Technical Writing

Independent Study 613

July 1, 2012

FEMA

Course Overview

Unit 1: Course Introduction

Unit 2: Research in Communications

UNIT 3: Communications Considerations and Models

Unit 4: The Technical Writing Process

Technical writing encompasses the processes and techniques used to produce manuals and other supporting documents to communicate complex and technical information more easily. The processes including developing methods to develop, gather, and disseminate technical information among customers, designers, and manufacturers.

Technical writing is an essential skill of the training professional, as it forms the basis of producing curriculum materials used to train and educate students. Poor curriculum materials result in courses and training programs that cannot meet organizational goals and learning objectives.

This course provides an overview of technical writing processes and products. Key topics in this course include prewriting, drafting, revising, editing and proofreading, and publishing, as well as copyright requirements, organization of information, and use of photographs, graphics, and charts.

UNIT 1   OBJECTIVES

After completing this unit, you should be able to:

- Determine a strategy for completing the course successfully.

COURSE OBJECTIVES

At the conclusion of the IS-613 Technical Writing course, the participant will be able to:

1. Identify the proper use of research in training project development.

2. Describe the various characteristics of written communications.

3. Explain the communication features of graphics and visual media.

UNIT 1   COURSE INTRODUCTION

RATIONALE

> The IS-613 Technical Writing course is designed as an asynchronous course. This course supports the Master Trainer professional and communication foundational competencies of the Instructional Design Certificate program. The course will consist of multiple modules instructing to the comprehension of research, writing, and graphic communications principles.

GOAL

> The purpose of the IS-613 Technical Writing course is to provide participants with comprehension level knowledge of research, written, and graphical skills needed to communicate with diverse audiences and stakeholders.

Technical Writing contains 7 units. Each unit is described below.

- **Unit 1: Course Introduction,** offers an overview of the course content
- **Unit 2: Research in Communications**
- **Unit 3: Communications Considerations and Models**
- **Unit 4: The Technical Writing Process**
- **Unit 5: Design and Strategy**
- **Unit 6: Graphic Communications**

    Unit 7: Course Summary and Final Exam

How to Complete This Course

Activities

This course includes activities that highlight basic concepts. These activities emphasize different learning objectives and students are encouraged to complete them in order to meet course objectives.

Knowledge Checks

To help you check your understanding of the course material, Units 2 through 6 are followed by a Knowledge Check that asks questions that pertain to the unit content.

Appendices

In addition to the seven units, this course also includes two appendices.

- Appendix A includes *Redacting with Confidence: How to safely Publish Sanitized Reports Converted From Word to PDF*

- Appendix B includes the *Section 508 Standards Guide*

Unit 2

Research in Communications

Objectives:

1. Describe the use of research and references in technical writing

2. Describe Primary Sources of Information from:

   a. Interviews
   b. Surveys
   c. Observations

3. Describe the following Secondary Sources of Information:

   a. Books
   b. Periodicals
   c. Encyclopedias
   d. Dictionaries
   e. Directories
   f. Government publications
   g. Electronic databases
   h. Web sites

4. Define the following terms:

   a. Redact
   b. Redaction

5. Discuss the three areas where common mistakes are made in sanitizing a document:

   a. Redaction of Text and Diagrams
   b. Redaction of Images
   c. Redaction of Meta-Data and Document Properties.

What is Technical Writing?

Technical communication is effective and clear communication. It is the process of translating technically complex concepts into language easily understood by a target audience.

It is the process of how you prepare, research, and craft your message. Technical communication is objective driven and directed towards a specific audience. Technical writers translate expert level information to the non-expert.

Written products are supported with evidence that may be better represented graphically. At times you may have to redact sensitive information in your communication to broaden its scope and audience.

Technical writers not only have to understand how to explain technological concepts simply and have professional level writing skills, they need people skills to gain necessary information and organizational skills to keep project deliverables timely.

This course is about the process and strategy of technical writing. Technical writing impacts several professions where people are called upon to write technical documents. Technical documents often are a collaborative effort involving a team consisting of a writer, subject matter expert, editor, graphic designer, and others. The primary assignment may often fall to the writer who, faced with potential resource restrictions, may require skills in each of these mentioned roles to complete the project.

Some of the more common technical documents you may have observed are:

- Abstracts
- Presentations
- Reports
- Evaluations
- Training materials
- User instructions
- Standard operation procedure manuals

Use of Research and References in Technical Writing

You have received a project to develop a technical paper.

Initial considerations for a technical writer are to identify the purpose of the project to discover the purpose of your document.

You will need content and information.

Where and how will you begin?

Consider a project you have worked on or are working on currently. How did you gather the information you needed? Write down a basic strategy you would employ:

Research! Research! Research!

When tasked with a technical writing project what research sources do you think of?

When starting a new project learn *everything.* The more you know the more accurate your writing will become. If your material is found inaccurate, it will be easy to dismiss.

Given a particular topic where would you begin? Who would you contact and what references would you collect?

List resources you utilize to conduct research:

Research Sources

There are two types of research technical writers look for, **Primary** and **Secondary**.

Primary sources are firsthand. It is the type of information that has not yet been published. It cannot be located through print. It will require a conversation with people you have identified as knowledgeable about your topic.

Given the above, where do you think you would find this type of information to support your projects?

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Secondary sources are those that have been published. Scheduling and identifying meetings with experts presents unique challenges and time may be a factor.

Researching published materials through a visit to the local library or an online publication search may provide a foundation to build upon.

What other publication sources can you think of?

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Primary Sources

Primary research requires interaction and is best when seeking information that you cannot locate in print.

Sources of primary research are:

Interviews – speak with someone who has the information and experience you need. Come prepared with questions you developed in advance. Your time is limited so make it count.

Surveys – an excellent way to gather information from a large audience. Anonymous surveys can offer unfiltered feedback. The rate of return for surveys is always a challenge.

Observations – for task oriented and performance based functions observations can provide perspective and information on structured processes and procedures.

Primary Research

When have you observed or participated in primary research?

Interviews

Identify people who are knowledgeable about your topic and interview them. The advantage is you can gain in-depth information and discover material that may be unique compared to other sources. A disadvantage is the scheduling and preparation for the interview. An alternate approach is to conduct interviews by phone.

Ask concise questions and allow the interviewee do the majority of the talking. Listening skills are important during these opportunities. Take extensive notes to avoid relying on your memory of the session. Recording interviews is another method for capturing needed information. Always ask permission of the interviewee first before recording an interview.

Consider a job interview you have participated in.

What questions were asked?

What types of information were you asked to provide?

A job interview represents a potential employer conducting research on an employee prospect.

How would you prepare to conduct an interview?

How would you prepare to be interviewed?

Interviewing confidence comes from arming yourself with a foundation of knowledge on your subject. You can gain higher level information in the interview if you can demonstrate you know the basics. Interviewees will be less likely to lose patience if they do not have to "teach you the ropes".

Surveys

Surveys are a great tool to gain specific information from a large dispersed group. Select your questions carefully. The information you receive will only be as good as the question that is asked. Survey data has the benefit of producing clear and categorical information. The disadvantage is once distributed there is no follow up or elaboration of responses.

Consider market research.

Every day we are bombarded with surveys on what we buy, our likes and dislikes, where we eat, and what we watch on television.

Do we write it down? Not usually, someone has to prompt us to participate and we agree to have our responses recorded.

A survey is a primary research method to get information that we have to ask for.

What types of surveys have you participated in? What impact do surveys have on us daily?

Observation

Observation is a method for capturing performance! Technical writing projects often are directed towards demonstrating skills and procedures that are task oriented.

Observation is also good for capturing behaviors as they are actually conducted. A disadvantage is while discovering evidence of poor performance, observation may not identify exactly why poor performance occurs. Only that it *does* occur.

When have you observed people to gather information?

Examples:

- Sport scouts observe the performance of high school athletes.

- An inspector observes the construction at a worksite.

- A scientist observes participants in a medical study.

Observation involves studying performance to capture information we cannot gather from written material.

It is important to only observe! If you become part of the process you affect the outcome and your information will be invalid. You want to objectively capture what occurs during the process or event that you are observing.

Secondary Sources

Secondary research is written information.

What sources of information can be found in print?

Where would you go to find them?

Gather and read everything you can regarding the focus of your project. You must become very familiar with the subject matter you are researching.   Identify the purpose of the process, product, or service and how it will be utilized. Know the pros and cons of the process tasks or the product or service features. If there are problems define them and present the proper interventions and solutions.

Locate related publications or manuals. Gather all the written and graphical information you can find. It is always better to have too much than not enough reference material. You can always discard what you no longer need later in the process.

Previous product specifications will serve as a rich source of information and a generator of questions to ask you subject matter experts later. Some materials are more professional than others (depending on the skill level of the original technical writer). They may contain jargon and acronyms that will need defining. Make a personal photocopy and mark it up. Highlighters and notes in the margin are your best friends during this process.

Conduct research at the library. Many sources of published information are available through the library and a librarian can lead you to resources and sources of information you may miss on your own.

Sources of published information

Books – a current library card belongs in every technical writer's toolbox.

Guides, SOP's, Manuals – Search for all writings that contribute to your topic that may have been developed by other technical writers. These are traditional technical writer products that may offer important foundational information.

Periodicals – Review periodicals associated to the products, and services of your subject.

Profession journals – review professional periodicals of the professions associated to your subject.

Trade magazines – are magazines targeted to a specific Industry.

Newspapers – A good source for current event information.

Encyclopedias – A collection of summarized information regarding all knowledge or focused on a specific area of knowledge.

Dictionaries – A collection of definitions, information and pronunciations in one or more specific languages.

Directories – A repository or database of information that supports searching and browsing inquiries.

Government publications – Publications that are funded, prepared, and distributed by federal, state, or local entities.

Catalogs – A systematic list of descriptive items of information. Used in searches and great for identifying additional sources of information.

Electronic databases – Categorized computer-based information.

University sites – Source for higher learning information or curriculum and degree programs.
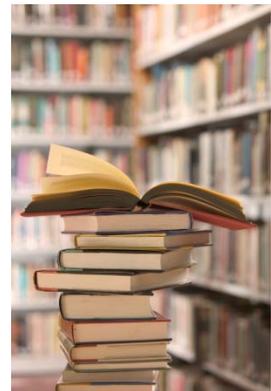
Web sites – There are multiple online information sources that have varying degrees of validity.

The internet is global and can open up new avenues of information. Use popular search engines to research key terms and phrases. Try and keep the topic narrow to avoid overwhelming results and to manage your time wisely.

Understanding web extensions is helpful in online research. Many of us are familiar with .com but knowing the following extensions can assist greatly with finding not only useful but valid information.

- .com – widely used commercial site extension
- .edu – education site
- .org – nonprofit site
- .gov – government site

Boolean Web search techniques involve the use of *or*, *and*, and *not* to filter results.

If you enter *Trees **or** Flowers* your search results will return all links related to *either* trees *or* flowers.

If you enter *Trees **and** Flowers* your results will return all links related to *both* trees *and* flowers in the link.

If you enter *Trees **not** Flowers* your search results will return all links related to trees but will *exclude* those that reference flowers.

Various search engines use slight variants of these logic terms to filter searches. The help section can offer directions of how to use them more effectively.

The more common search engines are:

- Google.com

- Bing.com

- Yahoo.com

Less common but worth a try:

- Woframalpha.com

- Ask.com

- Rollyo.com

- Blekko.com

- Yippy.com

Validity of Published Information

It is important that researchers determine the validity of the information gathered. The writer must be able to determine if the information presented is relevant, accurate, and objective.

Do not rely on just one source of information. Corroboration of information and concepts across multiple information sources is a sound indicator that the material is valid.

Researching the author of the materials is another way to determine if the materials the author has developed are valid. Is the author a well known Subject Matter Expert (SME) in the field? How often have they published and what has been the professional reaction to their materials?

Research the methods used to gather the data that has been presented in the information source. Understanding the data collection and analysis processes used can provide validity indicators of the information presented.

Redaction

Redaction is the process of removing sensitive information from a document.

Often when redacting a document the methods used are not as secure as believed.

Converting documents to .pdf can leave revealing information even when a due diligence effort has been made.

The National Security Agency has identified three common mistakes when redacting a document:

Common Mistakes #1:

Text and Diagrams

Covering text, charts, tables, or diagrams with black boxes or darkened highlights is effective for printed materials, but not for digital materials distributed electronically. The redaction attempt can be reversed revealing an original document.

Common Mistakes #2:

Redaction of Images

Covering images with other graphics in an attempt to obscure or modify the properties or scale of an image works for concealing printed material, but this strategy is not effective for electronic documents.

Technically savvy individuals can reverse your efforts to mask an image and revert it to its original state.

Common Mistakes #3:

Metadata and Document Properties

Electronic documents hold all kinds of hidden information known as Metadata.

Metadata is "data about data" and can include sensitive or personal information requiring proper procedures to maintain security and integrity.

Again, it is not difficult to extract meta-data given the know-how!

Learn more about redaction through the NSA website at; www.nsa.gov. The document *Redacting with Confidence: How to Safely Publish Sanitized Reports Converted From Word to PDF* is also provided as Appendix A of this course.

Research in Communications

Unit 2 Knowledge Check:

1. How would you research references in technical writing?

2. What are the three primary sources of Information?

3. List five Secondary Sources of Information

4. Define redaction

5. What are the three areas where common mistakes are made in sanitizing a document?

Unit 2 Knowledge Check answers:

1. Primary and Secondary research methods

2. Interviews, Surveys, Observations

3. Any of the following Secondary Sources of Information:

   a. Books
   b. Periodicals
   c. Encyclopedias
   d. Dictionaries
   e. Directories
   f. Government publications
   g. Electronic databases
   h. Web sites

4. The process of removing sensitive information from a document.

5. the three areas where common mistakes are made in sanitizing a document:

   a. Text and Diagrams
   b. Redaction of Images
   c. Metadata and Document Properties

Unit 3

Communication Considerations and Models

Objectives:

1. Describe the following characteristics of technical communication;
    a. Necessity for a specific audience
    b. Integration of visual elements
    c. Ease of selective access
    d. Timeliness
    e. Structure

2. Discuss the basis of Ethical Communication.
    a. Legality
    b. Honesty
    c. Confidentiality
    d. Quality
    e. Fairness
    f. Professionalism

3. Discuss the impact of cultural preferences on communication.
    a. Formality
    b. Directness
    c. Language
    d. Humor
    e. Personal space
    f. Eye contact

4. Discuss various communication models;
    a. Simple Transaction Model
    b. Interference Transaction Model
    c. CMAPP Communication Model

Characteristics of Technical Communication

Technical Communication can be identified by the following characteristics:

1. Necessity for a specific audience

2. Integration of visual elements

3. Ease of selective access

4. Timeliness

5. Structure

What do the above terms mean to you? Write your interpretation below:

Necessity for a specific audience

Technical writing is audience-driven. Meaning you write to satisfy the need for information of a particular audience. Knowing your audience is essential to crafting your message. Writing without the audience in mind will produce writing that may be too general to have interest to any particular party. Often if not targeted in its scope, a technical document may result in no audience at all.

Who is the audience?

Questions to consider:

- What do they know about the subject of the project?

- Are they novices or experts?

- What is their background?

- Are they technical or non-technical?

- Are they internal or external to your organization?

- What jobs do they perform?

- Are they management?

- Do they feel positive, negative. Or neutral to the subject?

Consider a current project and write a profile of the target audience. Utilize the previous questions:

Integration of visual elements

The use of images, diagrams, charts, and other visual elements helps to effectively relay a message. Presentation is as important as content when preparing a technical document. We are all familiar with the adage *"a picture is worth a thousand words."*

Visual elements are often used in the development of:

- Brochures

- Advertisements

- Prospectus materials

Ease of selective access

Selective access in technical communication ensures a format that allows readers to skim materials to gain a quick understanding of the message. A reader can determine which elements they wish to return to and focus on.

This self-directed approach appeals strongly to adults attempting to learn new information.

Timeliness

Technical communication has an expiration date. The information you prepare today may become outdated in the near future.

A computer manual more than a few years old may have outlived its usefulness.

If readers are not computer savvy then paper based delivery may be the best vehicle. If they are computer savvy will they use computers to access the document or will their location limit their options? Will they print it anyway?

Will information need to be updated on a regular basis, if so how often - daily, weekly, or monthly? Plan a scheduling strategy to remain timely with information.

Structure

Technical communication needs to be concise. Often technical communication gets right to the point and avoids lengthy introductions and conclusions.

Don't use a paragraph to say what you can with one sentence.

Don't use a sentence to say what you can with a single word.

Translate the following sentences into concise statements:

1. *"The diurnal fowl of prey has touched upon the demesne"*

   Or: *"The eagle has landed".*

2. *"To have authentic being, whether material or spiritual, or to possess neither fundamental substance nor personage"*

   Or: *"To be or not to be."*

Ethical Communication

The Society for Techincal Communication (STC) provides the following guidelines in sustaining ethical communications:

Legality

Technical writing may require communications that express legal rights and duties as they relate to the subject of your project. This may involve a level of analysis and interpretation that provides legal direction to your audience. As a technical writer every attempt should be made to eliminate ambiguous or confusing legal jargon. The structure of legal directives should remain simple and clear for ease of comprehension.

Honesty

Honesty in writing is a behavior that will dictate the success and longevity of a technical writing career. A single instance of written work proven to be dishonest in content or design is difficult to recover from. All future work may fall under scrutiny and suspicion. Not a risk any technical writer should consider.

Confidentiality

The principle of confidentiality is an ethical practice that ensures frankness with individual sources of primary information obtained through such methods as interviews and surveys. A break in confidentiality is another variable that will assuredly have a negative effect on a technical writer's future and professional reputation.

Quality

Quality is achieved through the accuracy which defines the credibility of your project. If your technical writing appears inaccurate then the credibility of the message is called into question. This creates another ethical dilemma that is difficult to recover from. Poor quality production is not a credential any technical writer wants associated with their work.

Fairness

Fairness attempts to ensure equitable and balanced presentation of information especially in situations where opposing positions may be incorporated. The goal of your project will determine if this latitude is permitted. Technical writing is often objectively one-sided in approach, but that does not guarantee that fairness will not be an ethical factor.

