to record to an audio track, also known as “arming.” For the purposes of vocal recording, we will not discuss setting up to record MIDI tracks as microphones need only be recorded to audio tracks.

Arming the Track

1. Switch Ableton to Arrangement View as shown in figures 9.1 and 9.2

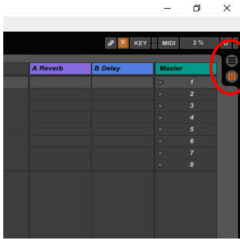


Figure 9.1: Session View is shown activated

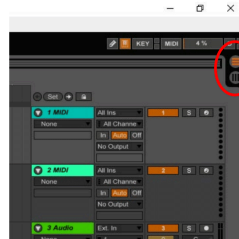


Figure 9.2: Arrangement View is activated

2. Set input on track to match that of the microphone connected to audio interface

Select 'Input 1' in Ableton if the cable from your microphone is connected to Input 1 on the audio interface. Figure 10 shows that the track is set to record from input 1 as noted by the “1” followed “Ext. In.”

3. Set your track to record by clicking the Arm button

See figure 10

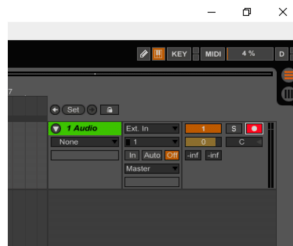


Figure 10: Track “1 Audio” is armed as identified by the record button highlighted in red.

- 4. Set Monitor output to “Auto”
See figure 11

- 5. Using headphones for reference, check audio levels from microphone

ve your talent project into the mic as they intend to during performance and adjust input volume until Ableton shows no less than -20dB for their quietest singing and no more than -3dB for the loudest. This will ensure a good take without being too quiet or subject to clipping at higher sound levels.



Figure 11

Recording a Take

- 1. Activate recording by clicking the Arrangement Record button or using keyboard key F9
See figure 12.1

- 2. Record take

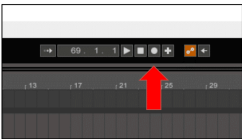


Figure 12.1

- 3. Click Arrangement Stop button, or use F9 or Space Bar to stop recording/stop playback



Figure 12.2

- 4. Press Arrangement Play button or Space Bar to listen to playback

record a different take delete existing take, record over existing take, or set up a new audio track.

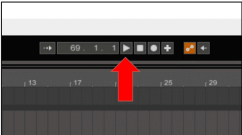


Figure 12.3

You Are Done!

There should now be recorded audio within your project. If there is no audio, run through this manual again and try to find any steps you may have missed or refer to the Troubleshooting Guide.

Congratulations!

If you have carefully followed this guide, then you should have successfully recorded vocals in Ableton Live 9. Ableton also allows users to connect multiple microphones and record simultaneously as long as your audio interface has more than one input. Consult the technical manual for your audio interface to determine whether or not yours is capable. If you have issues with recording, please refer to the Troubleshooting section of this manual.

Helpful Tips

Pop Filter

Virtually all professionally recorded vocals utilize pop filters. Though use of a pop filter is not necessary to record vocals, there are multiple advantages to using one. The main use for a pop filter is to control, or eliminate, plosives that occur from “p” or “b” sounds while singing. A pop filter should be placed around 4”-6” away from the mic, preventing talent from moving too close which can cause a proximity effect in cardioid pattern microphones. This can cause too much low-end or a change in frequencies captured making mixing and mastering more difficult. Lastly, pop filters may also help control sibilance during vocal takes due to the material used.



Mic Placement & Posture

Microphones should be set comfortably for the talent. The talent should stand, if possible, and avoid bad posture. Straightening the back and neck, positioning feet shoulder-width apart, and relaxing limbs will result in better performances with more control. The mic should be placed in such a way that this posture is reinforced. Boom stands are ideal for studio settings due to their adjustability. It is also recommended to have a shock mount for your microphone to avoid picking up undesirable bumps and sounds that travel through the floors.

