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12. Titles, Abstracts, Introductions, Conclusions

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Titles, Abstracts, Introductions, Conclusions

Title it, summarize it, introduce it, conclude it

Formal technical reports over eight to ten pages contain several components that deserve their own focus because they are important in technical reports and because people are unfamiliar with them:

- **Titles** explores strategies for making document titles specific but not paragraphs long.
- **Abstracts** provide several kinds of summaries of the report contents and conclusions.
- **Introductions** get readers ready to read reports by indicating the topic, purpose, intended audience, contents, and orther such matters.
- **Conclusions** shape how readers view and understand the report upon leaving it.

Abstracts

Summarize it

An *abstract* is a summary of a body of information. Sometimes, abstracts are in fact called summaries—sometimes, executive summaries or executive abstracts. The business and scientific worlds define different types of abstracts according to their needs. If you are taking a technical writing course based on this online textbook, your technical report (depending on your instructor) may use two types: the descriptive abstract and the informative abstract.

See examples of abstracts as they occur within **technical reports**.

Descriptive Abstracts

The descriptive abstract provides a description of the report's main topic and purpose as well an overview of its contents. As you can see from the **example**, it is very short—usually a brief one- or two-sentence paragraph. In this report design, it appears on the title page. You may have noticed something similar to this type of abstract at the beginning of journal articles.

In this type of abstract, you don't summarize any of the facts or conclusions of the report. The descriptive abstract does *not* say something like this:

> **Problem:** Based on an exhaustive review of currently available products, this report concludes that none of the available grammar-checking software products provides any useful function to writers.

This is the style of summarizing you find in the informative abstract. Instead, the descriptive abstract says something like this:

> **Revision:** This report provides conclusions and recommendations on the grammar-checking software that is currently available.

The descriptive abstract is little like a program teaser. Or, to use a different analogy, it is as if the major first-level headings of the table of contents have been rewritten in paragraph format.

Report
on
LIGHT WATER NUCLEAR REACTORS

submitted to
Mr. David A. McMurrey
Center for Technology Research
Austin, Texas

July 24, 20xx

Descriptive abstract: Indicates the purpose of the report and its main contents.

by Bonie B. Student
Technical Research Associates, Inc.

This report examines light water reactors as a possible energy alternative for municipalities. Both types of light water reactors and their processes for producing electricity are described. The report concludes with a review of these reactors' economics and safety systems.

Descriptive abstract on report title page.

Informative Abstracts

The informative abstract, as its name implies, provides information from the body of the report—specifically, the key facts and conclusions. To put it another way, this type of abstract summarizes the key information from every major section in the body of the report.

It is as if someone had taken a yellow marker and highlighted all the key points in the body of the report then vaccuumed them up into a one- or two-page document. (Of course, then some editing and rewriting would be necessary to make the abstract readable.) Specifically, the requirements for the informative abstract are as follows:

- Summarize the key facts, conclusions, and other important information in the body of the report.
- Equals about 10 percent of the length of a 10-page report: for example, an informative abstract for a 10-page report would be 1 page. This ratio stops after about 30 pages, however. For 50- or 60-page reports, the abstract should not go over 2 to 3 pages.
- Summarize the key information from each of the main sections of the report, and proportionately so (a 3-page section of a 10-page report ought to take up about 30

percent of the informative abstract).

- Phrase information in a very dense, compact way. Sentence are longer than normal and are crammed with information. The abstract tries to compact information down to that 10-percent level (or lower for longer reports). While it's expected that the writing in an informative abstract will be dense and heavily worded, do not omit normal words such as *the*, *a*, and *an*.
- Omit introductory explanation, unless that is the focus of the main body of the report. Definitions and other background information are omitted if they are not the major focus of the report. The informative abstract is *not* an introduction to the subject matter of the report—and it is *not* an introduction!
- Omit citations for source borrowings. If you summarize information that you borrowed from other writers, you do *not* have to repeat the citation in the informative abstract (in other words, no brackets with source numbers and page numbers).
- Include key statistical detail. Don't sacrifice key numerical facts to make the informative abstract brief. One expects to see numerical data in an informative abstract.
- Omit descriptive-abstract phrasing. You should not see phrasing like this: "This report presents conclusions and recommendations from a survey done on grammar-checking software." Instead, the informative abstract presents the details of those conclusions and recommendations.

This last point is particularly important. People often confuse the kinds of writing expected in descriptive and informative abstracts. Study the difference between the informative and descriptive phrasing in the following examples:

> **Informative:** Based on an exhaustive review of currently available products, this report concludes that none of the available grammar-checking software products provides any useful function to writers.