Professionalism

Your reputation and identity as a technical writer will be defined by your professional actions as perceived by clients and peers of the technical writing community. Ethical conduct has a positive or negative impact on your expert reputation.

Professionalism in writing is an ongoing process and lifelong pursuit for any technical writer.

Cultural preferences

Target audiences for technical writers can be wide and varied. Analysis should provide information on the audience and direction on how to adapt to an array of cultural preferences. Following are many of the cultural elements that a technical writer may need to consider.

Formality

Formality is a matter of defined behaviors within cultures that dictate degrees of formal actions and common practices which vary among cultures. In the western world it is common to shake hands when introduced, yet in some eastern cultures the accepted norm involves additional actions such as bowing and exchange of formal names.

Directness

American directedness in business is well established, yet in some cultures such forwardness can be considered rude and impolite. Directness is considered a respectable trait in one instance and just the opposite in others.

Language

Translation is the obvious consideration is communication between different languages. Yet even when speaking the same language there are particular words that have distinctly different meaning. America, The United Kingdom, Australia, and Canada all have a large population which primarily speaks English yet the jargon and vernacular can have dramatically different definitions. Expand your audience to people who speak English as a second language and the intent can quickly become lost to confusion.

Humor

In technical communication humor is used sparingly. Understanding your audience and assuring an appropriate reaction to a humorous anecdote is a must.

Personal space

This consideration applies mostly to physical space and proximately between people. The application to technical writing may appear minimal, but in instances where physical direction and placement may be part of a process, be aware of your audience.

Eye contact

Another primarily physical consideration, the acceptance of eye contact varies among cultures and perceptions can range from honest to rude.

Communication models

Communication models are used to explain and illustrate the way people exchange information.

Simple Transaction Model

The Simple Transaction Model is a representation of two-way communication between a **sender** and **receiver**.

Transactional Model

The sender originates the message and sends it to the receiver. The delivery methods may be face-to-face, telephone, or written message, such as email.
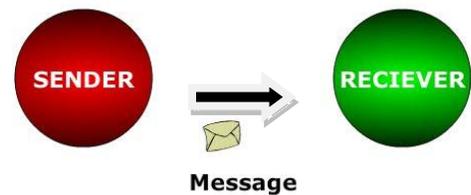
The receiver interprets the message and provides feedback to the sender.

The sender will process the feedback and modify the message appropriately.

Figure 3.1

Interference Transaction Model

The Interference model builds upon the simple transaction model by adding the concept of interference, both internal and external. External interference in communication is the surrounding noise and distraction that serve as obstacles to communication. Internal interference to communication may be a lack of concentration regarding the subject, physical or mental fatigue, or the inability to remain objective towards a topic.

Figure 3.2 demonstrates the impact of interference between the *sender* and *receiver*. The sender *encodes* the message by determining structure and content, and then sends (*transmission)* the message to the receiver who interprets (*decodes*) the message before providing a response (*feedback*). Internal and external interference impacts the communication at multiple points during the process.
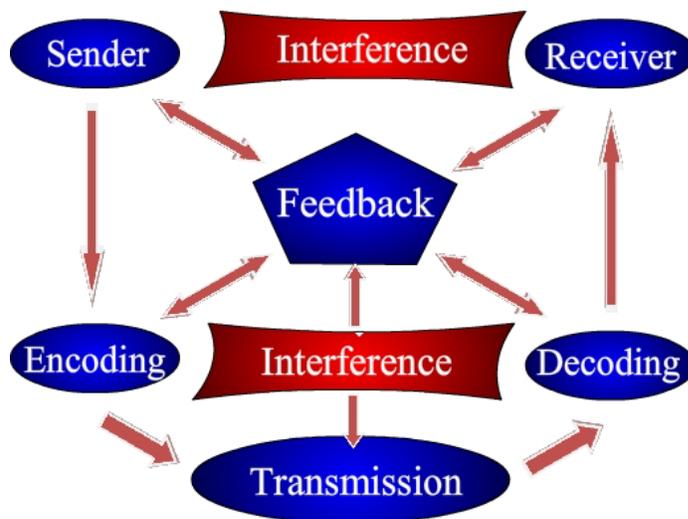
figure 3.2

CMAPP Communication Model

Unlike the previous models which apply to most general communication exchanges, the CMAPP (Context, Message, Audience, Purpose, and Product) Communication model applies specifically to technical communications that omit the sender, receiver, and transmission elements.

Figure 3.3 illustrates the CMAPP Model which demonstrates the concept of *Context* and how it affects communication.

The *Message* affects the *Audience* to which communication is directed.

Purpose affects the intent of the *Message*.

The *Product* refers to the technical document.

Each element impacts and affects the others continuously.
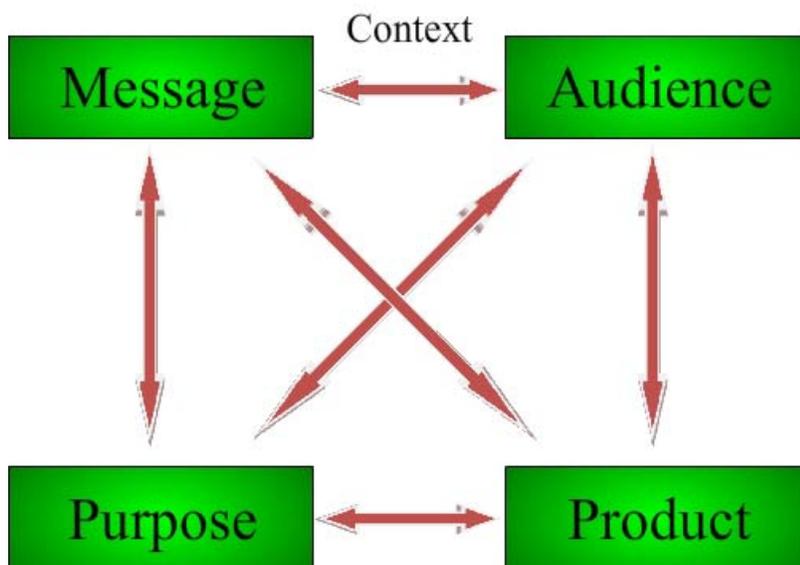
figure 3.3

Communication Considerations and Models

Unit 3 Knowledge Check:

1. What are the five characteristics of technical communication?

2. What are the six elements that compose the basis of Ethical Communication?

3. What are the six elements which impact cultural preferences in technical communication?

4. What are the three communication models?

Unit 3 Knowledge Check answers:

1. The five characteristics of technical communication are:

    a. Necessity for a specific audience
    b. Integration of visual elements
    c. Ease of selective access
    d. Timeliness
    e. Structure

2. The six elements that compose the basis of Ethical Communication are:

    a. Legality
    b. Honesty
    c. Confidentiality
    d. Quality
    e. Fairness
    f. Professionalism

3. The six elements which impact cultural preferences in technical communication are:

    a. Formality
    b. Directness
    c. Language
    d. Humor
    e. Personal space
    f. Eye contact

4. The three communication models are:
    a. Simple Transaction Model
    b. Interference Transaction Model
    c. CMAPP Communication Model

Unit 4

The Technical Writing Process

Objectives:

1. Describe the following stages of the technical writing process:

    a. Prewriting
    b. Drafting
    c. Revising
    d. Editing and proofreading
    e. Publishing

2. Discuss the Prewriting Stage of technical writing.

    a. Organization of the message
        i.   Chronological
        ii.   Spatial
        iii. Comparison and Contrast
        iv.   Most-important to Least-important
        v.   Cause and Effect

    b. Outlining
        i.   Principles of Outlining
        ii.   Numbering systems
        iii. Organizing Data
        iv.   Drafting the outline
        v.   Finalizing the outline (Subordination, Division, Parallelism)

3. Discuss the Drafting Stage of technical writing

4. Discuss the Revising Stage of technical writing

    a. The ABCs of CMAPP
    b. Accuracy
    c. Brevity
    d. Clarity

5. Discuss the Editing and Proofreading stage of technical writing.

    a. Supporting references such as a dictionary and thesaurus
    b. Techniques for effective editing
    c. Techniques for effective proofreading methods

6. Discuss the Publishing Stage of technical writing.

Technical Writing Process

Technical writing is a process and this unit will walk you through the steps of:

1. Prewriting
2. Drafting
3. Revising
4. Editing and proofreading
5. Publishing

We'll examine each stage from prewriting to Publishing.

Prewriting

Prewriting is the step we often wish we had taken anytime we have sent off a message and regretted it later or wished we had worded it differently.

Prewriting is the planning before putting into words.

Prewriting - Organization of the message

When prewriting, plan how you want to sequence your information:

Based on events in a timeline?

How items relate to one another or by location?

- Similarities and/or differences?

- In order of importance?

- Cause and effect?

Considering these questions prior to writing helps formulate our design thoughts.

Prewriting – Chronological

Often we present information based on the order events occurred:

We present information as it builds up to a significant event, otherwise known as ascending order.

Or we start with the significant event and discuss it in reverse, or descending order.

During emergencies do we not often discuss what built up to the emergency or break down events that led to the emergency?

Prewriting - Spatial

When referring to States or FEMA regions we are making a spatial reference based on geographic location. Spatial placement uses words such as *over, next to, behind, in front of*, to describe relationships between items.

Write about how you would explain where to find items in your refrigerator?
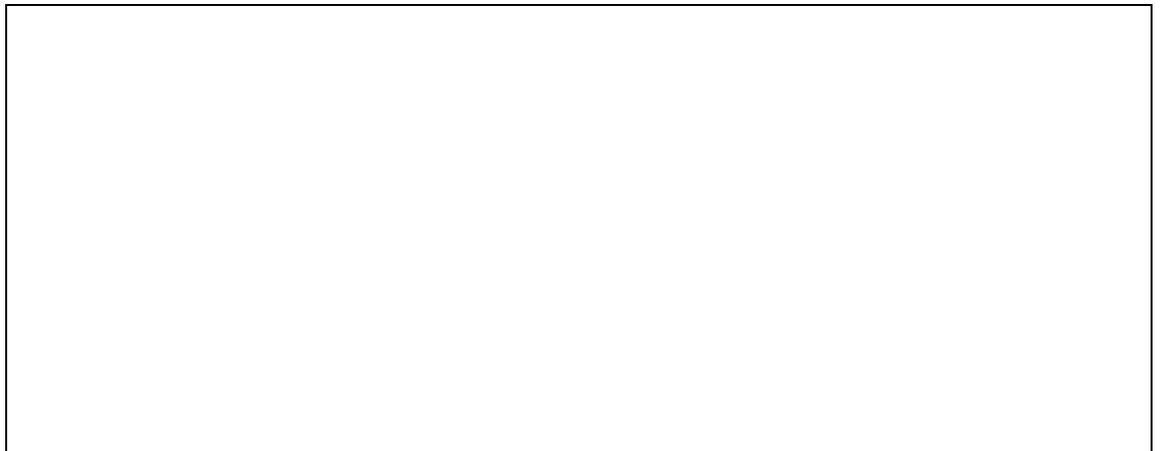
"It's on the top shelf, behind the milk, next to the orange juice, under the tin foil, on top of the paper plate."

Prewriting - Comparison and Contrast

Comparison – how things are alike

Contrast – how things are different

Often used together to illustrate advantages and disadvantages of a subject

Consider the expression; "*comparing apples and oranges*"

How would you explain the meaning?

How would you compare?

How would you contrast?

Prewriting - Most-important to Least-important

What types of information do we list by order of importance?

Organize the following from most important to least important to you:

- love, health, wealth, family

- Things to do when leaving for vacation

- Things to do during an emergency

Prewriting - Cause and Effect

This method is used to describe an action that causes an outcome:

The tornado caused the roof to fly off the building.

The earthquake broke the dishes.

Identify the cause from the effect:

Causes: *tornado, earthquake*

Effect: *roof flies off, dishes break*

Outlining

Once you have identified how to organize your message the next step of prewriting is to *outline* your thoughts.

Often writers will mistakenly skip this step. Formulating a framework for your document *now* will provide a structure to build upon *later*.

An outline serves as a great reference for when the writing starts!

Principles of Outlining

4 steps to outlining:

1. Numbering systems
2. Organizing Data
3. Drafting the outline
4. Finalizing the outline

Numbering systems

Two primary number systems used in outlining:

Alphanumeric system - consisting of both letters and numbers

Decimal System – numbers only with subcategories expressed in decimals

Alphanumeric System

    1. Heading (number)
          A. Subheading (letter)
          B. Subheading (letter)
               1) Subheading (number)
               2) Subheading (number)
    2. Heading (number)
          A. Subheading (letter)
          B. Subheading (letter)
               1) Subheading (number)
               2) Subheading (number)

Decimal System

    1. Heading (number)
          1.1 Subheading (decimal)
          1.2 Subheading (decimal)
               1.2.1 Subheading (decimal)
               1.2.2 Subheading (decimal)
    2. Heading (number)
          2.1 Subheading (decimal)
          2.2 Subheading (decimal)
               2.2.1 Subheading (decimal)
               2.2.2 Subheading (decimal)

Organizing Data

Consider the message and how information will be sequenced

(*Remember;* Chronological, Spatial, Comparison and Contrast, Most-important to Least-important, Cause and Effect)

Begin listing your topics in order as they will populate your outline.

Activity

Draft a list of your diet in the past 24 hours. Review the example in the table below. Begin to sequence your information with one of the formats previously mentioned. Compare your draft to the example on the next page.

Example: Yesterday's Diet	Yesterday's Diet
1. Breakfast 6:00 am 2. Cereal 3. Coffee 4. Banana 5. Lunch 12:00 pm 6. Tuna salad sandwich 7. Potato chips 8. Cola 9. Dinner 6:00pm 10. Spaghetti	

Drafting the Outline

Merge your information with a numbering system to illustrate your though process and convey the message.

1. Breakfast 6:00 am

    A. Cereal
        1. Whole milk
        2. Bran flakes
    B. Coffee
        1. Black
        2. Caffeinated
    C. Banana

Convert diet list into an outline format

2. Lunch 12:00 pm
    A. Tuna salad sandwich
    B. Potato chips
    C. Cola

3. Dinner 6:00pm
    A. Spaghetti
        1. Tomato sauce
        2. Wheat pasta

Alphanumeric System

Finalizing the Outline

After drafting the initial outline continue to review and refine. To assist with finalization of the outline consider the following elements:

Subordination	Items found under a subject head within the outline framework. Each subordinate item must directly relate to the main subject of the section.
Division	Each heading must have a minimum of two subordinate supporting sections.
Parallelism	Each heading must have matching grammatical structure throughout the outline.

Drafting Stage of Technical Writing

Now that you have your outline developed the process of adding content should go smoothly. Work on single sections at a time. Feel free to skip around to sections and prioritize those that are easier from those that will require more thought. In the drafting phase it is always important to continue to produce and move forward. Write and write some more. You'll be tempted to want to review what has been written so far and to check grammar and spelling. Worry about that when you get to the revising and editing phases. Now is the time to be prolific.

While in the drafting phase begin to consider what images may support your writing and how you may integrate them down the line. Make notes in your draft describing your ideas for a graph or picture to identify later. Don't get distracted with finding these resources now, but if an idea appears jot it down as a placeholder to return to later.

The Revising Stage

Revision

Once all feedback has been returned review which information you want to integrate into your work. Continue to proofread and evaluate the tone of your document. Read as if you are the audience. Remember who this is for. Does it meet their expectations and needs?

The *ABC*s of CMAPP:

*A*ccuracy: Are examples and supporting content correct and factual?

*B*revity: Be clear and concise. Make the point and move on to the next item.

*C*larity: Keep grammar and word selection simple and understandable.

Editing and Proofreading stage

Editing

Distribute your draft and ask for input. If you have a project stakeholder have them read through and provide feedback. If distributing electronically, utilize tracking features to capture input and suggestions for review. Be conscious of timelines and place deadlines to maintain the integrity of your schedule. It's also important to maintain a thick skin during this process. Remember this is a formative phase to help improve the quality of your product. Use it to your advantage.

Supporting references such as a **dictionary** and a **thesaurus** are important resources to have available while editing. A dictionary will help reduce ambiguity through validating clear definitions and a thesaurus can assist with expressing concepts by offering alternatives to over used words and phrases. At times it can be difficult to reinforce a concept and avoid appearing repetitive. A thesaurus can help represent a common idea through variation.

The editing phase is for improving the document. Next, we correct through proofreading.

Proofreading

During proofreading we polish the product and remove grammatical, technical and content errors. We often are compelled to utilize technology to perform this function by selecting the spelling and grammar checker of our word processing program. As good as these tools can be they are not good enough to place total confidence in them. Discrepancies do happen. *There*, *their*, and *they're* used inappropriately can derail the readers focus and the integrity of your document. You will need to read your document thoroughly to detect proper usage and intent of your writing.

It helps to read your document aloud and listen for clarity and tone. Print a copy and review it in print as well as online. Look for redundancy in language and phrases that you may use more often than aware of. Always keep your audience in mind and try to perceive if you are meeting their needs.

Publishing Stage

Now that you improved the message through editing and proofreading it's time to improve the presentation of the product. Publishing looks at the project from a visual perspective. You have taken the steps to make it sound good, now it's time to ensure it looks good too. Publishing prepares the document for the reader. Reinforcing concepts and ideas with graphics and images will help to determine the success of your project.

The Technical Writing Process

Unit 4 Knowledge Check:

1. What are the five stages of the technical writing process?

2. What are the steps to organizing and outlining the Prewriting Stage of technical writing?

3. What are the four considerations of the Revising Stage?

Unit 4 Knowledge Check answers:

1. What are the five stages of the technical writing process?

   a. Prewriting
   b. Drafting
   c. Revising
   d. Editing and proofreading
   e. Publishing

2. What are the steps to organizing and outlining the Prewriting Stage of technical writing?

   a. Organization of the message
      i. Chronological
      ii. Spatial
      iii. Comparison and Contrast
      iv. Most-important to Least-important
      v. Cause and Effect

   b. Outlining
      i. Principles of Outlining
      ii. Numbering systems
      iii. Organizing Data
      iv. Drafting the outline
      v. Finalizing the outline (Subordination, Division, Parallelism)

3. What are the four considerations of the Revising Stage?

   a. The ABC's of CMAPP
   b. Accuracy
   c. Brevity
   d. Clarity

Unit 5

Design and Strategy

Objectives:

1. Discuss the use of information in technical writing.
   a. Plagiarism
   b. Evaluating Information for validity, reliability, currency, and bias
   c. Documenting information and citing references.

