A Professional Plain English Handbook

Writing Technical and Scientific Research Papers in Plain English

Recognizing and Correcting Common Errors Using the Principles of Plain English

This handbook is a guide that covers many of the problem areas that writers face when writing technical and scientific research papers in English.

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PREFACE

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How to use this handbook

This handbook is a guide that covers many of the problem areas that writers face when writing technical and scientific research papers in English. We employ a method of writing, called Plain English, to correct the problems that are highlighted here. The system of Plain English is explained thoroughly in the first chapter, but here, we should note that it is made up of several principles, guidelines and rules for writing English clearly, correctly and concisely. This system has been applied elsewhere to business and workplace writing applications, as well as for many professional situations for spoken applications.

Not all Plain English guidelines and rules are equally important in all fields. So, in this handbook designed for writers of technical and scientific English, we will not cover each and every principle, guideline and rule that has been developed for the system of Plain English, but rather, will focus only on those areas that are particularly relevant in the writing of a basic research report. I should also point out that in Appendix A, there is a list of all principles, guidelines and rules of Plain English, though, again, not all are referred to in this handbook. Each of these is described in much more detail in other publications.

We will look at many typical writing errors found in research reports from different viewpoints. We will see, for example, how some errors can be considered as problems of wordiness, and later, the same errors seen as problems of poor word choice, and still later, as problems of poor word order. We will see some problems that appear to be purely errors in grammar, and again the same problems as problems of style. It is important to understand that it is not necessary to attribute one problem to one specific cause, or to try to separate style from grammar; in Plain English, we assume a basis of grammaticality, but understand that differing conventions of style, and usage, can often confuse the issue. You need not, therefore, try to identify and categorize each and every error as something unique and special; likely, it is not. In fact, we will see that most problems are a result of several factors, so it is important, therefore, to consider a multitude of factors in order to be fully prepared to repair the problems.

This text is not intended for the strict grammarian, nor does it require that the reader know much about the prescriptive grammatical rules of English. Rather, we attempt to show you how to use and develop the knowledge and skills that you possess now, so that in the future you are able to write more successfully. We hope to do this by showing how a set of Plain English principles can be employed to improve the readability of your reports.

Since we will look at problem areas from many different viewpoints, it is probably best to read the entire text through, once, before attempting to use it as simply a reference guide. In some cases, important points are only made once, and will be overlooked if the reader skips from one topic to another. Also, one of the main ideas behind the system of Plain English is that all principles, guidelines and rules are interconnected, and together, they operate as system of language expression and usage, but will not be nearly as effective if each of the many different points are viewed in isolation of the others.

Once you are familiar with the book, and the principles of Plain English, then the handbook can be used as a handy reference guide for problems (and solutions) that require special attention for your particular needs. Further, in the second appendix, Appendix B, I have provided a list of supplementary resources which may be of some use to you if you wish to do further reading and preparation on the subject of writing in Plain English. Finally, in the third appendix, Appendix C, please find a "reference guide" which summarizes the basic steps for writing a research paper, followed by a brief discussion of each of the steps mentioned in the guide. This guide provides a useful overview for the three stages of developing a research paper; including preparation, writing and revision. Good luck with your writing, and I hope that you find some ideas in the handbook that will help you to write more effectively in English.

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CHAPTER ONE
PURPOSE

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Chapter 1. Purpose

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Introduction

In this hand book, I will introduce how writers can apply the system of Plain English to the task of writing a typical technical or scientific research article. In order to do this, we need to first consider what the system of Plain English is, and also, what the basic structure of a research article is.

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1.1. What is Plain English?

Plain English is a complete *system* of English usage that embodies four rigorous *principles*, which further address sixteen basic guidelines, which in turn govern eighty separate rules of usage (see Appendix A for the complete list). Due to the introductory nature of this handbook, however, we will primarily focus on the four basic principles. These four basic principles of Plain English are described in (1).

(1) The Principles of Plain English

a. Cohesiveness (unified, logical, consistent, complete, etc.)
b. Directness (clear, succinct, positive, etc.)
c. Economy (brief, uncluttered, minimal, etc.)
d. Appropriateness (polite, respectful, correct, neutral, etc.)

The *Principle of* Cohesiveness is composed of four basic guidelines. These guidelines are: (a) Conform to context (identify a target audience and write to it); (b) Be consistent (avoid shifts in tense, voice, subject, etc.); (c) Use a logical order (organize material logically, link ideas clearly, unify the text, etc.), and; (d) Avoid distractions (avoid overly simple sentences, repetition of words, and dense sentence structure). In essence, the Principle of Cohesiveness helps us to tie our ideas together into well-formed units. So, words are combined into well-formed phrases, phrases into well-formed sentences, sentences into well-formed paragraphs, and well-formed paragraphs into well-organized discussions. The Principle of Cohesiveness unifies our thoughts around a central idea, or structure, and helps us to move from one point to another in a clear and understandable fashion. It organizes our words along standard forms of writing, and helps the audience move smoothly through the various points of our discussion.

The next principle is the *Principle of Directness***.** This principle helps us to direct the audience to the pertinent information, with as little deviation as possible. There are four basic guidelines supporting the Principle of Directness: (a) State what things are, not what they seem to be (use concrete terms, avoid syntactic and lexical ambiguity, separate fact from opinion, etc.); (b) State the subject clearly (avoid ambiguity, focus on the message, avoid indirect references, etc.); (c) State the "bottom line" succinctly (avoid developing ideas that you will dismiss later), and; (d) Avoid multiple negatives (avoid negatives expressions as well as spite and sarcasm).

The *Principle of Economy* contains basic four guidelines. These include: (a) Brief is best (avoid wordiness, restatement and redundancy); (b) High frequency words are preferred over low frequency "specialty" words (use common words, avoid coining new terms, define or gloss uncommon expressions); (c) Avoid subordination (avoid reported speech and avoid subordinate conjunctions), and; (d) Discuss one point per statement (avoid run-on sentences, develop your discussion one step at a time, and avoid unrelated ideas in the same sentence). In essence, the Principle of Economy can be summarized as "brief is best." This principle helps to trim a text of unnecessary words, sentences and ideas, so that the point of focus is placed

clearly on the key elements of the message. Many of the rules governed by the Principle of Economy are also closely related to the Principle of Directness, since wordiness tends to obscure meaning and focus.

The *Principle of Appropriateness* consists of four supporting guidelines: (a) Be truthful and show politeness and respect for others (use appropriate gender references, use neutral words, avoid generalizations and stereotyping, etc.); (b) Avoid idioms and slang, especially the more obscure regional variations (avoid clichés and slang); (c) Avoid contractions and casual speech rules (avoid uncommon contractions), and; (d) Use grammatically correct sentences (keep tense and number in agreement, choose the right prepositions and avoid dangling modifiers). This principle basically guides proper usage of the English language. It gives guidelines for avoiding offensive and counter-productive writing styles, and helps to ensure an accurate use of the basic rules of English. This principle can screen out language that is unsuitable for written text, although it may be perfectly fine when spoken.

What is important to understand in this system of Plain English is that the principles provide *usage* guidelines that, if followed, will help to ensure that texts are written clearly, concisely and correctly. The essential goal is to promote a one-to-one relationship between the author's intended message, and the reader's perceived message. In order for this to happen, though, we have to recognize that not all grammatically correct sentences in English are necessarily clear, or concise. In fact, there are many "grammatical" sentences that are very difficult to understand because of vague or ambiguous words or syntax, overly long and dense sentence structures, confusing pronoun and article usage, and so forth. While there is neither the time nor the space to summarize all of the key elements in the system of Plain English in this handbook, we will highlight some of the more important principles, guidelines and rules as they specifically apply to research papers.

Before moving on to the next point, a word should be mentioned about the principles, and the approach taken to writing errors in the main sections of this book. It is important to understand that each of the principles works in consort with the others, and that it is rare when only one principle comes into play with regard to a particular writing error. Rather, as we will see in Chapters Two, Three and Four, the guidelines tend to overlap with one another, allowing us to view writing errors from multiple viewpoints. So, for example, we will see where a problem with the overuse of the passive voice (a violation of the Principle of Cohesion which makes the text difficult for the reader to easily comprehend), also likely involves wordiness (a violation of the Principle of Economy), since usually more words are required to convey a message in the passive voice than the active, and also may involve a violation of the Principle of Directness as a result of using an imprecise or vague term. As such, then, we will see some errors from alternate viewpoints throughout this text. It is important to recognize, therefore, that while each Plain English principle, guideline and rule has its own specific function, it is likely that other principles, guidelines and rules also play important roles in guiding us towards producing better results when dealing with any one target problem area.

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1.2. What is a research paper?

Essentially, a research paper is a report on research that has been conducted on a scientific or technical problem. The research is initiated by the asking of a question -- a research question -- that is then followed by an investigation which usually involves one of two approaches; (1) the analysis of actual experiments, which further requires discussion of *materials, methodologies, results, analysis*, and so forth (often referred to as *primary research*), or (2) a survey of available information, or literature review, which in most cases simply means a careful study of existing research (*secondary research*).

(2) The Two Basic Types of Research Papers

a. A Report on an Actual Experiment, or Original Investigation (*Primary Research*)
b. A Literature Review (*Secondary Research*)

While both types of papers share many things in common, and are quite similar structurally (though the literature review naturally does not have sections on an actual experiment), our main focus will be on the structure of the research paper which addresses an actual experiment (or investigation). In other words, we will concentrate mainly on developing papers that report on original investigations (reports on primary research).

Virtually all research papers follow fairly rigid formats. Sometimes these formats are determined by the governing scientific or technical organization within which the writer is operating. Similarly, journals themselves provide guidelines for the overall structure of the reports that they publish. For these reasons, it is neither possible nor necessary to attempt to suggest here exactly how to format an article for a professional journal, since there are slight variations from one field to the next, but at the same time, we can consider some of the more common aspects of the research paper's format, below, and see how the Principles of Plain English effect them. In general, most reports contain the following components, listed in (3).

(3) The Basic Components of a Research Report

a. Title
b. Abstract/Summary
c. Key Word List
d. Introduction
e. Main Body:
    e1. Background/Theory
    e2. Experiment: Materials and Methods
    e3. Experiment: Results
    e4. Experiment: Discussion
f. Conclusion
g. Acknowledgements
h. Author Biography

i. Appendices and/or Footnotes
j. References

For research papers that are primarily literature reviews, the sections on the experiment would be replaced by one or more sections which introduce and critique already existing research. Otherwise, these papers would follow the same basic formula as described above. In the ensuing chapters of this handbook, we will discuss the main text portions of the paper (sections a-f), in terms of Plain English.

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1.3. Why are you writing?

First, we need to understand that technical and scientific writing is quite different from literary writing, where scientific (and technical) writing is usually employed in a very direct, matter-of-fact style, while literary writing, on the other hand, can range widely from the very abstract and obscure, to the more literal and concrete. The main purposes of scientific and technical writing can be perhaps divided into four main groups: (a) to record, (b) to inform, (c) to educate, and (d) to participate. Let us briefly consider each of these below.

Reports that *record* are often reports on experiments that have produced results that add to the knowledge of the scientific community, and provide a basis for others to conduct further research. It is similar to using building blocks to establish a foundation. Once a block is set down, other blocks can be set on it, and so forth, so that each earlier work contributes to the ever-growing foundation of the field. Recording information is archival in nature, and documents the evolution of a field of research.

Reports that *inform* can be thought of as progress reports, and are often concerning portions of a larger body of research. They tell others what the current issues are, what the current trends are, and what the current problems are. Often, major conclusions have not yet been obtained, and are simply suggestive of directions that the researchers will take, and others might consider.

Reports that *educate*, tell us of research that we were unaware of, of solutions that we had not heard of before, and often, of both problems and solutions that we were unfamiliar with. Often, these reports attempt to persuade, or convince, others of problems that should be addressed, of solutions that should be adopted, and methods that should be followed. Still other directions in regard to the field might be to question, to criticize, to lead and to direct. In these ways, such reports are often pro-active and argumentative.

Finally, a very common purpose for many reports is just to indicate *participation* in the field. These are often for local publications, such as by professors for their own university journals, and frequently represent simply demonstrations of competence in a certain field. Such reports may of course attempt to ask and answer important scientific questions, but may be inherently limited by opportunity, funds, and other mitigating circumstances.

Rarely is any one report limited in purpose to just one of the four types mentioned above. Rather, most reports are in fact multi-purpose, where two or more of these purposes are addressed in the same paper. For writers, the important point here is the need to consider the topic well enough to be able to determine *why*, exactly, you are writing the paper, since this will obviously have some impact on *how* you write, and *what* you write. Too often, I see researchers approach the writing process blind, and as a result, may have produced an unsuccessful (unread) report. Deciding why you are writing is just one of many points to consider in order to write a successful report.

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1.4. Who are your readers?

Related to the last question, *why* are you writing, here, we consider *who* your audience is. First, you must determine the target readers' degree of familiarity with your subject. Usually, your readers will represent a range of degrees of expertise, where some readers may be very familiar with your subject, and others, not very familiar at all. It is best to target those readers less familiar with your subject, rather than more, so that you would use as a starting point information that almost anyone would know in your field, and work from that point one step at a time, to the special area of your focus. This is in effect working from the known, to the unknown, or from the familiar to the unfamiliar. This movement, from known to unknown, can be quite brief, but if omitted, will lose many potential readers. Also, even for those readers familiar with your specific topic, most will enjoy a brief review simply to refresh their memories, especially if the topic area is quite specific, unique or obscure.

Another question related to your target audience is the language issue. Since your report is being written in English, it assumes an audience both inside, and outside, Japan. Likely, there will be a large number of researchers in Japan reading your report. For this reason, your English must be clear, precise, and relatively easy to understand. As we all know, technical and scientific writing is difficult to understand in one's own native language, and even more difficult to understand in a second, or foreign language. Also, it is likely that your report will be read by other people around the world, some using English as a first language, but likely, many using English as their second or foreign language. It is therefore doubly important to make sure that the reports are written clearly, concisely, correctly and concretely.

Before you write, and while you write, then, visualize your audience. How wide is the field that you wish to address? Are you communicating with engineers, chemists, physicists, mathematicians, or...? Try to define the range of expertise for your audience. Try to imagine how much they know, how much they don't know, and how to make your points simple and understandable to them. Next, even though you have determined that most of your readers will have a certain level of understanding, not all will, so make allowances for them as well. Do not leave even the smaller readership groups completely out of your target. Sometimes it may be necessary to provide extra explanations, illustrations, etc., for some of these smaller readership groups within your overall targeted audience. This can often be done using footnotes or appendices that don't otherwise intrude upon, or deviate from, the main discussion. Finally, determine a degree of technical expertise that you intend to address, and maintain that degree consistently throughout the paper.

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1.5. What should you include?

In general, include only enough information to make your points clearly and succinctly, and no more. Treat factual information with the respect it deserves, but do not overstate the issues. The report should provide adequate background, or history, to the problem under investigation, but should not do so at the point of distraction from the main subject. It should stay focused on the main issues throughout the discussion, and should acknowledge both its range and limitations. No paper can address all issues relevant to any single problem, and to attempt to do so is distracting. It is best to stick clearly with the main theme, and when necessary, suggest where readers could look for further related information, or where questions have been left necessarily unanswered. In this way, your reader is focused on your intended message, is aware that you recognize the inherent limitations in the discussion, and has ideas of where to look for related information.

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1.6. What should you leave out?

There are two basic areas to avoid in report writing, in terms of Plain English. One is to avoid opinions, exaggerations, bias and other slanted viewpoints. Just let the facts speak for themselves, and treat them impartially as a neutral observer. The conclusions you reach as a result will be stronger, and more convincing. The other area to avoid involves taking the reader on unnecessary detours. Often we have more information available to us than need be included in our report. We must learn that economy in most cases is preferred over comprehensiveness. Sometimes in the course of research, experiments have led to incorrect or useless conclusions. While it is tempting sometimes to discuss everything we studied in the course of our investigations, such detours are usually detracting and misleading. If the discussion does not in some way positively and constructively support the main points of the report, then it is probably best to leave such discussions out.

Along these same lines, it is sometimes tempting to add an argument, or situation, which is then quickly dismissed for lack of support or evidence, in favor of the “preferred” analysis. Unless this false argument truly demonstrates the utility of the preferred solution, it is best to avoid these facades which simply get in the way of the main analysis. With these ideas concerning the targeted reader, and how to organize our discussion, let us now turn to our main task, and consider the various components of a research paper from the perspective of Plain English by observing common writing errors and their possible remedies.

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CHAPTER TWO

TITLES, ABSTRACTS, KEY WORD LISTS AND INTRODUCTIONS

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Chapter 2. -- Titles, Abastracts, Key Word Lists and Introductions

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Overview

In this first section, we look at the portions of the report that potential readers first see. These include titles, abstracts, key word lists and introductions. Each of these must be written in such a way as to *attract* the readers so that the readers will wish to read the rest of your paper. Also relevant is that first impressions often *set the tone* for the rest of the paper. If a reader is positively impressed, likely this impression will be carried through the rest of the paper, but on the other hand, if a reader begins with a negative first impression, it is unlikely the reader will overcome this “bias” and may in fact result in the early dismissal of the paper. For these reasons, each of these early components of a research paper plays an important role in the overall success or failure of your paper.

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2.1. Titles

Titles are the first, and sometimes the only things readers will see. They should be well-constructed, understandable and clear. They need not be whole sentences, and should contain one or more of the key words that define your article. Even here, Plain English can play a role. One of the Principles of Plain English, Economy, contains guidelines that combat wordiness, ambiguity and vagueness. Titles should not contain words we already can understand from context, such as “a study of”, “an investigation of”, “a report on”, and so forth. Further, the titles should make specific references, not general ones, to the topics. Let us consider the following sets of poor and good titles as an illustration. These are two different proposed titles for the two different papers.

(4) Poor Titles

a. A Report on Image Extraction Networks
b. Image Extraction Using Linear Networks and Their Implementation Using Constant Tone Techniques Based on a Modified Legion Model

The problem with (4a) is that, though short, it is too general, or broad, while it provides unnecessary information (you don’t need to tell us that it is a report). On the other hand, the title in (4b) is too long, repetitive and confusing, where it can be shortened. In the following good examples, we lengthened (4a) while restricting its scope. In (4b) we have deleted some of the unnecessary details. Both titles, as a result, have been improved.

(5) Good Titles

a. Image Extraction Networks and Tone-Pulse Modulation Techniques
b. Image Extraction in Linear Networks Using Constant Tone Techniques

Many people do article searches based on words in the title, so words should only be used if they are clearly and directly relevant to the contents of the article.

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2.2. Abstracts/Summaries

Abstracts and summaries are the next most widely read part of any paper. They usually have one of two purposes: (1) to describe, and (2) to inform. If their sole purpose is to *describe*, this is usually accomplished in two or three sentences that simply elaborates on the main topic -- a kind of extended introductory statement. However, I have seen very few of these kinds of abstracts. On the other hand, abstracts, or summaries, which *inform* are quite common. Abstracts that inform describe each of the sections of the paper in limited detail, providing a kind of general map, or outline, for the reader regarding the specific contents of the paper.

As a general rule, abstracts should be around 150 words, and usually never more than 300 words. More important than length, however, is that they should inform! What this means is that they should provide a brief, but complete, overview to the entire paper, including a reference to key findings and solutions, if any. Both the Principles of Cohesiveness (logical order, complete structure) and Directness ("state the bottom line succinctly", among others) apply here. The summary should address in a logical order the nature of the question you pursued, what you did to investigate the issue, what results were obtained, and what conclusions you drew from the investigation. Since this is reporting on a past event, you should write in the past tense, though in the discussion of your conclusion(s) (your last few sentences) you may bring things up to the present, and use the present tense.

There are two common errors often found in the abstract section; (a) the author is reluctant to reveal all, thereby forcing the reader to read the entire article in order to see if the investigation was successful or not, or what the solution was, and (b) the author treats the abstract as the introduction to the paper, which only touches on the surface of what is actually discussed.

Let us consider what an abstract for this handbook (on Plain English) would be like. First, we will start with a poor example, containing some of the common problems found in many abstracts.

(6) Poor Abstract

> This handbook deals with a study of the problem of writing scientific research papers in Plain English. The relationship of Plain English to the writing of scientific papers is an important one. Scientific papers usually follow format guidelines established by the governing body or journal which oversees the specific scientific discipline. Plain English is a system of English usage that begins with grammatically correct English and incorporates guidelines to promote the writing of English in such a way as to promote a one-to-one relationship between the writer's intended message and the reader's perceived message. (94 words)

In this poor example, we have the basic elements covered (Plain English and writing research papers), but we really have no idea of what will actually be covered in the article, and whether Plain English is helpful or not. It is also too short, and tells us nothing about how the question,

stated in the first line, is either investigated or resolved. Let us consider a revised version, below.

(7) Good Abstract.

> The system of Plain English, which guides precise usage of written English, was applied to the task of writing technical and scientific research papers. Plain English consists of four basic principles (Cohesiveness, Economy, Directness and Appropriateness), 16 general guidelines and 80 rules of implementation. These principles were applied to the writing of research papers, papers that are generally designed to report on the results of research investigations, specifically for the professional writer of English. Each of the major sections of the research paper was reviewed, from the title to the conclusion, with poor examples, representative of problems common to many research papers considered, and corrected, using the Principles of Plain English. Ultimately, it is shown that Plain English can play an important role in the writing of technical and scientific research papers that will ensure maximum readability on the part of the targeted audience. (144 words)

Though our model abstract is still a bit short, and not necessarily “perfect”, it covers most of the points raised above, and is suitable for a general handbook such as this.

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2.3. Key Word Lists

Most journals require that a list of key words be included following the abstract. Generally, the key "words" may in fact be words or short phrases (which really should be limited to just two or three words, if possible), and should usually be restricted to four or five separate entries. These expressions should be very directly related to the main points of your article. They should be both specific and representative, and contain mostly nouns rich in content. Here too, let us consider poor and good examples of what a key word list would look like for this article.

(8) Poor Key Word List for "Writing Technical and Scientific Research Papers in Plain English"

1. Principles of Plain English
2. Cohesiveness, Directness, Economy and Appropriateness
3. Scientific and technical papers
4. Good and bad examples
5. Revision

The above key word list contains too many words overall, and some words are too general to be of any use ("good and bad", for example) and too specific to be helpful ("Cohesiveness, Directness, Economy and Appropriateness"). Let us look at a revised list.

(9) (Good) Key Words for "Writing Technical and Scientific Research Papers in Plain English"

1. Plain English
2. Writing research papers
3. Scientific, technical English
4. Readability

Note that the good examples overlap somewhat, but cover all of the basic topics that the paper is directed towards. Note also that the title contains the first three of the five "key words", reinforcing a point made earlier about titles, which should contain one or more of the key words (or phrases) of the ensuing discussion.

2.4. Introductions

The introduction to a research report is very important, and should accomplish at least 5 specific goals. The introduction should (1) begin with an introductory statement that introduces the main idea, and what new or unique perspective is going to be pursued in the paper; (2) state the question, or problem, that is being investigated, and it should do so from the very first sentence, or at least the first paragraph; (3) provide a very brief overview of the problem, and the relevant research that led up to the present investigation; (4) provide a quick summary of each of the sections that are found in the paper, and; (5) highlight the key conclusions elicited from the investigation. The first of these aspects of the introductory section, concerning the introductory statement, will be discussed in some detail below.

2.4.a. Introductory Statements: Introductions to Papers

An introductory statement, usually the first sentence in the introduction, introduces the main idea, or point, under investigation, and the specific, or unique view that is adopted in regard to this main point. Let us look at a poor example of the introductory statement.

(10) Poor Introductory Statement.

> How to establish a network is explained here.

This takes the Principles of Economy and Directness to the extreme! It doesn't, however, tell us what kind of network is being investigated, or why. Both Economy and Directness would require more precise terminology, and more elaborate phrasing.

(11) Good Introductory Statement

> In this paper, we discuss how PC networks can be established so that positional information can be transmitted to designated receivers.

Relevant Plain English Rules: ***17***

Also, some authors treat the introduction simply as a continuation of the abstract. Or, similarly, many treat the abstract as if it were the introduction, and they use the introduction to begin their argument. In fact, some actually start their argument, beginning with an equation, from the very first sentence.

(12) Poor Introductory Statement

> Let $E=MC^2$, where mass is measured in […].

This violates the Principle of Cohesion, and misrepresents the purpose of the introduction completely. We cannot offer a revision of this introductory statement since it is in fact a statement in mid-discussion, and should be preceded by an adequate fully explanatory introductory statement. Below is a similar example for purposes of illustration, where the poor introductory statement seems to be written as if it were much further along in the discussion than it should be as the introductory statement of the paper.

(13) Poor Introductory Statement

> "Let *C* be an (*N*,*K*) binary linear block code and let *VN* be the set of the *N*-tuples over GF(2)."

We have corrected the introductory statement, below, by offering a prequel to the statement listed above.

(14) Good Introductory Statement

> In this paper, we present an algorithm to compute the weight distribution of coset leaders for a code with smaller memory, although the time complexity may be larger.

Relevant Plain English Rules: ***17***

Note that in this last example, we had to change the content of the statement significantly in order for it to serve as an adequate introductory statement. The information used, of course, was based on the main points discussed in the article.

While we return to the issue concerning proper citations of resources in another section, below, let us observe an example here of how this problem can be corrected, an example which actually addresses two problems of reference.