> **Descriptive:** This report provides conclusions and recommendations on the grammar-checking software that is currently available.

ABSTRACT

Computerized speech recognition takes advantage of the most natural form of communication, the human voice. During speech, sound is generated by the vocal cords and by air rushing from the lungs. If the vocal cords vibrate, a voiced sound is produced; otherwise, the sound is unvoiced. The main problem in speech recognition is that no two voices produce their sounds alike and that an individual voice varies in different conditions. Because voices do vary and because words blend together in a continuous stream in natural speech, most recognition systems require that each speaker train the machine to his or her voice and that words have at least one-tenth of a second pause between them. Such a system is called

an isolated word recognition system and consists of three major components that process human speech: (1) the preprocessor which removes irregularities from the speech signal and then breaks it up into parts; (2) the feature extractor which extracts 32 key features from the signal; and (3) the classification phase which identifies the spoken word and includes the training mode and reference pattern memory. Spoken words are identified on the basis of a certain decision algorithm, some of which involve dynamic programming, zero crossing rate, linear predictive coding, and the use of a state diagram.

Voice recognition systems offer many applications including data entry, freedom for mobility, security uses, telephone access, and helpful devices for the handicapped. However, these same systems also face problems such as poor recognition accuracy, loss of privacy among those who use them, and limited vocabulary sizes. The goal of the industry is the development of speaker-independent systems that can recognize continuous human speech regardless of the speaker and that can continually improve their vocabulary size and recognition accuracy.

Informative abstract. This type summarizes the key facts and conclusions in the body of the report. (By the way, speech recognition has come a *long* way since this report was written in 1982!)

Executive Summary

The executive summary is a hybrid of the descriptive and informative summaries. Written for executives whose focus is business decisions and whose background is not necessarily technical, it focuses on conclusions and recommendations but provides little background, theory, results, or other such detail. It doesn't summarize research theory or method; it makes descriptive-summary statements: for example, "theory of heat gain, loss, and storage is also discussed."

To get a sense of the executive summary, study the following example:

EXECUTIVE SUMMARY *Rural Health Clinics: Requirements*
The most important needs of rural health clinics, which require energy resources, are as follows: *Refrigeration*. Absorption refrigeration, fueled by propane or kerosene and common at unelectrified health clinics, is vulnerable to interruption and is thus inadequate for the vaccines needed in immunization programs for dangerous diseases including polio, diptheria, tetanus, pertussis, tuberculosis, measles, yellow fever, and Hepatitus B. Instead, compression-type refrigerators powered

by 12- or 24-volt storage batteries and recharged by photovoltaic panels or a small wind turbine can meet these needs. *Lighting*. Instead of kerosene lighting, common in unelectrified communities and a known safety hazard and contributor to poor indoor air quality as well, renewable energy technologies can improve lighting in rural health clinics for such important functions as emergency treatment, birthing, maternity care, surgery, and administrative tasks. *Communications*. Health care services and emergency medical treatment, in particular, are greatly facilitated with reliable radio and radio-telephone communications to other health clinics and facilities in the region. Rural health clinics can have reliable two-way regional communication via VHF radio with electricity provided by a single 30-W PV module. *Medical appliances*. Small medical appliances that operate on 120-volt AC electricity require an inverter, which is easily incorporated into wind- or solar-based systems. Although photovoltaic systems can provide the electricity needed for the high temperatures, approximately 120°C (250°F) needed in sterilization, solar thermal collector systems can produce high temperatures at a lower cost, especially in areas with good solar insolation. *Water*. Solar and wind power can be used to generate high volumes of potable water in tandem with techniques such as ozone treatment, reverse osmosis, photochemical treatment, also known as ultraviolet or UV, disinfection and carbon filters. Ozone treatment is very suitable to solar- or wind-generated power requiring only 0.3 watt-hours per liter. Clean water can also be provided from deep wells but requires an energy source for pumping significant volumes. Solar or wind power (or both) generated on site can economically meet the broad range of these needs.

Executive summary.

Revision Checklist for Abstracts

As you reread and revise your abstracts, watch out for problems such as the following:

- Make sure that the descriptive abstract does *not* include informative abstract phrasing; make sure that the informative abstract does *not* include descriptive abstract phrasing.
- Make sure the descriptive abstract provides an overview of the topics covered in all the major sections of the report.