2. Describe the concept of Information Design.
   a. Size and style of type fonts
   b. Use of Headings, lists, and design attributes for emphasis
   c. Use of White Space
   d. Justification and column widths
   e. Selection and presentation of visuals

3. Describe the impact of Section 508 of the Rehabilitation Act of 1973 (as amended) on Information Design.

4. Describe document and presentation visual features and attributes
   a. Body Text and Level Heads
   b. Headers and Footers
   c. Line and Paragraph Spacing
   d. Justification
   e. Lists

5. Describe the use of tables for organizing and depicting data.

6. Describe the importance of development of style guides and templates in technical writing.

7. Describe the strategies used for effective communication in technical writing.
   a. Process Description Strategy
   b. Mechanism Description Strategy
   c. Deductive Strategy
   d. Inductive Strategy
   e. AIDA Strategy
   f. Content Summary Strategy

Information in Technical Writing

Plagiarism

What is Plagiarism?

Plagiarism is using the written words of another and presenting those words as your own work.

How do we know if we have plagiarized?

You have plagiarized if you have:

1. Taken the writing or ideas from other work and presented them as your own.

2. Failed to cite a source

3. Failed to provide a list of references

What is not Plagiarism?

You will know you have not committed plagiarism when you have properly internalized and carefully considered the concepts and ideas you have absorbed in the research process prior to writing.

Common subjects are safe ground to write upon because they are general knowledge and not attributed to a single source. Specific concepts and ideas need to be summarized and properly referenced.

Evaluating Information

When researching information you should check your sources and consider the following:

1. Validity
   a. Is the information factual and accurate?

2. Reliability
   a. Can the information be verified through multiple sources?

3. Currency
   a. Is the information timely?

4. Bias
   a. Does the information contain any prejudice? Is it balanced?

Documenting information and citing references

Documentation and citing of references gives credit to sources and references used in the technical project. Proper documentation gives readers directions to the source documents to pursue further information of interest. Citing sources also supports your writing with evidence-based material provided by experts and professionals focused in discreet areas of knowledge. Lastly, through proper citing you absolve yourself of the risk of plagiarism by giving credit.

There are three dominant systems of citation. Each has a distinct citation format. A basic example for a book citation is included for each. The individual style website offers greater information on citation styles and formats:

- **The American Psychological Association** (APA) www.apastyle.org/

  o Style often used in social science publications

  o Author's last name, First initial. (Publication year). *Title.* Place of publication: Publisher.

- **The Modern Language Association** (MLA) www.mla.org/

  o Style often used in humanities publications

  o Author's last name, First name. <u>Title</u>. Place of publication: Publisher, Publication date.

- **The Chicago Manual of Style** (CMS) www.chicagomanualofstyle.org/

  o Style often used in business publications

  o Author's last name, First name. *Title.* Place of publication: Publisher, Publication date.

Information Design

What are the elements of Information Design?

You do not need to be a technical writing expert to feel the impact of a poorly designed document. It may appear too busy, difficult to scan, and difficult to absorb. If you find yourself continually reviewing the same pages, it may either be that you are trying to learn something difficult that interests you or that you are trying to learn something that is just difficult due to design.

Font Selection

Word processing applications offer an overwhelming selection of fonts to choose from. Simplicity and consistency is always best. Select a font that is easy to read and maintain it through your document. Utilizing a mix of fonts can help to emphasis elements of a document, but limit the usage of mixed fonts to two or three at most.

Fonts come to two basic types: *Serif* and *Sans Serif*. Again, readability is the major consideration in selection of your font. Serif styles have extensions to the letters and Sans (meaning without) Serif styles are without the extension appearing simpler and straighter in design.

Serif	Sans Serif
Arrows point to the distinctive extensions found with Serif fonts	Arrows point to the lack of extensions with Sans Serif fonts

Document Layout

White space

Proper document design has as much to do with what you do not include as with what you do. White space is the background to your message. It is the space between images and words, charts and diagrams, headers, footers, and margins. Proper use of white space dictates how difficult your document will be to read.

The greater the white space the easier the comprehension of the page.

Some readers like to make notes in the margins. Give them that opportunity and they will appreciate your document as a resource and reference.

What types of comments do you make when reviewing written materials?

Do you highlight?

Jot notes?

Underline words that you want to look up in a dictionary?

White space does not only present good design it allows for the practical usage of technical documents as working copy. It makes your document inviting and easy to read.

Justification

Justification is the placement relationship between the margins (left, center, and right) and the text of your document.

Documents are **Left** justified as they begin from the left and read to the right. The majority of documents are left justified following a line along the left margin.

Center justification aligns text to the middle of the document. Often this justification is used for headings and titles. These are often located at the top of the page or section breaks.

Right justification is used for right flushed placements in tables and charts. It is not often used in the body of a document.

Column Width

Standard column width of a document is 6.5 inches with 1 inch margins (left and right) with a paper width of 8.5 inches.

Varying column widths assist with the readability of a document. Sections and subsections can be identified through indentation and multiple columns can help present and organize items of information.

Consider the width of this document. Now think of the layout of a newspaper. Many papers and magazines deploy a variety of columns widths to add separation to stories. This technique helps readers to distinguish stories from one another on the page. Would a newspaper format work for this course document?

Selection and presentation of visuals

Most people utilize photos and graphics to enhance a document visually. This is only part of the technical message.

Information design is the consideration, selection, and integration of each of the previously mentioned elements to enhance presentation and communication with your intended audience. Layout, fonts, and white space are as important as other visuals for communicating technical information.

Visuals enhance layout and content once design and strategy formats have been determined. The following are important considerations for selecting visuals for your project:

- o Detail – images need to be large enough that the objective can be clearly seen but no larger than necessary to support the message.

- o Relevance – Arbitrary visuals intended to add aesthetics to a document but hold no relation to the content can distract from the effectiveness of the message. A technical document on changing a light bulb clearly should have images of light bulbs, but as appealing as butterflies may be, they have no relation to the objectives.

- o Simplification – "A picture is worth a thousand words". If you can achieve this with your selected image you have chosen well.

Section 508 impact on Information Design

Accessibility of information in documents

Section 508 of the Rehabilitation Act of 1973, as amended, is a congressional mandate that requires all federal agencies to provide equitable access to information technology, including online information or information contained in electronic documents and files.

Section 508 applies to all contractors (when funded by Federal dollars); many outside the Federal government voluntarily follow this standard.

Technical writers must be aware of the requirements of Section 508 to ensure that electronic documents being prepared are accessible and easy to navigate.

Information technology impacted by Section 508:

- Software applications and operating systems
- Telecommunications products
- Self-contained, closed products (copiers and fax machines)
- Web-based Intranet and Internet information and applications
- Desktop and portable computers
- Video and multimedia products
- Classroom material delivered electronically

Section 508 applies to these Disability Areas:

- Blind/Visually Impaired
- Low Vision (20/70–20/200)
- Deaf
- Hard-of-Hearing
- Communication/Speech-Impaired
- Impaired Motor Skills (limited use of arms/hands or impaired coordination such as a neurological disorder)

Learn more about Section 508 through the website at; http://www.section508.gov/ *Section 508 Standards Guide* is also provided as Aappendix B of this course.

Visual Features and Attributes

Body Text and Level Heads

Body text is the main content of your document. Visually you will want to deploy various features to enhance the appeal of the product. Consistencies among elements that contribute to the overall layout are important to the success of the document.

Level heads are the headers and titles used throughout the document to create hierarchy and design. Word processing programs can assign levels to headings based on importance. Common level head designations are "level 1" and "level 2" and so on. Each will have default formatting attributes, but these can be altered to meet design preferences.

Headers and Footers

Headers and **Footers** refer to the dedicated space found at the top (header) and bottom (footer) of each page of the document.

Line and Paragraph Spacing

Determine spacing when developing the early format of your document. Spacing between lines and paragraphs impacts the visual appearance of a document. The application of white space between text can add or detract to the appearance of denseness to a document and impact the overall readability.

Leave sufficient white space around important ideas or concepts to create emphasis and allow your audience to reflect on important ideas before moving forward.

Whichever spacing option you choose, single, double, or other variant, be consistent throughout the document.

Justification

Justification of margins can add white space to a document. Left justification of text sets a hierarchy for topics and content. It directs your audience to the style and format of the product. Consistency is key to remain functional and to maintain navigational features of your format.

Lists

Lists are a visual tool for organizing information. They can draw a reader's eye to a group of related items. A cognitive association is made between the reader and the material. Lists are important for relaying task information or steps to a process.

Using the objectives for this chapter as an example you can see how the usages of letters and numbers assist with the display of list items.
 	
Items of equal importance are assigned the same category.
	Unit 5
	
	Design and Strategy
	
	Objectives:
	
	1. Discuss the use of information in technical writing.
	    a. Plagiarism
	    b. Evaluating Information for validity, reliability, currency, and bias
	    c. Documenting information and citing references.
	
	2. Describe the concept of Information Design.
	    a. Size and style of type fonts
	    b. Use of Headings, lists, and design attributes for emphasis
	    c. Use of White Space
	    d. Justification and column widths
	    e. Selection and presentation of visuals
	
	3. Describe the impact of Section 508 of the Rehabilitation Act of 1973 (as amended) on Information Design.
	
	4. Describe document and presentation visual features and attributes
	    a. Body Text and Level Heads
	    b. Headers and Footers
	    c. Line and Paragraph Spacing
	    d. Justification
	    e. Lists
	
	5. Describe the use of tables for organizing and depicting data.
	
	6. Describe the importance of development of style guides and templates in technical writing.
	
	7. Describe the strategies used for effective communication in technical writing.
	    a. Process Description Strategy
	    b. Mechanism Description Strategy
	    c. Deductive Strategy
	    d. Inductive Strategy
	    e. AIDA Strategy
	    f. Content Summary Strategy

Use of Tables for Organizing and Depicting Data

Tables utilize rows and columns to organize information visually and aid in comprehension and comparison of large amount of data.

When designing a table it is best to keep the format as simple as possible. Clearly label columns and rows to allow for easy understanding of the data to be viewed. Be generous with white space to add distinction to the data cell and to distinguish information.

Review the table below displaying teams of the National Football League. How is the information presented?

National Football League			
Division:	Team name:	Division:	Team name:
NFC West	Arizona Cardinals	AFC West	Denver Broncos
NFC West	San Francisco 49ers	AFC West	Kansas City Chiefs
NFC West	Seattle Seahawks	AFC West	Oakland Raiders
NFC West	St. Louis Rams	AFC West	San Diego Chargers
NFC North	Chicago Bears	AFC North	Baltimore Ravens
NFC North	Detroit Lions	AFC North	Cincinnati Bengals
NFC North	Green Bay Packers	AFC North	Cleveland Browns
NFC North	Minnesota Vikings	AFC North	Pittsburgh Steelers
NFC East	Dallas Cowboys	AFC East	Buffalo Bills
NFC East	New York Giants	AFC East	Miami Dolphins
NFC East	Philadelphia Eagles	AFC East	New England Patriots
NFC East	Washington Redskins	AFC East	New York Jets
NFC South	Atlanta Falcons	AFC South	Houston Texans
NFC South	Carolina Panthers	AFC South	Indianapolis Colts
NFC South	New Orleans Saints	AFC South	Jacksonville Jaguars
NFC South	Tampa Bay Buccaneers	AFC South	Tennessee Titans

After review you may have noticed:

- The column headers distinguished teams by *Division* and *Name*.
- The table was split between the *AFC* and *NFC* conferences.
- Each *Division* was separated by *West*, *North*, *East*, and *South*.
- Each team was listed by city of origin then team name.
- Each team was listed alphabetically by city of origin in each specific conference.

National Football League			
Division:	Team name:	Division:	Team name:
NFC West	Arizona Cardinals	AFC West	Denver Broncos
NFC West	San Francisco 49ers	AFC West	Kansas City Chiefs
NFC West	Seattle Seahawks	AFC West	Oakland Raiders
NFC West	St. Louis Rams	AFC West	San Diego Chargers
NFC North	Chicago Bears	AFC North	Baltimore Ravens
NFC North	Detroit Lions	AFC North	Cincinnati Bengals
NFC North	Green Bay Packers	AFC North	Cleveland Browns
NFC North	Minnesota Vikings	AFC North	Pittsburgh Steelers
NFC East	Dallas Cowboys	AFC East	Buffalo Bills
NFC East	New York Giants	AFC East	Miami Dolphins
NFC East	Philadelphia Eagles	AFC East	New England Patriots
NFC East	Washington Redskins	AFC East	New York Jets
NFC South	Atlanta Falcons	AFC South	Houston Texans
NFC South	Carolina Panthers	AFC South	Indianapolis Colts
NFC South	New Orleans Saints	AFC South	Jacksonville Jaguars
NFC South	Tampa Bay Buccaneers	AFC South	Tennessee Titans

Style Guides and Templates

Style guides

Style guides document collections of writing conventions and approved policy that govern the selection of grammar, language, fonts, graphics, and other strategies as defined by an organization. A style guide is a design road map for technical writers to follow.

Often technical writers will request a technical style guide to direct them on how to prepare a document according to the rules of the organization. The availability of style guides serve as a tool to maintain consistency and identity.

The table below is a sample comparing the *Department of Homeland Security*, the *Government Printing Office*, and the *Associated Press* style guidelines regarding the use of capitalization.

COMPARISON OF DHS, GPO, AND AP STYLE GUIDES

Capitalization

	DHS *(Department Preferences – use as default in conflicts with GPO)*	**GPO** *(Official DHS/FEMA Writing Style)*	**AP** *(Use only for press-related documents)*
Commonly used words	• Nation (when referring to the United States) • Federal, Federal Government, the Government • Member of Congress, Member, Congressional • State (when referring to a particular state)	• Nation (when referring to the United States) • Federal, Federal Government, the Government • Member of Congress, Member, congressional, the committee • the State (in reference to a particular state or region in the U.S., e.g., the Gulf States)	• nation • federal, federal government, the government • member of Congress, member, congressional • state (in all references)
Federal, State, or local agencies/bodies	• Capitalize the name of Federal Agencies **Exceptions for institutional prerogative and courtesy: the Administrator, the Board (for Federal Reserve Board)	• Capitalize the full name for Federal agencies; use the abbreviation or acronym on the second reference: Geological Survey, the Survey • Capitalize the full name of State or local agencies/bodies, and use the lowercase for any substitutes: California Highway Commission, the commission	• Capitalize the formal name of Federal and State agencies • Use the abbreviation or acronym on the second reference

Templates

A Template is a reusable framework for writing multiple documents in the same format. Style guides provide the information for the development of templates. Technical writers either develop or utilize templates to meet project needs and reduce formatting time.

Templates standardize common documents such as newsletters, proposals, contracts, training materials, operating procedures, etc.

Templates and style guides are very important on projects that involve several team members contributing to the work. Each should receive a copy of the style guide and all should work from the same template.

Strategies used for Effective Communication

Technical communication is dictated by strategy. The strategy you select is contingent on the situation. The communication approach you design is based on the audience and purpose of your project. Communication strategies can be instructive, persuasive, or descriptive in nature. You effectiveness as a technical writer will rely on your ability to select the correct strategy for the situation.

Process Description Strategy

Process strategy is best used to explain procedures that can be mechanical or human in nature. This strategy involves communicating steps to a process where order and sequence is important.

A mechanical process could apply to an automotive assembly line. The human process would be the line worker who performs a specific part of the process. Both require a process description. As a technical writing strategy, emphasize how the completion of each stage contributes to the final overall process.

Mechanism Description Strategy

A mechanism description strategy is used to explain a system or object. The mechanism can be small to large, inanimate to living, or basic to complex. This strategy can be used to describe any number of parts, each with a specific function. The intent is to answer how something works by describing the appearance, function, and operation of the object or system.

A mechanism strategy can be used to describe topics as simple as a light switch or as complex as the national power grid.

Consider the following when writing a mechanism description:

- Size
- Shape
- Relationship to other parts
- Material
- Finish

Deductive Strategy

Deductive strategy is a logical argument that assumes your audience knows and understands the assertion being discussed. Deductive strategy is intended to be persuasive and requires the following three steps:

1. Make a brief accurate assertion.
2. Justify the assertion with supporting points.
3. Summarize the argument.

Deductive strategy takes facts an audience may generally know about a topic to lead them to a specific conclusion. An example of a deductive statement would be:

> All apples are fruit
> All fruit grow on trees
> Therefore, all apples grow on trees

In this example two facts are stated; apples are fruit and fruit grow on trees. Therefore one can come to (deduce) the conclusion that all apples grow on trees.

Inductive Strategy

Inductive strategy is the inverse to the deductive method and assumes the audience is not familiar with the assertion you propose or may be resistant to the concept.

Inductive strategy is also intended to be persuasive and requires these following three steps:

1. Introduce the topic and make it relevant to the audience.
2. Justify the assertion with supporting points.
3. Summarize the argument as the logical conclusion for the audience.

Inductive strategy differs from deductive by constructing and presenting specific examples to justify an assertion.

> Making the statement that smoking is bad for one's health may be received skeptically. If presented with several research examples of how cancer and smoking are directly related the audience is introduced (or inducted) to the concept that smoking causes cancer. This is with the intent to persuade them to agree with an assertion about smoking.

AIDA Strategy

AIDA is an acronym for *attention, interest, desire, and action*. This strategy utilizes each element of AIDA to target the emotions of an audience.