(15) Poor Introductory Statement

> Recently, VTS [1], which aims at reducing white noise rates, has been successfully implemented.

One problem with (15) is that it assumes the reader knows what "VTS" stands for, and, as pointed out above, it also uses a reference that contains no useful associative information ("[1]") -- both are inappropriate from the standpoint of Cohesiveness, certainly, at least, in the introductory statement. In substantiating, or supporting, points in the discussion, it is best not to assume the reader knows everything, and even if he or she does, you should make it easier on the reader by providing a reminder at least when new or unusual terms are first introduced. Also, in the introduction and elsewhere, it significantly slows the reader down if you use abstract citation references, with no useful semantic or referential content. Let us see a revised version of (15).

(16) Good Introductory Statement

> We were able to successfully implement the Voice Transfer System (VTS), first proposed by Suzuki, 1999 ([1]), which aims at reducing white noise rates.

Relevant Plain English Rules: ***17, 33***

Note the following set of examples for further illustration.

(17) Poor Introductory Statement

> "Recently, ITS [1], which aim at making safety, pleasant, and efficient transportation by solving traffic accidents, traffic jam, environmental pollution, and energy problems, have attracted the attention of the world."

(18) Good Introductory Statement

> Recently, Intelligent Transport Systems, ITS (Bender, 1991, [1]), which aim at making transportation safe, pleasant, and efficient by solving the problems of traffic accidents, traffic jams, energy shortages and environmental pollution, have attracted the attention of the world.

Relevant Plain English Rules: ***17, 33***

A final alternative to handling the distraction of references in the introduction is more economical, and that is to simply delete them, and focus on the main idea discussed in the body of the paper.

2.4.b. Introductory Statements: Introductions to sections and paragraphs

Elsewhere in your paper (beyond the first statement in the introduction), introductory statements are found at the head (beginning) of every paragraph. They similarly introduce to the reader what the paragraph (and/or section) will be about, and should include reference to the main points, and how these points will be viewed. As such, they begin a thought, and should not therefore look as if they are simply continuations of the previous discussions (though of course transitions are important, as we will note below). To illustrate this, in the following poor example, the introductory statement uses "this" which refers to previously stated information, which should be avoided (in the first sentence of a new paragraph). Words that ambiguously refer to previously discussed information, particularly pronouns ("it", "they", "this", "these", etc.) should be avoided in most introductory statements.

(19) Poor Introductory Statement

> "*This* test chip consisted of 64 x 64 cells, two base generators […]."

(20) Good Introductory Statement

> Our test chip consisted of 64 x 64 cells, two base generators […].

Relevant Plain English Rules: ***17, 16***

Below is another set of examples of introductory statements taken from elsewhere in the text (not from the introduction) where most of the same points discussed above still hold true, though here, the statement's scope is limited to just a single paragraph (or a section).

(21) Poor Introductory Statement

> "How to reboot is explained here."

This last poor example has very little useful information, and therefore ignores the basic role of the introductory statement which is to introduce the main idea of the paragraph, and the point of focus. We don't know what is being "rebooted", nor why.

(22) Good Introductory Statement

> We now discuss the reboot conditions in the PC scheme so that the original default information is transmitted to the receiver.

Relevant Plain English Rules: ***17, 16***

We will return to the idea of introductory statements, particularly as they are used in paragraphs and sections elsewhere in the discussion (beyond the introduction) in other portions of this handbook, as they play a central role in providing adequate transitions from one paragraph to another, and from one section to another. For here, though, it should be sufficient to summarize that introductions play a key role in any research paper, and should introduce the subject, provide a brief background to the problem, and give a general overview of the rest of the paper, including thehighlights of key findings. Introductory statements, the first sentences a reader sees in the main discussion of the paper should be attractive and inviting. They should inform and interest the reader, and they should not contain distractions that would otherwise send the reader anywhere else but to the following sentence.

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2.5. Introductions: Organization and Overview

Introductions play three important roles in any paper. First, they should *attract the reader's attention*. They should compel the reader to want to read further. This is often difficult in a research paper, but some attention to this idea should be given. Opening statements may be provocative, controversial, challenging or thought-provoking. They should not be dull and lifeless, however, nor should they appear to be in mid-discussion. If your subject is important and interesting enough to write a paper about, you must appeal to the readers' interests in such a way as to draw them into your report. Second, an introduction should *clearly state the main topic*, or thesis, of the report, as well *as the point of view* that you are taking towards this topic. It should tell the reader specifically what question is being addressed, what hypothesis is being tested, or what problems are being resolved. To this end, as mentioned above, it should also give the reader an indication of the answers, the results, and the conclusions that you have developed as a result of your investigations (see Appendix C, Step 2, for further discussion of the basic research question, or statement). Finally, an introduction should *tell the reader specifically what will be covered in the paper*, and in what order, giving the reader a section-by-section guide to the rest of the paper.

In dealing with this last point, unnecessary abbreviations should be avoided; too often I have seen “Section”, abbreviated to “Sect.”, where the savings is just two type spaces! The resulting abbreviation is both unattractive and unnecessary. Below, and throughout the text, please note that we have not repeated the entire text of the overview, and have instead using the brackets, “[...]”, to indicate deleted content.

(25) Poor Overview

> This paper is organized as follows. In Sect. 2 we briefly review […] In Sect. 2, we briefly review […] In Sect. 3. […] are briefly reviewed. In Sect. 4, we review briefly […] Finally, the conclusion is given in Sect. 5.

The above overview suffers from repetition (a violation of Cohesiveness), as well as needless abbreviations (also a violation of Cohesiveness). Further, this form of an overview, though quite common, is not all that useful, particularly since it does not suggest in any way what the actual conclusions are?it simply tells us where to find them, which we know already.

(26) Better Overview

> This paper is organized as follows. In Section 2, we briefly review […] In Section 3, we consider […] In Section 4, the results of our study are presented, dealing with […] In Section 5, we offer a new analysis regarding […] Finally, in Section 6 we conclude by noting that [...].

Relevant Plain English Rules: ***32, 31, 2***

Other problems in the introductory section have to do with length and relevance. Too

many authors seem to think the introduction is the *background*, or *history* section. While it is perfectly fine to deal with some of the earlier analyses that relate to the present topic in the introduction, it should not detract from the main purpose of the introduction, which is to set a course for the reader regarding what will be considered, why, and in what order. If a lengthy historical discussion is necessary, it should be set apart from the introduction in a following section devoted specifically to that purpose (a section on the background, or history of the problem).

Even in this section of the report (the "overview" of the paper), which follows a fairly routine formula, every statement must have some useful information to convey. In this last example of this section, very little content of any value is offered.

(27) Bad

> "Finally, the paper *is concluded with some remarks*."

While this statement obviously comes at the end of the overview in the introduction, and naturally addresses expected territory, it must tell us something of value, which it does not. The "good" example, though not perfect, offers a slight improvement over the original.

(28) Good

> Finally, in Section 5, we summarize our findings and suggest possible directions for future investigations.

Relevant Plain English Rules: 33, 34, 24

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Japanese

2.6. Introductions: Citations and References

We have already introduced this topic above, but it deserves special mention in its own right. While many journals specify how to format reference citations, it is wrong to think that these guidelines are necessarily sufficient for the reader to read and *understand* the text easily. Such guidelines are *designed to ensure that proper credit has been given to the original authors*, but are *not designed necessarily to encourage or ensure readability*. So, I advise that of course you should follow the guidelines of the specific journal in dealing with references and citations, but, certainly in the introductions at least, some additional help can be given the readers, as illustrated in the following examples.

(29) Bad

> "Wireless network systems introducing both of the cellular concept and the ad-hoc concept have been proposed [6], [7]."

Keeping in mind that we are looking at a statement taken from the introduction, let us put ourselves in the reader's shoes. We have just started reading a new article, and immediately, we come to the numerical references "[6],[7]". It is virtually impossible for us to guess what these references might refer to, so, in order to proceed, we must then go to the reference page, and look up the information. Over time, if these citations are repeated, we may be able to remember, or associate, the key information with the numerical references. However, for their first introduction, a little bit of help would be very useful, as indicated in the following good example.

(30) Good

> Wireless network systems introducing both the cellular and the ad-hoc concept have been proposed (Suzuki, 1993 [6], Aoki 1999 [7]).

Relevant Plain English Rules: ***71, 72***

Print

Japanese

2.7. Introductions: Background versus History

Many writers seem to have a difficult time differentiating between the purpose of the introduction, and the possible separate sections of background or history. An introduction should provide only the briefest of background or historical information, just enough for the reader to understand where the current research fits into the continuum of investigations on the subject. If extensive historical or background information is necessary, then a separate section should be written, usually just following the introduction. Many authors have combined the introduction with an extensive background or historical discussion, and as a result, have discouraged many readers from pursuing the article any further. It is necessary to break the text up into logical sections, where each section plays a clearly defined role in the overall paper. An introduction should introduce the subject, while a section on the background, or history, should provide the necessary foundations upon which the present research was undertaken. The introduction should only very briefly cover these preliminary issues.

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CHAPTER THREE
MAIN BODY: GENERAL WRITING GUIDELINES

Contents

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Overview

In this chapter we cover a few of the most common usage problems, including those involving articles, repetition, wordiness and redundancy, merging of mathematics expressions and English, and passives. Since our purpose here is not to provide a comprehensive guide to usage errors found in research papers, but rather simply an introduction to such errors, and how the Principles of Plain English may be relevant in their revision, we will only consider a few representative examples of each of the most common types of errors found in the main body of the text.

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3.1. Cohesion

As noted earlier, The *Principle of Cohesiveness* is composed of four basic rules. These rules are: (a) Conform to Context; (b) Be Consistent; (c) Use a Logical Order, and; (d) Avoid Distractions. In this section, we will look at violations of some of the more noticeable areas of English usage, and provide explanations involving the rules governed by the Plain English Principle of Cohesiveness in overcoming them. One of the most frequently misused parts of English involves the articles, so we begin with them here.

3.1.a. Using Articles

Articles (or determiners), specifically “a”, “an” and “the”, are the most frequently misused parts of English sentence structure. The usage of these articles is governed by the Principle of Cohesiveness in Plain English, which provides a few basic guidelines for proper usage. There are many kinds of observed errors involving articles, including using them when they should not be used (such as in general statements), using the wrong ones (such as “the” for “a”, and vice versa), or not using them when they should be used. We will look at each type of misuse below.

3.1.a.i. When not to use articles: General statements and “mass” nouns

First, in general statements, which often characterize the observations made in a scientific report, articles are *not* used, since general statements are usually in the plural. Many errors occur when writers attempt to write general statements by using singular references. Note the following examples.

(31) Poor Examples of General Statements

a. Therefore, to avoid *the* deterioration [...].

b. The white noise filter absorbs *a* motion information [...].

In both cases, above, these general statements can be improved by simply deleting the articles.

(32) Good Examples of General Statements

a. Therefore, to avoid deterioration [...].

b. The white noise filter absorbs motion information [...].

Relevant Plain English Rules : ***15***

Below are several more pairs of examples where articles should be omitted, due to the general nature of the statements.

One of the most difficult aspects of proper English usage, and one of the most common problems found in the IEICE articles was the improper use of articles in making general statements that involved “mass”, or “non-count” nouns. Note the following examples. We will look at other misuses of articles below.

(33) Bad

a. “Therefore, to avoid *the* degradation [...].”

b. “3D filters are efficient for removing *an* additive noise [...].”

c. “The Video-DDWA filter has *a* motion information as the [...].”

In the first sentence, a general condition is being described, so articles are not necessary--this is like our first examples, above. In the second of the three bad examples, however, we see “an” used with “additive noise”, but as “noise” is not “countable” it can’t be modified by “an”. Nouns that are not countable (mass nouns), such as “oil” or “sugar” of course can‘t have “one” (as in “an oil/one oil”), as opposed to countable nouns such as “apples” (as in “an apple/one apple”). Finally, in the third example, we have a similar problem as in the second, where “information” is a mass noun, so no articles are necessary.

(34) Good

a. Therefore, to avoid degradation [...].

b. 3D filters are efficient for removing additive noise [...].

c. The Video-DDWA filter has motion information as the [...].

Relevant Plain English Rules : ***15***

The following is another problem with the mass/count noun distinction.

(35) Bad

“In the systems with only one microphone, extracting a speech form from *a* speech degraded by additive background noise requires the use of SS method.”

This is a simple example of incorrectly using an article with a “mass” noun (“speech”).

(36) Good

In the systems with only one microphone, extracting a speech sample from speech degraded by additive background noise requires the use of the SS method.

Relevant Plain English Rules : ***15***

Below are several more examples of sentences that have articles that are not necessary.

(37) Bad

> "We have found all *the* four weights of coset leaders by only generating five pairs [...] without generating all the 16 pairs."

In this case, we might place "the" before "weights", as in "all four of the weights", but in the interest of economy, and because this is a general statement, this isn't necessary. Notice, however, that we do need "the" before "coset" because this is a specific entity (see discussion below, on using "the").

(38) Good

> We have found all four weights of *the* coset leaders by generating only five pairs [...] without generating all 16 pairs.

Relevant Plain English Rules : ***15, 37***

Next, we see a similar problem.

(39) Bad

> "In the following, due to *the* space limitation, we mainly focus on the differences between the proposed algorithm and the original Wong-Liu algorithm."

This example is a good illustration of the problem in general statements. Usually, such statements require the subject nouns in the plural, and as such, does not need an article.

(40) Good

> In the following, due to space limitations, we mainly focus on the differences between the proposed algorithm and the original Wong-Liu algorithm.

Relevant Plain English Rules : ***15, 27, 76***

(41) Bad

> "If *the* larger generations of checkpoints are frequently executed, *the* larger overhead for them will be incurred."

This is a clear case of general statements where articles are not desirable.

(42) Good

> If larger generations of checkpoints are frequently executed, larger overhead for them will be incurred.

Relevant Plain English Rules: ***15***

In this next example, we have multiple uses of articles that should be avoided.

(43) Bad

"This paper describes a new approach to the digital watermarking of motion pictures...which intends to enhance *the* error detection ability. The conventional method lacks not only *the* detection ability but also *the* compatibility with vision decoders widely used today."

The italicized articles, above, all can be omitted. This is because they are used in general statements, such as "apples are good for you", and should not be referred to as specific instances, or occurrences, of the items in focus. Also, "intends to enhance" is wordy and has been reduced to "enhance".

(44) Good

This paper describes a new approach to the digital watermarking of motion pictures... enhances error detection ability. The conventional method lacks not only detection ability but also compatibility with vision decoders widely used today.

*Relevant Plain English Rules : **15, 57***

For another look at the improper multiple use of articles in general statements, let us consider the following.

(45) Bad

"In the encoder *the* check marker embedding can be a promising key technology of *the* error detection. *The* check marking is to embed [...] and hence it causes *the* picture quality degradation [...]."

As in the last example, the italicized articles can be omitted because they are used in general statements.

(46) Good

In the encoder check marker embedding can be a promising key technology for error detection check marking is to embed [...] and hence it causes picture quality degradation [...].

*Relevant Plain English Rules: **15***

In the following example, there are two different problems with articles.

(47) Bad

"Assuming that the background noise is represented as generated by exciting a linear system with *a* white noise, then we can reconstruct the background noise from the prediction error signal by estimating the transfer function of noise generation system."

This last example actually contains two problems with articles. The first treats noise as countable noun, which it is not, so "a" should be omitted. The second should recognize "noise generation system" as a specific known entity, and as such, requires the definite article.

(48) Good

We can reconstruct the background noise, assuming that it is represented as being generated by exciting a linear system with white noise, from the prediction error signal by estimating the transfer function of *the* noise generation system.

*Relevant Plain English Rules : **15**, **6**, **5***

We conclude this first portion on article misuse, involving when not to use articles, with a poor example that has two possible solutions.

(49) Bad

"By adopting the CMI for the same code of (15, 17), the upper bound shows *the* improvement of 0.5dB and the simulation results show the improvement of 0.3dB."

In this last example, the definite article "the", should either be changed to the indefinite article "an", or it should be omitted.

(50) Good

By adopting the CMI for the same code of (15, 17), the upper bound shows improvement of 0.5 dB and the simulation results show improvement of 0.3 dB.

(or)

By adopting the CMI for the same code of (15, 17), the upper bound shows *an* improvement of 0.5 dB and the simulation results show an improvement of 0.3 dB.

*Relevant Plain English Rules: **15***

3.1.a.ii. Inserting articles where they have been omitted

Sometimes, articles are omitted when they should be included. The remedy here is just to follow one of two basic rules. Use the indefinite article, "a" or "an", when the noun which is being modified is unspecific, previously unknown or unimportant; it may be "any one of many". On the other hand, use the definite article, "the", when the noun being modified is specific, known or important; it is "a particular one of possibly many".

(51) Bad Example of Omitted Articles

This paper describes new way to handle IT network [...].

In this last example, there are two omitted articles, one before "new" and the other before "IT". In the latter case, you have a choice of using "an" if any IT network is applicable (not "a"), or "the" if a specific one is referred to.

(52) Good

This paper describes *a* new way to handle *the* IT network [...].

Relevant Plain English Rules: ***15***

Consider another example of an omitted article.

(53) Bad

> "Because the outline is to be closed, blocks situated in one-block wide structure are passed twice or more."

This is another example where an indefinite article needs to be added to the text.

(54) Good

> Because the outline is to be closed, blocks situated in *a* one-block wide structure are passed two or more times.

Relevant Plain English Rules : ***37, 15***

(55) Bad

> "The function *h(x)* is called *switching function* in this paper and satisfies the following relationship; [...]."

Similar to the last example, we need to insert an indefinite article before the noun, or noun phrase, in focus.

(56) Good

> The function *h(x)* is called *a switching function* and satisfies the following relationship; [...].

Relevant Plain English Rules : ***15, 56***

(57) Bad

> "As effective query vectors, let us introduce V1, V2, and V3, which will respectively be used to determine whether a term dS is odd number or even [...]."

This is a relatively straightforward example where we have indefinite nouns which require the addition of the indefinite articles, "an".

(58) Good

> As effective query vectors, let us introduce V1, V2, and V3, which will respectively be used to determine whether a term dS is *an* odd or *an* even number [...].

Relevant Plain English Rules: ***15***

(59) Bad

> “However, in case that the Signal to Noise Ratio (SNR) is low, the DSP-PLL can not pull in the frequency offset and the phase offset [...].”

It is difficult to determine whether the error in the bad example is caused by simple article omission, or a misuse of the phrase “in case”. Whatever the cause, “case” in this context is a noun that requires an article.

(60) Good

> However, in *the* case that the Signal to Noise Ratio (SNR) is low, the DSP-PLL can not pull in the frequency offset and the phase offset [...].

Relevant Plain English Rules: ***15***

Since the misuse, through omission, of articles and the noun “case” was common, I have included two more examples here.

(61) Bad

> a. “In case the bit rate of the modulation signal [...].
>
> b. “In case the average and the variance [...].”

In both “cases”, the definite article is necessary. Think of “case” as “situation”, such as “in the situation where positive results outnumber negative ones...”.

(62) Good

> a. In *the* case that the rate of the modulation signal [...].
>
> b. In *the* case where the average and the variance [...].

Relevant Plain English Rules: ***15***

In this next example, we see the first occurrence of the confusion over how to use the word “above”. Here, we look at it from the viewpoint of article usage, while in other sections we will take different perspectives. (Please note that in the next example, and throughout the rest of the text, mathematical equations, such as “2 + 2 = 4”, have been replaced by the expression [*equation*], for the purposes of both clarity and brevity.)

(63) Bad

> “From above considerations, the [*equation*] is composed of the narrow band signal and the wide band signal.”

The error in this statement may be as a result over the confusion of how to use “above”, or it may be due to solely problems with article usage. Think of “above considerations” in this context as substituting for a larger statement such as “the considerations presented above”,

and as such, treat it as a noun phrase (specific), and use the definite article.

(64) Good

> From *the* above considerations, the [*equation*] is composed of the narrow band signal and the wide band signal.

Relevant Plain English Rules: ***15***

Finally, in this portion of when to insert articles that have been omitted, we come to a situation that involves acronyms. Acronyms are abbreviations, such as FYI, which stands for "for your information", and are usually made from combining the first letters of each word in the target phrase. These are specific, known nouns, and as such, require the definite article, as is demonstrated in the following pair of examples.

(65) Bad

> "BBS method can estimate the noise level without voice/voiceless section detector, at an expense of increase in computation load."

(66) Good

> *The* BBS method can estimate the noise level without a voice/voiceless section detector, at the expense of increase in computation load.

Relevant Plain English Rules: ***15***

3.1.a.iii. Wrong article choices

Sometimes, however, articles get entangled with phrases and end up misused as a result. While I observed many situations (in the IEICE papers) where the definite article was used, when the indefinite one should have been used, and vice versa, I include just a few representative examples here, since the rules of usage are identical to those stated above in our other sections on article usage. We will then conclude this section by looking at a common related problem concerning the words "another" ("an other"), and "the other".

(67) Bad

> "In this scenario, block cipher designers must prove the MDCP is enough small, as *the* security evaluation against differential cryptanalysis."

Here, we see the definite article replaced below with the indefinite. The reason for this is that it is likely the "security evaluation" is not a single, one time, isolated event, but rather, something that is performed repeatedly, and as such, is just "one of many", and should therefore be modified with an indefinite determiner.

(68) Good

> In this scenario, block cipher designers must prove the MDCP is small enough, as *a* security evaluation against

differential cryptanalysis.

Relevant Plain English Rules : ***15, 37***

The following is a simpler example of the indefinite article replacing the definite article, as well as problems with the expression “which is open”. The reason the indefinite article, “a”, is used is because it refers to the origin of the “question”, which, since it would be the first mention of it, would be (previous to that) unknown, and as such, unspecific, or indefinite. After it was first raised, it then becomes specific, and would require the use of the definite article “the”.

(69) Bad

“This paper is concerned with *the* question which is open since 1986.”

(70) Good

This paper is concerned with *a* question first raised in 1986.

Relevant Plain English Rules : ***15, 37, 76***

We know consider a few examples concerning “another” and the misuse of articles.

(71) Bad

From *the* other point of view, procedural view point, local networks [...].

Here, we have an interesting use of “the other” for the word “another” (“an” + “other”), also, there is awkwardness as a result of repetition (a violation of Economy). These have been repaired in the following sentence. Note that in this situation, we have chosen to negate the problem with “the other/another” by shortening the sentence (deleting it) in the interest of economy.

(72) Good

From the procedural view point, local networks [...].

Relevant Plain English Rules: ***15***

In the next set of examples, we take the direct route, and replace “the other” with “another”.

(73) Bad

“From *the other* point of view, industrial view point, logic circuits in actual products should not contain so much logical redundancy to guarantee high testability of the circuits.”

Note that we have also corrected a problem involving “much”, a term so often misused that it has its own section, which is presented elsewhere below.

(74) Good

> From *another* point of view, the industrial view point, logic circuits in actual products should not contain a significant amount of logical redundancy in order to guarantee high testability of the circuits.

*Relevant Plain English Rules : **15, 5, 37, 33***

While there are many more examples of misused articles that could be discussed here, let us conclude by observing the three main points suggested above; (1) write most generalizations in the plural form, with no articles, (2) use the indefinite articles, “a” or “an”, before nouns that are unknown, unimportant and unspecific, and (3) use the definite article, “the”, when the nouns are known, important and specific.

3.1.b. Dense Text

Dense text refers to text that has no paragraph breaks, and continues through several different thought groups, while often merging complex expressions and equations into the text. Dense text can also be sentences that are too long, and contain too many dependent and independent clauses, to the point that the reader can not follow the argument easily. In both cases, we want to make it easier for the reader to understand what we wish to communicate, so we want to take measures to avoid dense text. We will look at both types of problems below, beginning first with some discussion concerning how to deal with the merging of mathematical expressions and English grammar.

3.1.b.i. Problems with the Merging of Mathematical Expressions and English

In this section we will present two examples of a problem that can be found in many scientific research papers that deal with mathematical, or algebraic, equations. Namely, some writers consider the syntactic rules of English grammar and the syntactic rules of algebraic equations to either be on a par with one another, or to have no discernible division between the two. As a result, equations often get merged inextricably with the written word, making for very difficult and tedious reading.

As an example, suppose we take a simple equation such as the following: “two plus two equals four”. Even though this is a very simple mathematical expression, in prose, it looks quite confusing?imagine how it would be if the expression were truly complex, as most engineering expressions are? We suggest here to give a prose description of the mathematical expression, and the mathematical equivalent, and to keep the two separate. For our simple example, we could do this in the following way: “…two plus two equals four (2 + 2 = 4)…”, but for longer and more complex expressions, it is best to split the forms of expression up. A good rule to follow here (guided by the principle of Cohesion) is a simple one; separate equations from the written text by using numbered formulas, offset by spaces before and after the indented formulas. This will allow the mathematicians amongst us to be able to scan the equations easily, and the rest of us to read the text (argumentation), just as easily.

(75) Bad. Equations Merged with Text.

> A tri-set over a non-empty set NES is a function T: NES => IN, i.e., for each *nes* < NES, T(*nes*) denotes

the number of occurrences of *nes* in T [...].

The passage on which the bad text is loosely based actually continues on in this manner for several dense paragraphs! This kind of writing style has merged algebra with English in such a way as to render both rather difficult to read, thereby violating the basic tenets of Plain English. What we should see is a general description of the equation in prose, and a clearly delineated equation listed apart from the prose, something like the following (this is not an actual equation, just an illustration).