- Make sure that the informative abstract summarizes *all* the major sections of the report. (And don't forget—the informative abstract is *not* an introduction!)
- Make sure the informative abstract summarizes *all* key concepts, conclusions, and facts from the body of the report (including key statistical information).
- Make sure that the informative abstract excludes general, obvious, deadwood information and that the phrasing is compact and concentrated.
- Make sure that the informative abstract is neither too brief (less than 10 percent) nor too long (more than 15 percent).

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Introductions

Get readers ready to read that document

The introduction is one of the most important sections of a report—or, for that matter, any document—but introductions are often poorly written. One reason may be that people misunderstand the purpose of introductions. An introduction introduces readers to the report and not necessarily, or only minimally, to the subject matter. "Introduction" does not equal "background"; it may contain some background but only minimally.

Readers have an understandable need to know some basic things about a report before they begin reading it: such as what is it about, why was it written, what's it for, for whom it written, and what are its main contents. Readers need a basic orientation to the topic, purpose, situation, and contents of a report—in other words, an introduction.

Imagine that, years ago, you were writing a recommendation report about CD-ROM computer devices. You might be tempted to use the introduction to discuss the background of compact disc development or its theoretical side. That might be good stuff to include in the report, and it probably belongs in the report—but not in the introduction, or at least not in much detail or length.

For 10-page reports, introductions might average one half to one full page. On that one page, you might have three paragraphs. One of those paragraphs could be devoted to background information—in other words, to introducing the subject matter. But the other two paragraphs must do the job of introducing the report and orienting the reader to the report, as discussed in the following.

Be sure to check out the additional examples: **introductions to instructions and reports**.

Common Elements of Introductions

Note: If you are writing a brief 1- to 2-page document, be sure to read the following section

on **introductions to brief documents**.

Each of the following elements is not required in all introductions, and some elements combine into the same sentence. Rather than mechanically applying these elements, write the introduction that seems good to you, then come back and search for these elements in it.

Topic. Early in the introduction, indicate the specific topic of the report. Some introductions seem to want to hold readers in suspense for a while before they indicate the true topic—that's a gamble. Better is to indicate the topic early—such that you could circle the topic words in the first three to four lines.

Purpose and situation. A good introduction needs to indicate why it was written, for whom, and for what purpose. If the report provides recommendations on whether to implement a program, the introduction needs to indicate that purpose. You might also consider indicating something of the scope of the report—what it is *not* intended to accomplish.

Audience. Indicate who are the appropriate or intended readers of the report—for example, "experienced technicians trained on the HAL/6000." Indicate what level of experience or knowledge readers need to understand the report, if any. If none is needed, say that. If the report was prepared for council members of the City of Utopia, Texas, the introduction needs to express that.

Overview of contents. Indicate the main contents of the report. You can do this with an in-sentence list, as the examples illustrate. If you are concerned about readers; exaggerated expectations, indicate what topics the report does *not* cover.

Background on the topic. This is everybody's favorite! Some minimal background is usually in an introduction—for example, key definitions, historical background, theory, the importance of the subject. Information like this gets readers interested, motivated to read, grounded in some fundamental concepts. Watch out, though—this discussion can get away from you and fill up more than page. If it does, that's okay—all is not lost. Move it in to the body of the report, or into an appendix.

Background on the situation. Another kind of background is also a good candidate for introductions—the situation that brought about the need for the report. For example, if there were a lot of conflicting data about some new technology, which brought about the need for the research, this background could be summarized in the introduction. For example, if a company needed new equipment of some kind or if the company had some problem or need and some requirements in relation to that equipment—discussion of these matters should go in the introduction.

Notice in the discussion of these elements the word "indicate" keeps getting used. That's

because you'd like to avoid heavy-handed language such as "The topic of this report is..." or "This report has been written for..." Notice how the example introductions generally avoid this kind of phrasing.

[Example introduction to a lengthy report with contract elements included](). (Opens as a popup; resize for better viewing.)

[Example of another lengthy report introduction again, with contract elements included.]() (Opens as a popup; resize for better viewing.)

Introductions to Brief Documents

Be sure to check out the additional examples: **introductions to instructions and reports**.

If you are writing a brief document of 1 to 2 pages, you don't need all those elements common to report introductions discussed in the preceding section. Here's the subset of what you are likely to need:

Topic. If you can circle the topic words somewhere in the first three to four lines of the introduction, you're good.

Purpose and situation. In instructions, it's enough to tell readers that they are going to see how to do something. In a recommendation report, just mention that readers will be seeing conclusions and recommendations.

Audience. Indicate what level of experience or knowledge readers need to understand the document. If none is needed, say that.

Overview of contents. Indicate the main contents of the document. A simple in-sentence list will do.