Attention	Refers to the design appearance and lure of your document.
Interest	The attempt to emotionally generate curiosity about the topic and sustain the initial attention made.
Desire	Now that you have garnered interest, appeal to the desire of the audience. Often accomplished with a "hook" or catch phrase that lingers with a person. Similar to advertising slogans that appeal to the emotions of a consumer.
Action	Now that desire has been created, explain the actions that will satisfy the need.

An example of an effective AIDA strategy is in the design of product brochures that appeal to the interest and desire of a target audience. A person in the market for a sports car picks up a shiny convertible brochure (*attention*). The brochure includes appealing rates and purchasing options (*interest*). Details on specifications, colors, interior, and other options are provided (*desire*). Sales and dealership contact information is also included (*action*).

Content Summary Strategy

Summaries recount significant information and details from a document. A content summary reflects the content of a document without adding or embellishing any of the details. Material is presented in the same order and considers an audience that may not have time to read an entire document.

Examples of content summaries are executive summaries or meeting minutes. Both are strategy tools for providing information and details on greater bodies of content.

Design and Strategy

Unit 5 Knowledge Check:

1. What three areas are required regarding information usage in technical writing?

2. What are the five elements of Information Design?

3. What is the impact of Section 508 of the Rehabilitation Act of 1973 on Information Design?

4. What are the five document and presentation visual features and attributes?

5. What are the six strategies used for effective communication in technical writing?

Unit 5 Knowledge Check answers:

1. What three areas are required regarding information usage in technical writing?

    a. Avoiding plagiarism
    b. Evaluating Information
    c. Properly documenting and citing references

2. What are the five elements of Information Design?

    a. Size and style of type fonts
    b. Use of Headings, lists, and design attributes for emphasis
    c. Use of White Space
    d. Justification and column widths
    e. Selection and presentation of visuals

3. What is the impact of Section 508 of the Rehabilitation Act of 1973 on Information Design?

    a. Section 508 of the Rehabilitation Act of 1973, as amended, is a congressional mandate that requires all federal agencies to provide equitable access to information technology, including online information or information contained in electronic documents and files.

4. What are the five document and presentation visual features and attributes?
    a. Body Text and Level Heads
    b. Headers and Footers
    c. Line and Paragraph Spacing
    d. Justification
    e. Lists

5. What are the six strategies used for effective communication in technical writing?
    a. Process Description Strategy
    b. Mechanism Description Strategy
    c. Deductive Strategy
    d. Inductive Strategy
    e. AIDA Strategy
    f. Content Summary Strategy

Unit 6

Graphic Communications

Objectives:

1. Describe document and presentation visual features and attributes with regard to graphics, photographs, animations, and other imbedded media.

2. Describe effective techniques for development and selection of graphics and visuals.

3. Describe the types of charts and their purposes in organizing and depicting data.
   - Pie Chart
   - Bar Chart
   - Line Chart
   - Histogram
   - Pareto Chart
   - Ishikawa Diagram
   - Timeline Chart
   - Organizational Chart
   - Tree Chart
   - Pedigree Chart
   - Flow Chart
   - Area Chart
   - Gantt Chart
   - PERT Chart
   - Control Chart
   - Run Chart

4. Describe the use of illustrations and photographs in documents and presentation visuals.

5. Copyright Law

Graphic Communications

Graphics are as important as text in your product. Many writers are not experienced in the application of graphic design. This role may be coordinated with a graphic designer if you should have that resource available. Often technical writers are responsible for this duty. Regardless, a technical writer needs to be familiar with the elements of sound design theory.

Visual Features and Attributes

There are four basic principles of design that apply to the selection and placement of visuals:

1. **Contrast** – The intent is to avoid similar items. If certain elements are not identical (font, color, shape, space, etc.) then make them very different. Contrast gains attention, ads visual depth, and is the first thing a reader will notice.

2. **Repetition** -Repeat visual elements throughout the project. This will visually define and organize the project.

3. **Alignment** - Every element should have a visual relationship to every other element on a page. Nothing should be placed arbitrarily.

4. **Proximity** – Related items should be grouped together. It establishes structure and helps to organize information. When related items are grouped together they become a single unit.

Selection of Graphics and Visuals

Graphics and visuals can include anything that is not text. We often utilize charts, graphs, photos, and illustrations to convey information. Readers will remember a graphic long after they have forgotten pages of text.

Graphics software allows technical writers to convert information into visuals that can reinforce the concepts and purpose of a project. It is important to select graphics that are appropriate to the topic and audience.

- Charts show relationships through step or flow processes

- Diagrams illustrate abstract concepts

- Graphs display correlation between data variables and compare the trends between them

Whichever visual type you choose, design graphics to be clear and easily understood. Include simple captions for straightforward comprehension.

The next few pages will introduce common and not so common graphic types used by technical writers to relay data and information visually.

Pie Chart

A pie chart is divided into sections. Each section of the chart is a representation of the total pie. Each pie section has a percentage value. The sum of each section will always add up to 100%. Pie charts can be presented as a flat circle drawing. Others can be three dimensional as seen below. (Figure 6-1)

The pie chart illustrates total student accounts as a percentage by fiscal year from 2005 to 2010.
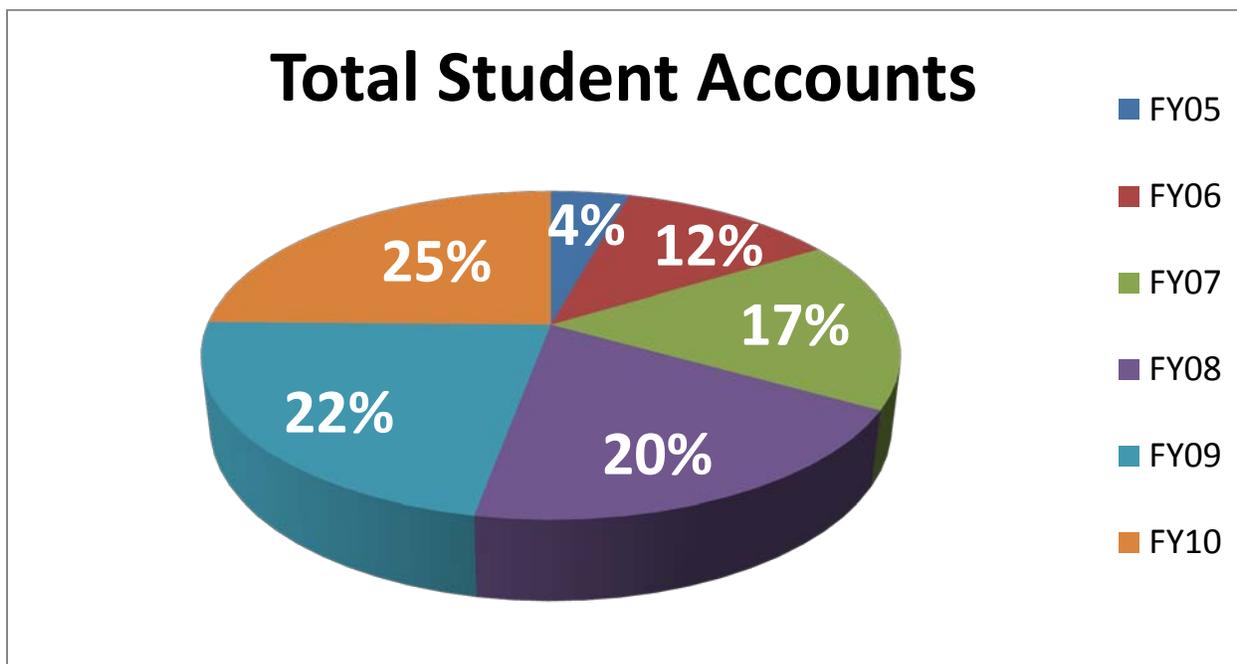
(Figure 6-1)

Bar Chart

Bar charts are used to compare values of several grouped items at given points in time.

Bar charts can be vertical or horizontal (Figure 6-2). Each bar represents a category. Bars are presented for comparison. In the example below you can see the comparison of the *Agency Completions* category (in red) to *Total Student Accounts* category (in blue).

Axes need to be labeled clearly to define the variables used for comparison. In figure 6-2 the x axis is a numerical value in millions. The y axis is fiscal year from 2005 to 2010.
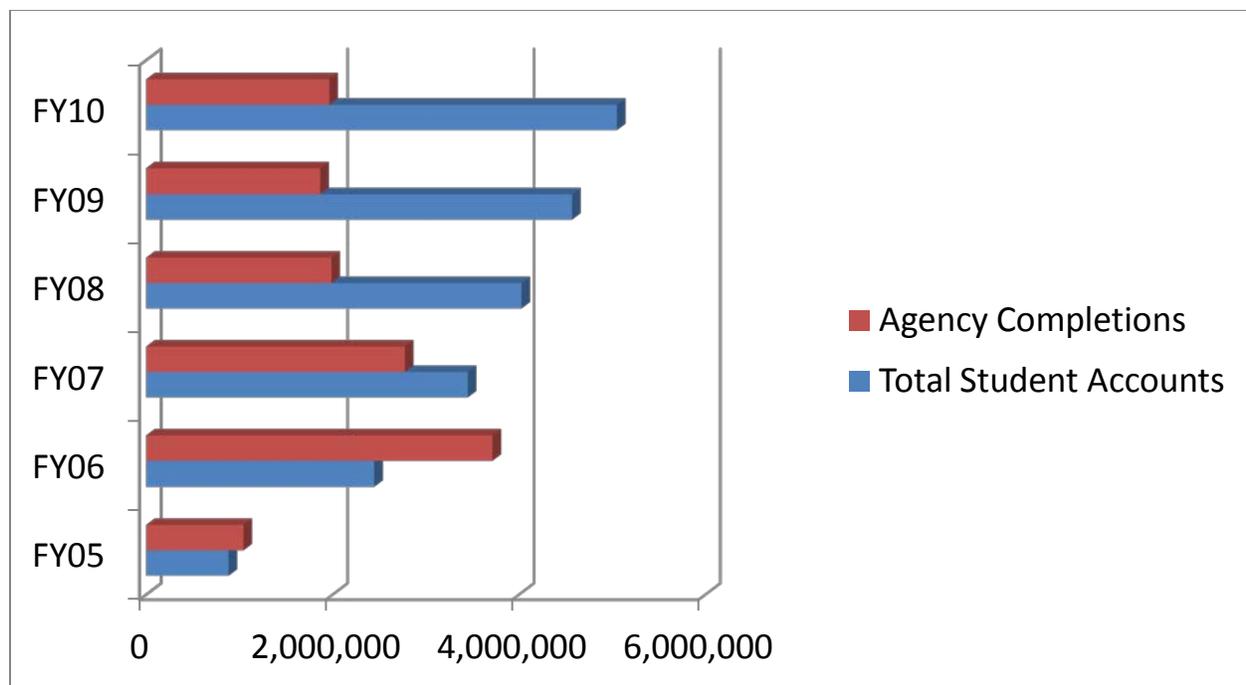
(Figure 6-2)

Pareto Chart

A variation of the bar chart based on the Pareto Principle that 20% of all problems have 80% of the impact on the issue. A Pareto Charts aims to illustrate the 20%.

Line Chart

Line charts track trends over time. They can illustrate a single trend or can compare multiple categories as in figure 6-3 below.

In the line chart below we see the categories of total student accounts compared to agency completions over the course of five years (FY05 to FY10) with numbers in the millions.

Figure 6-3 illustrates an annual increase in total student accounts while agency completions increase from FY05 to FY06, decrease from FY06 to FY08, and remain constant from FY08 to FY10.
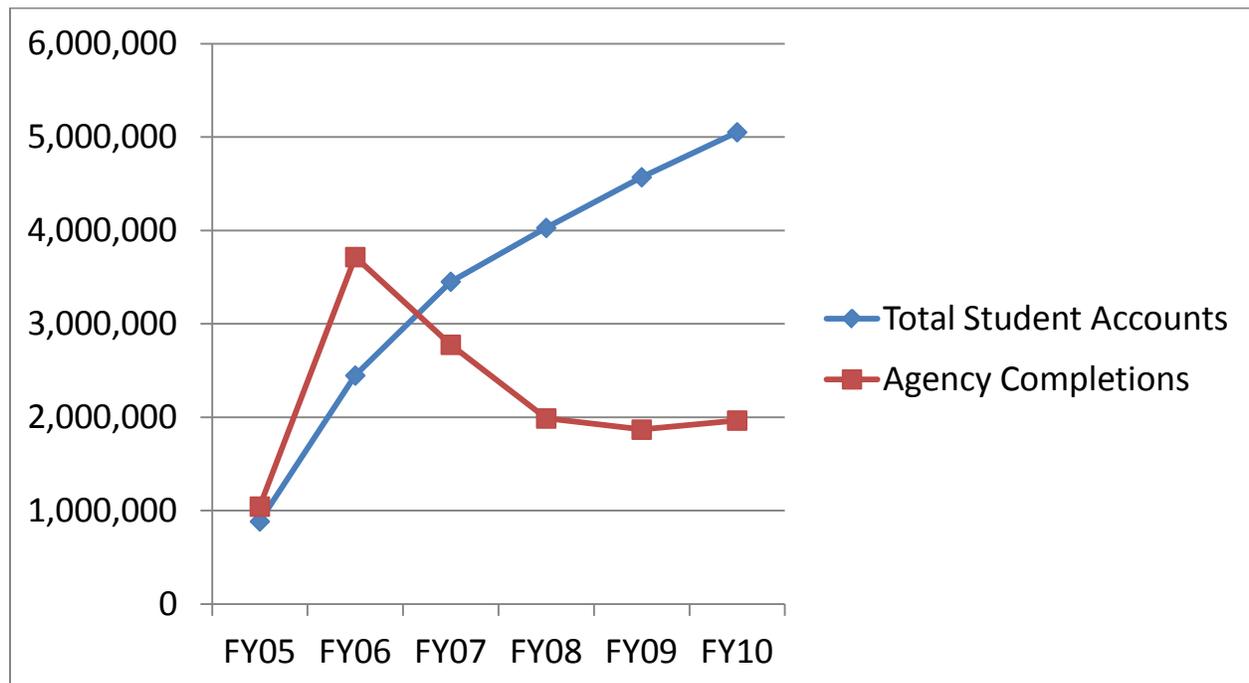
(Figure 6-3)

Run Chart

A Run Chart is a variation of the line chart. Run charts illustrate trends in a time sequence to display how a process performs over time. Use run charts to show whether a process is consistent and predictable.

Histogram

A Histogram is a variation of a bar chart that displays a distribution (frequency, central tendency, and variability) of a set of data. Good for summarizing large data sets.

Figure 6-4 below illustrates *Means of Transportation* for workers 16 years and older from 1960 to 2009 based on census data.
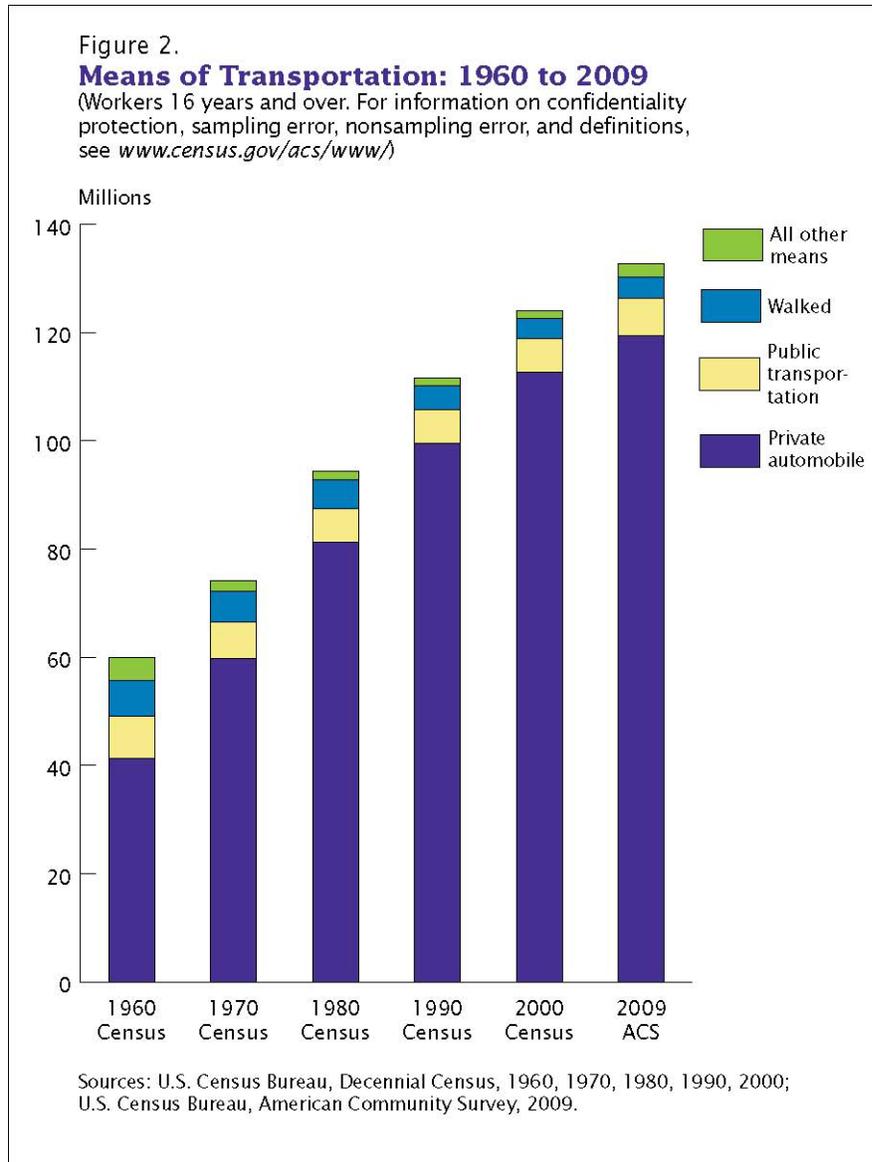
(Figure 6-4)

Ishikawa Diagram

Ishikawa (also known as *fishbone* or *cause and effect*) Diagrams are used to map out contributing causes to an issue in an attempt to discover the root of the problem.

This diagram is often used to brainstorm ideas at a management level. Ideas impacting a process are categorized in an effort to identify quality issues. The results are then used to develop interventions to address and improve the process.