(76) Good. Equations Separated from Text.

In the following figure, we have a tri-set (T) over a non-empty set (NES), where there are repeated occurrences of NES, represented as *nes*. The number of occurrences of *nes* is denoted by the formula of T times *nes*. Please note the following.

(1) T: NES => IN (where *nes* < NES; T(*nes*) = #T/NES)

*Relevant Plain English Rules : **67**, **65**, **68**, **55***

For illustration purposes, the point of the last example is to show that equations first need to be generally explained, and then written, separate from the English prose, so that maximum clarity is achieved. In some cases this explanation may follow the equation, but usually it precedes it. Let us consider one more example, below.

(77) Bad

"The *i*-th checkpoint is generated as soon as the total operation time since the (*i*-1)st checkpoint reaches the length Si(*i* = 1,2,...)."

The problem here is one of logical inconsistency. Is this a mathematical expression, or is it an English sentence? It really should be clearly one or the other. While I have attempted to rewrite this example into intelligible English prose, the question still remains as to whether this should be written in a sentence format at all, as opposed to a purely mathematical equation.

(78) Good

The checkpoint, *i*-th, is generated soon as the total operation time since the checkpoint, (*i*-1)st, reaches the length, Si(*i* = 1,2,...).

*Relevant Plain English Rules : **68**, **23**, **18***

As noted, above, the "good" example is still not the best solution. If this could be made into an equation, and separated from the text altogether, it would be better still. I conclude this brief section by emphasizing the importance to clearly separate English prose from mathematical equations--not to do so unnecessarily diminishes the overall readability of the text significantly, and is quite distracting.

3.1.b.ii. Controlling overly long statements

Overly long sentences represent another example of “dense text”, which makes it difficult for the reader to understand our intended message. It is a little simpler combating this problem, and essentially becomes one of where to insert sentence breaks, and perhaps, where to introduce appropriate transition, or linking, terms.

The following is one sentence similar to many others in a fairly well written paper. It is problematic for two reasons. One is because the sentence is simply too long, and is nearly impossible to comprehend as a result. The other is that it is an illustrative example of how mathematical syntax and language grammar have been merged to form a rather complicated syntax of its own, a problem discussed in the last section. This is to be avoided in the interest of clarity of expression and understanding.

(79) Bad

> “Namely, we will represent the maximum delay $d(v,0)$ ($d(v,1)$) spent for transmitting logic value 0 (1) from a primary input to terminal v by the longest path length $d(v0)$ ($d(v1)$ from a source to 0-vertex (1-vertex) of terminal v, where the longest path length $d(x)$ from a source to vertex x is the maximum sum of weights of edges on a path from a source to x.”

While it is easy to point out what is wrong with the bad example, it is less easy to provide a solution. Let us start with the problems. First and foremost, the single sentence is much too long (with more than sixty “words”!--the usual sentence has between twelve and twenty words), and the obvious solution is to break it up into more manageable chunks. The second problem, noted above, is the integration of mathematical formulas into the sentences as if they are interchangeable systems, which they are not. When possible, it is best to simply write these formulas as formal equations and set them apart from the main discussion. While I cannot suggest how to write the formal equations here, I will at least suggest how the text could be parsed into smaller segments.

(80) Better

> Namely, we will represent the maximum delay $d(v,0)$ ($d(v,1)$) spent for transmitting logic value 0 (1). The logic value 0 (1) is derived from a primary input to terminal v by the longest path length $d(v0)$ ($d(v1)$ from a source to 0-vertex (1-vertex) of terminal v. The longest path length $d(x)$ from a source to vertex x is the maximum sum of weights of edges on a path from a source to x.

Relevant Plain English Rules : ***67***, ***64***, ***3***, ***54***

Let us consider one more set of examples of dense text here.

(81) Bad

> “Equation (1) is reformulated not only using the Euclidian distance and but also by *using* the weight of code word tension to the case of an inter-symbol-interference channel *since* the Euclidean distance is not proportional to the Hamming distance and the Euclidian distance depends on the combination of information bits and parity bits after an ISI channel.”

This sentence suffers from many problems, including those involving conjunctions, prepositions, articles, word choice and sentence length (all in one sentence). The results are quite confusing when presented as a single complete statement. Some of the errors have been

italicized in the both the bad and good examples.

(82) Good

> Equation (1) is reformulated not only by using the Euclidean distance but also by applying the weight of *the* code word tension to the case of an inter-symbol-interference channel. *This is because* the Euclidean distance is not proportional to the Hamming distance and the Euclidean distance depends on the combination of information bits and parity bits after an ISI channel.

*Relevant Plain English Rules : **67**, **54**, **33**, **15**, **62***

3.1.c. Use the Active Voice in Favor of the Passive

Here we deal with the overuse of the passive voice, a problem that is quite common in most research papers, where we favor the use of the active voice. Let us first consider the differences between an active and a passive sentence. The sentence, "John threw the ball to Susan" is a simple active sentence. However, the passive version of this is not so simple: "A ball was thrown to Susan by John." The passive sentence is longer (by two words), harder to understand, and ultimately, awkward. It is, however, grammatical. Because they are grammatical, passives may seem like they shouldn't be a problem, but as pointed out above, grammaticality alone does not equate to readability.

Since we are not assuming the reader of this handbook is particularly interested in, or knowledgeable of, the very fine nuances that define the proper rules of English grammar, we will refer to both true passives, as illustrated above, and pseudo-passives (sentences that have the look and feel of passives, usually by placing subjects and/or verbs after objects and other prepositional phrases).

Now that we know what passives are, why are they particularly problematic for foreign writers of English? One reason is that both true passives, and pseudo-passives, are used an unusually large amount of the time. The reason for the extended use of passives by Japanese writers, for example, can easily be traced to the differences in the basic word order of Japanese and English. The most common English sentence has a subject-verb-object (SVO) word order, while the common Japanese sentence has the order of subject-object-verb (SOV). It is this placement of the verb at the end in Japanese that appears to be carried over to the writing of English, which in so doing, creates passive structures in English. There are also other factors which cause the overuse of passives, such as the Japanese tendency to favor indirect subject reference (often leaving the subject out entirely). Why is this a problem? Since English is primarily written in the active voice, when using the SVO word order, it takes readers extra time, and requires additional effort, in order to read and understand passive sentences, which employ a SOV word order. So, following the Principle of Cohesiveness, we want to make it easier on the reader to understand.

There is also a reason based on the Principle of Economy to avoid passives; namely, passive expressions are usually "wordier" than actives. In other words, to state the equivalent active expression in English in the passive voice usually requires relatively more words in the passive than in the active.

Of course there are occasions when passives are useful (such as when we want to focus on the object, rather than the subject), but for the most part, the best formula to follow is to avoid using passives as much as possible. Since this is a very common problem, and a

major impediment to achieving success in Plain English, we have included a large number of representative examples.

(83) Bad

> "Miller, et al. [8] *has been proposed* an adaptive predictive PID control scheme based on a generalized predictive control (GPC) [10] criterion."

This is a very simple illustration of one of the most common problems found in technical writing. Note that the passive form not only reverses the logical sentence structure of English, it also adds two more words in doing so.

(84) Good

> Miller, et al. [8] *proposed* an adaptive predictive PID control scheme based on a generalized predictive control (GPC) criterion [10].

*Relevant Plain English Rules : **6, 5, 4***

Here is another similar, simple example of the poor use of the passive.

(85) Bad

> "On the other hand, as one of self-tuning control schemes for such systems, GPC scheme [10] *had been proposed* by Clarke et al."

The solution of course is to reverse word order to the active voice.

(86) Good

> On the other hand, Clarke et al. *proposed* the GPC scheme as one of self-tuning control schemes for such systems [10].

*Relevant Plain English Rules : **5, 6, 7***

We now consider a variety of slightly more complex problems with the passive construction.

(87) Bad

> a. Here the problem of white noise *is discussed*.
>
> b. To verify the results, a series of simulations *were performed*.
>
> c. Determining the specifications of the bandwidths, for which our experiments *have been attempted* from the following aspects.

In all three poor examples, we have passives which place the verbs after the subjects, thereby requiring readers to scan to the end of the sentences first before being able to understand them

completely. Let us consider the revised versions.

(88) Good

a. Here, we *discuss* the problem of white noise.

b. We *performed* a series of simulations to verify the results.

c. We *attempted* several experiments to determine the specifications of the bandwidths.

*Relevant Plain English Rules : **5**, **6**, **4***

Next is a common mistake of word order, where the main verb has been attached at the end, in a passive-like of construction, where it should be placed within the main clause of the sentence.

(89) Bad

"Here, the problem of algorithm HL *is discussed*."

The repair here is very simple; just move the verb into active position, preceding the object. To do this, of course, we would also need to insert a subject, as I have done ("we"). Notice, too, we have inserted a missing article ("the").

(90) Good

Here, we *discuss* the problem of the algorithm HL.

*Relevant Plain English Rules : **5**, **6**, **4***

The next two examples are obvious cases of passives that should be actives.

(91) Bad

a. "To verify the practicability..., simulation *have been performed*..."

b. "The specifications of simulations[...], for which our experiments *have been attempted* from the following aspects."

In both cases, the "have been PAST PARTICIPLE" needs to be repaired. This will again require insertion of a subject, such as "we", and bringing the verb forward.

(92) Good

To verify the practicability..., we *performed* simulations...

We *attempted* several experiments on the specification of simulations based on the following conditions.

*Relevant Plain English Rules : **5**, **6**, **4***

Note a similar example, with a different subject.

(93) Bad

> "As an empirical model which is developed to fit collected data a mixture model *is commonly used*."

This is another problem of placing the verb at the end of the sentence, which is contrary to the basic logic of English sentence structure.

(94) Good

> A mixture model *is commonly used* as an empirical model which is developed to fit collected data.

*Relevant Plain English Rules : **37**, **6**, **4***

Next is another example of the poor placement of the verb in sentence-final position.

(95) Bad

> "A new protocol, termed FGS (Flooding Gateway Selection) protocol, between a cluster head and its gateways to realize SGF *is presented*."

(96) Good

> A new protocol, termed the Flooding Gateway Selection (FGS) protocol, *is presented* between a cluster head and its gateways to realize SGF.

*Relevant Plain English Rules : **6**, **5**, **4***

The following are portions of poor sentences that illustrate the passive problems, and how to correct them.

(97) Bad

> a. "...*was* expressed..." (...time and cost was expressed as a ...function...)
>
> b. "...*was* derived..." (...function was derived that a ... problem based on MTR was *NP*-hard.)
>
> c. "...*was* given as..." (...method was given as a non-linear programming...)

In the examples above, essentially, we have the form "B was VERB/PAST TENSE A". In other words, "B was expressed as A", "B was derived from A", "B was given as A...", etc. It would be better to change these to active constructions in all cases, as in "A produces/gives/becomes (or, simply, "is") B".

(98) Good

a. ...*is*... (...time and cost is a ...function...)

b. ...*is*... (...function is based on a *NP*-hard MTR...)

c. ...*is*... (...non-linear programming is the method...)

*Relevant Plain English Rules : **5**, **6**, **4***

The following example involves the misuse of the word “able”, similar to the misuse of “how to”, something we will return to and consider from other viewpoints (principles of Plain English) in other sections of this handbook. Here we look the problem from the point of view of word order to the simple active voice.

(99) Bad

“The range blocks *are also able to be* classified into several classes for encoding in different manners.”

Not all problems with the passives are true passives. Here, we see a passive-looking structure, which is much wordier than the preferred alternative.

(100) Good

The range blocks *can be* classified into several classes for encoding in different manners.

*Relevant Plain English Rules : **6**, **76***

The next example is a further illustration of the problem with “able” and passive-like constructions.

(101) Bad

“By using this merging scheme, range blocks of various shapes as well as of various sizes, which are called range “regions” more appropriately rather than range “blocks”, *are able to be* obtained.”

This case, as in the last, involves a difficulty in using “able” correctly. Usually, as shown in both this and the last example, shorter alternative expressions can replace any of these constructed phrases using “able” as their base component.

(102) Good

By using this merging scheme, we *can* obtain range blocks of various sizes and shapes, called range “regions”.

*1Relevant Plain English Rules : **32**, **56**, **37**, **5**, **6***

We see yet another problem with “able”.

(103) Bad

> "Range blocks of not only various sizes but also various shapes, which are called range "regions" more appropriately, *are able to be* obtained by using region segmentation techniques."

This example contains several problems, including the use of "not only ... but also", but here we use it to illustrate the "able" problem further.

(104) Good

> Range blocks of various sizes and shapes, which are appropriately called range "regions", *can be* obtained by using region segmentation techniques.

*Relevant Plain English Rules : **57**, **6**, **42**, **15***

We now turn to another common problem that occurs at the beginning of sentences, where we see expressions such as "it is confirmed (considered, found, assumed, and so forth)". The use of such expressions render the sentence order awkward, and like the true passives above, should be repaired in favor of a more straightforward active structure.

(105) Bad

> a. "*It is confirmed* that according to changes in the switch status pattern as shown in Table 2, the proposed universal biquad filter can certainly realize all filter types of a 2^{nd} order function."
>
> b. "Therefore it is confirmed that the cutoff (center) frequency of the proposed filter is easily timed by the bias current."

This is another problem with a passive appearance resulting from using a pronoun as a sentence subject, followed by a verb (as in "it is confirmed") and then followed by an explanation of the real subject. Of course, the real subject should be placed first. In the first example, *what* was confirmed is placed in subject position, and in the second example, *who* did the confirming was placed in subject position.

(106) Good

> a. The proposed universal biquad filter can realize all filter types of a 2^{nd} order function according to changes in the switch status pattern *is confirmed*, as shown in Table 2.
>
> b. We confirmed that the cut-off (center) frequency of the proposed filter is easily timed by the bias current.

*Relevant Plain English Rules : **5**, **6**, **57***

Let us look at a similar example, using a different verb.

(107) Bad

> "*It is found* that the proportional gain [...] changes in the transient state, and converges on [...] in the steady state."

Our repair is the same as when we inserted the subject “we” in some of the passive examples above.

(108) Good

> *We found* that the proportional gain [...] changes in the transient state, and converges on [...] in the steady state.

*Relevant Plain English Rules : **6**, **5**, **4***

Next, we see a similar misuse of “it is found”, but offer an alternative method for correcting the problem.

(109) Bad

> “In Table 3, *it is found* that the optimal checkpoint interval increases except for the column of Ozbaykal approximations [...].”

In this example, we made our repair by omitting the “it is found” expression (rather than inserting a subject such as “we”), and turning the example into a direct statement, which by implication of course means that the authors found these points to be true. This is a much more direct, and economical solution.

(110) Good

> Table 3 shows that the optimal checkpoint interval increases except for in the column of Ozbaykal approximations [...].

*Relevant Plain English Rules : **4**, **6**, **77**, **27***

Here is another similar pair of examples, where we adopt the more direct approach.

(111) Bad

> “In Fig. 3, *it is found* that the control responses are not good due to the effect of the mutual interactions and nonlinearities.”

(112) Good

> Figure 3 shows that the control responses are not satisfactory due to the effect of the mutual interactions and non-linearities (*of the scheme (?)*).

*Relevant Plain English Rules : **6**, **5**, **4**, **57**, **33**, **34***

The following pair illustrates this same situation, involving yet a different verb (“note”), and again employing the direct solution of deleting the words that refer to the actual *noting*, *finding* or *considering* of the information, all of which are obvious from context.

(113) Bad

"*It is noted* that this lossless integrator can be only used in a feedback loop due to proper bias setting."

(114) Good

This lossless integrator can only be used in a feedback loop because of the proper bias setting.

*Relevant Plain English Rules : **6, 5, 57***

We see similar problems where the verb is used passively, rendering the sentence unacceptable. As in the last example, the poor statements are unnecessarily wordy and/or indirect.

(115) Bad

"[...] the right sons are definitely not included in the searched range, therefore, *the right sons are not needed to be visited*."

The repair here involved simply a verb choice, changing "are" to "do", and a trimming of a few words ("the right sons", rather than being repeated, are replaced with "they").

(116) Good

...the right sons are definitely not included in the searched range, therefore, *they do not need to be visited*.

*Relevant Plain English Rules : **37, 5, 6***

The following is another example of having no real subject at the head of the sentence, compounded by a poor verb choice.

(117) Bad

"*It has been proven* that the *proposal* noise reduction technique is available under the practical environment."

Here, the problem of word order is avoided, with the passive at the beginning of the sentence, but still, excessive wordiness remains. Additionally, the form of the "proposal" has been changed "proposed".

(118) Good

We have demonstrated that the *proposed* noise reduction technique is viable in the normal environment.

*Relevant Plain English Rules : **6, 5, 37, 34, 9***

We see the problems of passives, and passive-like constructions in other areas as well. These problem areas also are involved with wordiness and articles, in particular, so we will see overlaps in such areas of misuse. In general, as stated above, the best solution is to try

to avoid passives in of favor actives, whenever possible.

3.1.d. Transitions

In this section we consider the problem of poor transitions from one sentence to another. Generally, two sentences can be combined into one, using appropriate linking devices, while at other times, separate sentences need to be linked better, while remaining separate, so that the ideas flow naturally from one statement to the next.

(119) Bad

> "The basic idea for estimating the routing cost for 3-terminal nets is the same as for 2-terminal *nets. Only* the difference between the two cases is the number of indexes of the table."

The second sentence in the bad example depends upon the first sentence, and as a result, should be grammatically joined to it, and/or separated with a clear transition element inserted; in many cases, both remedies are required.

(120) Good

> The basic idea for estimating the routing cost for 3-terminal nets is the same as for 2-terminal nets, where the only difference between the two cases is the number of indexes of the table.

Relevant Plain English Rules : ***11, 38, 59***

Next, we have another pair of sentences that should be joined together better by linking them together.

(121) Bad

> "On the other hand, novel concepts for mobile communication have been considered. Ad-hoc networking [2] -- [5] is one of the concepts."

This is another problem involving a clear dependency of the second sentence on the first, but no clear link between the two. In this case, we have joined the two sentences together, and added a transition word, "such", to link the two. I should point out that the usual form of "Ad-hoc" is actually "ad hoc", but this has not been altered in case it is a field-specific reference, with a special meaning or usage.

(122) Good

> On the other hand, novel concepts for mobile communication, such as Ad-hoc networking [2] -- [5], have been considered.

Relevant Plain English Rules : ***11, 23, 5***

We see a similar problem in the next example, but here, keep the sentences separate by adding appropriate linking words.

(123) Bad

> "Therefore, the LPF limits the performance range of frequency-offset compensation. *We will later derive* the valid range."

Here, too, the second sentence depends on the first, but has no obvious transition, or link. We have suggested one possible solution below, where, in this case, we have maintained two distinct sentences, while providing a link between the two ("will thus seek").

(124) Good

> Therefore, the LPF limits the performance range of frequency-offset compensation. *We will thus seek to derive* the valid range.

*Relevant Plain English Rules : **23, 16***

Below we look at a different kind of problem with transitions. In this case, the author has made a statement, but has not suggested any motivation, or reasoning for it. This situation requires an explanation, in order for the reader to make the appropriate transition from one set of facts to another.

(125) Bad

> "For simplicity, the number of neighboring connections of each node is four in Fig. 1, but we assume eight neighborhoods in this paper."

In the bad example, "but" is used, which suggests a contrary fact, or opposition, yet no explanation or further discussion is offered. In this situation, an appropriate explanation is required.

(126) Good

> For simplicity, the number of neighboring connections of each node is four in Fig. 1, but we assume eight neighborhoods in this paper *since* (*explanation*).

*Relevant Plain English Rules : **16, 23***

Poor transitions are often found at the beginnings of paragraphs as well. In particular, some paragraphs begin with no link to the preceding discussion, and often with no clear introduction to what will be covered in the ensuing paragraph. A common example of such an opening statement is listed here.

(127) Bad

> "Let T*i* (*i* = 1,2,...) be the actual time interval between the (*i*-1)st and the *i*-th checkpoints."

In the bad example, there is obviously no link to any other statements made, rather, this is

simply the beginning of a mathematical statement. Before the reader sees this, the author should make an appropriate transition from the last point to the next. Below, though perhaps a more appropriate transition can be developed, this should provide a basis for understanding and correcting the problem.

(128) Good

> *Let us now consider the effect of actual time.* Let T*i*, (*i* = 1,2,...), be the actual time interval between the checkpoints (*i*-1)st and *i*-th.

*Relevant Plain English Rules : **17**, **16***

3.1.e. Consistency

In this section, we look at the problem of lack of consistency. First we consider several examples of tense, where the tense is mixed within single statements. Next, we look at number, such as the relationship between subject number, and the verb's suffix, where there are disagreements. We then look at parallel constructions, where several items are included as a list, but vary in form or type, and next we look at problems with abbreviations, where some authors have coined their own unfortunate abbreviations. Further, we look at inconsistent usage of punctuation, particular in using (or not using) commas appropriately. Finally, we consider forms of argumentative support, in using facts, while controlling opinions.

3.1.e.i. Tense

As noted above, tense is often misused, frequently by mixing two or more tenses together in the same statement or paragraph, something we would generally want to avoid. Other times, errors are simply due to incorrect tense choices, or a mismatch between subject number and tense number. We will consider various problems of tense misuse below.

(129) Bad

> "There *are* several attempts to generate chaotic binary sequences by using one-dimensional maps."

Clearly, in order for "attempts" to have been made, they have to have been made in the past, therefore, an appropriate form of the past tense should be used.

(130) Good

> Recently, there *have been* several attempts to generate chaotic binary sequences by using one-dimensional maps.

*Relevant Plain English Rules : **34**, **76**, **28***

The following bad example actually contains many problems, most of which have been corrected here (note the much shorter correct version).

(131) Bad

> "It *has turned out so far* that for some special orders, *computing* discrete logarithms over the elliptic-curve groups of those orders *are* no longer hard, or *become* easier than expected."

In terms of tense, the phrase "has turned out so far" is awkward and unnecessary. We also have the word "computing" matched with "are", but of course this would be a singular reference, so "is" is required here. Finally, again, "computing" is used with "become", but as a singular reference, "becomes" is necessary.

(132) Good

> For some special orders, computing discrete logarithms over the elliptic-curve groups of those orders *is* no longer hard, or *becomes* easier than expected.

*Relevant Plain English Rules : **57**, **27**, **29**, **76***

In the next example set, we see where it is important to maintain tense consistency throughout the discussion of a single event.

(133) Bad

> "In [6], another merging scheme where merging was applied to surrounding blocks in a predetermined order *was* proposed. In these merging schemes, the restriction on the locations of range regions *is* removed. However, the variety of region shapes *is* still somewhat restricted."

In this example, the tense (past) is established for the event by the first use of "was" above. Once tense is established, it should generally be consistently maintained throughout the description of the event (unless it brings us directly to the present, where the last statement may in fact be in the present tense).

(134) Good

> In [6], another merging scheme where merging was applied to surrounding blocks in a predetermined order *was* proposed. In these merging schemes, the restriction on the locations of range regions *was* removed. However, the variety of region shapes *was* still somewhat restricted.

*Relevant Plain English Rules : **29**, **76***

The next example has both the present tense and the infinitive mixed together.

(135) Bad

> "Thus, we concentrate our attention *to solve* the nonlinear equation [...]."

This is primarily a misuse of the phrasal verb "concentrate on", where the result of replacing "on" with "to" creates the infinitival form of the verb "solve". When using this verb in the context presented here, we need to change "solve" to "solving", since it implies focused effort for a period of time.

(136) Good

> Thus, we concentrate our attention *on solving* the non-linear equation [...].

*Relevant Plain English Rules : **29**, **28**, **4**, **6***

Next, we have another example of mixed tenses.

(137) Bad

> "The information theoretic measure *has been shown to be useful* to evaluate the performance of the attack as well as to show deviations in certain attacks are of no use *to derive* secret information."

The first and most obvious problem in the bad example has to do with the inclusion of the unnecessary passive structure "has been shown to be useful", but is further compounded by a problem similar to the one noted above for "concentrating on". Here, when "use" is employed to indicate application, "in deriving" is preferred over the infinitive "to derive", to order make tenses consistent.

(138) Good

> The information theoretic measure can be used to evaluate the performance of the attack as well as to show *that* deviations in certain attacks are of no use *in deriving* secret information.

*Relevant Plain English Rules : **29**, **28**, **4**, **6***

The following demonstrates another misuse of the infinitive.

(139) Bad

> "The following example shows how we can avoid *to deal* with the combinatorial number of transition bindings."

This is another example where the progressive form, is preferred over the infinitive form of the verb, in describing how something applies in a particular situation.

(140) Good

> The following example shows how we can avoid *dealing* with the combinatorial number of transition bindings.

*Relevant Plain English Rules : **28**, **76***

Next we see "have" and "has" used interchangeably (and thus, incorrectly).

(141) Bad

> "Infinite-sort PN^2's *can have* infinitely many states, and *has* the same modeling power as Turing machines [...]."

This is a simple problem of having two different kinds of verb endings to describe parts of the same event; they should agree in form.

(142) Good

> Infinite-sort PN^2's can *have* infinitely many states, and *have* the same modelling power as Turing machines [...].

*Relevant Plain English Rules : **27, 76***

The following example has two different forms of the past tense used, incorrectly.

(143) Bad

> "Recently, many types of neural networks [1] *are proposed* and *have been employed* in the various fields.