Acoustic Treatments

What often sets professional studios apart from home studios, outside of higher quality gear, is the acoustic treatment of the recording booth/room. Unless it is the sound you’re trying to achieve, acoustics can make the best vocal take impossible to manage. Adding sound dampeners (like this reflection filter) will help reduce acoustics within a lively room giving you more options to mix and add your own effects to a vocal track. Standing

partitions or foam padding placed on walls will reduce acoustics. For home studios, carpet, rugs, or even furniture placed within the room can lower unwanted acoustics. Get creative!



Troubleshooting Guide

Symptom	Possible Cause(s)	Solution
No sound	No power to condenser microphone.	Check your audio interface for a switch to enable phantom power, or enable your phantom power supply.
	Faulty cable.	Change cables and inspect for any damage that can compromise integrity.
	Input volume too low/muted.	Check the volume on your audio interface as well as Ableton to determine if the software is receiving a loud enough signal.
	Input for microphone not selected or monitor not activated in Ableton.	Ensure that the armed track is routed to the correct input for the microphone and that the monitor in Ableton is set to "Auto" or "In."
Ableton cannot find audio interface	No power.	Ensure that the audio interface is receiving power.
	Drivers not installed.	Refer to your audio interface's user manual for information about installation and to determine compatibility.
Glitches or noise artifacts in playback audio.	Ableton Live or audio interface not up to date.	Check Ableton and your audio interface for software/driver updates.
	Driver Error Compensation set too low/incorrectly.	See steps 8-11 of "Connecting to your Computer" section of this manual for instructions on setting up Driver Error Compensation. If this is set too low, the computer's processing

		power will be unable to keep up with the overall latency and will produce undesirable results.
--	--	------------------------------------------------------------------------------------------------

For more information, refer to the respective instruction manuals for your hardware.

* DeSantis, Dennis, et al. "Ableton Live 9 User Manual." Ableton, Ableton AG, 2016, cdn-resources.ableton.com/80bA26cPQ1hEJDFjpUKntxfqdmG32ykO/static/manual/pdf/L9Manual_EN.pdf.

How to Create a PID DC Motor Position Controller

HOW TO CREATE A PID DC MOTOR POSITION CONTROLLER

Introduction

Control Engineers are tasked with creating a way of controlling systems, whether its mechanical, chemical, electrical, etc. This task is achieved by creating controllers that decide how to influence a system to achieve the desired outcome. One of the simple examples of controllers are PID controllers such as the one in the cruise control feature of modern day cars. The cruise control takes in a desired speed (reference value) and the actual speed (feedback) to accelerate the car to reach the desired speed. Just like this, there are many more applications for PID controllers in everything from airplanes to animatronics and even thermostats in your house. By the end of this instructional guide, you will have a basic understanding of what a PID controller is and have created a position controller for a DC motor, just like a controls engineers would use for a robotics application.

Throughout this guide you will:

- Learn the basic theory behind PID controllers
- Build a demonstration motor and feedback assembly
- Program a PID controller for the assembly

Completion time: 20 to 45 minutes.

Minimum skills required:

- Basic soldering skills
- Familiarity with programming Arduino microcontrollers
- Past 3D printing experience
- A conceptual understanding of integration and differentiation

Materials:

1 – Arduino Nano (microcontroller)
4 – P160KNP-0FC25B5K (Linear Potentiometers)
1 – MD5-2445 (12V DC motor)
1 – Pololu Jrk 21v3 (motor driver)
1 – YB1203000-USB (Power Bank)
1—20 AWG Wire (Black, Red, Yellow, Blue, Orange)
1 – 3D printed model
1 – Coaxial female connector

Tools:

1 – Soldering Iron
1 – Rosin Core Solder
1 – Wire Strippers
1 – Computer with Arduino IDE
1 – Mini USB cable

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Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

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Dangers: serious injury or death
Warnings: injury
Cautions: damage to product or equipment

Dangers, Warnings, and Cautions

These instructions can be a great way to gain exposure in the field of controls engineering, but it must be done safely. Below there is a list of dangers, warnings, and cautions. Dangers are those that could cause serious injury or even death. Warnings are those that may cause injury if done improperly and cautions are those that can damage the final product or equipment. Read the followings in detail to be aware of the risks involved with these instructions. In addition to this warning, there will reminders on the steps that are associated with each of these categories to remind you of the risks. Every danger will be written in red text, every warning will be in red-orange text and every caution will be written in orange text.