Background. Always remember that an introduction is not a background discussion; it may contain some, but only minimally.

Using the Avaya MDW 9040 Wireless Pocket Phone

The Avaya MDW 9040 Wireless Pocket Phone is a lightweight, pocket-sized wireless phone. It lets you make, receive, announce, and transfer calls while having the freedom to move about the office. This guide will cover (1) understanding the handset display icons; (2) using the handset for call-handling; and (3) changing the settings. This guide does not cover using the conference-call or hold buttons.

To use this guide, front desk staff should be familiar with the basics of using multi-line phones and transferring calls.

— *Thanks to Anissa L.*

Topic and background

Overview

Scope

Audience

Example of a brief introduction with most of the key elements present.

Section Introductions

We don't normally think that there is more than one introduction in a report. However, in reports over 8 to 10 or more pages, the individual sections also need some sort of introduction. These can be called *section introductions* because they prepare readers to read a section of a report—they orient readers to its contents and purpose and show some linkage to the preceding section.

Of course, a section introduction need not have all the elements of a report introduction. However, it does have several that, if handled well, can make a lot of difference in the clarity and flow of a report.

Wire-Line Logging Devices

Coring and core analysis techniques are adequate only to a certain extent, as the previous section shows. However, a much faster and less expensive method of detecting fractures is increasingly being used in exploratory wells: wire-line logging anlysis.

Logging can be generally defined as the storing of any information that may be of importance in producing an accurate subsurface geological map. Logs are kept of such things as cores, drilling muds (the fluids used to

New section introduced by a 2nd-level heading.

Topic of the previous section "coring and coring analysis" is referenced.

Indicates how this section and the previous section are related.

Example section introduction. Notice that this section introduction not only mentions the preceding and upcoming topics but shows how they are related. (From a report written in 1983.)

Topic indication. As with the report introduction, indicate the topic of the upcoming section. But remember—it doesn't have to be the stodgy, heavy-handed "The topic of this next section of the report is..."

Contents overview. Just as in the report introduction, it is a good idea to list the main contents. The in-sentence list serves this purpose well.

Transition. An element that is very useful in section introductions is transitional phrasing that indicates how the preceding section relates to the one about to start. In reports of any length and complexity, it is a good technique—it guides readers along, showing them how the parts of the report all fit together.

Revision Checklist for Introductions

As you revise your introductions, watch out for problems such as the following:

- Avoid writing an introduction consisting of only background information; avoid allowing background information to overwhelm the key elements of the introduction.
- Make sure to indicate the topic early.
- Be sure to indicate the audience and situation—what the readers should expect from the report; what knowledge or background they need to understand the report; what situation brought about the need for the report.
- Make sure there is an overview of the report contents, plus scope information—what the report doesn't cover.

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Conclusions

Get it over with . . . gracefully

We normally use the word "conclusion" to refer to that last section or paragraph or a document. Actually, however, the word refers more to a specific type of final section. If we were going to be fussy about it, the current chapter should be called "Final Sections," which covers all possibilities.

There seem to be at least four ways to end a report: a summary, a true conclusion, an afterword, and nothing. Yes, it is possible to end a document with no conclusion (or "final section") whatsoever. However, in most cases, that's a bit like slamming the phone down without even saying good-bye. More often, the final section is some combination of the first three ways of ending the document.

Summaries

One common way to wrap up a report is to review and summarize the high points. If your report is rather long, complex, heavily detailed, and if you want your readers to come away with the right perspective, a summary is in order. For short reports, summaries can seem

absurd—the reader thinks "You've just told me that!" Summaries need to read as if time has passed, things have settled down, and the writer is viewing the subject from higher ground.

VIII. SUMMARY

This report has shown that as the supply of fresh water decreases, desalting water will become a necessity. While a number of different methods are in competition with each other, freezing methods of desalination appear to have the greatest potential for the future.

The three main freezing techniques are the direct method, the indirect method, and the hydrate method. Each has some adavantage over the others, but all three freezing methods have distinct advantages over other methods of desalination. Because freezing methods operate at such low temperatures, scaling and corrosion of pipe and other equipment is greatly reduced. In non-freezing methods, corrosion is a great problem that is difficult and expensive to prevent. Freezing processes also allow the use of plastic and other protective coatings on steel equipment to prevent corrosion, a measure that cannot be taken in other methods that require high operating temperatures.

Desalination, as this report has shown, requires much energy, regardless of the method. Therefore, pairing desalination plants with nuclear or solar power resources may be a necessity. Some of the expense of desalination can be offset, however . . .