This is another statement that contains mixed tense references to describe the same basic event. Again, we want to maintain a consistency of tense usage to describe all aspects of the same event.

(144) Good

> Recently, many types of neural networks *have been proposed* and *employed* in various fields.

*Relevant Plain English Rules : **29, 17, 23, 16***

3.1.e. ii. Number

Number refers to subject and verb number alignment, for the most part. So, the problems we see here involve mismatches of subject number and the verb endings that should agree with the subject. Often the real problem is that the subject itself is pluralized when it can only be in the singular form (such as non-count mass nouns). Let us consider some problems involving number misuse below.

(145) Bad

> "In this section, we assume that *every elements* in diffusion layer belong to GF(2^n)."

In this example, "every" require a singular subject, such as "every person" (not "every people"), so "elements" should be in the singular form, or "all" used with the plural form.

(146) Good

> a. In this section, we assume that *every element* in the diffusion layer belongs to GF(2^n).
>
> (or)
>
> b. In this section, we assume that *all elements* in the diffusion layer belong to GF(2^n).

*Relevant Plain English Rules : **76**, **27**, **15***

Note the following similar example.

(147) Bad

> "We describe every *transformations* as follows."

Here, "transformations" should be singular, or "all" used with the plural form.

(148) Good

> a. We describe *every transformation* as follows.
>
> (or)
>
> b. We describe *all transformations* as follows.

*Relevant Plain English Rules : **27**, **76***

This next example involves a problem of inconsistent use of singular and plural forms.

(149) Bad

> "In the current implementation, for each stage, the start *temperatures* and the end *temperature* are specified in advance."

Note that in the bad example, "temperature" in one case is singular, but in the other, plural. They both should be the same, and in a general statement such as this, they both should be plural.

(150) Good

> In the current implementation, for each stage, the start *temperatures* and the end *temperatures* are specified in advance.

*Relevant Plain English Rules : **27**, **76***

Please note the poor use of tense in the following example.

(151) Bad

> "Equation (7) means that every input error sequence with weight 2 produces error *event* longer than *t* x *Fp* at one of the component encoder *at least*."

In this example, "event" should be in the plural, since these are repeated activities. Also, "at least" should precede the phrase it modifies, otherwise, it can modify the entire expression.

(152) Good

> Equation (7) means that every input error sequence with weight 2 produces error *events* longer than *t* x *Fp at least* at one of the component encoders.

*Relevant Plain English Rules : **76**, **15***

Regarding number, certain words seem to be misused more than others in the writing of technical and scientific papers. In particular, we see many problems with “research”, and “results”. We look at the latter case here, observing two examples, having considered “research” elsewhere.

(153) Bad

> “The *result* of the test is summarized in Table 1. From the *result*, we can see that the scores of the proposed method are higher than BBS method.”

In this example, we see a common mistake, where “result” is written in the singular form, where almost always it should be written in the plural, when speaking of the outcome of an experiment. Also, note we have added the article, “the”, before the acronym “BBS” since it represents a specific noun.

(154) Good

> The *results* of the test are summarized in Table 1. From the *results*, we can see that the scores of the proposed method are higher than *the* BBS method.

*Relevant Plain English Rules : **76**, **15***

(155) Bad

> “Here, the control *results* without the modeling error compensatory *is* shown in Fig. 3, where the user-specified parameters were set as follows: [...].”

With “results” in the plural, then naturally the verb must agree with this, so “is” needs to be changed to “are” in this set of examples.

(156) Good

> Here, the control results without the modelling error compensatory *are* shown in Fig. 3, where the user-specified parameters were set as follows: [...].

*Relevant Plain English Rules: **27***

Turning our attention to number problems involving other nouns, let us now review the use of “transition”.

(157) Bad

> "Relabeling of transitions in the lower level nets if more than *one transitions* have the same label [...]."

In this example, "transitions" when used with "one" is of course incorrect; there can only be one "transition". The phrase "more than" does not change the noun form in this situation.

(158) Good

> Re-labeling of transitions in the lower level nets if more than *one transition* has the same label [...].

*Relevant Plain English Rules : **27, 76***

A pair of words many people have difficulty with in terms of number is "seem" and "seems".

(159) Bad

> "[...] the decreasing properties on the parameters above *seems* to be natural."

In this case, "the decreasing properties" are the nominal subject, so since they are plural ("properties"), "seem" rather than "seems" is required.

(160) Good

> [...] the decreasing properties on the parameters above *seem* natural.

*Relevant Plain English Rules : **27, 76, 37, 4, 6***

Sometimes the problem with number agreement arises from having subjects that are mixed in number to begin with.

(161) Bad

> "Nowadays, *computer* and *communications* are inevitably connected to *each other*."

Unless we are talking about a single computer, we are in fact making a generalization, which usually requires plural subjects, so in this case, "computer" should be "computers". Further, since both "computers" and "communications" are plural, the device "each other", which refers to two singular items, cannot be used. Note that the replacement still appears to have a singular reference, but these terms can be used to refer to groups of items, where "each" in the bad sentence has a particularly singular connotation.

(162) Good

> Recently, *computers* and *communications* have become closely connected to one another.

*Relevant Plain English Rules : **27, 76, 17, 15***

Here is another common error involving subject number and tense agreement, where the writer wants to indicate a numerical limit.

(163) Bad

> "If there is *only one or less* Y block that has the DCT coefficients in a macro block, the check marker is not embedded into the macro block."

The problem here involves how to handle "only one or less Y block". Using this phrasing, we would need to write "blocks" (in the plural), since "less" involves multiple possibilities, but "less than one" in this case is zero, so we need another solution. We can repair this by breaking up the inclusive expression ("only one or less Y block") into two more manageable pieces, as in the following.

(164) Good

> If there is *just one Y block* that has the DCT coefficients in a macro block, *or none at all*, the check marker is not embedded into the macro block.

Relevant Plain English Rules: ***76***

This is another problem involving the need to set a numerical limit, and the resulting confusion in number agreement.

(165) Bad

> "For the remaining *more than 3*-terminal nets, the accuracy of routing cost estimation would be degraded compared to the case of 2- or 3-terminal nets."

This is a rather unique problem involving how to indicate an amount "more than" a set limit. In the bad example, clearly the reference is to a number of at least 4, or more, terminal sets. So, we need to indicate this clearly.

(166) Good

> For the remaining *4- (or more)* terminal nets, the accuracy of routing cost estimation would be degraded compared to the case of 2- or 3-terminal nets.

Relevant Plain English Rules : ***27***, ***76***, ***37***

The next example is fairly complex, involving the wrong article, the passive, and number disagreement.

(167) Bad

> "In order to confirm the validity of the derived performance bound, *the* simulation of iterative decoding based on

BCJR algorithm *have been executed*."

While maintaining the passive structure, a few problems still need to be corrected here. First, "the" should be changed to "a" since the simulation was not specifically identified, and second, "have been" was change to "was" since "simulation" is what the verb should agree with, and it is singular.

(168) Good

In order to confirm the validity of the derived performance bound, *a* simulation of iterative decoding based on the BCJR algorithm *was executed*.

*Relevant Plain English Rules : **27**, **76**, **15***

The word "each" and the phrase "each other" often causes problems for writers in handling number agreement.

(169) Bad

"Flexible segmentation of complicated natural scene images is achieved by using resistive-fuse networks, and *each* segmented *regions* is extracted by nonlinear oscillator networks."

This is a very simple example involving the use of "each". Here, "each" refers to a singular item, so "region" the noun it modifies, should be singular.

(170) Good

Flexible segmentation of complicated natural scene images is achieved by using resistive-fuse networks, and *each* segmented *region* is extracted by non-linear oscillator networks.

*Relevant Plain English Rules: **76***

Acronyms, discussed more thoroughly below, are often misunderstood with regards to number, as we see in this next example.

(171) Bad

"[...] EOS *do* not allow to have infinitely many states."

Often times, the number of acronyms are not clear. In general, despite what they once referred to, as an acronym, they become singular nouns, and must be used accordingly in subject-verb agreement situations. I have also suggested an improvement on "infinitely many states".

(172) Good

[...] EOS *does* not allow infinitely many states (*an infinite number of states*).

3.1.e.iii. Parallel structures

Parallel structures are repeated structures that usually appear in the form of a list, but may also appear in a series of phrases, clauses or sentences. In these series of expressions, we want to have each item in the series conform as closely as possible in structure to all the other components. So, we will want to try to make the verb forms all the same when relevant, as well as subject or object number, word types (such as adjective, adverbs, nouns, etc.) and even preposition type. In other words, each item on the list should be made consistently, and each should look, in form, like all the others.

We will begin with a few simple illustrations of problems in parallel constructions. In our first example, we see where word types such as nouns and adjectives are mixed up in parallel structures.

(173) Bad

> "If the following *syntax* and *semantic* violations occur in the quantized DCT coefficients [...]."

In this case, "syntax" is a noun, while "semantic" is an adjective, yet they are both in a parallel list construction. To remedy this, we need to convert one to the other.

(174) Good

> If the following *syntactic* and *semantic* violations occur in the quantized DCT coefficients [...].

*Relevant Plain English Rules: **9***

In the next set of examples, we see problems with parallel constructions not at the word level, but at the phrase level.

(175) Bad

> "The distribution shown in the figure can be classified to 3 categories. Category 1: *this category mainly includes long routes*. Category 2: *the routes in this category are so simple that little time is needed*. Category 3: *This category includes the routes on really difficult patterns*."

It is easy to see the problems with the poor example. Two of the three categories contain sentences starting with "this category" while one starts with "the routes"; all three should follow the same format. However, we clearly do not need to even state the word "category", as it is already mentioned in the main introductory statement. We can condense things, following the principles of both Directness and Economy, and put everything into parallel distribution, as in the good example.

(175) Good

> The distribution shown in the figure can be divided into 3 categories: (1) those that mainly include long routes;

(2) those that are so simple that little time is needed, and; (3) those that are routes on really difficult patterns.

*Relevant Plain English Rules : **8**, **72**, **77***

Similarly, a list should follow a similar pattern of grammatical construction whether it is included within a single sentence, or made up of several sentences.

(176) Bad

1) Check marker embedding:

A check marker is embedded into a macro block [...].

2) Error Addition:

One bit error with [an] error rate of [...].

3) Error detection performance:

We investigate how each condition [...].

4) PSNR calculation:

To investigate the influence of the check marker embedding [...].

In the above list, each explanation (the line under the numbered heading) should be of the same type (see the italicized portions). The first two are of the form of a list with the noun subject as a head, the third has the focus noun placed after the verb, and the forth has an infinitival verb. What we want, however, is all four items to follow the same general pattern, as is suggested in the following.

(177) Good

Check marker embedding:

Check marker embedded into a macro block [...].

Error Addition:

One bit error with [an] error rate of [...].

Error detection performance:

Conditions' contributions to error detection.

PSNR calculation:

Check marker influence on picture quality [...].

*Relevant Plain English Rules : **8**, **37***

This next example is representative of the kinds of problems involved when parallel structures are embedded in dense or complex text.

(178) Bad

> "When the failure mechanism for the database management under uncertainty is examined, we should image more serious situations on failures such as the *increasing failure rate circumstance* or *catastrophic failure* from the standpoint of the fault-tolerant, and should model the database system under more complex and general situations in terms of system failure."

This poor example is a single very complex sentence. We can repair this by breaking it up into two shorter statements, thereby focusing on two important points that are parallel; "increasing failure rate" and "catastrophic failure". This solution still is not perfect, but it suggests the appropriate direction to take. Though perhaps other errors exist, we wish to concentrate our attention on the basic idea of breaking up the sentence, while maintaining a parallel structure, so some problems are left unchanged.

(179) Good

> When the failure mechanism for the database management under uncertainty is examined, we should image more serious situations on failures. We should investigate the *increasing failure rate circumstance* or *catastrophic failure* from the standpoint of the fault-tolerant, and should model the database system under more complex and general situations in terms of system failure.

*Relevant Plain English Rules : **37**, **66**, **67**, **54***

3.1.e.iv. Abbreviations

The key to proper abbreviation use is acceptability. In other words, abbreviations can be used if they are accepted industry standards, but should not be coined just to fit the purposes of your particular paper. Further, even if they are accepted, they must be clearly decipherable. The reader must be able to look at the abbreviation, and immediately understand what it represents. Finally, it must make sense from a utilitarian point of view. Abbreviations are meant to save time, not cause delays, and are meant to save space. Usually, an abbreviation that saves only a character space or two should be avoided (such as "sect." for "section", as we noted above, in our discussion of the introduction). There should be elegance in the economy, not ugliness. As a general rule, avoid abbreviations unless they truly are widespread. You can apply a simple test to see if any abbreviation is appropriate. First, is the word it represents used frequently enough in the text to warrant a shortened, telegraphic form? Second, is the abbreviation decipherable (clearly understood for what it represents)? Third, is the savings of character spaces significant?

Let us consider the problems with abbreviations concerning the word "section" first discussed in the section on introductions.

(180) Bad

> "The rest of the paper is organized as follows. In Sect. 2 we present some preliminary definitions. In Sect. 3 we give a real-time algorithm for the k-shading problem on partial *h*-trees. Finally, we conclude our result in Sect. 4 with some comments on a delayed time algorithm."

The word "section" is used probably less than ten times in the entire paper, so it does not meet

the test of high frequency usage, which most abbreviations should pass. Also, there is a net savings of only two character spaces between “Sect.” and “Section”, which fails the test of noticeable savings in character spaces. For these reasons, and for the other stylistic reason that abbreviations are unattractive and distracting, they should generally be avoided.

(181) Good

> The remainder of the paper is organized as follows. In Section 2 we present some preliminary definitions. In Section 3 we give a real time-time algorithm for the *k*-shading problem on partial *h*-trees. Finally, we conclude in Section 4 with some comments on a delayed time algorithm.

*Relevant Plain English Rules : **31**, **57***

The next example we consider here is the abbreviation “resp” used in the following poor example. What does this stand for? It could stand for “with respect to”, “represented as”, “respectively” or? Certainly from context it is unclear, so it should be avoided, since it fails the “decipherable” test, to the lay reader, but may be acceptable within the scientific context in which it was used. As part of English syntax, it is confusing. As part of a mathematical expression, it may be acceptable.

(182) Bad

> “On the other hand, if given the trapdoor for *f* (*resp*. f^{-1}) it is hard to compute the trapdoor for f^{-1} (*resp*. *f*) respectively, these call such an *f* separated trapdoor no-way functions.”

We have replaced the distraction abbreviation “resp.” with “in relation to” but this may not be correct?the point is, some lexical change is required.

(183) Better

> On the other hand, if given the trapdoor for *f* (in relation to f^{-1}) it is hard to compute the trapdoor for f^{-1} (in relation to *f*), and vice versa. As a result these *f* separated trapdoors are called no-way functions.

*Relevant Plain English Rules : **31**, **37***

3.1.f. Capitalization and Punctuation

Here we look at a few examples where capitalization and punctuation, or lack of it, causes problems with our understanding of the text.

The first example is a simple one of incorrect capitalization, where the first word in the parenthetical is capitalized, where it should not be, since it is still part of the first sentence.

(184) Bad

> “The most important part of this construction is the transition from *pi* and *rn* to *ps* (*Occurring* of this transition are possible only when both nets in *pi* and *rn* are identical).”

Notice that repairs have also been made to how the verb “occur” is used.

(185) Good

> The most important part of this construction is the transition from *pi* and *rn* to *ps* (*this* transition occurs only when both nets in *pi*and *rn* are identical).

Relevant Plain English Rules: ***37***

In this next example, we see how important the placement of a single comma is.

(186) Bad

> "Moreover, for each *path edges* consist of deleted loops correspond to the externally active edges for the corresponding spanning tree."

In the poor example, the reader must decide whether the noun is simple, as in "path", or complex, as in "path edges", or, whether "path" and "edges" are two separate things, or part of one whole. By placing a single comma, we can see that "paths" and "edges" are separate.

(187) Good

> Moreover, for each *path, edges* consist of deleted loops corresponding to the externally active edges for the corresponding spanning tree.

Relevant Plain English Rules: ***76***

The next pair of examples also suffer from run-ons of meaning, where it is difficult to tell where one noun phrase stops and the other starts. Commas again correct this problem.

(188) Bad

> "This kind of binary sequences based on chaos orbits are called the chaotic binary sequence."

Here, it is particularly difficult to tell whether there is a phrase "based on chaos", or "based on chaos orbits"; the commas help us to clearly see which it is.

(189) Good

> These kinds of binary *sequences, based* on chaos *orbits, are* called *chaotic binary sequences*.

Relevant Plain English Rules : ***27, 76, 15***

3.1.g. Argument Support: Facts and opinions

In terms of Plain English, we want to be very careful about maintaining a neutral perspective, even when discussing our own findings, in a research paper. We want to avoid interjecting our own opinions, or bias, and allow the reader to judge the merits of our arguments fairly and without prejudice. Similarly, we want to avoid showing undue bias (positive or negative) towards the work and ideas of other people; rather, we simply should

rely on the strength of our argumentative analysis to provide convincing evidence for one point of view or another.

In this first example, the use of extreme words such as “malicious” is distracting.

(190) Bad

> “Moreover, the *malicious* subscribers might try to expose the secret decryption keys buried in their decryption boxes [...].”

The remedy in this situation is to find a more neutral description that conveys the intended meaning. Two suggestions are offered.

(191) Good

> Moreover, the *unlicensed* (or *illegitimate*) subscribers might try to expose the secret decryption keys buried in their decryption boxes [...].

*Relevant Plain English Rules : **33**, **34***

The next example contains another example of the kind of biased language that we want to avoid.

(192) Bad

> “Our experimental protocol is *highly conservative*, we *don’t feel it appropriate to use unknown and untested ideas* in the framework of a new encryption schema.”

The use of “highly conservative” suggests a value judgment which is out of place in a neutral context such as a scientific or technical report. Also, the phrase “we don't feel appropriate to use unknown or untested ideas” has a nuance of a superior talking down to inferiors, which is again something we want to avoid.

(193) Good

> Our experimental protocol prevents us from using unknown and untested ideas in the framework of a new encryption schema.
>
> (or)
>
> Our experimental protocol requires us to use known and tested ideas in the framework of a new encryption schema.

*Relevant Plain English Rules : **70**, **20**, **57***

Print

3.2. Economy

The *Principle of Economy* contains four guidelines. These guidelines include: (a) Brief is best; (b) High frequency words are preferred over low frequency "specialty" words; (c) Avoid subordination, and; (d) Discuss one point per statement. The most frequent violation of these principles involves repetition, wordiness and redundancy; all of which are discussed below. In addition, in this section we also look at the misuse of conjunctions.

3.2.a. Repetition

Repetition generally involves the repeating of same or similar words and phrases throughout the text to the point of distraction. Repetition of terms signals to the reader that the author's vocabulary is limited, and at the same time makes for very tedious, boring reading. Of course, we want to eliminate as much obvious repetition as possible.

Most examples of repetition occur within the larger domain of a paragraph, section or even the entire paper. So, in order to see exactly what is meant by repetition, let us look at several examples taken from a single paper.

(194) Bad

a. *In this paper*, to avoid an increase in white noise transmission rates [...].

b. *This paper* is organized as follows [...].

c. *In this paper*, we consider the VTS technique [...].

d. *In this paper*, we focus on methods of transmitting [...].

e. *In this paper*, we set the signals on [...].

f. *In this paper*, we use the formula [...].

(and so forth -- there were many more!)

The problem here is the repetition of the phrase “(in) this paper”. Such repetition, whether it is of a single word, or a phrase such as this, is quite distracting, and eventually can be an impediment to the reader. Overuse of common terms, or uncommon ones, suggest a limited vocabulary on the one hand, and serves to make the text monotonous and dull on the other hand. Let us see how we can improve on this situation.

(195) Good

a. To avoid an increase in white noise transmission [...].

b. This paper is organized as follows [...].

c. Next, we consider the VTS technique [...].

d. In this section we focus on methods of transmitting [...].

e. We set the signals on [...].

f. We propose using the formula [...].

*Relevant Plain English Rules : **32**, **56***

By using alternative expressions for repeated words, we still leave the opportunity to use the originally over-used expression where necessary ("in this paper"), such as done partially in (195.b) and (195.d), without offending or distracting the reader.

Below, we see another very similar example of repetition of phrases which intrude on an otherwise generally well-written paper. All examples are taken from a single paper.

(196) Bad

a. "*In this paper*, to avoid weight transmission using side [...]."

b. "*This paper* is organized as follows."

c. "Finally, the conclusion of *this paper* is given in Sect. 5."

d. "*In this paper*, we consider the PTS technique [...]."

e. "*In this section*, we focus on methods of transmitting [...]."

f. "*In this paper*, we set the pilot signals on edge [...]."

g. "*In this paper*, we use $p = 3$, [...]."

h. "*In this paper*, we compare the performance [...]."

i. "*In this subsection*, the performance [...]."

j. "[...] *in this section*, we can confirm [...]."

k. "*In this paper*, we have proposed [...]."

There is a clear repetition of the phrase "this paper (or section...)" that occurs so often that it is distracting. Note that the whole phrase is overworked, so even if "paper" is replaced with "section" or "subsection" a few times, it still has the same net effect of being repetitive and distracting. There are two ways to solve this problem. One is to simply acknowledge the fact that all statements you make generally relate to "this paper" and thus, "this paper" is understood, or implied (and thus can be omitted). The only time when there is a question is when you are discussing another person's paper, where it is important to make it clear that it is your ideas that you are referring to, not those of someone else. So, in all those cases above that include "we" (seven of the examples), we could simply omit "in this paper" and begin with "we" (as in "we compare the performance..."). The other solution is simply to expand the vocabulary base by choosing appropriate synonymous words and expressions, such as "here", "below", "next" and so forth. Of course, one or two uses of the expression, "in this paper", is fine.

(197) Good

a. To avoid weight transmission using side [...].

b. This paper is organized as follows.

c. Finally, our conclusions are offered in Sect. 5.

d. Next, we consider the PTS technique [...].

e. In this section, we focus on methods of transmitting [...].

f. We set the pilot signals on edge [...].

g. Throughout, we use $p = 3$, [...].

h. We now compare the performance [...].

i. Here, let us consider the performance [...].

j. [...] we can thus confirm [...].

k. Above, we have proposed [...].

*Relevant Plain English Rules : **32**, **56***

Next, we observe a few examples where the repetition occurs within the domain of a single paragraph. In this next example, we have several sentences that repeat the same word so much that it is very distracting.

(198) Bad

"This formula is derived by *assuming* the following: It is *assumed* that the service area consists of regular hexagonal cells and traffic intensity of each cell is the same. *p*-belt buffering systems are *assumed* and it is also *assumed* that each cell has the same number of interference cells. This *assumption* means that we can neglect the edge effect. Furthermore, it is *assumed* that terminals never move."

Keeping in mind that we want to avoid repetition of words (it is distracting, and suggests that the writer has a limited vocabulary), what can we do to solve this problem? There are usually two alternatives in this situation. The first is to use the key word once, and place everything else in a parallel listing construction, or, an alternative is simply to use synonyms wherever possible. The list can be written as shown first, or incorporated into a paragraph using numerals in parentheses and the same list of statements, as shown second.

(199) Good (1)

This formula is derived by assuming the following four conditions:
(1) The service area consists of regular hexagonal cells and traffic intensity of each cell is the same.
(2) There are *p*-belt buffering systems.
(3) Each cell has the same number of interference cells (edge effect can be neglected).
(4) Terminals never move.

(199) Good (2)

This formula is derived by assuming the following four conditions: (1) The service area consists of regular hexagonal cells and traffic intensity of each cell is the same; (2) There are *p*-belt buffering systems; (3) Each cell has the same number of interference cells (edge effect can be neglected), and; (4) Terminals never move.

Relevant Plain English Rules : ***32, 56***

In this next example we see a similar problem, that of the same word repeated frequently, but due to the structure it is used in, a different solution is required.

(200) Bad

"In this paper, we assume that *BM* in the system *considering* no hand-off operations where offered traffic is *an* is equivalent to *BM* in the system *considering* the mobility where offered traffic is *a*. In other words, we *consider* offered traffic *considering* the influence of the mobility. Similarly, we assume that *BH* in the system *considering* no hand-off operations where offered traffic is *ah* is equivalent to *BH* in the system *considering* the mobility where offered traffic is *a*."

Clearly, we are not able to solve the problem of the overuse of "consider" by creating a listing structure as we did with the last example. We are thus left with the alternative of using suitable synonyms, and perhaps deleting one or two uses of "consider" altogether. Besides simply overusing "consider", it was misused, as the meaning of this verb does not extend as far, I believe, as the authors intended. As a result, my choices may not coincide with the author's intentions, but should point in the direction of a preferred solution. In order to remain faithful to the original text, the italics in this section were carried over as originally written, and do not refer to our highlighted material.

(201) Good

In this paper, we assume that *BM* in the system implementing no hand-off operations where offered traffic is *an* is equivalent to *BM* in the system recognizing the mobility where offered traffic is *a*. In other words, we determined that offered traffic involves the influence of the mobility. Similarly, we assume that *BH* in the system implementing no hand-off operations where offered traffic is *ah* is equivalent to *BH* in the system recognizing the mobility where offered traffic is *a*.

Relevant Plain English Rules : ***32, 56***

Let us now look at examples of repetition that occur across just two sentences.