Dangers Involved with these instructions

Situation	Precaution
<ul style="list-style-type: none"> Unattended soldering irons are a fire hazard Stripped wires powered by mains voltage are an electric shock hazard 	<ul style="list-style-type: none"> Turn off or disconnect soldering iron when not in use Inspect all connections and wires before powering any mains voltage device

Warning Involved with these instructions

Situation	Precaution
<ul style="list-style-type: none"> The flux in the solder can boil and expel hot solder The soldering iron is hot and a burning hazard Short circuits can cause elements to become a burning hazard 	<ul style="list-style-type: none"> Wear safety glasses when soldering Be careful when soldering and hold the soldering iron solely by the handle Before powering a device make sure all connections are properly made

Caution Involved with these instructions

Situation	Precaution
<ul style="list-style-type: none"> Parts from the 3d printer are weaker perpendicular to layer lines and stresses can break them Mistakes in the code can cause parts to rotate in the wrong direction and break 	<ul style="list-style-type: none"> Do not force parts to fit. If they do not friction fit, use some sandpaper to loosen the tolerances and retry. Ensure that the electrical connections and the code are in unison

Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

Theory

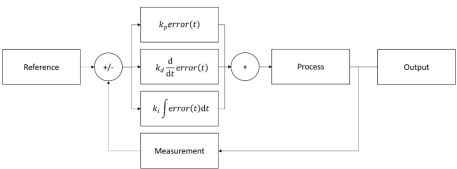


Figure 1: Block Diagram of a PID Controller

Consider this problem: you are tasked with finding a way of regulating the temperature inside your house and keeping it at the desired temperature. During spring and winter, you want to keep the house warm while during summer and fall you want to keep the house cool. Where would you start?

This is a very similar problem to what controls engineers face when they are tasked with controlling a process. A process is defined as any physical operation that we are interested in controlling. The process converts a given input into an output, which is governed by the physics of the process, also referred to as "the system". An example of this would be the relationship between the accelerator and the speed of a vehicle. As the accelerator is pressed down, the speed increases proportionally to the input. To control a process, engineers use a controller to provide the appropriate inputs for the process to ensure that the output of the process is the desired output.

One of the simplest models for a controller is what is known as a PID controller. PID is an acronym for Proportional Integral Derivative controller. This controller works by finding the error between the desired output, also referred to as the "state of a system", and the actual output. This error in the system is then transformed by four mathematical operations to produce an appropriate input to the process. Going back to the heating example, if the temperature in your house is 70F yet the desired temperature is 75F, there is a 5F error. The error can also be negative, and it simply means that the desired temperature is less than the actual temperature. A simpler way of thinking about it is that the error is a measure of how far and in what direction the actual measurement must move to equal the reference.

The first of the three operations is a simple multiplication. The error in the system is multiplied by a constant called the proportional constant, K_p . This proportional constant takes the state error and converts it to an input to the process. The error in temperature in this example was calculated to be 5F. This error would be multiplied by the constant K_p to give the expression $5 * K_p$.

Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

The second operation is taking a time derivative of the error. A time derivative is the rate of change of the error with respect to time, or how quickly is the error changing. Suppose that for the heating example the temperature at 6 am inside of the house is 60F and at noon is 65F. The error at 6 am will be (75-60) F or 15F while the error at noon will be (75-65) F or 10F. This means that the change in the error was (10-15) F or -5 F while the change in time was (12 pm - 7 am) or 5 hrs. The time derivative of the error will then be $-5/5$ [F/hr.] or -1 [F/hr.]. This time derivative is then multiplied by a constant Kd to give the expression $-K_d$ [F/hr.].

The third operation is a time integral of the error. A time integral is a combination of a sum and a multiplication in which the error at any point in time is multiplied by a very small increment of time and then added to the previous multiplication of error and time increment. The integral measures how long the system has been at a given state. In our example, we can measure the temperature every second and multiply the measurement by a second to then add it to the previous sum. For this example, let's assume that the calculated integral has a value of 2 [F*hr.]. This result is then multiplied by a constant Ki to give the expression $2K_i$ [F*hr.].