Summary-type of final section. From a report written in the 1980s.

"True" Conclusions

A "true" conclusion is a logical thing. For example, in the body of a report, you might present conflicting theories and explored the related data. Or you might have compared different models and brands of some product. In the conclusion, the "true" conclusion, you'd present your resolution of the conflicting theories, your choice of the best model or brand—your final conclusions.

V. CONCLUSIONS

Solar heating can be an aid in fighting high fuel bills if planned carefully, as has been shown in preceding sections. Every home represents a different set of conditions; the best system for one home may not be the best one for next door. A salesman can make any system appear to be profitable on paper, and therefore prospective buyers must have some general knowledge about solar products.

A solar heating system should have as many of the best design

features as possible and still be affordable. As explained in this report, the collector should have high transmissivity and yet be durable enough to handle hail storms. Collector insulation should be at least one inch of fiberglass mat. Liquid circulating coils should be at least one inch in diameter if an open loop system is used. The control module should perform all the required functions with no added circuits. Any hot water circulating pumps should be isolated from the electric drive motor by a non-transmitting coupler of some kind.

Homeowners should follow the recommendations in the guidelines section carefully. In particular, they should decide how much money they are willing to spend and then arrange their components in their order of importance. Control module designs vary the most in quality and therefore should have first priority. The collector is the second in importance, and care should be taken to ensure compatibility. Careful attention to the details of the design and selection of solar heating devices discussed in this report will enable homeowners to install efficient, productive solar heating systems.

A "true"-conclusions final section. This type states conclusions based on the discussion contained in the body of the report. (From a report written in the 1980s.)

Afterwords

One last possibility for ending a report involves turning to some related topic but discussing it at a very general level. Imagine that you had written a background report on some exciting new technology. In the final section, you might broaden your focus and discuss how that technology might be used, or the problems it might bring about. But the key is to keep it general—don't force yourself into a whole new detailed section.

VII. CONCLUSION: FUTURE TRENDS

Everyone seems to agree that the car of the future must weigh even less than today's down-sized models. According to a recent forecast by the Arthur Anderson Company, the typical car will have lost about 1,000 pounds between 1978 and 1990 [2:40]. The National Highway Traffic Safety Administration estimates the loss of another 350 pounds by 1995. To obtain these reductions, automobile manufacturers will have find or develop composites such as fiber-reinforced plastics for the major load-bearing components, particularly the frame and drivetrain components.

Ford Motor Company believes that if it is to achieve further growth in the late 1980's, it must achieve breakthroughs in structural and semistructural load-bearing applications. Some of the breakthroughs Ford sees as needed include improvements in the use of continuous

fibers, especially hybridized reinforced materials containing glass and graphite fibers. In addition, Ford hopes to develop a high speed production system for continuous fiber preforms. In the related area of composite technology, researchers at Owens Corning and Hercules are seeking the best combination of hybrid fibers for structural automotive components such as engine and transmission supports, drive shafts, and leaf springs. Tests thus far have led the vice president of Owen Corning's Composites and Equipment Marketing Division, John B. Jenks, to predict that hybrid composites can compete with metal by the mid-1980's for both automotive leaf springs and transmission supports.

With development in these areas of plastics for automobiles, we can look forward to lighter, less expensive, and more economical cars in the next decade. Such developments might well provide the needed spark to rejuvenate America's auto industry and to further decrease our rate of petroleum consumption.

Afterword-type final section. The main body of the report discussed technical aspects of using plastics in main structural components of automobiles. This final section explores the future, looking at current developments, speculating on the impact of this trend.

Combinations

In practice, the preceding ways of ending reports often combine. You can analyze final sections of reports and identify elements that summarize, elements that conclude, and elements that discuss something related but at a general level (afterwords).

Here are some possibilities for afterword-type final sections:

- Provide a brief, general look to the future; speculate on future developments.
- Explore solutions to problems that were discussed in the main body of the report.
- Discuss the operation of a mechanism or technology that was described in the main body of the report.
- Provide some cautions, guidelines, tips, or preview of advanced functions.
- Explore the economics, social implications, problems, legal aspects, advantages, disadvantages, benefits, or applications of the report subject (but only generally and briefly).

Revision Checklist for Conclusions

As you reread and revise your conclusions, watch out for problems such as the following:

- If you use an afterword-type last section, make sure you write it at a general enough level that it doesn't seem like yet another body section of the report.

- Avoid conclusions for which there is no basis (discussion, support) in the body of report.
- Keep final sections brief and general.