(202) Bad

"To develop ad-hoc networks, we must overcome *a lot of* problems. These problems include *a lot of* theoretical issues."

The repeated phrase, "a lot of", is distracting both because it is repeated, and it is vague; both should really be replaced. We will return to the "a lot" in a latter section of this handbook.

(203) Good

To develop ad-hoc networks, we must overcome *a large number of* problems *that involve many* theoretical issues.

*Relevant Plain English Rules : **32**, **56**, **34**, **37***

The following is another set of examples that show how intrusive repeated phrases are in adjoining sentences.

(204) Bad

"*On the other hand*, once given the power of computing [...]. *On the other hand*, if one can access the oracle of computing [...]."

One key to handling repetition is simply to use alternative words and phrases to get the same idea across. Here, variety is preferred over consistency (monotony).

(205) Good

On the other hand, once given the power of computing [...]. *Alternatively*, if one can access the results of computing [...].

*Relevant Plain English Rules : **32**, **33**, **34***

The following set of examples contains repetition that stretches from the introduction over to the conclusion. While sometimes repetition is useful to highlight key points, it can be distracting. Often, readers remember the introduction very well, which they read perhaps more carefully than certain parts of the main body of the paper. It is also likely they may concentrate again on the conclusions. So here, too, it is best not to simply repeat the same words, expressions or sentences even across these distances, since readers might remember.

(206) Bad

a. (from Introduction) "Generating state spaces is one of important and general methods in the analysis of Petri nets."

b. (from Conclusion) "Generating state spaces is one of important and general methods in the analysis of Petri nets."

As is obvious, the original statement in the introduction has been repeated verbatim in the conclusion. Most readers will notice this, and it is therefore distracting. It would be better to restate the idea in different words.

(207) Good

a. Generating state spaces is one of the most important and general methods in the analysis of Petri nets.

b. In this paper, we proposed an efficient algorithm for exploring the state spaces of Petri nets with large capacities.

*Relevant Plain English Rules : **32**, **56**, **15***

Here is a slightly different set of examples that repeat words across (with some distance between) sentences.

(208) Bad

a. "The reference signal *w(t)* is given by *piecewise* constant components."

b. "One is the reason that *w(t)* is given by *piecewise* constants."

In this example, the word "piecewise", a very uncommon word, is repeated. Though many paragraphs separate the two sentences, because it is so uncommon, it stands out, and when it is repeated, it lowers the readability of the text. Such uncommon words should generally be avoided altogether, and certainly not repeated. By replacing "piecewise" with a common word, such as "separate", it no longer stands out, and if only used twice, separated by many paragraphs, is probably fine.

(209) Good

a. The reference signal *w(t)* is given by *separate* constant components.

b. One is the reason that *w(t)* is given by *separate* constants.

*Relevant Plain English Rules: **32***

3.2.b. Wordiness

Wordiness is a very common problem in most reports, and is one that can be corrected fairly easily, as long as the problem is recognized. Essentially, wordiness means that you have used too many words to convey an idea, where another term or phrase, using fewer words, will get the idea across. Wordiness simply means we have to read more words to comprehend the message, so if we can convey the message in fewer words, we can improve the readability of the text. Often times, wordiness tends to over-formalize statements, or to create unnecessary distance between the writer and the reader--both unwelcome results that we want to try to avoid. Let us look at several examples of wordiness, and how we can improve on them.

(210) Bad

a. We assume that *there does not exist the* problem of image quality loss...

b. [...] accept the connections *in other cases*.

c. This paper devises a computational method *which is more effective than that of the traditional method, and moreover the proposed approach is compatible with conventional protocol*.

In these last examples, involving wordiness, we see a common usage problem. In "a", five words are replaced by three, in "b" three are replaced by one, and in "c" twenty words are replaced by fifteen. In all three examples, too many words are used to get otherwise simple ideas across, and in the interest of both Economy and Directness, should be avoided.

(211) Good

a. We assume that *there are no* problems of image quality loss...

b. [...] accept the connections *otherwise*.

c. This paper introduces a computational method *that is both more compatible with conventional protocol, and more effective than the traditional method*.

Relevant Plain English Rules: ***57***

Combating wordiness is a primary goal in Plain English, which suggests "brief is best" (Economy), and whenever possible when there is an expression with fewer words that can replace a longer expression, then the one with fewer words is preferred.

(212) Bad

"In practice *it is often considered to be sufficient* to prevent from analyzing a decoder by supplying subscribers with so-called secure hardware solutions, say smartcards."

This is another problem using "it" in an awkward passive-like expression, similar to ones we saw in the section on passives. Here, though, we will view this from a wordiness perspective, where the whole expression, "it is often considered to be sufficient", really adds nothing to the meaning of the sentence, and most of it can therefore be deleted.

(213) Good

In practice, supplying subscribers with so-called secure hardware solutions, such as smartcards, *is often sufficient* to prevent (unlicensed users?) from analyzing a decoder.

Relevant Plain English Rules : ***6***, ***71***, ***72***, ***57***, ***40***

As we have already seen, many words and phrases simply are not needed to get the basic intended message across.

(214) Bad

"From this result *it can be seen* that the improvement of 7.0dB in *SNR* has been obtained ."

This is an example where the italicized phrase adds nothing to the sentence, and as such, can be deleted. We have repaired the passive structure here as well, since we also reduce wordiness by doing so, and added an article to modify the singular acronym form, "SNR".

(215) Good

Based on these results, we obtained an improvement of 7.0 dB in the *SNR*.

*Relevant Plain English Rules : **57, 6, 5, 27***

Here is another pair of examples illustrating the addition of unnecessary words in getting the overall message across. The italicized phrase can be deleted, and the sentence can be arranged (note that there are passive problems here as well).

(216) Bad

> "In [6], *it is described* that introducing the ad-hoc concept to cellular systems is effective on efficient usage of frequency bands as follows."

In addition to the deletion of the unnecessary phrase, the citation has been moved to a position following the statement. By doing this, no direct reference, such as "in", is required.

(217) Good

> Introducing the ad-hoc concept to cellular systems is effective for efficient usage of frequency bands [6], as follows.

*Relevant Plain English Rules : **5, 57, 6, 4***

Often times, complex tense forms are used in favor of their simple alternatives, but usually, the simple solution is the best solution.

(218) Bad

> "To conveniently execute the above-mentioned calculation, Viterbi et al. *have already* proposed the method using a state transition matrix of the component code [12]."

In the poor example, above, there is no difference in basic meaning, based on context, between "have already proposed" (a past event) and simply "proposed" (a past event). In this case, then, following the principle of Economy, simple (brief) is best.

(219) Good

> To conveniently execute the above-mentioned calculation, Viterbi et al. proposed using a state transition matrix of the component code [12].

*Relevant Plain English Rules : **57, 56***

Here is another example where a single word is sufficient to get our idea across, and the added extras convey nothing useful.

(220) Bad

> "As a result, this concept has been applied to most *of all* land mobile communication networks."

Do the words “of all” change the meaning of “most”? If not (they don't), then they are not necessary.

(221) Good

> As a result, this concept has been applied to most land mobile communication networks.

*Relevant Plain English Rules: **57***

Some wordiness problems are quite simple to correct, particularly when it simply requires the removal of one or more unnecessary words.

(222) Bad

> “By replacing steps A4) to A8) in Fig. 3 by B1) to B15) in Fig. 5, we obtain the *entire* improved algorithm.”

Words such as “entire”, “complete”, and so forth, are rarely needed. The “improved algorithm” is one unit, one thing, so of course we are referring to it as a complete, or entire unit. This is like saying, I am “completely finished”. If you are indeed completely finished, you are, in simpler terms, “finished”. It is a rather simple situation, you are either finished, or you aren't--“completely” adds no meaning to the expression in a technical or scientific report.

(223) Good

> By replacing steps A4) to A8) in Fig. 3 by B1) to B15) in Fig. 5, we obtain the improved algorithm.

*Relevant Plain English Rules: **57***

Here is another problem where modifying words add nothing to what we already know.

(224) Bad

> “We have investigated the difficulty of the *open* question: Can we construct an elliptic curve of a given order in deterministic polynomial time?”

Like “free gift” (have you ever heard of gift that was not free), and “completely finished, “open question” is a wordy way of saying “question”, since any unanswered question is presumably, “open”.

(225) Good

> We have investigated the difficult question: Can we construct an elliptic curve of a given order in deterministic polynomial time?

*Relevant Plain English Rules : **33**, **34**, **57***

In another example involving “open questions”, we see the same problem made worse by repetition, and further wordiness.

(226) Bad

> "We have also given a necessary and efficient condition for the *open* question to be solved affirmatively under the ERH. This leads to another *open* question that is equivalent (under ERH) to the original *open* question: [...]."

First, of course we don't need "open" for any of three occurrences in the poor example, and in the second sentence, we can condense this statement into a much more economical structure.

(227) Good

> We have also given a necessary and efficient condition for the question to be solved affirmatively under the ERH. This leads to a nearly identical (under the ERH) question: [...].

*Relevant Plain English Rules : **57**, **32***

The following set of examples contains a pairing of words where one overlaps in meaning with the other, and as such, is wordy.

(228) Bad

> "Accordingly, there are a lot of speech enhancement techniques such as *existent* methods utilizing the estimation theory [3]."

The meaning of the word "existent" is repetitive (redundant), since it implies "existing" or simply "is/are". In other words, if we have a method, then it "exists", so we don't need to call it an "existent method". This is similar to points made about "open question", "completely finished" and "free gifts". Things that are repetitive are often redundant, and vice versa.

(229) Good

> Accordingly, there are a lot of speech enhancement techniques such as methods utilizing the estimation theory [3].

*Relevant Plain English Rules: **56***

The following example involves confusion caused by a similar case of wordiness.

(230) Bad

> "We assume that there *does not exist* the minimum-cost tree of *H* whose root is u*0.*"

In this example, there are too many words used to get a basic idea across. Namely, "does not exist" is wordy and intrudes on the main message. Further, the negative is awkward and out of place as well. The word "exist" is frequently used both in these negative statements and affirmatives as well, but in both cases, the preferred alternative is simply "is".

(231) Good

> We assume that there *is no* minimum-cost tree of *H* whose root is u*0.*

*Relevant Plain English Rules : **57**, **42***

No reference needs to be made to obvious information. Though at times we may use the following expression, It is important to note that it adds very little to the actual meaning of the statement.

(232) Bad

> "Summarizing *the above*, our scheme is more efficient than the previous [schemes] [...]."

In this case, what else could you be summarizing, other than what was written "above"? In most cases, just telling us that you are summarizing is sufficient; this is both direct and economical.

(233) Good

> Summarizing, our scheme is more efficient than the previous [schemes] [...].

*Relevant Plain English Rules: **57***

Let us view a similar example.

(234) Bad

> "To summarize *above* a deterministic polynomial-time algorithm for computing the order itself is known [...]."

In this last case, "above" is unnecessary, where adding a comma is all that is needed.

(235) Good

> To summarize, a deterministic polynomial-time algorithm for computing the order itself is known [...].

*Relevant Plain English Rules: **57***

Sometimes "above" isn't a bad thing. In the next example, the expression is used as a modifier, and while it could be replaced by "our", it need not be. There are other wordiness problems, however.

(236) Bad

> "Summarizing the above arguments, when a structural network of at most 50 ~ 60 vertices and 150 ~ 180 edges is *of practical interest to* investigate, the problem is *never hard to solve* and can be handled within a practical time."

Here, the italicized phrases are wordy, and be replaced by more economical alternatives.

(237) Good

> Summarizing the above arguments, when a structural network of at most 50 ~ 60 vertices and 150 ~ 180 edges is *worth* investigating, the problem can be solved quickly and easily.

*Relevant Plain English Rules : **57**, **33***

This is another awkward reference to previously discussed information, where the use of "above" would offer a reasonable solution.

(238) Bad

> "First, sort the *so far observed* contexts, [*equation*] in order of [...]."

Our simple repair here is to replace the awkward phrase, "so far observed", with the lest wordy, and more precise, "noted above".

(239) Good

> First, sort the contexts *noted above*, [*equation*] in order of [...].

*Relevant Plain English Rules : **37**, **57***

Here are three more examples of problems with "above". In two of the three cases, we have taken "above" out, and in the third, have reworded the sentence.

(240) Bad

> a. "Next, based on the above fact [...]."
>
> b. "To estimate the rate function for the above methods [...]."
>
> c. "However, because of the above mentioned differences [...]."

In the first poor example, "a", we can simply use "this" to follow a previously stated point. In the second example, we use "previous", and in the third, we change the word order.

(241) Good

> a. Next, based on this fact [...].
>
> b. To estimate the rate function for the methods discussed in the previous section [...].
>
> c. However, because of the differences mentioned above [...].

*Relevant Plain English Rules : **32**, **34**, **38**, **57***

Wordiness sometimes comes about when explanations are offered when they really aren't necessary, as in the following example.

(242) Bad

> "Otherwise, *that is to say*, if the range region contains *more than one* primitive blocks, a 1-bit is assigned, and then, the following process is applied."

The sentence begins with "otherwise", then follows this by another expression which plays a similar function ("that is to say"). In this situation, only one such expression is necessary. We have also repaired the number-reference problem ("more than one") where it is difficult to make subject and tense agree in number.

(243) Good

> Otherwise, if the range region contains *two or more* primitive blocks, a 1-bit is assigned, and then, the following process is applied.

*Relevant Plain English Rules : **57**, **27***

Here is another example that shows how to eliminate unnecessary words, thereby focusing more directly on the message.

(244) Bad

> "Thus this paper *devises* an error detection on the basis of the third way, which is more effective than that of the *conventional* method, and moreover the proposed approach is compatible with the conventional decoder."

First, there are several problems that must be addressed before even beginning to shorten the sentence. The verb "devises" in inappropriate (a paper doesn't "devise" anything, people do); it can probably be replaced with something like "introduces". Next, "the third way" needs to be restated explicitly here--it is a key point. With these points in mind, let us now see if we can reorder the ideas to shorten and clarify the message. Essentially, our repairs included the removal of one of the occurrences of "conventional".

(245) Good

> Thus this paper *introduces* an error detection on the basis of the third way (detecting syntactic and semantic video coding violations), which is compatible with, yet more effective than, that of the conventional method.

*Relevant Plain English Rules : **57**, **54***

Wordiness, like passive structures, sometimes makes the text look too formal, and distant. The following example illustrates this point.

(246) Bad

> "*To our best knowledge*, this is the first paper that gives a circumstantial evidence suggesting that the open operation could be solved affirmatively."

The first phrase in the poor example, above, is too formal (and wordy), and should be replaced with a more common and familiar expression. Taking this one step further, in the interest of both economy and directness, we could in fact simply begin the statement with "this is the first...", since of course, the reader understands that all written statements in your report represent ideas that you believe, or that represent your best knowledge.

(247) Good

a. *We believe that* this is the first documented circumstantial evidence suggesting that the open operation could be solved affirmatively.

(or)

b. This is the first documented circumstantial evidence suggesting that the open operation could be solved affirmatively.

*Relevant Plain English Rules : **57**, **2**, **51***

Whenever possible, it is best to seek out shorter, simpler expressions that can be used to replace awkward and unwieldy phrases.

(248) Bad

"Especially, histogram modification *is the method where* the gray scale transformation is *designed* to realize the desirable intensity histogram."

Often, what causes phrases to be awkward is a poor sentence structure, where clauses have been pasted together in an unnatural string. In the repaired version of our poor example, we have both replaced the italicized awkward expression (with "involves"), and moved the verb to an earlier point in the sentence.

(249) Good

Especially, histogram modification *involves designing* the grey scale transformation to realize the desirable intensity histogram.

*Relevant Plain English Rules: **57***

In the following examples, we have two pairs of sentences where the problem is with the second sentence of each. Each of these sentences contains wordy expressions that can be reduced.

(250) Bad

a. "Reject the call if some cliques already have the same number of calls as *nd, respectively*. Accept the calls *in other cases*."

b. "Reject the call if some maximum cliques have the same number of calls as *nd, respectively*. Accept the calls *in other cases*."

First, I should say that in the first sentence of each, there is a problem with “respectively” since this implies two items, followed by another two items the order of which would be in agreement with the first two items. In both cases, however, there is only one item, so this word should be deleted. Next, and the focus here, is that in the second sentences of both examples, the phrase “in other cases” is both awkward and wordy. This can be replaced by a single word as shown below.

(251) Good

> a. Reject the call if some cliques already have the same number of calls as *nd*. Accept the calls *otherwise*.
>
> b. Reject the call if some maximum cliques have the same number of calls as *nd*. Accept the calls *otherwise*.

*Relevant Plain English Rules : **57**, **54***

In giving credit for important research, sometimes authors overstate their case. Usually, it is best to simply make the citation without a lot of extra discussion.

(252) Bad

> “The result agrees with *the classical one by* Young [1] when $\alpha = 1$.”

In this example the italicized expression can be omitted, since it adds little to what the reader already knows, and uses several words to make a simple attribution.

(253) Good

> The result agrees with Young [1] when $\alpha = 1$.

*Relevant Plain English Rules : **57**, **40***

Sometimes, the obvious need not be stated. In general, when we use tables, diagrams and figures, we are doing this so the reader may better understand the information we are discussing. This is the expected practice, and we need not tell the reader that these representations are for that purpose.

(254) Bad

> “*In order to make the later explanation easy*, Fig. 1 shows the block diagram of the newly proposed neural-net based controller [...].”

In the poor example, the italicized phrase tells us what we already know; figures are to help us understand the discussion. We do not need to tell the reader this.

(255) Good

> Fig. 1 shows the block diagram of the newly proposed neural-net based controller [...].

The last example to be considered here in this section on wordiness is challenging because it contains many problems, including poor word order, word choice, repetition and of course wordiness. Let us see what we can do, from the perspective of mainly handling the wordiness problems, but also addressing the other issues as well.

(256) Bad

> "On the study of turbo codes over a practical channel by a Monte Carlo simulation, we should be forced to spend a lot of time on the simulation."

From the perspective of wordiness, the phrase "on the study of" is a good candidate for reduction. We have incorporated this idea simply as "studying" in the revised example. We also reversed the order of the main clauses, deleted the repetition of "simulation", and improved upon the word choice of "forced"--even then, it still probably needs further intervention from the original author.

(257) Good

> We would likely be required to spend a significant amount of time in a Monte Carlo simulation studying turbo codes over a practical channel.

*Relevant Plain English Rules : **57**, **37***

3.2.c. Redundancy

Redundancy is similar to, and overlaps with, both wordiness and repetition. It is like repetition, which involves repeating identical or similar words and phrases, but differs in that redundancy can usually be overcome by deletion of unnecessary words, phrases and sentences, while repetition usually requires rewording, with some trimming of unnecessary words. Wordiness, on the other hand, is a problem involves using too many words to get a simple idea across, and can usually be overcome by seeking out shorter, more economical expressions. In other words, repetition is usually cured by thinking of alternative expressions with similar meanings, wordiness is usually cured by replacing longer expressions with shorter ones of similar meaning, while redundancy (a basic rule of Economy) is usually overcome by simply deleting the repeated words and phrases. We want to avoid restatement and redundancy whenever possible, so as to economize on our message, and keep the readers focused. In this section we will of course see overlaps with the problems we noted above, for both repetition and wordiness. Let us look at two examples of redundancy to see what is meant by the unnecessary repetition of information.

(258) Bad. Redundancy.

> In Suzuki, 1999, an evaluation technique using *Binary Packing evaluation* was proposed. *Binary Packing evaluation*, which is based on the concept of *Binary Packing*, is one of the *evaluations*.

Here, the same word has been used several times within a very small textual space. Similar to repetition, the difference is that redundant terms usually can be deleted, and the text shortened

with no major problems, while repeated terms simply need to be replaced by other words or expressions of similar meaning. Let us look at how we can combat the redundancy in the last example.

(259) Good. Redundancy.

> Suzuki, 1999, proposed a Binary Packing evaluation technique.

*Relevant Plain English Rules : **56**, **54**, **32***

The following is a similar example.

(260) Bad

> "In [7],[8], an *approximate* technique using Clique Packing *approximation* has been proposed. Clique Packing *approximation*, which is based on the concept of Clique Packing [6], is one of the *approximations*."

First, it is easy to see that "approximate" in various forms has been repeated several times in the bad example. As with most examples of redundancy, the remedy is not to find alternative words to describe the same thing, as we did with repetition, but to find ways to simply trim the text of some of the redundant (unnecessary) information. Finally, I should point out that just because numerals in brackets are used does not mean regular rules of grammar do not apply. Thus, when two items are listed next to each other in subject position, we need a conjunction ("[7] and [8]").

(261) Good

> [7] and [8], proposed an approximate technique using Clique Packing approximation, based on [6].

*Relevant Plain English Rules: **56***

3.2.d. Conjunctions

In this short section, we look at the misuse of conjunctions, where they have been placed at the heads of sentences, or where an incorrect conjunction has been employed, or one has been used incorrectly.

It is usually best not to start a sentence with a conjoining conjunction such as "and", "or" and "but". These are best used to conjoin clauses within a sentence.

(262) Bad

> "*And* they have learning abilities and versatilities that can adapt to the unknown environment."

As we can see from this example, below, it is often possible simply to omit the "head" conjunction with no loss of meaning.

(263) Good

They have learning abilities and versatilities that can adapt to the unknown environment.

Relevant Plain English Rules: ***23***

The following is a similar set of examples.

(264) Bad

"*And vice versa* for the case when the searched range is in the right of a node."

In this example, the repair was a little more involved, since "vice versa for the case" cannot be used to begin a sentence.

(265) Good

The opposite is true for the case when the searched range is in the right of a node (i.e., the left sons are not included in the searched range, and thus are not visited).

Relevant Plain English Rules : ***23, 62***

The following is another example of the improper use of a conjunction to begin a sentence.

(266) Bad

"*But* the detailed manipulation for this algorithm is described in Appendix A."

As we have noted, it is best not to begin statements with common conjunctions such as "and", "or", "but" and so forth.

(267) Good

The detailed manipulation for this algorithm is described in Appendix A.

Relevant Plain English Rules : ***23, 62***

Here is another example of a sentence improperly initiated with conjunctions, in this case, the problem is with "because".

(268) Bad

"[...] the statistical static timing analysis becomes important [for] designing high speed and low power VLSIs. *Because*, designers often set excessive margins derived from the worst-case analysis [...]."

In this example, the easiest solution is to simply combine the two sentences that are separated by the conjunction as the head of the second sentence. In some cases, though, the resulting combined sentence may be overly long and complex, and might require other forms of repair.

I have replaced “because” with “since” in this example, since I consider it a stylistic improvement (where “because” is often considered more formal than “since”).

(269) Good

> [...] the statistical static timing analysis becomes important [for] designing high speed and low power VLSIs *since* designers often set excessive margins derived from the worst-case analysis [...].

*Relevant Plain English Rules : **11**, **62***

This next problem has to do with choosing the right conjunction.

(270) Bad

> “[...] the location of an error in the bitstream that the decoder detects can not be *the one that* the error has actually occurred.”

Clearly, the second “that” refers to “location”, and should be replaced by “where” -- the proper term to be used for “place”. Notice also that “the one” refers to the same place, and as such is redundant and can be omitted.

(271) Good

> [...] the location of an error in the bitstream that the decoder detects can not be *where* the error has actually occurred.

*Relevant Plain English Rules : **62**, **63***

Choosing the right conjunction depends upon what kind or relationship the conjoined structures enjoy, such as agreement, opposition, cause, and so forth.

(272) Bad

> “From the renewal argument, it is sufficient to consider the system *behaviour* for one cycle *and* we drop the discrete time index *i* (*i* = 1,2,...) in the following discussion.”

The problems in the poor example involve the conjunction “and” (suggesting equal coordination of joined clauses) and mixed English spellings (uses British spelling in a paper otherwise employing only American English). The conjunction “and” has been replaced with “so”, showing a causal relationship rather than one of equivalence, or agreement.

(273) Good

> From the renewal argument, it is sufficient to consider the system *behavior* for one cycle *so* we drop the discrete time index *i* (*i* = 1,2,...) in the following discussion.

*Relevant Plain English Rules : **62**, **2**, **3**, **9***

In the last set of examples involving problems with conjunctions, we see the contrastive “but” placed in a coordinate position (which requires “and”).

(274) Bad

> “PN^2’s are sufficiently simple for the mathematical analysis, such as invariant analysis, *but* have enough modeling power.”

When “but” is used, we expect the second set of facts to contrast with the first. In this case, the second clause simply adds to, or embellishes, the first clause, so “and” is required.

(275) Good

> PN^2’s are sufficiently simple for the mathematical analysis, such as invariant analysis, *and* have adequate modelling power.

*Relevant Plain English Rules : **33**, **34**, **62***

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3.3. Directness

There are four basic guidelines supporting the Principle of Directness: (a) State what things are, not what they seem to be; (b) State the subject clearly; (c) State the "bottom line" succinctly; (d) Avoid negatives. In general, this principle combats ambiguity, vagueness, and obscurity in favor of clarity, concreteness and recognizability.

3.3.a. Visualize your Message

One idea to keep in mind when writing is visualization. It is important to try to help your readers “see” what you are talking about by using clear images, common references, and easy-to-follow guidelines. It is important to remember that what appears obvious to us may not be so obvious to the reader, so it is up to us to write in a way that will ensure an accurate understanding of our intended message. We will see how many of the corrections that follow in this section, on the Principle of Directness, help to make the statements more “visible”, and understandable, to the reader.