After the three operations are performed on the error measurement, the three resulting expressions are added together to yield the following expression: $(5K_p - 1K_d + 2K_i)$. The final expression will be the input to the process which will minimize the error in the system and ultimately reach the reference value, but before this can happen the variables Kp, Ki, and Kd must be set.

With this crash course in PID controller design, you will be able to properly tune the values for the PID controller and achieve a stable system with proper response time.

Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

1. Mechanical Assembly

1.1. Identify the components needed for the mechanical assembly

1.1.1. Identify the 3D printed components



Figure 2: Base



Figure 3: Feedback Mount



Figure 4: Pointer



Figure 5: Motor Mount

1.1.2. Identify the purchased components



Figure 6: Linear Potentiometer

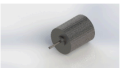


Figure 7: 12V DC motor

1.2. Assemble the motor-feedback subassembly

- 1.2.1. Press fit the motor into the motor mount
- 1.2.2. Press fit linear potentiometer into feedback mount
- 1.2.3. Press fit motor mount into the pointer
- 1.2.4. Press fit linear potentiometer into the pointer

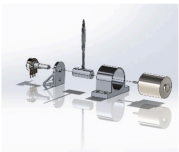


Figure 8: motor-feedback subassembly exploded view



Figure 9: motor-feedback subassembly

The motor-feedback subassembly will look like this once steps 1.2.1 – 1.2.4 are completed

Dangers: serious injury or death
Warnings: injury
Cautions: damage to product or equipment

1.3. Assemble the base-dials subassembly

1.3.1. **Press fit** the linear potentiometers into the base



Figure 10: base-dials subassembly exploded view

The base-dials subassembly will look like figure 11 once step 1.3.1 is completed



Figure 11: base-dials subassembly

1.4. Final Mechanical Assembly

1.4.1. **Press fit** the motor-feedback subassembly onto the posts on the base

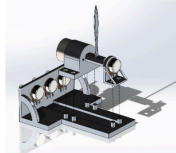


Figure 12: final mechanical assembly exploded view

The final assembly will look like figure 13 once step 1.4.1 is completed



Figure 13: final mechanical assembly

Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

2. Electrical Assembly

2.1. Identify the materials and tools required for the electrical assembly

2.1.1. Identify the purchased components



Figure 14: Power Bank



Figure 15: 20 AWG Wire

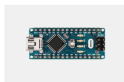


Figure 16: Arduino Nano



Figure 17: Motor Driver



Figure 18: Rosin Core Solder



Figure 19: coaxial connector

2.1.2. Identify the tools



Figure 20: Wire Strippers



Figure 21: Soldering Iron

Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

2.4. Solder the potentiometers to the Arduino

Solder the signal wires (blue) to the analog pins of the Arduino

- A0 = Kp potentiometer
- A1 = Ki potentiometer
- A2 = Kd potentiometer
- A3 = Feedback potentiometer

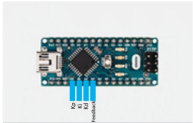


Figure 25: Wiring of the potentiometers to the Arduino

2.5. Solder the Arduino and motor controller

Solder pin D5 from the Arduino to the TX pin on the motor controller

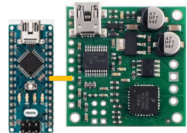


Figure 26: wiring of the Arduino to the motor controller

2.6. Solder the coaxial connector to the motor controller

- Center terminal of the coaxial connector to the 12V terminal on the motor controller
- Outside terminal of the coaxial connector to the GND terminal on the motor controller
- Reverse polarity will damage the board