The sample diagram below (Figure 6-5) illustrates the mapping of contributing causes in an attempt to locate the root effect. You can see the fishbone reference clearly.
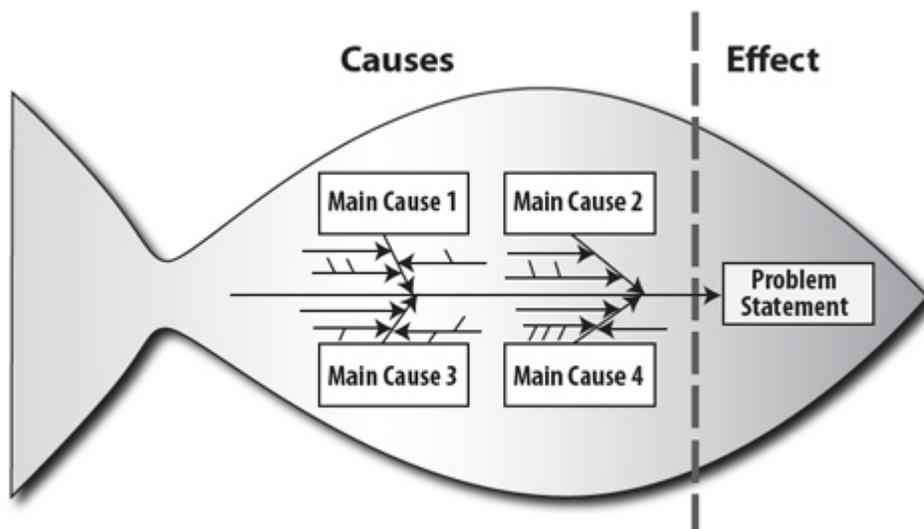
(Figure 6-5)

Timeline Chart

Timeline charts are good for illustrating events in chronological order. They can display historic information demonstrating a build up to a single significant event or can capture an evolution to help explain progression or changes over time.

Gantt Chart

A Gantt chart is a type of timeline chart used for tracking resources and activities often utilized by project managers. Its design divides task and subtask relationships into a schedule for monitoring and documenting progress. It is a projection of future target dates and milestones and serves as a tool for documenting progress and achievements towards those predicted goals and outcomes.

Figure 6-6 below provides a simple template illustration of a Gantt chart.

(Figure 6-6)

Source: http://www.hf.faa.gov/hfmaint/Default.aspx?tabid=105
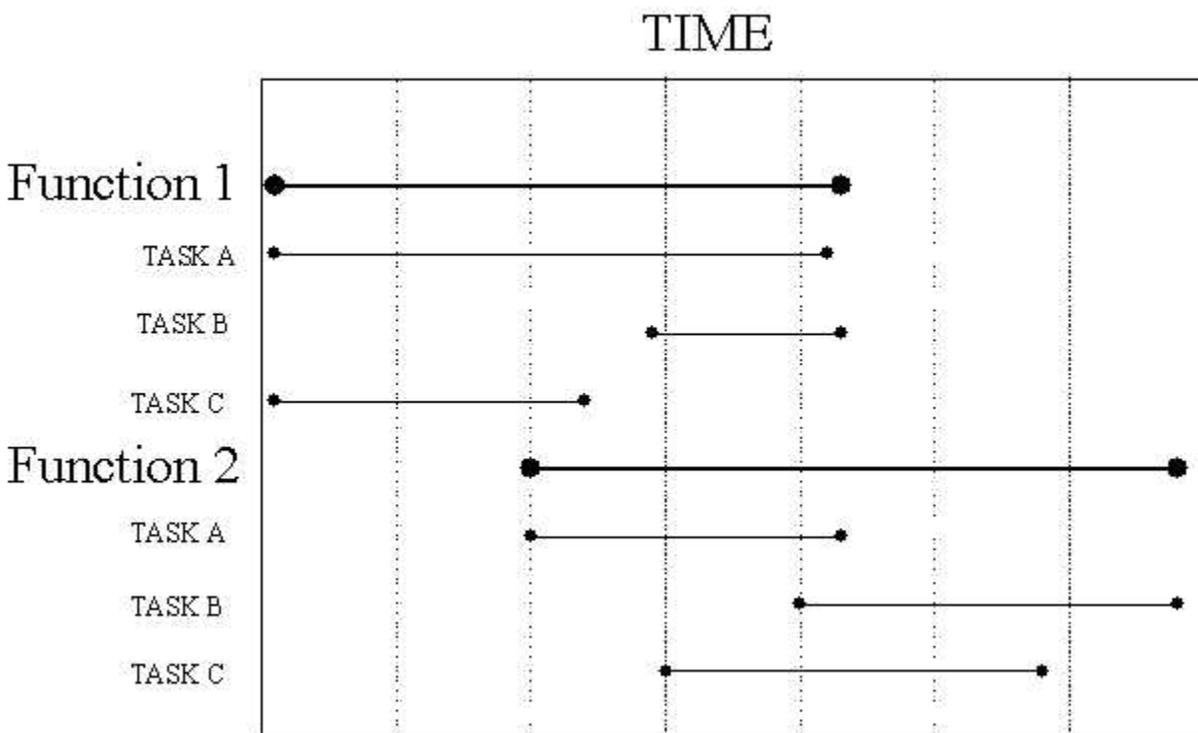
Organizational Chart

An organizational chart is a diagram that shows the structure of an organization and the relationships between people of the organization. Relations may be represented by rank, department, title, and other indicators demonstrating hierarchy or managerial structure.

Figure 6-7 below is a National Protection & Programs Directorate (NPPD) Organizational Chart.
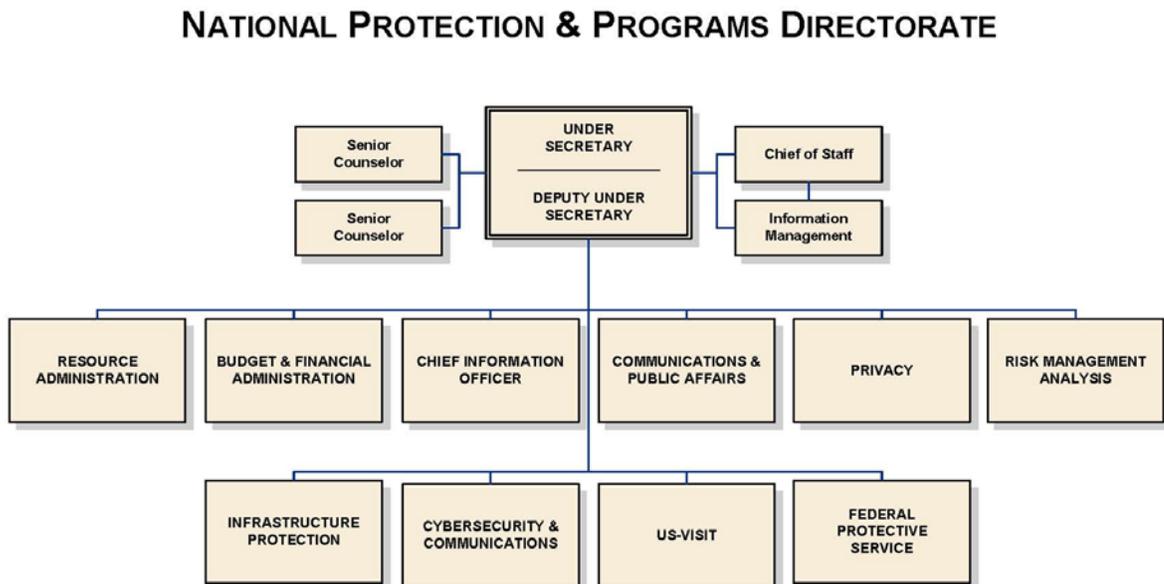
(Figure 6-7)

Tree Chart

Tree diagrams are a way of representing hierarchy in a graphical form. The chart resembles a tree with each element connecting as a network of branches demonstrating relationship and structure to the overall system.

Pedigree Chart

Pedigree charts map genealogical relationships with each split leading to different offspring from the parent.

Area Chart

Area charts are similar to line charts. Instead of single lines they display full color areas below the lines. This visual display technique is used to distinguish the data. Areas are made transparent to allow overlapping detail in the graphic.

PERT Chart

The Program Evaluation and Review Technique (PERT) is used in project management to analyze the tasks involved in completing a project.

Flow Chart

Flow charts use standard symbols to illustrate a process map which includes decision points with conditions that direct the user towards a solution forward or a return to a previous step.

Basic Flow Chart Symbols	
Symbol	**Purpose**
	Rectangles - denote a process
	Parallelograms - denote input or output operations
	Diamonds - denote a decision that can lead to different paths
	Ovals - denote start or end points
	Arrows - denote the direction or *flow* of the process

(Figure 6-8)

The United States Patent and Trademark Office (www.uspto.gov) offers the below flow chart **(Figure 6-9)** on their website which illustrates the process for obtaining a utility patent.

STEP   WHO?   ACTIVITY

1. Applicant → **Has your invention already been patented?** Search: http://patft.uspto.gov → Yes → end

No

2. Applicant   **Design Patent** (ornamental characteristics) ← **What type of Application are you filing?** → **Plant Patent** (new variety of asexually produced plant)

Utility Patent (most common) (useful process, machine, article of manufacture, composition of matter)

3. Applicant   **Determine Filing Strategy**

File Globally? → Yes → **Need international protection?** → File in U.S.? → No → end

No / Yes

4. Applicant   File in U.S.? → Yes → **Which type of Utility Patent Application to file?** Provisional or Nonprovisional

5. Applicant   **Consider expedited examination** Prioritized Examination / Accelerated Examination Program / First Action Interview / Patents Prosecution Highway

6. Applicant   **Who Should File?** File yourself (Pro Se) / Use a Registered Attorney or Agent (Recommended)

7. Applicant   **Prepare for electronic filing** Determine Application processing Fees / Apply for a Customer Number and Digital Certificate

8. Applicant   **Apply for Patent using Electronic Filing System as a Registered eFiler** (Recommended) About EFS-Web — EFS-Web

9. USPTO   **USPTO examines application** Check application status

Yes ← Allowed? → No

10. Applicant   **Applicant files replies, requests for reconsideration, and appeals as necessary**

11. USPTO   **If objections and rejection of the examiner are overcome, USPTO sends Notice of Allowance and Fee(s) due**

12. Applicant   **Applicant pays the issue fee and the publication fee** → **USPTO GRANTS PATENT**

13. Applicant   **Maintenance fees due 3 ½, 7 ½, and 11 ½ years after patent grant** ← USPTO GRANTS PATENT

end

Download Utility Patent Application Guide

Source: http://www.uspto.gov/patents/process/index.jsp   **(Figure 6-9)**

Control Chart

A Control Chart, also referred to as a *Shewhart* chart, is used to determine if a process is within a state of *statistical control*. Figure 6-10 below is a control chart for monitoring health care performance from the Agency for Healthcare Research and Quality (http://www.ahrq.gov/). This data allows one to determine if a process is operating as predicted (monitoring patient falls) and whether or not a corrective action is required.
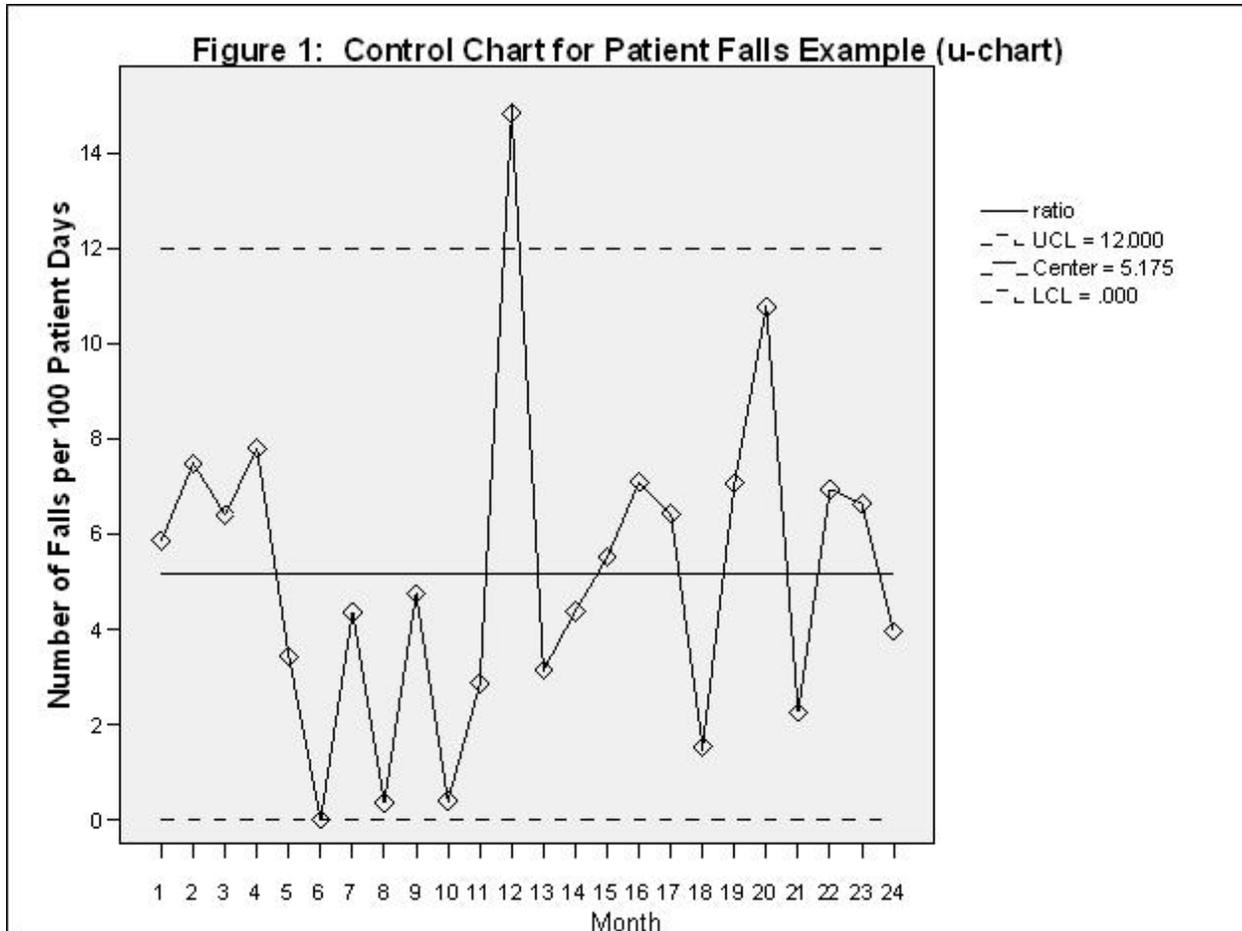
(Figure 6-10)

The Agency for Healthcare Research and Quality

Source: http://qualitymeasures.ahrq.gov/expert/printView.aspx?id=16454

Illustrations and Photographs

Artists create illustrations by hand with ink or with computer graphic software. Technical illustrations supplement your subject text or replace it entirely. The same strategy applies as with charts and graphics; you want to support the objectives of your writing with visual elements. An illustration that diagrams the separate electric, plumbing, and heating systems of a residential home may be a much better route than situating it all into words.

Photographs can be powerful assets to a project. Basic photography skills and a serviceable digital camera can greatly enhance a technical writer's toolbox.

As an alternate to a drawn illustration; a photograph can capture a person performing a task that you are attempting to describe.

Photographs and drawn illustrations can be scanned into your computer to be integrated into your project if you do not already have them in an electronic format. Proper copyright law will apply.

Copyright Law

Copyright law protects the intellectual property of the original author and grants them exclusive rights to the material they create.

As technical writers we often utilize graphics and materials as sources for content.

Technical Writers need to be mindful of copyright laws:

- Lawsuits for copyright violations are commonplace.

- Copyright lawsuits can be high-profile and subject the responsible party to significant punitive damages.

When using other source material remember to:

- Accurately quote and credit the source

- Identify the source for any graphics or visuals

In most cases, the technical writer needs to secure a release to use copyrighted material or visuals, but there are some exceptions to this rule. These exceptions are found in the *TEACH Act* and *Fair Use* used in education materials. Education based technical writing projects do have some flexibility in regards to using copyrighted material or visuals.

If you want to use copyrighted material in an educational or training project, these are you main choices:

- Use Public Domain material and graphics
- Obtain licensing for copyrighted materials and visuals
- Exercise Fair Use
- Exercise the TEACH Act

Fair Use

In an effort to provide technical educators and trainers with the means to use small parts of copyrighted works in the classroom, a law known as Fair Use was passed in 1976. Although the law allows the use of copyrighted material in the classroom, it is complex.

Fair Use is a copyright principle based on the belief that the public is entitled to freely use portions of copyrighted materials for purposes of commentary and criticism. (Copyright Act of 1976, 107) §

The main criteria that decide whether a copyrighted work may be fairly used under Fair Use are:

- Material uses a relatively small portion of the copyrighted work.
- Used for educational or other noncommercial purposes.
- Do not deprive the copyright owner of income or undermine a new or potential market for the copyrighted work.

TEACH Act

Technology
Education
And
Copyright
Harmonization

The TEACH Act is another copyright act intended to give technical trainers and educators the ability to use copyrighted material and graphics without securing a specific release from the copyright holder.

The TEACH Act is a copyright law that provides educators with a separate set of rights in addition to Fair Use. It allows educators to display others' works in the classroom and, in certain cases, online.

TEACH Act only applies to a "government body or an accredited nonprofit educational institution."

TEACH Act allows educators to use limited portions of works that previously required permission and/or licensing.

IMPORTANT: TEACH Act does not allow use of works produced primarily for educational purposes.

- Allows storage of copyrighted materials on a server.
- Digitized versions of works can be made that are not already available in a digital format.
- Digital works with no encryption can be used.
- Access to copyrighted material must be restricted to students in the course; it can not be openly available to anyone.
- Copies of copyrighted material must be removed from the server at the end of the course.