3.3.b. Concrete

The term “concrete” refers to something tangible, something that we can easily picture, or understand. It is grounded in real world referents, and comes from our common shared experiences. Often, being concrete requires us to replace very general expressions with more precise ones, or similarly, replacing words with multiple meanings with ones that have only singular interpretations.

One important part of writing successfully is choosing the best word to fit the situation. Often, the right word is not only precise (direct) it is economical as well. Let us look at some examples of poor word choice problems.

(276) Bad

> “In this paper, we use the idea in [8] to resolve such an *inconsistent problem*.”

In this example, we can replace “inconsistent problem” with the shorter “inconsistency”. Often we will see that adjectival phrases can be replaced by simple nouns, as we have done here.

(277) Good

> In this paper, we use the idea in [8] to resolve such an *inconsistency*.

*Relevant Plain English Rules : **33**, **34**, **9***

In research reports, one of the more common mistakes is the misuse of the term

“research”, both as a verb and a noun.

(278) Bad

> “There are only a few *researches for* the second problem.”

Here, “research” is treated as a countable noun, which it is not. Further, “for” should be replaced with “to”, but even then, finding another more suitable expression is the best solution.

(279) Good

> To date there has been only a few investigations related to the second problem.

*Relevant Plain English Rules : **33**, **34***

We see a problem with the word “exist” from yet another angle. As discussed before, “is” is usually a more suitable replacement.

(280) Bad

> “Then there *exists* at least one computation path that has the following sequence: [...].”

(281) Good

> Then there *is* at least one computation path that has the following sequence: [...].

*Relevant Plain English Rules : **51**, **33***

In this next example, the wrong superlative was chosen, resulting in an awkward phrase.

(282) Bad

> “Among them, MUSIC is *most well*-known for its super-resolution capability and simpleness.”

The superlative “most” cannot be joined with expression “well-known”; one or the other must be chosen, and if it is the superlative you want, “best” is the better choice.

(283) Good

> Among them, MUSIC is *best* known for its super-resolution capability and its simplicity.

*Relevant Plain English Rules : **9**, **33**, **34***

Here is another problem dealing with the difficulty of using a superlative with an adjective, in this case, there simply is a better choice available.

(284) Bad

> "Rijndael is the *most famous* SPN-type cipher with a variable block length and a variable key length [...]."

The word "famous" is out of place because it assumes a value judgment of sorts, and should be avoided in technical and scientific writing. Instead, a more neutral approach should be adopted.

(285) Good

> Rijndael is the *most widely known* (common, recognized) SPN-type cipher with a variable block length and a variable key length [...].

*Relevant Plain English Rules : **33**, **34***

Sometimes new words can be derived from existing ones, but in most cases, this is the wrong path to take.

(286) Bad

> "Thus, the proposed procedure only maintains the *irredundant* set of options, and in the end of the procedure *bottom.up(i)*, redundant options are pruned."

In this example, "irredundant" has been coined, but as there are suitable existing expressions to represent the intended meaning, the existing expressions should be used. We have left unchanged "bottom.up", but this too appears to be in need of repair.

*In English, we can actually create new words rather freely, and this form is possible from that perspective. However, from the perspective of Plain English, we suggest that you avoid using uncommon words and expressions, and that you also avoid coining new terms so that your readers will not have to spend time trying to understand such forms.

(287) Good

> Thus, the proposed procedure only maintains the non-redundant set of options, and in the end of the procedure *bottom.up(i)*, redundant options are pruned.

*Relevant Plain English Rules: **51***

3.3.c Pronouns

In this section, we look at various problems involving the misuse of pronouns. Often this involves poor alignment between the original subject and the pronouns that follow, and sometimes it involves the use of pronouns where no clear subjects precede them. We will look at these and other problems involving pronouns below.

In this next case, we need to know who, or what, is "enabled".

(288) Bad

> "This feature enables to represent mobile codes in a distributed environment."

We suggest that the pronoun "us" can be inserted here, but perhaps other representations are possible as well.

(289) Good

> This feature enables *us* to represent mobile codes in a distributed environment.

Relevant Plain English Rules: ***40***

Here is another example of a missing pronoun; we need to know *what* is "extended".

(290) Bad

> "By using the following transition matrix [*equation*], and by extending to the combined trellis, their method can be applied *for* the Markovian impulsive noise channel."

In addition to handling the omission of the pronoun, we have also changed the preposition, "for", to "to".

(291) Good

> By using the following transition matrix [*equation*], and by extending *it* to the combined trellis, their method can be applied *to* the Markovian impulsive noise channel.

Relevant Plain English Rules : ***40***, ***77***

In this next case, the pronoun that is used can be replaced with a better alternative.

(292) Bad

> "As for the trapdoor [...] once given α, trapdoor of σ, *one* can compute $\sigma^{-1}(y)$ efficiently. So *he* can also compute ψ efficiently."

In this last example, the first sentence introduces the neutral term, "one", but in the sentence that follows, switches to the pronoun "he". This is of course both inconsistent (a violation of Cohesiveness) and incorrect. The noun substitute "one" should be used in the second sentence as well (or, alternatively, "you" can replace "one" in both cases). Another reason to avoid "he" is the sexist implications of using a gender-based pronoun.

(293) Good

> As for the trapdoor [...] once given α, and a trapdoor of σ, *one* can compute $\sigma^{-1}(y)$ efficiently. So, *one* can also

compute Ψ efficiently.

*Relevant Plain English Rules : **28**, **40***

3.3.d. Word category change

This is a special section on the misuse of words where the problems are the result of changing the words from one type to another incorrectly, such as taking a verb, and changing it into a noun, or taking verb and turning it into an adverb, and other such alterations of the basic word forms.

(294) Bad

"When we have *computer* [*equation*]for an [*equation*], all we have to do is to *increment* the counter for [*equation*] by one."

While "increment" has the idea of "increase", it is not a verb, and cannot be used as one; rather, a true verb should be used. Notice that we have retained "increment" in the repaired version. Finally, I assume "computed" (a verb), is incorrectly written as "computer" (a noun).

*In English, we can actually create new words rather freely, and this form is possible from that perspective. However, from the perspective of Plain English, we suggest that you avoid using uncommon words and expressions, and that you also avoid coining new terms so that your readers will not have to spend time trying to understand such forms.

(295) Good

When we have computed [*equation*] for an [*equation*], all we have to do is to *increase* the counter for [*equation*] by one *increment*.

*Relevant Plain English Rules: **9***

Here, we see tense added to the wrong constituent of a phrase.

(296) Bad

"[...] the information *on* the main memory since the last checkpoint is *back-uped* in a secondary medium."

The phrasal verb, "back up", contains the verb "back", which is the only thing can accept tense in this expression. We also changed the preposition "on" to "in".

*In English, we can actually create new words rather freely, and this form is possible from that perspective. However, from the perspective of Plain English, we suggest that you avoid using uncommon words and expressions, and that you also avoid coining new terms so that your readers will not have to spend time trying to understand such forms.

(297) Good

> [...] the information *in* the main memory since the last checkpoint is *backed up* in a secondary medium.

*Relevant Plain English Rules : **9, 77***

The following example exemplifies the principles of “Plain English”. While the target expression in the first example is not grammatically incorrect, the replacement in the good example is more economical, and direct.

(298) Bad

> “Thereby, the approximation of Eq. (2) is not obtained *with accuracy*.”

We see many of these kinds of errors, where a phrase is made combining “with” with a noun to produce a pseudo-adverb. It is best just to use an appropriate adverb.

(299) Good

> Thereby, the approximation of Eq. (2) is not obtained *accurately*.

*Relevant Plain English Rules : **6, 5, 15***

3.3.e. Avoid (multiple) negatives

One very distracting element in a statement can be the misuse, or overuse, of negatives. Negatives include words such as “not”, “no”, “nor” and so forth. The use of negatives cause readers particular problems when more than one of them are used in a single sentence, as we shall see below. Sometimes, though, even a single negative, when used with qualifiers such as “only” or “just” can be quite confusing as well. As a general rule, avoid using more than one negative term in a sentence.

We start off this section by looking at an example that has four negatives in a single sentence, which, as a result, is very hard to understand.

(300) Bad

> “In addition, there are *no*-way functions that are *neither* separated *nor* common trapdoor *no*-way, which can be called semi-separated.”

Part of the problem here is that clearly some of the negatives are required, particularly the “no” in the “no-way” expressions. So, these are maintained, and the confusing “neither/nor” pair replaced with two instances of the simple negative, “not”. So while we did not succeed in reducing the number of negative expressions in the example, we did make the example easier to read by using simpler negatives.

(301) Good

> In addition, there are no-way functions that are *not* separated and do *not* share a common no-way trapdoor, which

can be called semi-separated.

Relevant Plain English Rules: ***42***

Finally, we have an example with the awkward positioning and use of a negative.

(302) Bad

"A behavior of the solution in E-transformation algorithm is determined *only* by *not* network properties but a given graph."

The problem here is with the phrase "not only" which has been rearranged incorrectly, and therefore makes the sentence extremely difficult to understand. We can avoid this by deleting "only", and focusing on the important issues, while retaining the negative.

(303) Good

The behavior of the solution in the E-transformation algorithm is determined by a given graph, *not* network properties.

Relevant Plain English Rules: ***42***

3.3.f. Avoid Lexical Ambiguity: Wrong word choice

We have already mentioned the problems of word choice in our discussion of the importance of "concrete" vocabulary, above, so we will just state here that we want to chose words that are precise, common and easily understood. Often times, the problem is one where a better word exists to replace the one chosen for the statement. This is a difficult problem to overcome, however, since we sometimes choose words from dictionaries that appear to suit the context, but actually do not. A good rule to follow here would be to use only words that you know, and that are commonly known to your readers as well. Let us look at some of the wrong choices, below.

A frequently misused word is "another", first mentioned in our discussion of article usage. It is perfectly acceptable in the right context, but it is often placed in the wrong context.

(304) Bad

"Figure 7 shows another results computed for n - 31, where R = 100 [...]."

The problem here is that "another" refers specifically to "an other", meaning *one other*, not (*many) others*, as the author intends here. We replace it with "additional" to get the multiple concept across.

(305) Good

Figure 7 shows *additional* results computed for n - 31, where R = 100 [...].

*Relevant Plain English Rules : **33**, **34***

Sometimes words are employed to play greater roles than they are intended to play. In this next set of examples, there is a mismatch between the verb and the noun in this regard.

(306) Bad

> "In order to *improve* this problem, we use the long time average value of the error signal *e(n)* for updating the coefficients [...]."

Essentially, "problems" do not get improved (like a wine improves with age). Good things get better, perhaps, but bad things likely will worsen. Essentially, we want to "correct", "solve" or "overcome" problems.

(307) Good

> In order to *solve* this problem, we use the long time average value of the error signal *e(n)* for updating the coefficients [...].

*Relevant Plain English Rules : **33**, **34***

Another frequent problem area involves the misuse of "how" in discussing manner and method.

(308) Bad

> "In designing multi-variable control systems, *it is important how to remove* or compensate for the interactions."

In this example, clearly we are missing a verb that follows "it is important" and precedes "how to remove"; we suggest inserting "understand" as a possible solution here.

(309) Good

> In designing multi-variable control systems, *it is important to understand how to remove* or compensate for the interactions.

*Relevant Plain English Rules: **37***

The following example involves another difficulty with "how".

(310) Bad

> "However, since most process control systems are multi-variable systems with large mutual interactions, it is *strongly desired how* to *prevent* the effects of the interactions."

In this case, "how" intrudes, and can be deleted, while "strongly desired", which is conversational and awkward, is replaced by the more direct "important". Also, "prevent" is

not a good choice to use with interactions, likely “restrict” better covers this idea.

(311) Good

> However, since most process control systems are multi-variable systems with large mutual interactions, it is *important* to *restrict* the effects of the interactions.

*Relevant Plain English Rules: **37***

Some words are just too ambiguous to be of any use. One such word is “enough”. It has a relative meaning (must be related or contrasted to something), but often authors leave out the other side of the contrast. It is best to avoid “enough” in favor of a more precise term.

(312) Bad

> “In other words, as the *i*-th neural network is trained *enough*, the following relation can be approximately expected: [*equation*].”

(313) Good

> In other words, when the *i*-th neural network is trained *sufficiently*, the following relation can be expected: [*equation*].

*Relevant Plain English Rules : **33**, **34**, **37***

Words that are too simple, or common, sometimes are to be avoided. Such words can be vague, and often misleading.

(314) Bad

> “Therefore, no work has been *done* on the mathematical analysis.”

The verb “done” usually is used in the context of finishing an activity, though here it is simply meant to refer to whether any action has been taken. So, in this case, “performed” is a better alternative.

(315) Good

> Therefore, no work has been *performed* on the mathematical analysis.

*Relevant Plain English Rules : **33**, **34***

Next, we see a similar problem with the common word “keep”.

(316) Bad

> “PCHECK directly calculates signal wave forms to *keep* high accuracy of delay time.”

Here, “keep” isn't too far off target, but it is like “done” in that it is so common, it has less precision than our preferred alternative.

(317) Good

> PCHECK directly calculates signal wave forms to *maintain* high accuracy of delay time.

*Relevant Plain English Rules : **33**, **34***

Still another ambiguous common word is “hard”.

(318) Bad

> “A one-way function is intuitively a function which is easy to compute but *hard* to invert.”

This is an another very common situation where words like “hard” (and “good”, “keep”, “done”, etc.) are too common to be used precisely. Here, “hard” for example can refer to difficulty, density, complexity, and so forth. It should be replaced by a more precise descriptive term.

(319) Good

> A one-way function is intuitively a function which is easy to compute but *difficult* to invert.

*Relevant Plain English Rules : **33**, **34***

Another common error is giving animate properties to inanimate objects, such as in the following example.

(320) Bad

> “These high-level object Petri nets *aim* to describe real applications in an object-oriented manner [...].”

Whatever a “Petri net” is, it is clear that it is not a living organism, and thus can not have an “aim”, or purpose, though it may be *used* in such a way as to achieve an aim or fulfill a purpose. We repair this by restricting our vocabulary to terms that are suitable for inanimate objects.

(321) Good

> These high-level object Petri nets *are used* to describe real applications in an object-oriented manner [...].

*Relevant Plain English Rules : **33**, **34***

Here is another example of wrongly assuming animate qualities of inanimate objects.

(322) Bad

> "Thus, the delay estimation with net decomposition produces a conservative, or *pessimistic* result."

The word "pessimistic" can be contrasted with "hopeful"; both of which are very human qualities, and cannot be assigned to a kind of result, which is an inanimate object, or idea.

(323) Good

> Thus, the delay estimation with net decomposition produces a conservative, or *unsuitable (*or, *undesirable?)*, result.

*Relevant Plain English Rules : **33**, **34***

The next example contains a wordy phrase that is both awkward and ambiguous, and can be replaced by a more economical, and precise alternative.

(324) Bad

> "[...] the noise model proposed by Middleton et al. is well known, and *provides very good fits to* a variety of noise with a determination method of noise parameters [8]."

(325) Good

> "[...] the noise model proposed by Middleton et al. is well known, and *is suitable for* a variety of different types of noise with a determination method of noise parameters [8].

*Relevant Plain English Rules : **33**, **34**, **37***

Formulaic expressions are often misused. Such expressions include patterns such as, "on the one hand, ... and on the other hand", "left for future research", and here, "regarding" and "in regards to".

(326) Bad

> "*As regards* the complexity issue, the most time-consuming operation in the image enhancement algorithm by Peli and Lim is 2-D low-pass filtering."

The problem in this example is that the italicized expression is an archaic expression more commonly represented as "in regard to", and, though acceptable, is a wordy alternative to our preferred form, "regarding".

(327) Good

> *Regarding* the complexity issue, the most time-consuming operation in the image enhancement algorithm by Peli

and Lim is 2-D low-pass filtering.

*Relevant Plain English Rules : **33**, **34**, **57***

Authors sometimes have a difficult time working with a verb in order to indicate that something has been realized, changed, or activated. In these situations, awkward phrases are constructed where in many cases simple alternative expressions exist.

(328) Bad

"[...] the generated unstable limit cycle *becomes to a stable one* after the D-type of branching, [...]."

We can see that the awkward phrase in the bad example is wordy and imprecise, while its replacement is both economical and precise.

(329) Good

...the generated unstable limit cycle *stabilizes* after the D-type of branching, [...].

*Relevant Plain English Rules : **33**, **57***

In this next set of examples, words related to time need some repairs, keeping in mind that even the most current research is slightly out of date by the time the findings are actually published.

(330) Bad

"Their *older* result shows that the decrease of estimated upper bound is saturated at 7 rounds. Their *new* result is much better for 4 to 10 rounds, and shows monotonic decrease for more than 7 rounds."

Though I have corrected several problems here, we want to focus on the replacement of "older" with "earlier" and "new" with "recent". In terms of research, investigations that happened in the past were undertaken at an *earlier* point in time, while the most *recent* research brings us close, but not quite to the present (all publications, by definition, come out after the work is finished, and other investigations have been initiated)--even the "newest" discoveries become occurrences in the recent past from the perspective of publications.

(331) Good

Their *earlier* results show that the decrease of estimated upper bound is saturated at 7 rounds. Their *most recent* results are much better for 4 to 10 rounds, and show a monotonic decrease for more than 7 rounds.

*Relevant Plain English Rules : **33**, **34**, **27**, **76**, **15***

Finally, we look at an example that combines two points made above. Like the problems with "done" and "keep", discussed, above, words such as "good" are simply too common to be used with much precision in a technical context. Further, like "famous", there is an underlying nuance of judgment here, which is better when slightly neutralized.

(332) Bad

> "This *good* feature enables to find critical paths in a very short execution time [...]."

(333) Good

> This *useful* feature enables us to find critical paths in a very short execution time [...].

*Relevant Plain English Rules : **35**, **33**, **34***

3.3.g. Avoid Lexical Ambiguity: Avoid vague terms

This section closely follows the last, in that both are concerned with proper word selection. In the last section, though, word selection was generally incorrect because the context of the statement required a different word altogether from that of the original that was chosen. Here, we go to the heart of concreteness, and unambiguous terms, by observing word choices that were poor simply because they were too vague, or ambiguous, and while they may fit loosely into the context, they still have either multiple interpretations, or not enough content to deliver any kind of interpretation at all. It may be difficult to see clear divisions between the sections on "concreteness", "lexical ambiguity" and "vague terms", but that is because there are clear overlaps of meanings, problems and solutions. Overall, we are simply taking slightly different viewpoints on many of the common problems that we face when we want to improve our directness by improving the precision of our word choice. The most important thing to understand, then, is that there are many different ways in which we can look at the imprecision of word usage, and that there are also many different ways we can choose to repair them. Ultimately, it is a combination of strategies that will prove most effective in developing better writing skills.

In the following example, an awkward phrase in the bad example suffers from lack of precision.

(334) Bad

> "Accordingly, the Wiener filter *yields only an approximately optimum* solution to speech enhancement problems."

I understand the original statement to indicate that a less than optimum solution was developed, so I have tried to make this meaning more direct in the good example. It may be that the authors intended an even more optimistic nuance, however, if it wasn't successful, it should be clearly stated that this was the case. It appears that partial failure is obscured (intentionally?) by the confusing description.

(335) Good

> Accordingly, the Wiener filter *does not provide a perfect solution* to speech enhancement problems.

*Relevant Plain English Rules : **33**, **34***

It is important to avoid tentative, unsure statements. If you are truly unsure, then it is

best just to omit such conclusions. If you wish to suggest a certain degree of uncertainty, do with a measure of directness.

(336) Bad

> "In this regard, this *may imply* that a new measure *may* be necessary to evaluate the complexity network [...]."

The italicized phrase is too vague, with both "may" (twice) and "imply" suggesting uncertainty. Does it imply, or doesn't it? We can reduce the tentativeness somewhat, and the wordiness, by replacing it with "suggests", which is more straightforward.

(337) Good

> In this regard, this *suggests* that a new measure is necessary to evaluate the complexity network [...].

Relevant Plain English Rules: ***34***

The next example exemplifies a very common error that in essence asks the reader to believe your statements based on intangible supporting evidence. If evidence exists to support your conclusions, make reference to it, don't assume the reader automatically shares your exact same knowledge and expertise base.

(338) Bad

> "*It is known* that *R(G;p)* can be computed by enumerating [...]."

The italicized phrase suggests that the reader is aware of facts that may or may not be shared. It is best not to place the burden of knowing on the reader, and to supply appropriate support for all such conclusions. Note that we have also discussed this phrase in the section on passives, where we pointed out that this phrase suffers from a missing subject, as well. Our repair addresses these problems, and erases the ambiguity.

(339) Good

> *According to Author, date [1], R(G;p)* can be computed by enumerating [...].

[Note: Replace "author" with real name, and "date", with real reference date, such as "According to Suzuki, 1999, [1], R(G;p) can be computed by enumerating[...].]

Relevant Plain English Rules: ***18***

This is another example of the author assuming what the reader knows. In virtually all situations, well known or unknown, it is best to cite supporting evidence.

(340) Bad

"*It is well known* that the renewal process belongs to more wide class of stochastic processes [...]."

Here we have added information (resources) that can be consulted to check for further supporting evidence. Of course, I am not suggesting that you make up fake references, but simply refer to those sources that are applicable, rather than simply using a hearsay expression such as "it is well known", or even "they say." The "cf." in the good example means, "confer with", "compare to", or "check for further information".

(341) Good

It is well known (cf. [*12**], [*23**]) that the renewal process belongs to a wider class of stochastic processes [...]. [* *these are not actual references, but suggest where they should be included*]

Relevant Plain English Rules : ***18, 33, 34***

In this next example, we see an expression that is both confusing and imprecise.

(342) Bad

"In fact, moderate-size networks used in testing randomized FPTAS in [16] can be analyzed *by ours exactly*. Here it should be noted that *ours* is an exponential algorithm, although its time complexity is mildly growing [...]."

In the poor example, "ours" needs to be spelled out specifically. I have suggested that perhaps "algorithm" was what the authors were thinking of. Also, "exactly" doesn't quite fit here.

(343) Good

In fact, moderate-size networks used in testing randomized FPTAS in [16] can be precisely analyzed by *our algorithm*. Here it should be noted that *our algorithm* is exponential, although its time complexity is slightly increasing [...].

Relevant Plain English Rules : ***33, 34, 5, 46***

Wordy and ambiguous phrases are worsened when broken up into smaller parts and distributed throughout the sentence.

(344) Bad

"Below we summarize *in what points* our results *are interesting*."

The awkwardness of this last example comes from the splitting of the wordy and imprecise phrase, "what points are interesting" which can be reworded simply as "interesting (or important) points".

(345) Good

Below we summarize *the important aspects* of our results.

*Relevant Plain English Rules : **57**, **34**, **33***

In the next examples, it is unclear whether the author intended to convey vagueness or bias.

(346) Bad

"The degradation by the check markering is *supposedly* similar to them. Therefore, the *so-called* epsilon-filter is used to reduce the random noise of low amplitude."

The words "supposedly" and "so-called" both have some nuance of disbelief or doubt, so it is unclear how we are to react to the statements (and as a result, should be left out of the text). Should the reader doubt that "check markering" is similar, or that the "epsilon-filter" is actually worth considering? Perhaps the author thinks that these two items were misnamed? In any case, it is impossible to tell what the intent was, and in most cases, if there is dissension, it should be clearly spelled out. Please note that "markering" is used as in the original, but I believe "marking" is the correct form, as "markering" cannot be found in a usual English language dictionary.

*In English, we can actually create new words rather freely, and this form is possible from that perspective. However, from the perspective of Plain English, we suggest that you avoid using uncommon words and expressions, and that you also avoid coining new terms so that your readers will not have to spend time trying to understand such forms.

(347) Good

The degradation by the check markering is similar to them. Therefore, the epsilon-filter is used to reduce the random noise of low amplitude.

*Relevant Plain English Rules : **33**, **34**, **80***

3.3.h. Word Usage: "much"

This is another special section devoted to common errors found in many research reports. Specifically, there are many problems involving the use of the word "much" sometimes as an adjective (where better adjectives, or alternative expressions, exist), and sometimes to replace "many". This is a very common problem, but at the same time, can be easily corrected.

(348) Bad

"[...] we have to test *much* more examples, in this regard, the following results are preliminary."

In this first example, "much" is used to modify a countable word, "examples", where of course "many" should be used instead.

(349) Good

> [...] we have to test *many* more examples, in this regard, the following results are preliminary.

Relevant Plain English Rules: ***33***

Note another example of the misuse of “much” below.

(350) Bad

> “As technologies are scaled down, however, *much* accuracy is required and Rubinstein [3] has introduced a calculation model utilizing second order circuit moments.”

Here, “much” is used to indicate “a large amount”, and can be easily replaced by “increased”, “significant”, or “a great deal of”.

(351) Good

> As technologies are scaled down, however, *increased* accuracy is required so Rubinstein [3] has introduced a calculation model utilizing second order circuit moments.

Relevant Plain English Rules : ***33***, ***34***

Though many examples of the misuse of “much” can be found in research papers, the foregoing two should provide the reader with an idea of the kinds of problems to be on the look out for. Avoid mixing non-count modifiers with count nouns, and avoid using “much” to indicate “a large amount” in affirmative statements.