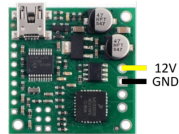


Figure 27: wiring for the power bank and

2.7. Connect battery pack to the coaxial connector, powering the system

Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

3. Code

3.1. Open the Arduino IDE and create a New Sketch	
3.2 Initialize all the constants required	<pre>int P_pin = A0; int I_pin = A1; int D_pin = A2; int Feedback = A3; int freq = 10; int Motor = 5;</pre>
<p>The controller needs set pins to read and write information to. By defining the pins beforehand, the variable name will take the place of its value and make the code more readable and easier to change if needed</p>	
3.3 Initialize all the variables required	<pre>float Kp; float Ki; float Kd; float Position; float err; float left_edge = 0; float right_edge = 900; float middle = 0.5*(left_edge+right_edge); float P; float I; float D; float currentTime; float elapsedTime; float previousTime; float lastError; float out; int PWM;</pre>
<p>For the controller to operate, there are several required measurements that change through the code. These measurements are the variables throughout the code.</p> <p>The first set of measurements needed are the gains (Kp, Ki, Kd) along with the feedback (Position), reference (middle) and error (err). The reference (middle) is the average value between the leftmost and the rightmost position.</p> <p>The P, I and D variables are the values of the input associated with the three branches of the controller.</p> <p>The currentTime, elapsedTime, and previousTime are variables used to keep track of time and to calculate the D and I portion of the controller. The out variable is the final input from the PID controller.</p> <p>The PWM variable is the duty cycle of the PWM wave based on the out variable and the PWM_mapped variable is the PWM variable normalized and centered around 127.5, the 0 value for the motor controller.</p>	

Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

<div>3.4 Measure the value of the gains</div> <div>The gains function measures the value of the gain dials and normalizes it to be used in the rest of the code.</div>	<div>void gains() { Kp = map(analogRead(P_pin),0,1024,0.5); Ki = map(analogRead(I_pin),0,1024,0.1); Kd = map(analogRead(D_pin),0,1024,0.5); }</div>
<div>3.5 Measure the Error</div> <div>The error function finds the difference between the reference position (middle) and the actual position which is read through the analogRead function. This difference can be either positive or negative depending on what side the pointer is.</div>	<div>float error() { Position = analogRead(Feedback); err = middle - Position; return err; }</div>
<div>3.6 Calculate the PID input</div> <div>The variable currentTime stores the time since the code started while previousTime stores this same value after the PID calculation is done.</div> <div>Elapsed time calculates how much time has passed since the last PID calculation.</div> <div>The error function from the previous step is utilized to find the error in position</div> <div>This error is then saved as lastError to later find the change in error</div> <div>P calculation: The error is multiplied by the proportional gain</div> <div>I calculation: The error is multiplied by the time interval between calculations and the integral constant</div> <div>D calculation: The rate of change of the error is found by dividing the change in error by the change in time. This is then multiplied by the derivative constant</div> <div>The final output of this function is the sum of the P, I and D calculations.</div>	<div>void PID() { currentTime = millis(); elapsedTime =(currentTime - previousTime); err = error(); P = Kp * err; I += Ki * err * elapsedTime; D = Kd * (err - lastError)/elapsedTime; out = P+I+D; lastError = err; previousTime = currentTime; }</div>

Dangers: serious injury or death
Warnings: injury
Cautions: damage to product or equipment

<p>3.7 Actuate the motors</p> <p>The motor driver is activated through a PWM signal. The output from the PID controller is normalized and centered around 127.5 to communicate clockwise and counterclockwise rotation to the motor driver.</p>	<pre>void motor() { PWM = map(out,-1000,1000,0,255); analogWrite(Motor,PWM); }</pre>
<p>3.8 Display the data</p> <p>The data function sends to the computer the value of the gains, error and PWM signal in a table for monitoring through the serial monitor.</p>	<pre>void data() { Serial.print(Kp); Serial.print("\t"); Serial.print(Ki); Serial.print("\t"); Serial.print(Kd); Serial.print("\t"); Serial.print(err); Serial.print("\t"); Serial.print(PWM); Serial.println("\t"); }</pre>
<p>3.9 Set pins and start communication</p> <p>The setup runs once and continues through the code. In the setup, the pins for the gains and communication with the computer is initialized.</p>	<pre>void setup() { pinMode(P_pin,INPUT); pinMode(L_pin,INPUT); pinMode(D_pin,INPUT); pinMode(Feedback,INPUT); Serial.begin(9600); }</pre>
<p>3.10 Create the main loop</p> <p>The loop runs indefinitely through the functions that are in it. It calculates the gain, calculates the PID inputs, actuates the motor and publishes the data. These are the stages of the block diagram in functions</p>	<pre>void loop() { gain(); PID(); motor(); data(); }</pre>
<p>3.11 Upload code to the Arduino Nano</p>	