Comparison of TEACH Act and Fair Use

The TEACH ACT and Fair Use have some overlap as both were intended to be for similar purposes. Let's take a moment and contrast the two:

How is Fair Use similar to the TEACH Act?

- Both are part of the Copyright Act.

- Both place restrictions on copyright protection.

- Both expand the technical writer's ability to use copyrighted works.

- The TEACH Act expanded higher education's ability to perform and display copyrighted works in digital online instruction.

- As an amendment to copyright law, the TEACH Act allows technical writers to transmit certain educational copyrighted works without permission from the copyright holder, provided certain conditions are met.

- The TEACH Act creates a safe harbor for institutions. Individuals who commit copyright infringement remain liable under the TEACH Act.

Learn more about *Copyright Law*, *The TEACH Act*, and *Fair Use* through the **United States Copyright Office** website at; http://www.copyright.gov/

Graphic Communications

Unit 6 Knowledge check:

1. What are the visual features and attributes which apply to graphics, photographs, animations, and other imbedded media?

2. What are effective techniques for development and selection of graphics and visuals?

3. What is the purpose and application of each of the following?

   - Pie Chart
   - Bar Chart
   - Line Chart
   - Histogram
   - Organizational Chart
   - Flow Chart
   - Control Chart

4. What is Copyright Law?

Unit 6 Knowledge check answers:

1. What are the visual features and attributes which apply to graphics, photographs, animations, and other imbedded media?
   a. Contrast
   b. Repetition
   c. Alignment
   d. Proximity

2. What are effective techniques for development and selection of graphics and visuals?
   a. Select graphics that are appropriate to the topic and audience.

3. What is the purpose and application of each of the following?

   - **Pie Chart** – divided into percentage value sections equaling 100%
   - **Bar Chart** – Compare values of several grouped items at given points in time
   - **Line Chart** – track trends over time
   - **Histogram** – Display a distribution of a set a data
   - **Organizational Chart** – Shows structure of an organization and relationship between people of the organization
   - **Flow Chart** – Uses standard symbols to illustrate a process
   - **Control Chart** – Used to determine if a process is within a state of statistical control

4. What is Copyright Law?

   a. Copyright law protects the intellectual property of the original author and grants them exclusive rights to the material they create.

Unit 7

Summary

This technical writing course provides a foundational introduction to the technical writing process. Each project begins with research. Primary research will require interactions with people to gain information utilizing interviews, surveys, and observation techniques. Secondary research is all the information found in print that will help to enrich and develop the content of the project. At times the research conducted may require redaction of sensitive information. The redaction process requires a series of considerations to address electronic and print sanitization.

When planning a technical project remember to consider the full range of communication characteristics, ethical considerations, and the impact of cultural preferences on communication. Reviewing the various communication models can assist in your development strategy.

Application of the technical writing process will help to ensure the success of your assignment. Remember to apply each stage:

- Prewriting
- Drafting
- Revising
- Editing and Proofreading
- Publishing

During the design phase apply information design principles and strategies accordingly. Refer to available style guides and utilize templates to meet the timely needs of the project. Section 508 compliance standards will impact federal projects. Remain familiar with the guidelines.

Remember the adage "*a picture says a thousand words*" and apply it generously. Proper usages of tables, visuals, charts, photographs, and illustrations can greatly enhance the ability of a project to relay a message, provide information, and present data.

As you develop as a technical writer read every technical document you can. Review what you like and dislike about the work. Glean ideas that you might find useful for future projects. The profession is rich with examples to assist with your growth. In the interim the following websites offer opportunities for further consideration:

IEEE Professional Communication Society

To foster a community dedicated to understanding and promoting effective communication in engineering, scientific, and other technical environments. https://training.fema.gov/emiweb/cgi-shl/goodbye.aspx?url=http:// pcs.ieee.org/

The Orange Journal of Technical Communication and Information Design

The *Orange Journal of Technical Communication and Information Design* is a graduate student journal that strives to foster critical thinking and discussion on a wide variety of topics and issues important to technical communicators. https://training.fema.gov/emiweb/cgi-shl/goodbye.aspx?url=http:// orange.eserver.org/

The Society for Technical Communication

The Society for Technical Communication is a professional association dedicated to the advancement of technical communication. https://training.fema.gov/emiweb/cgi-shl/goodbye.aspx?url=http://www.stc.org/

1. Which of the following is not a primary source of information?
    a. Observation
    b. Survey
    c. Encyclopedia
    d. Interview

2. All of the following are systems of citation except:
    a. American Psychological Association (APA)
    b. Modern Language Association (MLA)
    c. National Writers Guild (NWG)
    d. The Chicago Manual of Style (CMS)

3. The four steps to outlining include all of the following except?
    a. Finalizing the outline
    b. Defining the outline
    c. Drafting the outline
    d. Numbering systems

4. In technical communication humor is not a cultural preference consideration.
    a. True
    b. False

5. Secondary sources of information include all of the following except:
    a. Web sites
    b. Newspapers
    c. Surveys
    d. Government publications

6. Ethical communication guidelines apply each of the following except:
    a. Honesty
    b. Professionalism
    c. Accreditation
    d. Quality

7. The two types of research information are:
    a. Internal and external
    b. Macro and micro
    c. Primary and secondary
    d. Alpha and beta

8. The chart that tracks trends over time is:
    a. Flow chart
    b. Pie chart
    c. Bar chart
    d. Line chart

9. Section 508 of the Rehabilitation Act of 1973 mandates equitable access to:
    a. Private libraries
    b. State universities
    c. Information technology
    d. Internet access

10. The dedicated space located at the top of a document is known as the:
    a. Footer
    b. Header
    c. Level head
    d. Body text

11. The ABC's of CMAPP stand for Accuracy, Brevity, and _____?
    a. Clarity
    b. Consistency
    c. Compliance
    d. Consideration

12. Bar charts can be displayed horizontally or vertically.
    a. True
    b. False

13. The process of removing sensitive information from a document is:
    a. Deduction
    b. Retraction
    c. Redaction
    d. Subtraction

14. Which of the following is not a prewriting sequence type?
    a. Chronological
    b. Spatial
    c. Comparison and contrast
    d. Invalid to valid

15. Which of the following is not a communication model?
    a. Interference Transaction Model
    b. CMAPP Communication Model
    c. Deductive Reasoning Model
    d. Simple Transaction Model

16. All of following are elements of finalizing an outline except:
    a. Parallelism
    b. Division
    c. Addition
    d. Subordination

17. The chart represented as a circle divided into sections which always total 100% is a:
    a. Pie chart
    b. Bar chart
    c. Flow chart
    d. Pareto chart

18. The citation system most often used in business publications is:
    a. American Psychological Association (APA)
    b. Modern Language Association (MLA)
    c. National Writers Guild (NWG)
    d. The Chicago Manual of Style (CMS)

19. The chart used to map a process is:
    a. Pie chart
    b. Bar chart
    c. Flow chart
    d. Pareto chart

20. Which of the following is not a characteristic of technical communication?
    a. Necessity for a specific audience
    b. Timeliness
    c. Structure
    d. Connectivity

Appendix A

Redaction Documents

Redacting with Confidence: How to Safely Publish Sanitized Reports Converted From Word 2007 to PDF

Architectures and Applications Division
of the
Systems and Network Attack Center (SNAC)
Information Assurance Directorate

National Security Agency
9800 Savage Rd. STE 6704
Ft. Meade, MD 20755-6704
(410) 854-6191 commercial
(410) 854-6510 facsimile

Abstract

Prior to the distribution of Microsoft Word documents, users may want to remove content and assure that no data remnants persist in the file from the removed portion(s). Office 2007 offers a new interface and new features that change how users interact with Word. This paper describes the issue and provides a step-by-step procedure that provides reasonable assurance that information will not be unintentionally released following redaction of a Word 2007 document.

What This Document Addresses

This guidance intends to present Microsoft Word 2007 and Adobe Acrobat 8.1 (or higher) users with a procedure that can be followed in order to reduce the threat of hidden data in a document following redaction.

What This Document Does Not Address

This guidance does not intend to examine the effectiveness of the Microsoft Office 'Inspect Document' feature, the Adobe Acrobat Professional 8.1 'Examine Document' feature, or any possible vulnerabilities associated with Microsoft Office or Adobe Acrobat. This guidance enables users to reduce their level of risk in a uniform manner, although users should recognize that it does not intend to mitigate all possible hidden data risks.

Contents

Figures

1 Introduction

Microsoft Word is used throughout the Department of Defense (DoD) and Intelligence Community (IC) for preparing documents, reports, notes, and other formal and informal materials. Commonly used versions of MS Word include Word 2000, Word XP, and Word 2003. The release of Office 2007 has added Word 2007 to this list.

The Adobe Portable Document Format (PDF) is used extensively by all parts of the U.S. Government and military services for disseminating and distributing documents. PDF provides excellent fidelity and portability, and allows for easy distribution of documents over computer networks and the Internet. PDF files are usually produced using commercial conversion software programs (known as "distillers") that accept source formats such as Postscript or MS Word and output to PDF. PDF is often used as the format for downgraded or sanitized documents.

As past evidence of inadvertent disclosure reveals, simply converting a Word document to PDF does not remove all metadata automatically. In addition, Adobe Distiller and the PDFMaker Add-in to Word (one of the most common ways to convert) translate much of the layering complexity from one format to the next. For example, images placed on top of text in Word will continue to hide (but not prevent access to) the text within the resulting PDF file.

2 Background

Inadvertent disclosure of sensitive information has become an increasingly common problem because complex file formats offer substantial avenues for hidden data. Once a user enters data into the document, effectively removing it can be difficult. In response to the growing problem, the National Security Agency released *Redacting with Confidence: How to Safely Publish Sanitized Reports Converted from Word to PDF* in 2006. This guidance applied to versions up to and including Microsoft Office 2003 and Adobe Acrobat 7. For those applications, the previous guidance still applies.

Microsoft Office 2007 and Adobe Acrobat 8 offer new features, capabilities, and user interfaces. In addition, the new default OpenXML format used by Word 2007 changes how data is stored and enhances the ease with which users can manually verify that metadata has been removed. For these reasons, this updated version addressing the most recent release of Office was produced.

The three most common types of insufficient or incorrect redaction relate to:

1. **Text and Diagrams**- Covering text, charts, tables, or diagrams with black rectangles or highlighting the text in black is a common and effective means of redaction for hardcopy printed materials. It is generally not effective, however, for documents distributed in softcopy format. The most common mistake is simply covering the text with an image or object that does not

effectively remove the underlying content.

2. **Images**- Covering up parts of an image with separate graphics such as black rectangles or making images 'unreadable' by reducing their size has also been used for redaction of hardcopy printed materials. This approach is generally not effective for documents distributed in softcopy form.

3. **Metadata and Document Properties**- In addition to the visible content of the document, most office tools (such as Word) contain substantial hidden information about the document. This information is often as sensitive as the original document and its presence in downgraded or sanitized documents has led to the unintentional disclosure of sensitive information in the past.

3 Hidden Data and Metadata Removal Tools

Previous versions of Office offered tools for finding and removing hidden data and metadata by download from Microsoft's website. Remove Hidden Data 1.0 (for Office XP) and Remove Hidden Data 1.1 (for Office 2003), hereafter referred to as RHD, allow batch removal of information from Word documents. These tools remove some types of hidden data and metadata, but sensitive information may still be retained. Reliance upon these tools may give the user a false sense of security.

Word 2007 replaced RHD with an integrated 'Inspect Document' capability, which is available without requiring the user to download additional components. While this tool does offer enhanced stability over previous versions, the use of this tool by itself does not replace the manual sanitization procedures outlined in this document. The appropriate use of this tool is as a complementary approach to the steps outlined here. Users should note that while the tool is capable of finding and removing instances of a variety of types of potentially sensitive data, the interface does not display which specific instances are to be deleted, so loss of data may result by running this tool in some cases.

4 Process Overview

An overview of the process is presented here for easy review of the steps. Most of the redaction steps occur in Office, with a final sanitization step included for Acrobat. An overview of the steps is provided here (as shown in Table 1) and more detailed instructions are provided in Section 5.

1. Copy Document (copy.docx)	2. Turn Off Reviewing (copy.docx)	3. Edit Document (copy.docx)	4. Review and Run Doc. Inspector (copy.docx)	5. Verify Settings, Convert (file.pdf)	6. Examine Doc., Save, and Distribute (file.pdf)
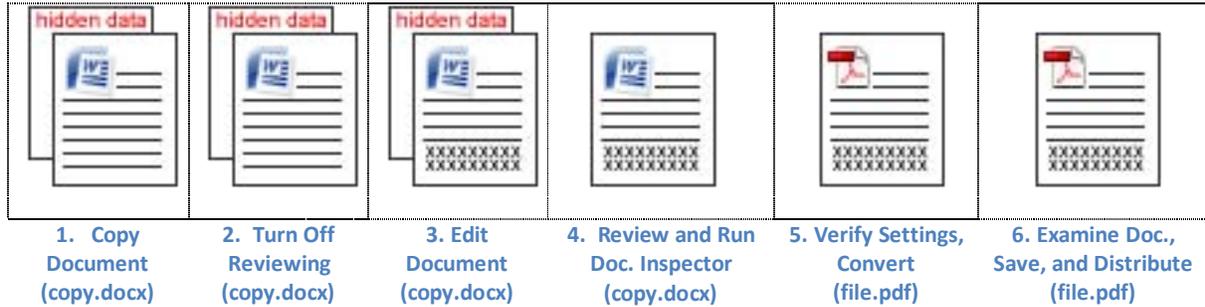
Table 1 Overview of the Redaction Process

4.1   Word 2007 Process

1. Open original document.   Save a copy of the document with a different name. Retain the original as a backup.
2. Turn off Track changes and remove all reviewing data.
3. Review and delete sensitive content. Delete sensitive text, diagrams, tables, and images. Do not cover up any content- remove it and replace it with innocuous data if necessary to maintain spacing.
4. Check Redacted Content and run 'Document Inspector'.
5. Save the new document. Verify PDF conversion settings. Convert to PDF. Review to ensure redaction was thoroughly performed and that the formatting is acceptable.

4.2   Acrobat 8.1 Process

6. Open PDF Result document in Acrobat Professional 8.1 or higher. Run the 'Examine Document' tool. Select all items for review. Optionally, if bookmarks are to be retained and manually reviewed, uncheck the bookmarks option. Remove any areas identified by the tool. Save the file. The file is ready to be shared.

5 Detailed Process Description

Step 1: Create a Copy of the Document

Open the original document and save it with a different name. The new document is where the redaction will be performed. Retain the original as a backup.

Step 2: Turn Off Reviewing Features and Remove Associated Data

Verify that the track changes feature has been turned off. Select the 'Review' tab, and look in the 'Tracking' area. The display setting should be set to 'Final Showing Markup' as shown in Figure 1 so that all tracking features are displayed for easy review. If another setting is selected, click the down arrow next to it and change it to 'Final Showing Markup'.
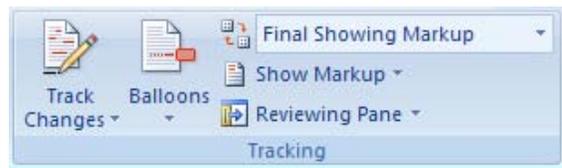
Figure 1 Correct: Tracking Area with Track Changes Off

If 'Track Changes' has been turned on, turn it off. The 'Track Changes' button is highlighted when this feature has been turned on as shown in Figure 2. It returns to the default background color when the feature has been turned off.


Figure 2 Incorrect: Track Changes Turned On!

Navigate through any tracked changes by using the 'Next' and 'Previous' buttons. After reviewing all tracked changes in the document (if any), accept all changes by clicking on the down arrow below the 'Accept' button and selecting 'Accept All Changes in Document' as shown in Figure 3.
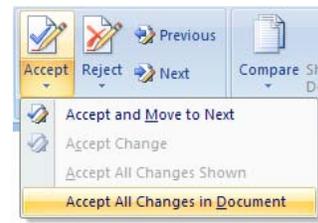

Figure 3 Accept All Changes

Navigate through any comments by using the Next and Previous buttons in the 'Comments' area of the 'Review' tab. Review and remove all comments by using the 'Delete All Comments in Document' as shown in Figure 4.
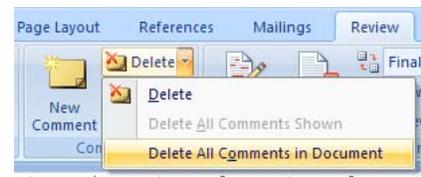
Figure 4 Review and Remove Comments

Step 3: Review and Delete Sensitive Content

Select each chart, diagram, image, or segment of text to be redacted and delete that item. Resizing the item, changing its viewable characteristics such as color, or making the object hidden will NOT effectively remove the data. The content **must** be deleted. If deleting an item changes the format or structure in an undesirable way, replace the item with innocuous content of a size that keeps the formatting correct. If the redacted item is text, replace the text with copies of a single letter such as all A's or all X's (see Example 1). If the redacted item is an image or a chart, replace it with a gray rectangle of the same size (see Example 2).