3.3.i. Avoid Syntactic Ambiguity: Scope, word order, adjectives and adverbs

Here, we look at some of the problems involving word order, and particularly, the placement of modifiers such as adjectives and adverbs in statements. Often, the incorrect placement of such modifiers can result in unintended meanings at best, or incorrect statements at worst. Usually, adverbs should be placed in a neighboring position, directly before or after the verbs they modify (there are exceptions of course), while adjectives of course go before the nouns they modify, but follow a certain order of placement when more than one adjective is used to modify a single noun. A good rule to follow for adjectives, then, would be to use at most only one adjective to modify any given noun.

One of the words frequently misplaced in a sentence is “only”. If placed too early, it limits the entire statement, rather than the range of a single phrase, or word.

(352) Bad

> “*Only* the difference in this case is the option calculation at the Steiner point.”

In the poor example, “only” appears to be a rhetorical device, representing something close to “however”, and if this is the case, such a transition marker should have been used. Otherwise,

“only” would have to have been used as a limiting factor, and if so, is placed too far away from the item that will be limited. In this case, it should be moved, as I have shown below.

(353) Good

> The *only* difference in this case is the option calculation at the Steiner point.

*Relevant Plain English Rules : **38**, **59***

Next is a simple problem of a single word placed in the wrong order.

(354) Bad

> “The output referred IP3 is *higher* 5.0 dB than the single balanced mixer.”

Usually, we put terms like “higher” and “lower” after the stated amounts, so in this case, it should be “5.0 dB higher”.

(355) Good

> The output referred IP3 is 5.0 dB *higher* than the single balanced mixer.

*Relevant Plain English Rules : **37**, **59***

Here is another example of the wrong placement of a single word.

(356) Bad

> “This paper deals with a *similar* stochastic database management model *to* Sumita, Kaio and Goes [11][...].”

In this case, “similar” is actually coupled with “to”, but is used as a modifier to the expression “stochastic database management model”, and as a means to compare theirs to a similar model proposed by the other authors noted. The repair in this case is to place “similar” and “to” together as they should be.

(357) Good

> This paper deals with a stochastic database management model *similar to* Sumita, Kaio and Goes [11][...].

*Relevant Plain English Rules : **37**, **59***

Here is a very similar problem of split phrases.

(358) Bad

> “[...] it has *comparable* compression performance *to* the best known data compression utilities.”

This is another example where a basic phrase, “comparable to” (like “similar to”) above, has been split, and the resulting sentence rendered confusing. As before, it is best to keep such phrases intact.

(359) Good

> ...it has compression performance *comparable to* the best known data compression utilities.

*Relevant Plain English Rules : **37**, **59***

Next is another relatively simply problem involving the misplacement of a single word, which in this case is an adverb.

(360) Bad

> “[...] if [*equation*], then [*equation*] *has* self-computable solutions *obviously*.”

In general, it is best to place most adverbs either directly before or after the verb that they modify.

(361) Good

> “[...] if [*equation*], then [*equation*] *obviously has* self-computable solutions.”

*Relevant Plain English Rules : **37**, **38***

Here is another example of the same problem of misplaced adverbs.

(362) Bad

> “Then, statistical techniques such as importance sampling and variance reduction should be applied to *perform* the system simulation *effectively*.”

(363) Good

> Then, statistical techniques such as importance sampling and variance reduction should be applied to *effectively perform* the system simulation.

*Relevant Plain English Rules : **37**, **60**, **39***

Here is one final example of a misplaced adverb.

(364) Bad

> “The quad-tree partitioning scheme is one scheme of *handling* blocks of various sizes *efficiently*.”

(365) Good

> The quad-tree partitioning scheme is one scheme of *efficiently handling* blocks of various sizes.

*Relevant Plain English Rules : **5, 60***

In this next case, we have another problem of word order, except that more words are involved; the words are all fine, but their order is a problem.

(366) Bad

> "On the other hand, when they belong to *neighboring different coherent regions*, they fire synchronously [...]."

In this last example, we see "different" as the main modifier of a type of region. What type of region is modified? They are "coherent, neighboring regions". We need to use the modifier that identifies place (neighboring) closest to the noun (regions), so "coherent" naturally precedes both.

(367) Good

> On the other hand, when they belong to *different coherent neighboring regions*, they fire synchronously [...].

*Relevant Plain English Rules : **5, 59***

Often, word order is not an isolated problem, but is joined by others as well. In this next example, we can also see wordiness and repetition.

(368) Bad

> "Moreover, *this filter* can be programmed *the filter type* even after it is fabricated by changing the switch status pattern of the built-in switches."

We can see that "filter" is unnecessarily repeated, before and after the verb that is performing an action on it. We have corrected this awkward phrasing by combining elements, and moving everything to one position.

(369) Good

> Moreover, *the type of this filter* can be programmed even after it is fabricated by changing the status pattern of the built-in switches.

*Relevant Plain English Rules : **5, 57, 32***

Next, we take another look at the problems with using "how" correctly (we discussed this in an earlier section).

(370) Bad

"*It is important how to tune* the control parameters in PID control laws [...]."

The phrase "how to tune" must precede the phrase that tells us *what* is being tuned, which in this case is "the control parameters". However, "it is important" should be placed after this subject in order not to confuse the reader. I have suggested two possible ways to do this, below. This is a natural order, where the subject is followed by a comment on the subject.

(371) Good

a. *How to tune* the control parameters *is important* in PID control laws.

(or)

b. *Tuning* the control parameters *is important* in PID control laws.

*Relevant Plain English Rules : **5, 37***

Sometimes, awkward word order is combined with poor word choices, which leads to confusing results.

(372) Bad

"The local contrast modification factor can be designed *by the following four steps.*"

In this last example, it appears that the four steps can perform the act of "designing", which is naturally not correct. *We* need to follow the steps in order to create the design. I have offered two alternatives to get this message across.

(373) Good

a. The local contrast modification factor can be designed *by following these four steps*.

(or)

b. The local contrast modification factor *recognizes the following four points*.

*Relevant Plain English Rules : **37, 15***

Common expressions, such as "whether or not" are often misused.

(374) Bad

"Therefore, to know the motion is exist *or not* in each *x (i, j, t)* is needed."

Here, "or not" sends up a flag, that tells us a comparison is being made, and it causes us to search for the rest of the expression, "whether", which is missing. To repair this, the full expression must be employed. Notice too, that the problem with the final dangling verb "needed" has been corrected. Note also that the article problem, when used with a non-count

noun (“motion”), has been corrected.

(375) Good

> Therefore, it is important to know *whether or not* motion exists in each *x (i, j, t)*.

*Relevant Plain English Rules: **37***

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3.4. Appropriateness

The *Principle of Appropriateness* consists of four supporting guidelines: (a) Be truthful and show politeness and respect for others; (b) Avoid idioms and slang, especially the more obscure regional variations; (c) Avoid contractions and casual speech rules, and; (d) Use grammatically correct sentences. In terms of research reports, the most common problems involved the use of conversational forms (casual speech rules), with a few examples of problems with neutrality and respect (both in a negative and positive way). Below, we review these specific problem areas.

3.4.a. Appropriateness: Avoid conversational forms

In this section, we look at the intrusion of conversational expressions in reports, and observe examples that overcome these problems. In general, we want to avoid colloquial, slang or jargon-like expressions in a scientific or technical report.

This is the first of several examples where one or more of the words used was too conversational; they are often colorful, wordy, imprecise, and inappropriate, and as such, should be avoided.

(378) Bad

> "Work on the problem has resulted in *a flood of* papers [1] - [4]."

Here, "flood" is a colorful, but imprecise and wordy description of a large amount of items.

(379) Good

> Work on the problem has resulted in *numerous* papers [1] - [4].

*Relevant Plain English Rules : **33**, **34**, **3**, **71**, **72***

This next example is essentially a word choice error, based on conversational expressions.

(380) Bad

> "The point is that these are not polynomial-time algorithms, although the running time has been reduced by many *clever* ideas."

The word "clever" is inappropriate since it is imprecise, and conversational, with a nuance of (positive) bias.

(381) Good

> The point is that these are not polynomial-time algorithms, although the running time has been reduced by many *insightful* ideas.

*Relevant Plain English Rules : **71**, **72**, **33**, **34***

Words which refer to the speech act are obviously inappropriate in a written report.

(382) Bad

> "This model may neglect many aspects of probabilistic link failures (*say*, burst, error caused by correlation), and yet it is *really* simple and captures some important aspects of reliability."

This is a rather straightforward example, where "say" referring to speech, should be replaced by something like "for example", or "such as"). Also, "really", too, in this context, is conversational.

(383) Good

> This model may neglect many aspects of probabilistic link failures (*for example*, burst error caused by correlation), and yet it is both simple and robust, capturing some important aspects of reliability.

*Relevant Plain English Rules : **72**, **8***

The next error similarly involves the idea that the text is being communicated orally (spoken), rather than visually (written).

(384) Bad

> "While (18) *may sound strange* because the right hand of (18) is a time function and the left hand is a constant, it is not."

In a sense, "sound" is a wrong word choice, but incorrectly chosen, I think, because of conversational influences. When we speak, things that people say, "may sound strange", but when we write, there is no sound of course, so things may "appear", "look" or "seem" strange.

(385) Good

> While (18) may *appear (seem)* strange because the right hand of (18) is a time function and the left hand is a constant, it is not.

*Relevant Plain English Rules : **33**, **34***

Here is another example of poor use of conversational forms.

(386) Bad

"Therefore, the proposed filter is expected to be altered with a microcomputer *and so on.*"

The phrase "and so on" is ambiguous, with a meaning similar to "etc.", but the role of this is better played by using "such as", which serves to limit the range or scope, as in the following example.

(387) Good

Therefore, the proposed filter can be altered by devices *such as* a microcomputer.

[*Note: It is unclear what "and so on" actually refers to; here I have interpreted it as meaning "computers and other similar electronic devices".*]

*Relevant Plain English Rules : **57**, **71**, **72**, **6**, **5***

The next poor example also contains a conversational "chatty" expression that should be avoided.

(388) Bad

"*By the way*, in process industries, PID control schemes [2],[3] are still mainly used due to the simple structures and easiness of grasping the physical meanings of control parameters."

The phrase "by the way" adds nothing to the meaning of the statement, and in fact detracts from it by being overly familiar and conversational; it should be eliminated.

(389) Good

In process industries, PID control schemes [2] and [3], are still used due to their simple structures and the ease by which they grasp the physical meanings of control parameters.

*Relevant Plain English Rules : **71**, **72**, **57**, **33**, **34***

We saw earlier the misuse of the word "much" to refer to amount (in another section), here, we see "lots", an imprecise and conversational reference also used for amount, similarly misused.

(390) Bad

"*To the best of our knowledge*, there are few studies of neural-net based PID control schemes for multi-variable systems, although *lots of* works with respect to ISISO neural-net based PID controller design have been reported."

We have actually dealt with the problem of "to the best of our knowledge" before (it needs not be stated, since we assume all statements in your report are to the best of your knowledge), but focus here on the use of "lots". This term is very imprecise, and can be easily be replaced by a number of suitable alternatives.

(391) Good

> There are few studies of neural-net based PID control schemes for multi-variable systems, although *numerous* investigations with respect to the ISISO neural-net based PID controller design have been reported.

*Relevant Plain English Rules : **56**, **71**, **72***

Here is another problem with the overused word, “lots”, accompanied by some other problems as well.

(392) Bad

> “However, in practice, since it is *considerably* difficult to determine the PID parameters suitability, *lots* of *researches* have been reported with respect to tuning schemes of PID parameters.”

I have repaired the use of “lots” as well as “considerably” (a basic word choice error), and “researches”, a misuse of the non-count noun “research”, though the main problem regarding conversational forms is the improper use of “lots”.

(393) Good

> However, in practice, since it is *extremely* difficult to determine the PID parameters, a *significant amount* of *research* has been undertaken with respect to the tuning schemes of PID parameters.

*Relevant Plain English Rules : **71**, **72**, **33**, **34**, **15***

Finally, another way that conversational forms make their way into reports is through the use of contractions. A good rule to follow here is to avoid all but the most common (“isn't”, “aren't” and “it's” are OK, but avoid most others, and even these could be avoided). This is more stylistic than necessarily a detriment to readability, but the use of contractions can be somewhat distracting to some readers.

(394) Bad

> “First, *let's* consider the simple case, that is, the case of 2-terminal nets.”

Avoid “let's” in favor of the spelled out form.

(395) Good

> First, *let us* consider the simple case, that is, the case of 2-terminal nets.

*Relevant Plain English Rules: **72***

3.4.b. Appropriateness: Adopt neutral, semi-formal, semi-polite style

It is important to stay within the confines of a particular writing style throughout the entire text. Basically we determine an appropriate level of usage, and use terms that conform

to that level. When in doubt as to what level of formality to use, it is best to use the somewhat detached semi-formal level for most of your writings. This level is used when your audience is not among your close inner circle of friends, but where the audience also does not require an obvious exaggerated degree of formality.

The key point here is to remember that we want to avoid bringing in words that are more suitable for other levels, so that we avoid the mixing of degrees of formality within a single text. In other words, we want to avoid overly familiar, or conversational, references in an otherwise “semi-formal” report. Similarly, if we refer neutrally to certain things (using words such as "one" or “you”), then we need to avoid bringing in non-neutral terms (like "he" or "she"). To repeat, we want to avoid mixing usage levels, or degrees of formality, within a single text, while maintaining a neutral perspective, using a semi-formal, semi-polite style.

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CHAPTER FOUR
CONCLUSIONS

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Chapter 4. -- Conclusions

Japanese

Overview

The conclusion is often the weakest part of the research paper, simply because so little effort goes into writing it, and as such, so little is actually covered in it. However, your conclusion should revisit your originally stated problem that you investigated, and should succinctly summarize your main conclusions regarding this problem in a brief and direct manner. It should focus on the successes achieved, but at the same time recognize its limitations, without dwelling on them. It should ultimately leave the reader with a clear and precise understanding of what it is you want he or she to think as a result of reading your discussion. The conclusion should not just taper off into obscurity, with the author assuming that the results of the investigation somehow can speak for themselves.

The way in which you summarize your analysis, and conclusions, follows the normal writing patterns referred to in the previous sections, so I will not go into any new techniques here, but will close by noting some typical errors that are often found in this final section of the report. Some of these errors are ones that we have noted in other sections, above, and some are unique to the conclusion.

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4. Summaries and Conclusions

One common error in the concluding section of the report is the reference to the need for further research on the problem that was investigated. Let us consider some examples.

(396) Bad

a. "Therefore, we need further *investigations*."
b. "There still remain some further *researches* […]."

Both of the sentences above indicate the need for further work in the area of discussion, but both do not communicate this well. In the first example, "investigations", as a plural, doesn't quite fit (perhaps "research" would be better), since as a noun "investigations" conjures up ideas of criminal investigations, and though of course not limited to this area, still is not often used as it was above. In the second example, indicative of many other similar errors in other papers, "research" is treated as a count noun, when in fact it is a mass noun, and cannot be used in the plural.

(397) Good

a. Therefore, we need to conduct further *research* in this area.
b. There still remains a need for further *research* […].

Relevant Plain English Rules: ***24, 25***

When we end sections and come to the conclusions of articles, we want to end on a strong note. Here, we see some unfortunate missteps at this juncture, with problems similar to those noted above.

(398) Poor Concluding Statements

a. As such, *there still remains some need for further researches*.
b. Following this, *we think more investigations on these questions are necessary*.

In the first poor example, above, "researches" is mistakenly used for the mass noun "research", but in general, this, and the second sentence, both suffer from ambiguity and vagueness, and are awkwardly phrased. Let us look at the revised examples.

(399) Good Concluding Statements

a. Because the present study only covered a narrow range of applicable criteria, we suggest that there is a need for further research in this area.

b. We leave, however, these questions for future research.

Relevant Plain English Rules: ***25, 33, 34***

Here precision (Directness) and context (Cohesiveness) provide guidelines for writing these almost formulaic closing statements. Because such comments are so common, they follow an established pattern, that if violated, look awkward and out of place.

The next poor example revisits our discussion of passive-looking structures, where the order of subject (the investigators) and object (what they are investigating) is reversed, in this concluding statement.

(400) Bad

"*To study* the large deviation principle for correlation functions of chaotic binary sequences *is left to us as further research*."

In order to make the poor example easier to read and understand, the order of the subject and object should be reversed creating a simple declarative sentence in the active voice.

(401) Good

We leave for *further research* the *study* of the large deviation principle for correlation functions of chaotic binary sequences.

Relevant Plain English Rules: ***37***

This next example really involves a word order problem, but is included here since it occurs in, and deals with a main theme concerned with, the conclusion.

(402) Bad

"One of our *future problems* is fabricate this fully digitally programmable filter system with controlling the […] values."

Here, "future" is treated as an adjective, and though perhaps an economical strategy, the results are less than satisfactory; it should be treated as a separate noun.

(403) Good

One of our *problems for the future* is to fabricate this fully digitally programmable filter system by controlling the […] values.

Relevant Plain English Rules: ***76***

Here, we have another look at how to handle the final statements in a conclusion.

(404) Bad

> "It is our future *problem* to analyze DCA in more practical models. For example, to *consider* irregular cell structure *is considered as one of the future problems*."

These statements are poor for several reasons. First, of course, there is the needless repetition of words such as "problems" and "consider". Second, the phrase "future problem" is awkward, and as such, an unfortunate way to end a research article. Let us see how this might look with attention paid to these two areas of concern. Even then, this is still a rather awkward last statement to leave your readers with, since it admits to the reader inadequacies of the present analysis, and suggests an uncertain future. Often this kind of statement is used, but with a more collaborative approach, as shown in the second good example.

(405) Good (1)

> In the future we plan to analyze DCA in more practical models. For one example, we hope to consider the problem of irregular cell structure.

(405) Good (2)

> In the future we plan to analyze DCA in more practical models. For one example, we hope to consider the problem of irregular cell structure. For the present, however, we hope our paper is of some small use for suggesting new ways for analyzing DCA methods.

Relevant Plain English Rules: ***24, 25***

To summarize the points made in this section, it is important to recognize that the conclusion is an important part of any research paper. It should briefly review the key points raised in your investigation, and leave your readers with a clear idea of what you want them to learn from your discussion. It should both summarize and emphasize these key points. Finally, it should suggest the report's inherent limitations, if any, and possibly suggest directions that the authors, or others, might pursue in the future, in relation to the main issues discussed in the report. Many of the expressions used in this final section are formulaic, and if deviated from significantly, become quite distracting to the reader. Ultimately, your conclusion should serve as a validation to the reader, reminding them of why it was worth their time to sit down and read it in the first place. In other words, end on a high note, by reminding the reader of the valuable insights obtained during the course of the discussion.

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CHAPTER FIVE
REVISION/SUBMISSIONS

Contents

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Chapter 5. -- Revision/Submission

Japanese

Overview

When you have completed writing the draft of your report, your work is not quite finished. There are a few more useful steps to follow to ensure that your published report will be accurate, understandable and well-received. We suggest that you allow about one month between completion of your draft and the final submission deadline. In this time, we encourage you to follow the following steps before finally submitting your report: (1) Self-edit; (2) Colleague check; (3) Revise and rewrite, and; (4) Native check (since some of these steps may be repeated, there will likely be more than four steps involved in this stage of the writing process). These steps are discussed in detail below.

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5.1. Self-edit

Now that you have finished your “final” draft, it is time to edit it yourself. This is one of those tasks where it is easy to talk about but difficult to do. You are indeed your best editor since you know better than anyone what information you intended to convey, and why. However, we are often somewhat blinded by what we intended to communicate (it is clear in our own mind), and what we actually succeeded in communicating (it may not be as clear to others). This is compounded by the fact that by the time we finish writing a report, the report is so familiar to us, that when we reread it, subconsciously, our mind “fills in the blanks” or overlooks small details, as if our intention overrides our actual accomplishment.

In order to check your text effectively, you must force yourself to read it critically. You must learn how to read it as if you were reading the report for the first time, and as if it were written by somebody else. Force yourself to be critical, to look for mistakes in grammar, logic and everything else. Sometimes this is very hard to do unless you have set the report aside for a few days, and then go back to it with “fresh” eyes. As suggested below, you may choose to simply let a few others read your paper for you, while you take a brief break from the paper yourself.

One problem that writers face, when they have finished writing their papers, is that there is simply no time left before the papers are to be submitted. They have worked hard to meet the submission deadline, and have met it, just barely. There is no time left for setting the manuscripts aside for a few days, or for following the suggestions below, by having others read their papers as well.

With the above in mind as you plan your paper, while the actual time spent “self-editing” your report might be just two or three days, you should set a deadline (to finish your “final” draft) three or four weeks in advance of the journal-submission deadline. Build this early completion date into your paper-writing routine. In this way, you will have time to set aside the paper for a few days while you can have others read it and make suggestions. Your paper will be significantly improved if you build this early completion date, and the other checking stages discussed below, into your overall implementation plan.

Print

5.2. Colleague check

A colleague check is very useful, and important. This is done by having another researcher or two, with interests similar to your own, read your paper quickly, and to provide constructive comments on all aspects of the paper as to how it could be further improved. Usually two obstacles stand in our way of this. The first is, as discussed above, time. Often, we have treated the submission deadline date as the date we need to finish our first “final” draft. But this of course is wrong, since it allows for no further editing either by you, the author, or by your colleagues. The second obstacle is often based on our fragile egos. We aren't quite ready to share the results of our new report with others who are close to us. Needless to say, there is much fault in this line of reasoning, since one primary purpose of writing the report is to share our findings and ideas with others, which will happen in a matter of months, if not weeks, upon submission. Further, by not allowing some trusted colleagues to look over our paper, we are in fact limiting the chances of our success in both the submission process, and in the eventual dissemination of our findings.

The natural solution is to finish the paper with enough time left before submission to allow for one or two of your colleagues to read and comment on your paper. Ask them to do so by a specific deadline, and if they are unable to commit themselves to the task, find someone that can. Once you get the papers and their comments back, you can then go through your text again carefully, and make changes as you see fit. Of course you don't have to follow all of your colleague's suggestions, but it is much better to understand what kinds of things they discovered, and whether there were indeed errors that could easily be corrected, and misunderstandings that could be cleared up, or neglected points added, and so forth. Allow a week to ten days to complete the colleague check.

Japanese

5.3. Revise/rewrite

After you have received comments back from your colleagues, go through your paper again carefully and critically, and make any changes that you feel necessary. As mentioned above, you know best what you intended to communicate, so obviously you will be the person who determines what should be included, and what should be left out. In some cases, it may be simply too late to include changes in your text that a colleague suggested, but may warrant an addition of a footnote to show that you are aware of problems in the analysis, but feel the present findings are valuable as written. In other cases you may even wish to acknowledge the colleague's contributions by naming the colleague in a note, or by referring to the comments from an “anonymous” reviewer. Depending upon how extensive the revisions are, your revisions may take as many as three to four days to complete. Your revised paper should now be given to a native speaker of English to be edited for spelling, grammar and usage problems.

Print

Japanese

5.4. Native check

A native check refers to having your paper read by a native speaker/writer of English. Normally, I would suggest you do this with your latest version of the paper, the version that you have produced *after* having your colleagues check and comment on your paper, and after you have made revisions based on their comments. A native checker may be a colleague, but does not necessarily have to be. Here, you are less worried about content, and organization, but more on grammar, usage, spelling and punctuation. For this reason, you need not have a native checker that is familiar with your type of work. A good native checker should be able to read a typical journal-submission article in a day or two (but may need as much as a week), and provide corrections that can be easily incorporated into your final draft. After you have received comments from your native checker, you may need to repeat earlier steps in this revision stage in order to produce a final copy of your paper that is suitable for journal submission.

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5.5. Submit

There is little to say here, other than follow your journal's submission guidelines, guidelines that of course helped to define the style and format of the paper from the point of initiation. There are usually formatting guidelines as well, which dictate requirements such as font type and size, margin dimensions, length, style of footnotes, citations, and so forth. In every case, follow the journal's specific submission guidelines.

For the actual submission, some journals require submission of drafts of the articles with the author's name omitted, so that copies can be distributed to referees for review, others require note cards with the article title, key words, author's information, etc., and still others require multiple copies of the submission. As mentioned above, it is naturally important to follow the particular guidelines of the journal you are submitting your article to. It should only take you a day or two to package and submit your report.

In the end, you may be asked to further revise your article on the basis of the editor's or a qualified referee's suggestions. In this case, you simply repeat some of the steps listed above, such as revising and rewriting the report (followed by having a colleague check it again if you have made major changes, followed by revision and rewriting, and checking by a native speaker), before submitting your second draft. Any subsequent drafts can usually be corrected solely by you, the original author.

For a simple chart description (followed by a detailed discussion) of the steps we encourage the writer to follow in writing a research paper, please see Appendix C “The Basic Steps for Writing a Research Paper”. This can be used as a kind of summary of some aspects of this book, and can give you an overview of the time required to complete the revision stage discussed in this chapter.

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5.6. Final Thoughts

In this handbook I have suggested how the basic principles of Plain English can be used to help write technical and scientific research papers clearly, concisely and correctly. We have reviewed many of the problems that writers face when using English as a second or foreign language, and have attempted to demonstrate how the basic principles of Plain English can be used to overcome such difficulties. By following the basic Plain English guidelines suggested above, you will avoid most of the common errors found in many research papers written by non-native speakers of English, and will produce a text suitable for publication both in Japan and abroad, thereby disseminating your valuable research to the far reaches of the world in a professional and effective manner. Good luck!