Dangers: serious injury or death

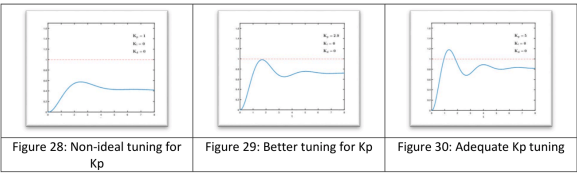
Warnings: injury

Cautions: damage to product or equipment

4. Tuning

PID controllers are highly sensitive to the gain values and drastically affect the response and stability of the system. The response of a system is how the system will approach the reference value. A good rule of thumb is striving to achieve a quick response without passing the reference, also called overshoot. The stability of the system can be thought of how well the system can stay at a given reference despite there being errors in measurements or external inputs. The desired response for this project would reach a vertical orientation quickly without overshooting. Likewise, the desired stability would be being able to push the pointer to either side and having it return to center. The next steps will guide you through the tuning process of the PID controller. Through this section, you will set new values for the different gains, test the system and iterate until the desired system response and stability is achieved.

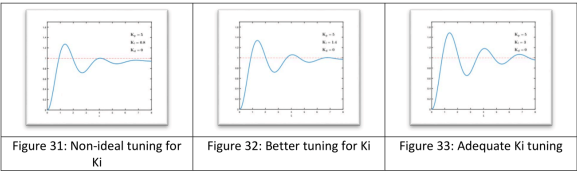
4.1 Setting Kp Value



- 4.1.1. Position the Kp dial to a non-zero value
- 4.1.2. Test the value
- 4.1.3. Increase or decrease the value based on the response
- 4.1.4. Repeat steps 4.1.1. – 4.1.3. until the response behaves like figure 30

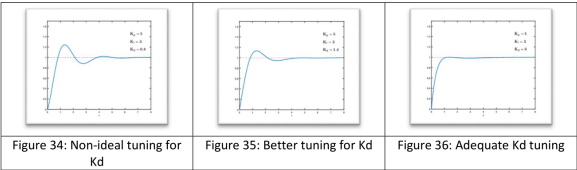
Dangers: serious injury or death
Warnings: injury
Cautions: damage to product or equipment

4.2 Setting Ki Value



- 4.2.1 Position the Kd dial to a non-zero value
- 4.2.2 Test the value
- 4.2.3 Increase or decrease the value based on the response
- 4.2.4 Repeat steps 4.2.1. – 4.2.3. until the response behaves like figure 30

4.3 Setting Kd Value



- 4.3.1.Position the Kd dial to a non-zero value
- 4.3.2. Test the value
- 4.3.3. Increase or decrease the value based on the response
- 4.3.4. Repeat steps 4.3.1. – 4.3.3. until the response behaves like figure 30

Dangers: serious injury or death
Warnings: injury
Cautions: damage to product or equipment

5. Conclusion

Congratulations! If you are reading this, you have successfully created a PID DC motor position controller. The system response should be fast with little to no overshoot and robust enough to avoid measurement inconsistency and external inputs. This project can be further expanded by making the setpoints change as a function of time and observing how the tuned controller responds to changing a changing reference instead of a fixed reference.

If you are interested in learning more about control engineers and the work they do I encourage you to visit Brian Douglas's YouTube channel, Control Systems Lectures, in which he explains what controls engineering is and provides a working understanding of the topic.

Link – youtube.com/controllectures

If you had difficulties with the programming of the Arduino, or want to learn more about them, visit the reference section of the Arduino website for detailed explanations of the syntax and the different functions used in this instructional guide.