Example 1: Redacting text. Figure 5 shows a document before redaction. Figure 6 shows the same page after deleting some text. Notice that a paragraph from the next page moves up in the document because deleting the text has shifted the subsequent text.
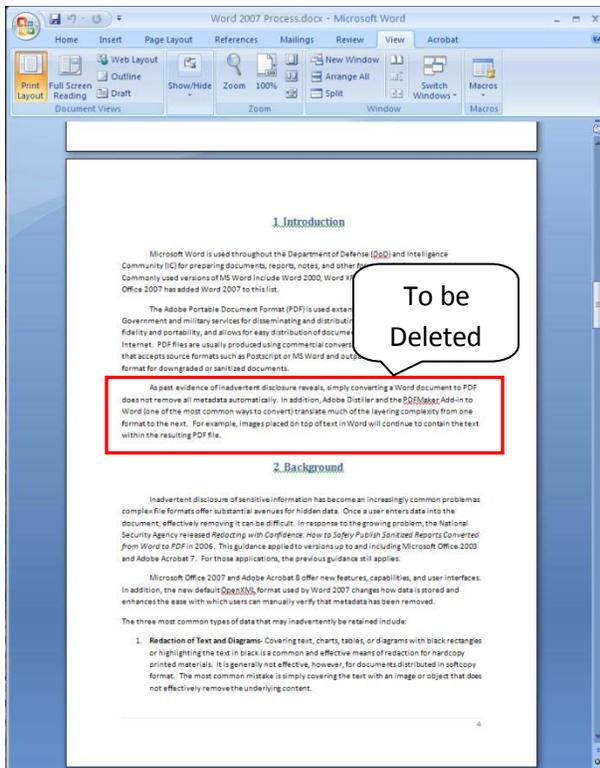
Figure 5 Text View Prior to Deletion
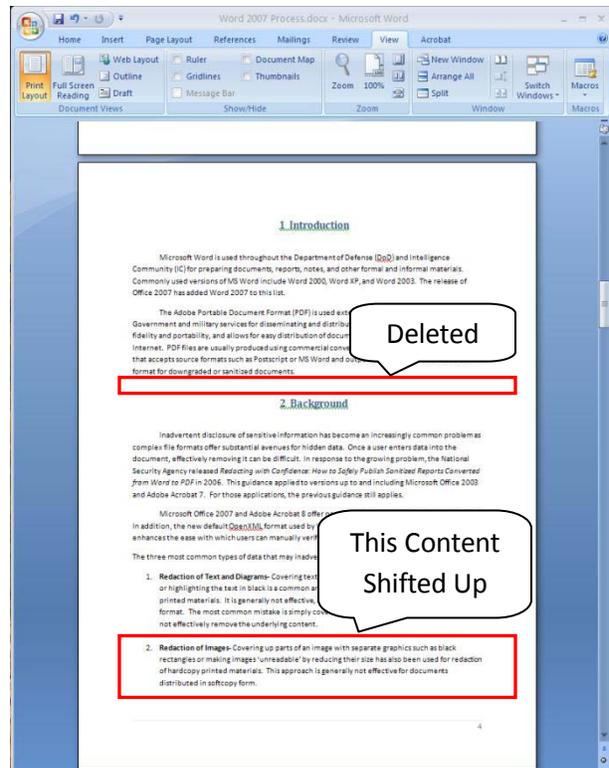
Figure 6 Text View Following Deletion

Because of the shift, subsequent pages may need to be reformatted to ensure figures stay within certain text, page breaks are in the right place, and other such formatting issues do not adversely affect the appearance of the document. This could be time consuming for a large document. If formatting changes are a concern, replace the text with innocuous content of the same size as shown in Figure 7.

Before   After

Figure 7 Redacted Text Where Formatting and Placement have Been Preserved

Example 2: Redacting a chart, image, or other object. If an image is deleted from a document, the text will shift to fill the void and affect the appearance of the document. To preserve formatting, first delete the image to be sanitized and then insert a grey rectangle that is the same size as the image into the vacant space as shown in Figure 8.

Before   After

Figure 8 Redacted Image or Object Where Formatting and Placement have Been Preserved

The easiest way to ensure that the AutoShape effectively fills the space left by the removal of the previous content is to replicate the size and positioning. To determine the size of the existing object, right click on it before removal and select 'size'. The size will then be displayed. Make a note of the height and width. Alternatively, for some shapes, images, or object types, you may need to right click on the object and select 'Format XXXX' in order to view the size (where XXXX is the content type). To view the positioning, right click on the item and select 'Text Wrapping'. Make a note of the current wrapping type. As with size, some types of objects may require that you use an alternative selection of menu options. If 'Text Wrapping' is not an option, select 'Format XXXX' and select the layout tab to view the current setting.

AutoShapes can be inserted by selecting the 'Insert' tab, and then clicking on 'Shapes' within the 'Illustrations' section as shown in Figure 9. Select the shape that most closely resembles the original image or object. After inserting the shape into the document, right click on the shape and select 'Format AutoShape'. Adjust the size and positioning to match the replaced object by selecting the 'Size' and 'Layout' tabs and adjusting the values accordingly. In the 'Colors' tab, select a grey fill color.
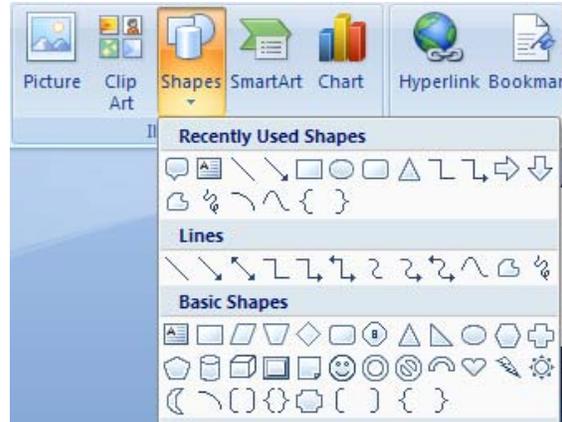

Figure 9 AutoShapes

Step 4: Check Redacted Content and Run Document Inspector

Carefully read over the document to ensure that all material to be redacted has been deleted and, if necessary, replaced with innocuous filler. Check all headers, footers, captions, section titles, footnotes, endnotes, labels, etc. Verify that all comments have been deleted. Ensure that the Print Layout view is selected because some images and objects in the headers and footers may not be visible in the Web Layout, Outline, or Draft views. To view and change the current view, go to 'View' and select 'Print Layout' as shown in Figure 10.

Figure 10 Document Views

To easily flip through the document, use Word's 'Browse By' feature for the different objects. The user interface is shown in Figure 11. By default, the arrows at the bottom of the right scroll bar browse through the document by page when clicked. To customize this behavior, click on the dot at the bottom of the scroll bar that is between the double arrows. This brings up a toolbar with the 'Browse By' options including 'Browse by Comment', 'Browse by Footnote', 'Browse by Graphic', etc. Select one of the options. Now use the double arrows above and below the dot to flip through the document to each instance of that type of object. This is a quick way to make sure all comments are deleted, all images have been redacted correctly, all footnotes have been checked, etc.
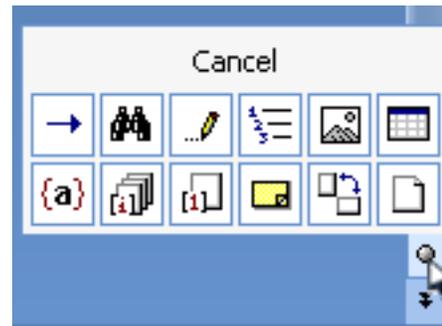
Figure 11 'Browse By' Interface

Next, inspect the document for residual hidden data by using the integrated inspection tool. To run the document inspector, click on the Office icon in the upper left corner of the application. Then navigate to 'Prepare' and select 'Inspect Document' as shown in Figure 12. Ensure all boxes are checked and run the inspection by clicking 'Inspect' as shown in Figure 13.
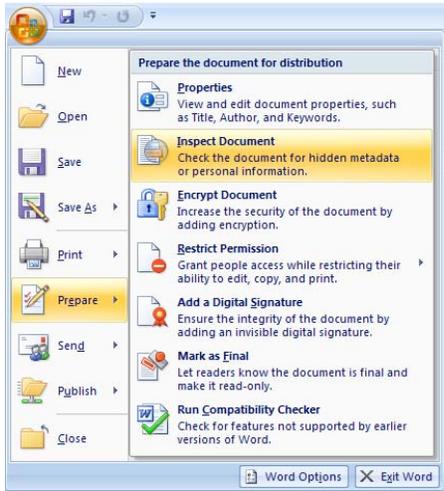
Figure 12 Select 'Inspect Document'
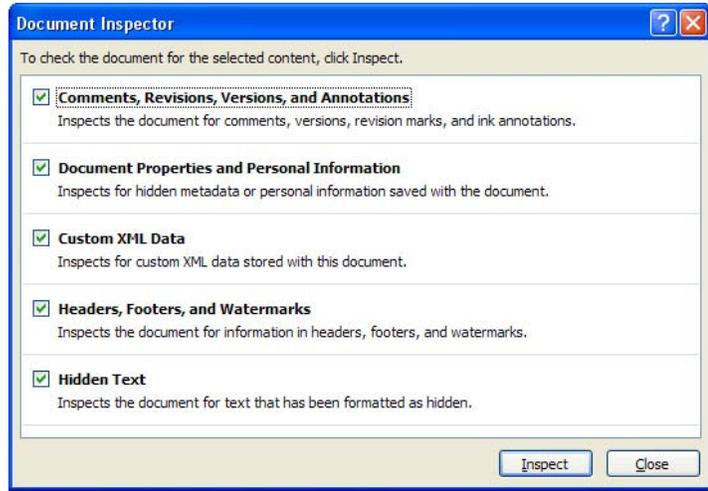
Figure 13 Check all options and Inspect

If any content areas are identified for removal, select remove and re-inspect the content. Verify that the undesired content does not reappear in the subsequent inspection. Headers and footers may need to be manually verified because any content in these areas may trigger the inspection notification, whether the content is sensitive or not.

Step 5: Verify Acrobat Conversion Settings and Convert

For Office 2007 integration (including the availability of the Adobe Acrobat toolbar inside the Word user interface), Adobe Acrobat 8.1 or higher must be used. With previous versions of Acrobat, the settings may not be as easy to modify and the user may not have the option to granularly specify the conversion setting preferences. The 'Preferences' and 'Create PDF' options appear in the 'Create Adobe PDF' section of the 'Acrobat' tab as shown in Figure 14. If the tab does not appear, verify that your Acrobat version is at least 8.1 and follow the instructions on Adobe's site to fix this issue.[1]
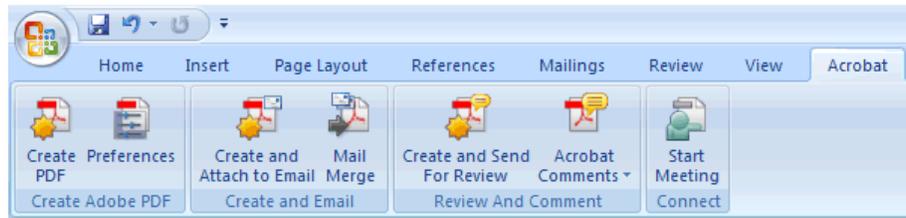
Figure 14 Word Menu Ribbon for Adobe Acrobat Features

Click the 'Preferences' icon. The 'Settings' options are presented as shown in Figure 15. Configure the options as shown, optionally also selecting 'Add Links to Adobe PDF' if you wish to retain any links from the source document. It is imperative that 'Convert Document Information' is **unchecked**. Also uncheck 'Create PDF/A-1a:2005 compliant file' and uncheck 'attach source file to Adobe PDF'. Next, select the 'Word' tab and configure the settings as shown in Figure 16. Uncheck 'Convert displayed comments to notes in Adobe PDF' and uncheck 'Enable advanced tagging'. After selecting the appropriate options, select 'OK' to save them.

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[1] http://kb.adobe.com/selfservice/viewContent.do?externalId=kb401734
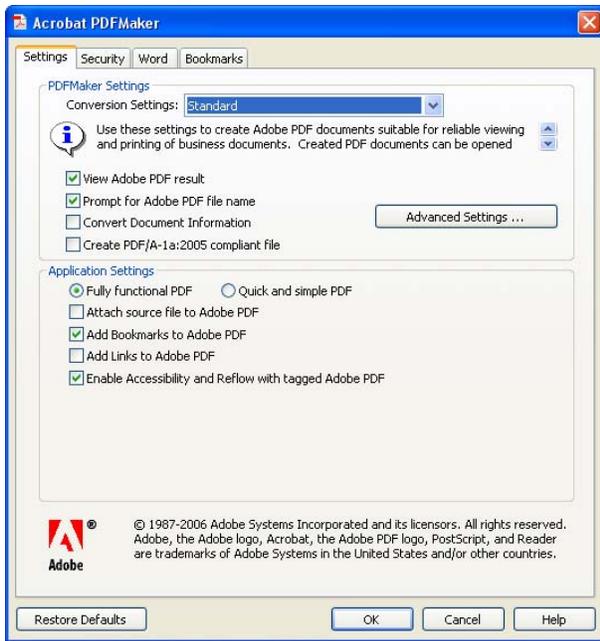
Figure 15 Basic Conversion Settings
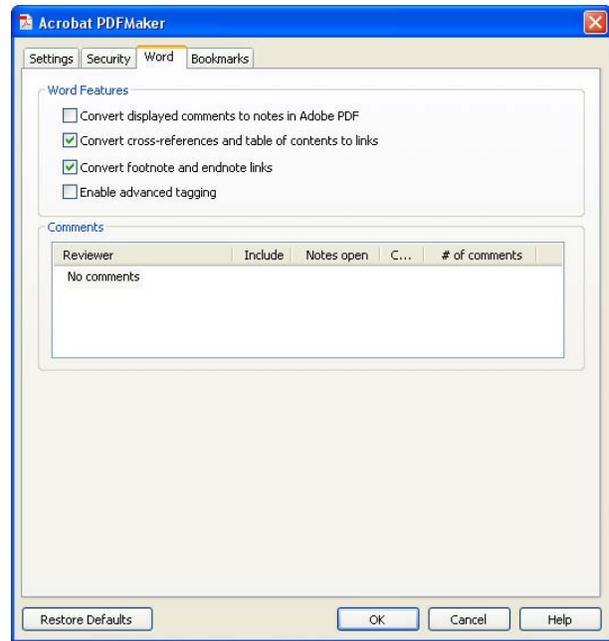
Figure 16 Word-Specific Conversion Settings

Convert the document to PDF by selecting the 'Create PDF' option from the 'Acrobat' tab within Word 2007. Select a descriptive name and save the file.

Step 6: Run 'Examine Document' Tool, Save, and Distribute

Open the resulting PDF file in Adobe Acrobat Professional 8.1 or higher. Select the 'Document' menu, and then select 'Examine Document' as shown in Figure 17.
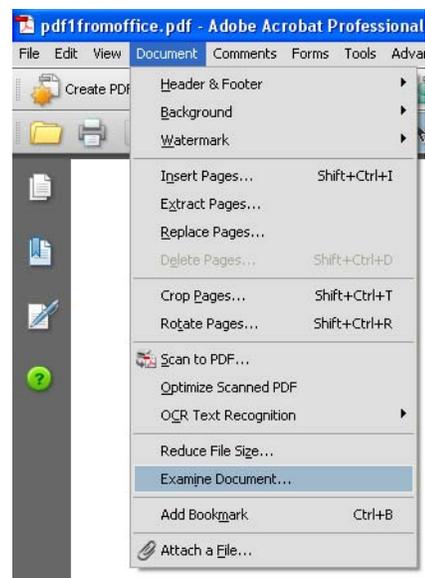
Figure 17 Document Menu

13

Check all the available options and examine the document. A sample set of results is shown in Figure 18. If hidden text was found, use the 'Preview' link to view any instances of hidden text within the document. This may include text that matches the background color or that was hidden behind an image or object. You should already have verified that such content has been removed before converting to PDF- this is a sanity check! Select 'Remove all checked items' (optionally unchecking 'Bookmarks' if you intend to manually review them) and then re-run the tool to verify that any items found have been corrected. Save the document. This document is the final distributable file.

Figure 18 'Examine Document' Interface

6 Conclusion

The new features, capabilities, and interface (including the integrated inspection and sanitization tools) change the way that users interact with Word. The redaction process presented in this document should help reduce the likelihood that hidden data, metadata, and sensitive content are hidden in the resulting file.

The use of Word's 'Inspect Document' feature and Adobe's 'Examine Document' tool are not intended to replace the redaction process, but do supplement the procedure by facilitating additional inspection and sanitization that may catch hidden data that could otherwise remain. Some of the specific benefits that may be provided include the ability to detect and remove:

- Residual Metadata
- Reviewing and commenting data
- Custom XML
- Text that matches background color or is hidden behind an object

More information about the tools are available on the respective developers' websites at https://support.office.microsoft.com/en-us/article/Remove-hidden-data-and-personal-information-from-Office-documents-c2499d69-413c-469b-ace3-cf7e31a85953?CorrelationId=f966acd6-9914-4b38-936c-c1ac936ff057&ui=en-US&rs=en-US&ad=US and https://helpx.adobe.com/acrobat.html.

References

1. *Redacting with Confidence: How to Safely Publish Sanitized Reports Converted from Word to PDF* *http://www.nsa.gov/ia/_files/vtechrep/I333-015R-2005.pdf*

Appendix B

Section 508

Section 508 Standards Guide

Section 508 Standards

Authority: 29 U.S.C. 794d.

Subpart A -- General

§ 1194.1 Purpose.

The purpose of this part is to implement section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794d). Section 508 requires that when Federal agencies develop, procure, maintain, or use electronic and information technology, Federal employees with disabilities have access to and use of information and data that is comparable to the access and use by Federal employees who are not individuals with disabilities, unless an undue burden would be imposed on the agency. Section 508 also requires that individuals with disabilities, who are members of the public seeking information or services from a Federal agency, have access to and use of information and data that is comparable to that provided to the public who are not individuals with disabilities, unless an undue burden would be imposed on the agency.

§ 1194.2 Application.

(a) Products covered by this part shall comply with all applicable provisions of this part. When developing, procuring, maintaining, or using electronic and information technology, each agency shall ensure that the products comply with the applicable provisions of this part, unless an undue burden would be imposed on the agency.

(1) When compliance with the provisions of this part imposes an undue burden, agencies shall provide individuals with disabilities with the information and data involved by an alternative means of access that allows the individual to use the information and data.

(2) When procuring a product, if an agency determines that compliance with any provision of this part imposes an undue burden, the documentation by the agency supporting the procurement shall explain why, and to what extent, compliance with each such provision creates an undue burden.

(b) When procuring a product, each agency shall procure products which comply with the provisions in this part when such products are available in the commercial marketplace or when such products are developed in response to a Government solicitation. Agencies cannot claim a product as a whole is not commercially available because no product in the marketplace meets all the standards. If products are commercially available that meet some but not all of the standards, the agency must procure the product that best meets the standards.