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Appendix

Appendix A - 80 Rules of Plain English

Appendix B - Suggested Reading List

Appendix C - Reference Guide

Basic Steps for Writing a Research Paper

-- from Conception to Submission --

Japanese

Appendix A - 80 Rules of Plain English

Overview

Our goal when using the principles of Plain English is to make our text readable, so that our intended message, as the author, corresponds as closely as possible to the message our reader understands, based on our discussion. We use Plain English to promote a one-to-one correspondence between what we want to communicate to our readers, and what our readers understand us to have communicated; a one-to-one correspondence between the written message, and the understood message.

There are four basic principles of Plain English; Cohesiveness, Directness, Economy and Appropriateness. These 4 principles in turn each govern 4 specific guidelines of language usage, for a total of 16 guidelines. The guidelines likewise govern a total of 80 separate rules. These rules are not grammatical rules, for the most part, but represent preferred strategies, or tendencies, that if employed, will work together to produce text that is clear, concise and correct. The 4 principles, 16 guidelines and 80 rules are all listed below. The numbers for the actual rules are based on the order in which they were introduced in the original text in which they were first published (Plain Written English), and are of no particular relevance here, other than as indicators for the rules mentioned in the body of the present text.

1. PRINCIPLE OF COHESIVENESS

a. Conform to Context

(1) Use context to determine best word choice (W)

(4) Use present tense, active voice, first person sing. (S)

(13) Know the intended audience, and write to it (P)

(14) Choose a design and stick to it (P)

(15) Use the correct articles (*a, an, the*) (P)

b. Use a Logical Order

(5) Use basic Subject-Verb-Object word order (S)

(6) Avoid Passive, Causative and Conditional structures (S)

(7) Place prepositions correctly in parallel structures (S)

(16) Organize material logically by linking paragraphs (P)

(17) Begin a paragraph with a good topic sentence (P)

(18) Using facts and statistics in supporting statements (P)
(19) Using examples and lists as supporting statements (P)
(20) Using opinions as supporting statements (P)
(21) Making statements of comparison and contrast (P)
(22) Using the cause and effect sequence (P)
(23) Making clear transitions within a paragraph (P)
(24) Summarizing your points (P)
(25) Emphasizing your points (P)

c. Be Consistent

(2) Choose words from same level of formality (W)
(3) Avoid mixing common words with technical ones (W)
(8) Keep tense the same in parallel structures (S)
(9) Keep types of words the same (S)
(10) Keep degrees of adjectives the same (S)
(26) Avoid shifts in person (P)
(27) Avoid shifts in number (P)
(28) Avoid shifts in voice (P)
(29) Avoid shifts in tense (P)
(30) Avoid shifts in subject.(P)
(31) Keep references, labels, measurement units same (P)

d. Avoid Distractions

(11) Avoid overly simple structures (S)
(12) Avoid Perfect and Subjunctive tenses (S)
(32) Avoid needless repetition of words (P)

2. PRINCIPLE OF DIRECTNESS

a. State what things are, not what they seem to be

(33) Use concrete terms (W)
(34) Avoid lexical ambiguity (W)
(36) State what things are, not what they seem to be (S)
(37) Avoid syntactic ambiguity (S)
(43) Avoid overstatement and exaggeration (P)
(44) Separate fact from opinion (P)

b. State the subject clearly

(35) Avoid indirect and unspecific subject/object (W)

(38) Reduce adverbial and adjectival phrases (S)

(39) Using scope to avoid misplaced adverbs (S)

(40) Avoid subject ambiguity: Use correct pronouns (S)

(41) Avoid ambiguity: Use correct reflexive pronouns (S)

(45) Avoid mixing subjects and objects up (P)

(46) Focus on the message: Place writer in background (P)

c. Avoid negatives whenever possible

(42) Avoid negative expressions and double negatives (S)

(48) Avoid spite and sarcasm (P)

(49) Be direct, but not too direct (P)

d. State the "bottom line" succinctly

(47) Avoid developing ideas that you will dismiss later (P)

3. PRINCIPLE OF ECONOMY

a. Brief is best

(50) Use words you know (W)

(54) Restrict length of sentences (S)

(55) Keep sentences separate in ambiguous situations (S)

(56) Avoid restatement and redundancy (S)

(57) Avoid wordiness (S)

(58) Use mainly nouns and verbs (S)

(59) Avoid overuse and misuse of adjectives (S)

(60) Avoid overuse and misuse of adverbs (S)

(66) Underwrite, rather than overwrite (P)

(67) Be brief and concise: Break writing up (P)

b. Common words are preferred over uncommon words

(51) Use common instead of uncommon words (W)

(52) Define/Gloss new expressions (W)

(53) Avoid coining new words and phrases (W)

c. Avoid subordinate clauses

(61) Avoid reported speech (S)

(62) Subordinate conjunctions (*who, which* & *that)* (S)

(63) Using *when* and *while* as conjunctions (S)

d. Discuss one point per statement

(64) Avoid run-on sentences (S)

(65) Avoid unrelated ideas in the same sentence (S)

(68) Develop your discussion one step at a time (P)

4. PRINCIPLE OF APPROPRIATENESS

a. Be truthful and show politeness and respect for others

(69) Use appropriate gender references (W)

(70) Use neutral words (W)

(73) Tell the truth (S)

(74) Avoid sweeping generalizations and stereotyping (S)

(75) Avoid sexist, racist and prejudiced comments (S)

(80) Use neutral tone: Avoid inference & implication (P)

b. Avoid idioms and slang, especially the more obscure regional variations

(71) Avoid colloquialism, clichés & slang (W)

c. Avoid contractions and casual speech rules

(72) Avoid uncommon contractions (W)

d. Use grammatically correct sentences

(76) Keep tense and number in agreement (S)

(77) Choosing prepositions (S)

(78) Avoid dangling modifiers (S)

(79) Avoid Incomplete Sentences (S)

(W) refers to a rule primarily involved at the *word* level of usage.
(S) refers to a rule primarily involved at the *sentence* level of usage.
(P) refers to a rule primarily involved at the *paragraph* level of usage.

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Appendix B - Suggested Reading List

The resources listed below are not endorsed by this author, or Babel, but are simply offered as possible resources for interested writers. All books and articles are maintained in the author's personal collection, and are deemed valuable for one reason or another by the author for the purpose of writing English more effectively. Some of these resources are more appropriate for technical and scientific writing, while others are meant for the typical business worker. Some are more geared towards the basic principles of Plain English while others are geared more towards handling the basic aspects of English grammar. All however, played some part, large or small, in developing the concepts of this handbook, while at the same time, all rules, guidelines and observations in this handbook are of course the original work of the author. Finally, I should say that since the list below is from the author's personal collection, it is quite likely that some of the books are available in more recent editions than the ones cited here, and that some of the online links may no longer be active at the time of this reading. The list, therefore, is simply offered to suggest the kinds of alternative resources that you might wish to consider in developing your writing skills for the purposes of technical and scientific writing.

Communicating in Science (2nd Edition)

1993. Booth, V. Cambridge University Press, Cambridge.

This is a short book that addresses both writing and speaking issues. It deals with the "micro" level of writing and preparing documents, going over issues such as title and key words, summary, introduction, materials and methods, results, discussion, conclusion, and references. It deals primarily with usage issues, and goes into some detail on proper pronoun usage, problems with spelling and punctuation, tense, voice and a large range of other details.

Getting Technical: An introduction to technical writing

1994. Pippin Publishing Limited, Ontario.

Getting Technical is meant to be used as a learning text, and comes complete with exercises at the end of each section, with a useful answer key available at the end. The book covers all aspects of writing a technical report, covering style (passives versus actives, ambiguity, repetition, etc.) as well as how to write definitions, descriptions, explanations and instructions. It further covers report writing from the first outline stages through all the main sections.

MLA Handbook for Writers of Research Papers (6th Edition)

2003. Gibaldi, J. The Modern Language Association of America, New York.

This is a very complete, and very popular, guide for writing many different types of research papers. It covers topics from copyrights to plagiarism, and everything in between. It deals with the research stages before writing, the organizing of the report, and the writing of it. Much attention is given to how to cite sources appropriately, how to prepare the reference sheet, and so forth.

How to Write in Plain English

2003. Online <http://www.plainenglish.co.uk/>.

This is one of several guides available online through "The Plain English Campaign" that offer short, practical suggestions for writing in Plain English. This guide offers suggestions for shortening sentences, choosing active verbs (over passives), targeting the audience, and using positive language, among other things.

The Chicago Manual of Style (14th Edition)

1993. Grossman, J. (ed.), University of Chicago Press, Chicago.

This comprehensive book covers all aspects of writing, and is a suitable reference for anyone interested in publishing their works in journals, magazines and as stand alone books. Very thorough, the book is divided into three main parts; (1) bookmaking, (2) style, and (3) production and printing. The second part, on style, is perhaps the most useful for the average writer, containing guidelines for punctuation, spelling, numbers, abbreviations, and so forth. This is a reference guide, rather than an informed narrative.

The Complete Plain Words

1986. Gowers, E. Penguin Books, England.

This book covers quite a lot of territory on how to use English effectively within the context of Plain English. It covers many areas of usage including "correctness", "avoiding the superfluous word", "choosing the precise word", "punctuation" and so forth. It is, however, somewhat wordy and obtuse in its own right, and originally written in 1948, may be inappropriate for some of today's writers.

The Elements of Style (2nd Edition)

1972. Strunk, W. & E. White. Macmillan Publishing Co, New York.

This is a very useful little handbook that has quite a well-deserved reputation for covering many important aspects of writing clearly and correctly. It covers rules of usage, composition and style; the latter of which are quite useful for understanding some of the basic concepts presented here in the form of Plain English.

The Elements of Technical Writing

1993. Blake, G. & R. Bly. Macmillan Publishing Company, New York.

This book provides a general overview for writing clearly and effectively within the framework of technical writing. While not devoted to the principles of Plain English, it nevertheless gives many useful suggestions on how to write numbers, equations, and other "non-English" symbols in appropriate ways, as well as covering topics such as punctuation, grammar and abbreviations. A section on the principles of technical communication covers many of the same topics we have discussed here, including using the active voice, avoiding elegant or complex language in terms of plain forms, deleting or limiting words, sentences and phrases that detract from the main message, and so forth.

The MIT Guide to Science and Engineering Communication

1998. Paradis, J. & M. Zimmerman. MIT Press, Cambridge, Massachusetts.

The MIT Guide contains an overview of all aspects of writing that a writer might come across in the sciences, including everything from writing memos, letters, and electronic mail to proposals, reports, articles and even job-search related documents. While comprehensive, it is clearly not focused on Plain English, nor is it really a "how-to" guide to writing. Instead, it is a detailed book of information that covers virtually all aspects of scientific writing, showing examples of each type. It would be particularly useful for those planning on doing research abroad, or in participating in international conferences. It is essentially an encyclopedia of formats useful for the scientist and engineer in writing in any context on their respective subjects.

The St. Martin's Handbook (3rd Edition)

1995. Lunsford, A. & R. Connors. St. Martin's Press, New York.

This handbook is similar to both the MLA guide, and to the Chicago Manual of Style. It is very comprehensive, and in fact incorporates many examples from the MLA handbook. It covers both academic and scientific writing issues, and offers more explanation than the other two guides. This is very useful for covering writing issues of all types, though likely will not contain as many as the "micro" details of writing that you will find in the other two guides mentioned above in this list.

Scientific English

1995. Day, R. Oryx Press, Westport, CT.

This guide is based more on anecdotal, personal experiences than any of the others mentioned here, and as such, has perhaps the least useful range of applications. It does, however, provide some practical insights into certain areas of scientific writing, and looks at the task from a very simple and clear perspective. It deals with most of the things we have discussed in this handbook, such as abbreviations, acronyms, problems of voice, person and tense, ambiguity,

sexism, and a range of other primarily word-usage issues.

Writing for FEMA

2003. Federal Emergency Management Agency.
Online <http://www.plainlanguage.gov/hotstuff/fema_writing_manual.pdf>.

This is not an entirely useful or accessible document, developed by an agency of the US government, but does provide some pairs of "bad" and "good" examples of government documents, where "bad" represents versions of text written in confusing text, and the "good" versions written in Plain English. Some familiar territory is covered, such as "eliminating wordiness", "active voice", "smothered verbs" and so forth.

Writing User-Friendly Documents

2003. Online <http://www.plainlanguage.gov/handbook/bigdocw.pdf>.

This is a general set of guidelines for writing government regulations in more natural language forms. It covers many of the same issues we noted for Plain English, and provides "bad" and "good" examples to illustrate many of its main points. The topics covered include how to engage your readers, identify your audience, use the active voice, set the appropriate tone, and so forth.

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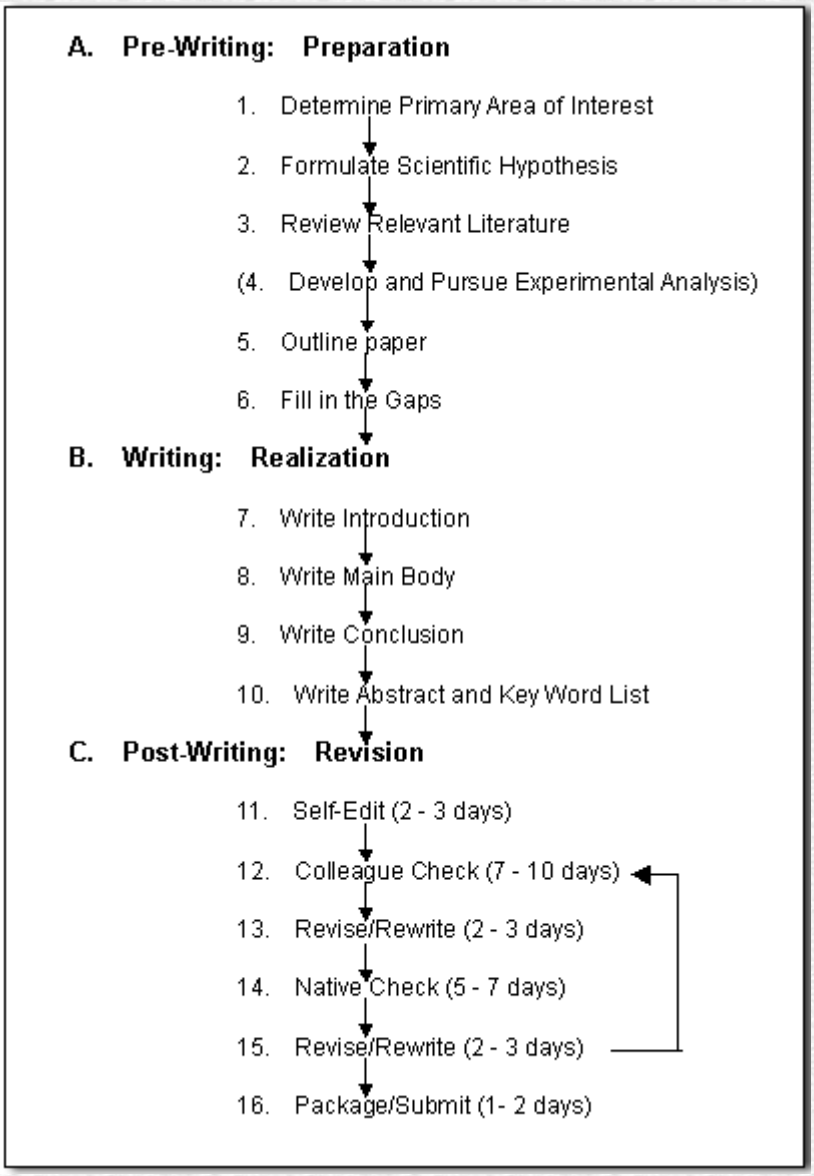
Japanese

Appendix C - Reference Guide

Basic steps for writing a research paper: From conception to submission.



Overview

In this handbook we have reviewed several aspects of writing a research paper, primarily from the point of view of recognizing some of the more common errors, and how to correct them, using the system of Plain English. During the course of our discussion we covered most of the important sections that comprise a research paper, including the title, the abstract, the key word list, the introduction, the main body and the conclusion. There is of course more to the writing of a research paper than just writing these sections. In fact, we can divide the basic steps for writing a research paper into three basic stages: (A) Pre-writing (planning and preparation); (B)

Writing (realization), and; (C) Post-writing (revision). In the following few pages, I will briefly cover all of the steps in each of the three stages. By understanding what these basic steps are, and the order that they follow, and in some cases the time that they require, the writer will be better prepared to write a research paper that will be successfully published and read.

A. Pre-Writing: Preparation

There are five or six steps in this first stage of writing a research paper. It is impossible to put a time estimate on how long it might take to complete this stage, but it is useful to understand the steps that must be covered. Recall from the first chapter that there are two basic types of research papers: (1) the report of an actual experiment (primary research), and; (2) a literature review (secondary research). In the case of a literature review the writer will not undertake an actual experiment, so will skip step 4 in this stage, while a writer who is reporting on the findings of an actual experiment will naturally include this step. (See Section 1.2.)

Step 1. Determine primary area of interest

The primary area of interest is usually clear from the start. This refers to the writer's specific area of expertise. The only reason that there might be a question here is if the writer has more than one specified field of expertise. For example, an investigator may be equally skilled in electrical engineering and in computer programming. In this case a choice would be made in regard to which area of expertise the writer will address, which will in turn have an impact on the target audience, the degree of formality, the choice of field-specific vocabulary, the context of the discussion, and so forth. Even for those of us with a single area of expertise, we still must resolve many of these same questions; we must determine who the audience is, the level of the expertise, why we are writing, and so forth. (See Sections 1.3 – 1.6.)

Step 2. Formulate a scientific hypothesis

Every research paper searches for an answer to some sort of scientific question. This is usually articulated in the form of a hypothesis. To do this, the investigator first thinks of a general statement, or law, that applies to a certain phenomenon in the writer's field of expertise. For example, a general medical doctor might determine that "apples are healthy". The next step is to turn this statement into a question that can be investigated. For our statement on apples, we would have something like "Are apples healthy?" This is still quite primitive, and would be further refined, since it is open to a wide range of variables, such as the type of apples, the definition of "healthy", the amount one must ingest, the actual improvements or benefits, and so forth. Likely, we would expect a much more specific question such as "what are the effects of Vitamin A obtained from 'granny smith' apples on the heart rates of laboratory rats?" We need to go one step further, however. Once we have determined the basic question we wish to investigate, we also want to formulate a guess, or hypothesis, about the likely answer to such a question. This is usually worded as a thesis statement, and tells the

reader both your main topic, and your point of view. In the case of apples, then, we could have the following statement: "Vitamin A from 'granny smith' apples reduces the heart rates of laboratory rats." This question, or statement, serves as the guiding point, or research topic, for the rest of the investigation. (See Sections 1.2, 1.3.)

Step 3. Review relevant literature

This step refers to the reading of all relevant materials available on your chosen research topic. For those doing a "literature review" type of paper, this comprises the investigation itself. For those doing an "investigative report", this provides a foundation for the research plan that will be enacted in the next step. In both cases, it is usually impossible to read every book or article on the subject, and therefore should be a survey of the most important, influential and representative sources available. As a result of this synthesis of existing materials, the investigator usually tries to come up with novel insights, or perspectives, which will form the basis of the new report, and/or experimental investigation. (See Section 1.2.)

Step 4. Develop and pursue the experimental analysis

In this step the actual experiment takes place. Naturally, however, it is skipped by the writer conducting a literature review. In the case of an experiment, the investigation may be one complete and solitary experiment, or it may be one part of a much more complex investigation. This step may consume a great deal of the researcher's time, and because of this, no timeline has been suggested for the entire stage.

Step 5. Outline the paper

We did not cover the outlining of a paper in this handbook, with the exception of providing a rough breakdown of the major sections of a typical research paper. Nevertheless, it is essential to make a plan, or outline, before you begin to write your paper. This will help you recognize whether your preliminary research was complete, adequate and balanced. As a result of developing an outline, the writer may notice that certain aspects of the investigation are incomplete, missing, or out of place. If deficiencies are detected, they can then be corrected in the next step. (See Section 1.2.)

Step 6. Fill in the gaps

This is a repair step that provides an opportunity for the investigator to go back and consider additional resources, pursue alternative experimental protocols, and so forth. Often this step is overlooked. Investigators are sometimes in a hurry to move forward with what they have covered up to this point, and simply ignore the need to go back and make sure that all questions have been resolved. We suggest that this is a good point in the paper development process, coming at the end of the pre-writing stage, to reconsider the overall initiatives of the paper, and whether all relevant aspects have been given appropriate consideration.

B. Writing: Realization

In the main body of the handbook we have covered most of the steps in this stage of the research paper's development, so will only cover the "realization" steps very briefly here. Again, it is impossible to suggest a basic timeline for completion of this stage, since the speed of development is solely up to the discretion of the writer.

Step 7. Write the introduction

This is the usual starting paper for any paper. It should contain the main thesis statement, and introduce to the reader the scientific hypothesis that is being investigated. It should also provide a brief history to the problem under investigation, as well a short overview of the entire paper, including reference to its major findings. (See Sections 2.4–2.7.)

Step 8. Write the main body

The main body of the paper constitutes most of the research paper. What is covered here depends upon what type of research paper is being written (a literature review, or a report on an experiment) which will determine whether there will be sections on methods, analysis, results, and so forth, or not (all found in the experiment-based paper). Both types of papers will usually include in the main body of the discussion, at a minimum, sections on the background or history of the problem, a discussion of the relevant literature, and a presentation of some novel suggestions or discoveries. (See Sections 1.2 and Chapter 3.)

Step 9. Write the conclusion

Throughout the whole writing process, it is useful to keep the conclusion in mind. By recognizing the overall purpose of the paper, you will remain focused and directed towards a recognizable conclusion. The conclusion itself should summarize the main points of the paper, suggest possible areas of future investigation, and highlight any new or unique discoveries that were developed in the paper. (See Chapter 4.)

Step 10. Write the abstract, the key word list, and anything else remaining

After the paper has been finished, there remain a few text portions that must be written. These include the abstract, which provides a summary of the entire paper, including its conclusions, the title, the key word list, and the reference list. You might also write a personal bibliography, if required, as well as an acknowledgment page (though this last item is often completed after several steps have been completed in the post-writing stage). (See Sections 2.1–2.3.)

C. Post-writing: Revision

This stage was covered in Chapter 5, so it will be only briefly reviewed here. In this third and final stage of research paper development, the writer is encouraged to check and revise the paper so that it is free of errors in both form and content. Here, we suggest that you set aside about one month to complete this stage of development. So, in plotting out the development of a research paper, build into your plan a completion date of the second stage, the "Writing" stage, at least one month ahead of the final submission deadline.

Step 11. Self-edit

As discussed in this handbook, it is important to be able to discover and correct your own errors. Though this is difficult, it is a skill that you can develop. This requires the ability to distance yourself from your own writing, which sometimes is made easier by simply setting aside the text for a period of time before looking it over carefully and critically. Minimally, this step will take two to three days. (See Section 5.1.)

Step 12. Colleague-check

Once you are sure you have done as much as you can with your paper, then it is very useful to have one or two of your colleagues look it over for errors in both content and form. Ultimately it will be your choice whether to include any or all of their suggestions, but it is always useful to get some sort of feedback, so you are aware of any possible weaknesses, and still have some time left before submission to correct them. Depending upon schedules and workloads, it is usually advisable to set aside a week to ten days for this step. (See Section 5.2.)

Step 13. Revise/Rewrite

After you have obtained your paper back from your colleagues, then you should make any corrections that you deem necessary. Sometimes a colleague has pointed out a major deficiency that cannot be adequately repaired without changing the paper significantly. In this case, you may choose to ignore it, and go on to the next step. Alternatively, you might try to address the problem by adding a footnote that indicates that you are aware of the problem, but feel that the present study has other merits that outweigh the deficiency. In these cases the investigator often suggests that such problems will be targeted in future research. Baring major deficiencies, however, your revisions should not take more than two to three days to complete. (See Section 5.3.)

Step 14. Native check

Since this handbook addresses the research paper written in English by a foreign writer, it is always advisable to have a native English speaker read your paper, to correct any mistakes of spelling, grammar and usage. The person performing the native check should be a college-educated speaker, familiar with academic publications, but does not necessarily need to be an

investigator in your particular field of study. Since the check is not focused on content, it can usually be conducted rather quickly, though you should probably allow between five to seven days for completion. (See Section 5.4.)

Step 15. Revise/Rewrite

Every time someone reviews and comments on your paper, you will need to go through it again and make changes as necessary. Each time, though, this will take less time, since the paper will naturally be improved at each step, and will therefore require fewer repairs as the process moves along. This will likely only take two or three days at most. At this juncture, if you have made several major repairs, you might want to repeat some of the earlier steps in this stage, and once again have a colleague look at the revised paper, making any additional changes as necessary, and further, have a native speaker take one more glance at the "finished" work, followed by making any final repairs that you see fit. This would naturally add another week or more to the process. (See Section 5.3.)

Step 16. Package/submit

Once you are satisfied that you have made as many improvements to the paper as you possibly can, then it is time to put it into the final format required by the target journal. This may require making multiple copies, cover sheets, identification cards and so forth. Once the package is assembled, make a basic set for yourself, and send the package off. Of course, the journal may later ask you to make some changes, which might require you to repeat some of the steps in this post-writing stage. The actual packaging and submission of your paper shouldn't take more than a day or two. (See Section 5.5.)

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