Link - www.arduino.cc/reference/en/

Hopefully this has been an interesting and learning experience and now have a better understanding of what a control engineer does.

Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

Attachment 2: Transcribed Code

```

// Constants
int P_pin = A0;
int I_pin = A1;
int D_pin = A2;
int Feedback = A3;
int Motor = 5;

// Variables
float Kp;
float Ki;
float Kd;
float Position;
float err;
float left_edge = 0;
float right_edge = 900;
float middle = 0.5*(left_edge+right_edge);
float P;
float I;
float D;
float currentTime;
float elapsedTime;
float previousTime;
float lastError;
int PWM;
int PWM_mapped;

// Functions
void gains(){
  Kp = map(analogRead(P_pin),0,1024,0.5);
  Ki = map(analogRead(I_pin),0,1024,0.1);
  Kd = map(analogRead(D_pin),0,1024,0.5);}

float error(){
  Position = analogRead(Feedback);
  err = middle - Position;
  return err;
}

void PID(){
  currentTime = millis();
  elapsedTime =(currentTime - previousTime);

  err = error();
  P = Kp * err;
  I += Ki * err * elapsedTime;
  D = Kd * (err - lastError)/elapsedTime;
  out = P+I+D;

  lastError = err;
  previousTime = currentTime;}

void motor(){
  PWM = map(out,-1000,1000,0,255);
  analogWrite(Motor,PWM);}

void data(){
  Serial.print(Kp);
  Serial.print("\t");
  Serial.print(Ki);
  Serial.print("\t");
  Serial.print(Kd);
  Serial.print("\t");
  Serial.print(err);
  Serial.print("\t");
  Serial.print(PWM);
  Serial.println("\t");}

```

Dangers: serious injury or death

Warnings: injury

Cautions: damage to product or equipment

```
Serial.begin(9600);}

// Code
void setup() {
  pinMode(P_pin,INPUT);
  pinMode(I_pin,INPUT);
  pinMode(D_pin,INPUT);
  pinMode(Feedback,INPUT);

  void loop() {
    gains();
    PID();
    motor();
    data();}
```

Dangers: serious injury or death
Warnings: injury
Cautions: damage to product or equipment

7. Cited Images

Figure 14:

"Rechargeable 12V 3000mAh DC Lithium-Ion Battery Pack, 12V/5V Dual Output External Battery Power Bank." *TalentCell*, www.talentcell.com/products/12v-battery/12v-3000mah-dc-lithium-ion-battery-pack.html.

Figure 15:

Holt, R. W. "20 AWG Colored Wire Spools." *Amazon*, 21 Feb. 2019, www.amazon.com/dp/B07G2GLKMP/ref=sspa_dk_detail_1?th=1.

Figure 16:

"Arduino Nano." *Arduino*, store.arduino.cc/usa/arduino-nano.

Figure 17:

"Jrk 21v3." *Pololu*, www.pololu.com/product/1392/resources.

Figure 18:

InductiveLoad. "60-40 Solder Roll." *Wikipedia*, 16 Sept. 2006, commons.wikimedia.org/wiki/File:60-40_Solder.jpg.

Figure 19:

Meise, Martin. "Hohlstecker Und Hohlbuchse." *Wikipedia*, 23 Dec. 2009, commons.wikimedia.org/wiki/File:Hohlstecker_und_Hohlbuchse_5,5x2,5.jpg.

Figure 20:

HetheMeow. "Wire Strippers." *Wikipedia*, 8 Nov. 2018, commons.wikimedia.org/wiki/File:Wire_strippers_5.jpg.

Figure 21:

Eugster, Simon A. "Weller Soldering Station." *Wikipedia*, 20 Aug. 2009, commons.wikimedia.org/wiki/File:Soldering_Station_Weller_2.jpeg.

Figure 24:

"Jrk 21v3." *Pololu*, www.pololu.com/product/1392/resources.

Figure 28 – Figure 36:

Physicsh. "PID Compensation Animated." *Wikipedia*, 28 May 2015, commons.wikimedia.org/wiki/File:PID_Compensation_Animated.gif.

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Warnings: injury

Cautions: damage to product or equipment

Links by Chapter