(c) Except as provided by §1194.3(b), this part applies to electronic and information technology developed, procured, maintained, or used by agencies directly or used by a contractor under a contract with an agency which requires the use of such product, or requires the use, to a significant extent, of such product in the performance of a service or the furnishing of a product.

§ 1194.3 General exceptions.

(a) This part does not apply to any electronic and information technology operated by agencies, the function, operation, or use of which involves intelligence activities, cryptologic activities related to national security, command and control of military forces, equipment that is an integral part of a weapon or weapons system, or systems which are critical to the direct fulfillment of military or intelligence missions. Systems which are critical to the direct fulfillment of military or intelligence missions do not include a system that is to be used for routine administrative and business applications (including payroll, finance, logistics, and personnel management applications).

(b) This part does not apply to electronic and information technology that is acquired by a contractor incidental to a contract.

(c) Except as required to comply with the provisions in this part, this part does not require the installation of specific accessibility-related software or the attachment of an assistive technology device at a workstation of a Federal employee who is not an individual with a disability.

(d) When agencies provide access to the public to information or data through electronic and information technology, agencies are not required to make products owned by the agency available for access and use by individuals with disabilities at a location other than that where the electronic and information technology is provided to the public, or

to purchase products for access and use by individuals with disabilities at a location other than that where the electronic and information technology is provided to the public.

(e) This part shall not be construed to require a fundamental alteration in the nature of a product or its components.

(f) Products located in spaces frequented only by service personnel for maintenance, repair, or occasional monitoring of equipment are not required to comply with this part.

§ 1194.4 Definitions.

The following definitions apply to this part:

Agency. Any Federal department or agency, including the United States Postal Service.

Alternate formats. Alternate formats usable by people with disabilities may include, but are not limited to, Braille, ASCII text, large print, recorded audio, and electronic formats that comply with this part.

Alternate methods. Different means of providing information, including product documentation, to people with disabilities. Alternate methods may include, but are not limited to, voice, fax, relay service, TTY, Internet posting, captioning, text-to-speech synthesis, and audio description.

Assistive technology. Any item, piece of equipment, or system, whether acquired commercially, modified, or customized, that is commonly used to increase, maintain, or improve functional capabilities of individuals with disabilities.

Electronic and information technology. Includes information technology and any equipment or interconnected system or subsystem of equipment, that is used in the creation, conversion, or duplication of data or information. The term electronic and information technology includes, but is not limited to, telecommunications products (such as telephones), information kiosks and transaction machines, World Wide Web sites, multimedia, and office equipment such as copiers and fax machines. The term does not include any equipment that contains embedded information technology that is used as an integral part of the product, but the principal function of which is not the acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. For example, HVAC (heating, ventilation, and air conditioning) equipment such as thermostats or temperature control devices, and medical equipment where information technology is integral to its operation, are not information technology.

Information technology. Any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation,

management, movement, control, display, switching, interchange, transmission, or reception of data or information. The term information technology includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources.

Operable controls. A component of a product that requires physical contact for normal operation. Operable controls include, but are not limited to, mechanically operated controls, input and output trays, card slots, keyboards, or keypads.

Product. Electronic and information technology.

Self Contained, Closed Products. Products that generally have embedded software and are commonly designed in such a fashion that a user cannot easily attach or install assistive technology. These products include, but are not limited to, information kiosks and information transaction machines, copiers, printers, calculators, fax machines, and other similar types of products.

Telecommunications. The transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received.

TTY. An abbreviation for teletypewriter. Machinery or equipment that employs interactive text based communications through the transmission of coded signals across the telephone network. TTYs may include, for example, devices known as TDDs (telecommunication display devices or telecommunication devices for deaf persons) or computers with special modems. TTYs are also called text telephones.

Undue burden. Undue burden means significant difficulty or expense. In determining whether an action would result in an undue burden, an agency shall consider all agency resources available to the program or component for which the product is being developed, procured, maintained, or used.

§ 1194.5 Equivalent facilitation.

Nothing in this part is intended to prevent the use of designs or technologies as alternatives to those prescribed in this part provided they result in substantially equivalent or greater access to and use of a product for people with disabilities.

Subpart B -- Technical Standards

§ 1194.21 Software applications and operating systems.

(a) When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.

(b) Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer.

(c) A well-defined on-screen indication of the current focus shall be provided that moves among interactive interface elements as the input focus changes. The focus shall be programmatically exposed so that assistive technology can track focus and focus changes.

(d) Sufficient information about a user interface element including the identity, operation and state of the element shall be available to assistive technology. When an image represents a program element, the information conveyed by the image must also be available in text.

(e) When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance.

(f) Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.

(g) Applications shall not override user selected contrast and color selections and other individual display attributes.

(h) When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.

(i) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.

(j) When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.

(k) Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.

(l) When electronic forms are used, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

§ 1194.22 Web-based intranet and internet information and applications.

(a) A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).

(b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.

(c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.

(d) Documents shall be organized so they are readable without requiring an associated style sheet.

(e) Redundant text links shall be provided for each active region of a server-side image map.

(f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

(g) Row and column headers shall be identified for data tables.

(h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.

(i) Frames shall be titled with text that facilitates frame identification and navigation.

(j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

(k) A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.

(l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.

(m) When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).

(n) When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

(o) A method shall be provided that permits users to skip repetitive navigation links.

(p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

Note to §1194.22:

1. The Board interprets paragraphs (a) through (k) of this section as consistent with the following priority 1 Checkpoints of the Web Content Accessibility Guidelines 1.0 (WCAG 1.0) (May 5, 1999) published by the Web Accessibility Initiative of the World Wide Web Consortium:

Section 1194.22 Paragraph	WCAG 1.0 Checkpoint
(a)	1.1
(b)	1.4
(c)	2.1
(d)	6.1
(e)	1.2
(f)	9.1
(g)	5.1
(h)	5.2
(i)	12.1
(j)	7.1
(k)	11.4

2. Paragraphs (l), (m), (n), (o), and (p) of this section are different from WCAG 1.0. Web pages that conform to WCAG 1.0, level A (i.e., all priority 1 checkpoints) must also meet paragraphs (l), (m), (n), (o), and (p) of this section to comply with this section. WCAG 1.0 is available at http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505.

§ 1194.23 Telecommunications products.

(a) Telecommunications products or systems which provide a function allowing voice communication and which do not themselves provide a TTY functionality shall provide a standard non-acoustic connection point for TTYs. Microphones shall be capable of being turned on and off to allow the user to intermix speech with TTY use.

(b) Telecommunications products which include voice communication functionality shall support all commonly used cross-manufacturer non-proprietary standard TTY signal protocols.

(c) Voice mail, auto-attendant, and interactive voice response telecommunications systems shall be usable by TTY users with their TTYs.

(d) Voice mail, messaging, auto-attendant, and interactive voice response telecommunications systems that require a response from a user within a time interval, shall give an alert when the time interval is about to run out, and shall provide sufficient time for the user to indicate more time is required.

(e) Where provided, caller identification and similar telecommunications functions shall also be available for users of TTYs, and for users who cannot see displays.

(f) For transmitted voice signals, telecommunications products shall provide a gain adjustable up to a minimum of 20 dB. For incremental volume control, at least one intermediate step of 12 dB of gain shall be provided.

(g) If the telecommunications product allows a user to adjust the receive volume, a function shall be provided to automatically reset the volume to the default level after every use.

(h) Where a telecommunications product delivers output by an audio transducer which is normally held up to the ear, a means for effective magnetic wireless coupling to hearing technologies shall be provided.

(i) Interference to hearing technologies (including hearing aids, cochlear implants, and assistive listening devices) shall be reduced to the lowest possible level that allows a user of hearing technologies to utilize the telecommunications product.

(j) Products that transmit or conduct information or communication, shall pass through cross-manufacturer, non-proprietary, industry-standard codes, translation protocols, formats or other information necessary to provide the information or communication in a usable format. Technologies which use encoding, signal compression, format transformation, or similar techniques shall not remove information needed for access or shall restore it upon delivery.

(k) Products which have mechanically operated controls or keys, shall comply with the following:

(1) Controls and keys shall be tactilely discernible without activating the controls or keys.

(2) Controls and keys shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls and keys shall be 5 lbs. (22.2 N) maximum.

(3) If key repeat is supported, the delay before repeat shall be adjustable to at least 2 seconds. Key repeat rate shall be adjustable to 2 seconds per character.

(4) The status of all locking or toggle controls or keys shall be visually discernible, and discernible either through touch or sound.

§ 1194.24 Video and multimedia products.

(a) All analog television displays 13 inches and larger, and computer equipment that includes analog television receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals. As soon as practicable, but not later than July 1, 2002, widescreen digital television (DTV) displays measuring at least 7.8 inches vertically, DTV sets with conventional displays measuring at least 13 inches vertically, and stand-alone DTV tuners, whether or not they are marketed with display screens, and computer equipment that includes DTV receiver or display circuitry, shall be equipped with caption decoder circuitry which appropriately receives, decodes, and displays closed captions from broadcast, cable, videotape, and DVD signals.

(b) Television tuners, including tuner cards for use in computers, shall be equipped with secondary audio program playback circuitry.

(c) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain speech or other audio information necessary for the comprehension of the content, shall be open or closed captioned.

(d) All training and informational video and multimedia productions which support the agency's mission, regardless of format, that contain visual information necessary for the comprehension of the content, shall be audio described.

(e) Display or presentation of alternate text presentation or audio descriptions shall be user-selectable unless permanent.

§ 1194.25 Self contained, closed products.

(a) Self contained products shall be usable by people with disabilities without requiring an end-user to attach assistive technology to the product. Personal headsets for private listening are not assistive technology.

(b) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

(c) Where a product utilizes touchscreens or contact-sensitive controls, an input method shall be provided that complies with §1194.23 (k) (1) through (4).

(d) When biometric forms of user identification or control are used, an alternative form of identification or activation, which does not require the user to possess particular biological characteristics, shall also be provided.

(e) When products provide auditory output, the audio signal shall be provided at a standard signal level through an industry standard connector that will allow for private listening. The product must provide the ability to interrupt, pause, and restart the audio at anytime.

(f) When products deliver voice output in a public area, incremental volume control shall be provided with output amplification up to a level of at least 65 dB. Where the ambient noise level of the environment is above 45 dB, a volume gain of at least 20 dB above the ambient level shall be user selectable. A function shall be provided to automatically reset the volume to the default level after every use.

(g) Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.

(h) When a product permits a user to adjust color and contrast settings, a range of color selections capable of producing a variety of contrast levels shall be provided.

(i) Products shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

(j) Products which are freestanding, non-portable, and intended to be used in one location and which have operable controls shall comply with the following:

(1) The position of any operable control shall be determined with respect to a vertical plane, which is 48 inches in length, centered on the operable control, and at the maximum protrusion of the product within the 48 inch length (see Figure 1 of this part).

(2) Where any operable control is 10 inches or less behind the reference plane, the height shall be 54 inches maximum and 15 inches minimum above the floor.

(3) Where any operable control is more than 10 inches and not more than 24 inches behind the reference plane, the height shall be 46 inches maximum and 15 inches minimum above the floor.

(4) Operable controls shall not be more than 24 inches behind the reference plane (see Figure 2 of this part).

§ 1194.26 Desktop and portable computers.

(a) All mechanically operated controls and keys shall comply with §1194.23 (k) (1) through (4).

(b) If a product utilizes touchscreens or touch-operated controls, an input method shall be provided that complies with §1194.23 (k) (1) through (4).

(c) When biometric forms of user identification or control are used, an alternative form of identification or activation, which does not require the user to possess particular biological characteristics, shall also be provided.

(d) Where provided, at least one of each type of expansion slots, ports and connectors shall comply with publicly available industry standards.

Subpart C -- Functional Performance Criteria

§ 1194.31 Functional performance criteria.

(a) At least one mode of operation and information retrieval that does not require user vision shall be provided, or support for assistive technology used by people who are blind or visually impaired shall be provided.

(b) At least one mode of operation and information retrieval that does not require visual acuity greater than 20/70 shall be provided in audio and enlarged print output working together or independently, or support for assistive technology used by people who are visually impaired shall be provided.

(c) At least one mode of operation and information retrieval that does not require user hearing shall be provided, or support for assistive technology used by people who are deaf or hard of hearing shall be provided.

(d) Where audio information is important for the use of a product, at least one mode of operation and information retrieval shall be provided in an enhanced auditory fashion, or support for assistive hearing devices shall be provided.

(e) At least one mode of operation and information retrieval that does not require user speech shall be provided, or support for assistive technology used by people with disabilities shall be provided.

(f) At least one mode of operation and information retrieval that does not require fine motor control or simultaneous actions and that is operable with limited reach and strength shall be provided.

Subpart D -- Information, Documentation, and Support

§ 1194.41 Information, documentation, and support.

(a) Product support documentation provided to end-users shall be made available in alternate formats upon request, at no additional charge.

(b) End-users shall have access to a description of the accessibility and compatibility features of products in alternate formats or alternate methods upon request, at no additional charge.

(c) Support services for products shall accommodate the communication needs of end-users with disabilities.

Figures to Part 1194

Figure 1 - Vertical Plane Relative to Operative Control

Control Area

Vertical Plane

48 in min
1220 mm

48 in min
1220 mm
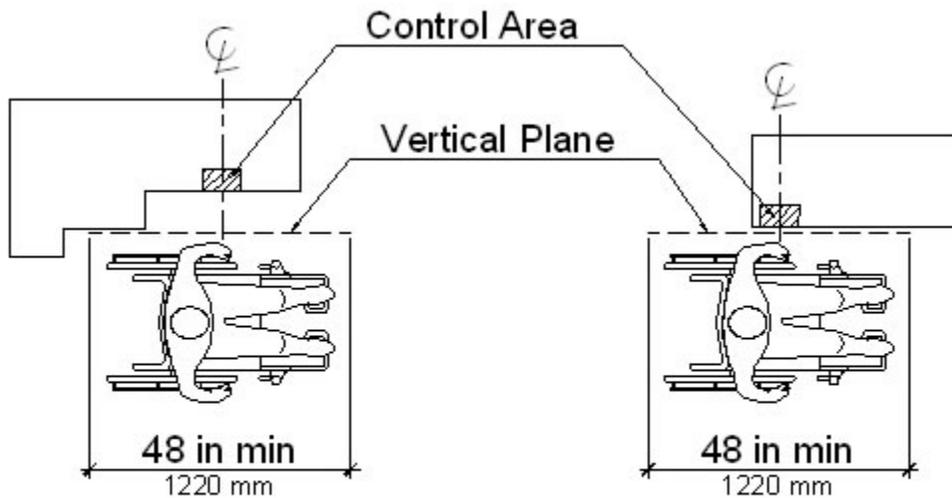
Vertical Plane Relative to the Operable Control

Figure one above illustrates two bird's-eye views of the Vertical Plane Relative to Operative Control. In both views, the vertical plane is centered on the control area. In the first view, the vertical plane is set back from the control area by a protrusion on the device. In the second view, there are no protrusions on the device and the vertical plane is right up against the control area.

Figure 2 - Height of Operative Control Relative to a Vertical Plane
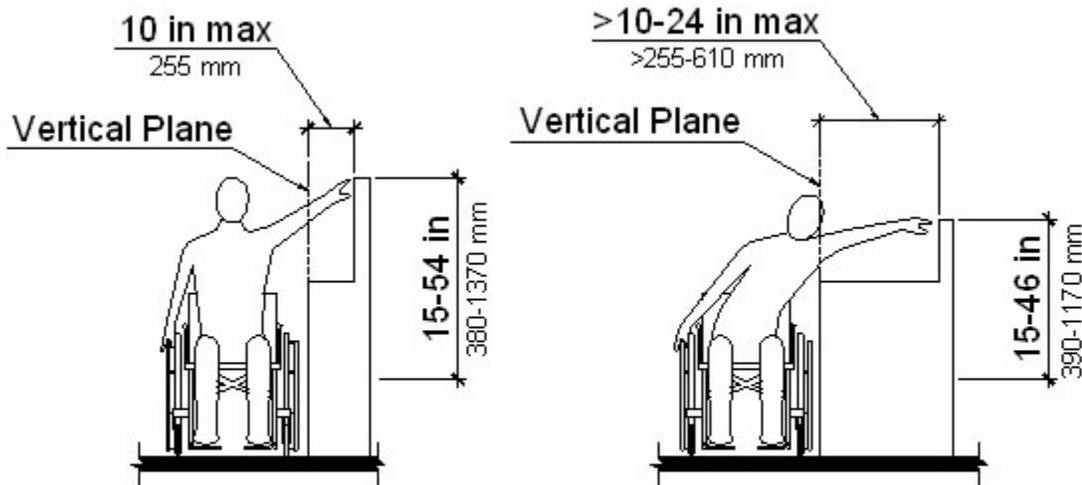
Height of Operable Control Relative to the Vertical Plane

Figure two above illustrates two front views of Height of Operative Control Relative to a Vertical Plane. The first view illustrates a reach of no more than 10 inches deep with the control area between 15 and 54 inches. The second view illustrates a reach greater than 10 inches but not more than 24 inches deep with the control area between 15 and 46 inches.

1. Section 508 does not apply to national security systems, as that term is defined in section 5142 of the Clinger-Cohen Act of 1996 (40 U.S.C. 1452).

2. The Access Board is an independent Federal agency established by section 502 of the Rehabilitation Act (29 U.S.C. 792) whose primary mission is to promote accessibility for individuals with disabilities. The Access Board consists of 25 members. Thirteen are appointed by the President from among the public, a majority of who are required to be individuals with disabilities. The other twelve are heads of the following Federal agencies or their designees whose positions are Executive Level IV or above: The departments of Health and Human Services, Education, Transportation, Housing and Urban Development, Labor, Interior, Defense, Justice, Veterans Affairs, and Commerce; the General Services Administration; and the United States Postal Service.

3. Whenever the Access Board revises its standards, the Federal Acquisition Regulatory Council is required to revise the FAR, and each appropriate Federal agency is required to revise its procurement policies and directives within six months to incorporate the revisions.

4. 48 CFR Chapter 1, part 2, §2.101 Definitions Information Technology (c).