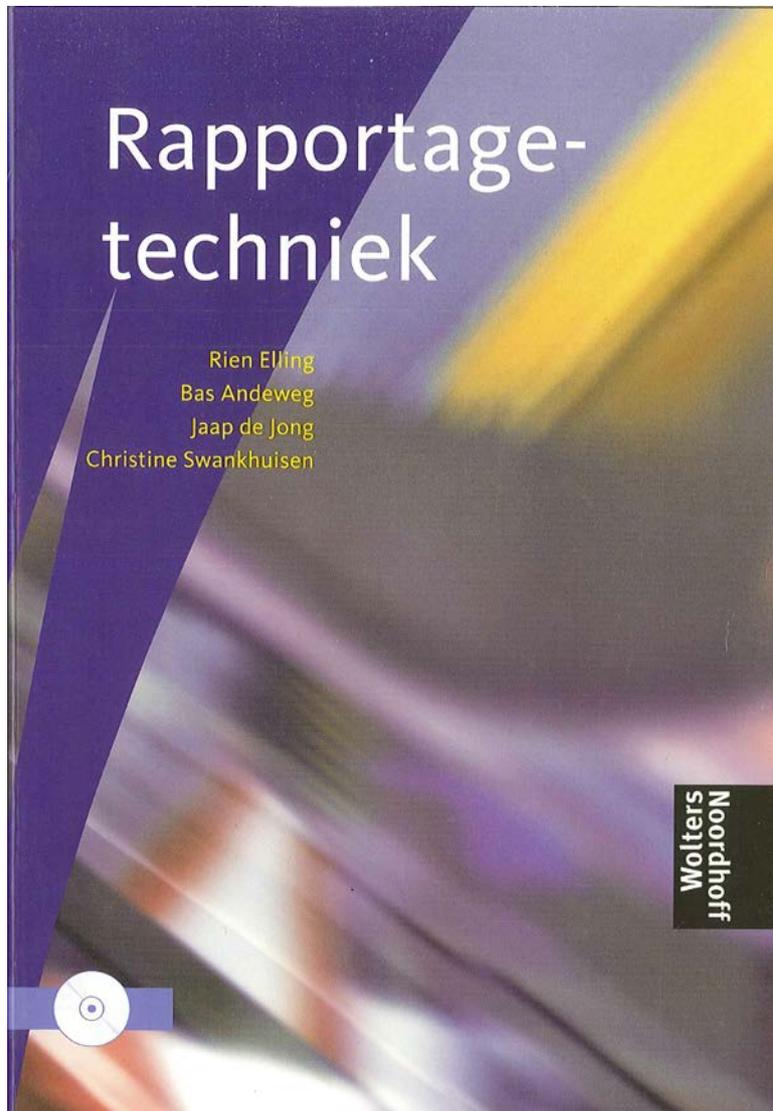


Technical Writing Skills



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1 Introduction

Guidelines for writing effectively can be summarized in a few, simple rules of thumb: do not use more words than necessary, make sure your text has a beginning, middle and end, and avoid jargon. These are seemingly simple rules which you probably know, or - if you don't - can easily be learned.

However, the application of such rules is a lot trickier. Many of these rules cannot be applied, for instance when the assignment of your superiors is unclear, the readers have different backgrounds or the amount of information you have to process is obscure and the deadline unrelenting.

This book offers an approach rather than simple rules: a way of writing a report more systematically. One of the basic requirements for an efficient approach is the correct attitude towards your readers. Your audience usually consists of different target groups varying from specialists to managers. These groups have different information needs but share a chronic lack of time and a dislike for lengthy reports. It is up to you to convince them of the importance and reliability.

The approach we present in this reader increases your chances of satisfying all parties. However, sometimes you will have to find a solution to your own personal writing issues. Even the most extensive advice cannot solve all issues as everyone has developed their own writing style. Some matters require practice combined with useful feedback from experienced readers. If doing a writing course is not an option for you, then use every opportunity to receive feedback from critical colleagues.

This reader was compiled for those readers with little time. You could even use it selectively.

2 Writing effectively

- 2.1 The importance of writing
- 2.2 Strategic factors
- 2.3 The lack of internal regulations
- 2.4 Essential skills for writers

Some people regard the writing of reports as something that keeps them from doing their real job. This chapter will show that writing is a more central activity. Additionally, strategic factors are discussed which strongly influence writing. As useful guidelines to writing reports are seldom available in companies, the writer is often alone in their task. They must be able to establish norms for writing effectively and convincingly. The skills required to do so are discussed briefly.

2.1 The importance of writing

Writing forms a larger part of the daily activities of the higher-educated than was anticipated at the start of their career. Take engineers for example. Of course they are trained primarily to design or optimize technical products and processes. Nevertheless, before a product comes onto the market, many feasibility reports were written, research papers drafted and memos sent backwards and forwards. However brilliant your idea for a new product, ingenious your research or decisive the conclusions, nobody will ever realize if you do not succeed in conveying your findings clearly and convincingly to others: colleagues, superiors, clients. Despite the importance of oral communications, for the major part you will have to put it on paper. This is time consuming, sometimes up to a third or half our working hours. Enough anyway that we can easily say that often the primary work of an engineer is not about machines or systems but texts.

It is not surprising that employers stress ‘good oral and written communication skills’ in job advertisements. And it is not surprising either that shortcomings in this area often lead to complaints from employers’ organizations. Research conducted by employers’ journal *Forum* amongst graduates working for 60 large, Dutch corporations showed shortcomings in professional insight, social and communicative skills and commercial insight.

‘The exact question in the Forum research study was: do you notice a lack of knowledge and/or skills in Dutch graduates which you believe they should have learned during (or before) their university degree?’

Of the two thirds of those questioned who responded affirmatively, 68% said graduates lack professional insight, 55% said they lack social/communicative skills and 45% notice a lack of commercial insight. Another aspect which is lacking according to those questioned is a command of languages such as Dutch (28%), English (20%), German (13%) and French (8%).’

(Source: Forum 1997:16-17)

Such skills are especially required of graduates.

‘To be able to make a contribution to the solution to everyday, multi-faceted professional problems, each individual must possess, apart from expertise, skills to exchange their knowledge with other specialists, within but especially outside their own profession. And that is where the biggest obstacle lies: during their education little attention is paid to the development of these skills. This lack of communicative skills generally affects graduates but the shortcomings are felt most strongly by University graduates; not because they have enjoyed a more specialist education than college graduates but because they especially are expected to be all-rounders.’

(Source: Advisory body for the science and technology policy 1997:3)

Companies and government organizations are much more aware of the importance of appropriate communication. That is why they dedicate a large part of their educational budget on training in the field of communicative skills. Sometimes, with big projects, external script writers are hired to make important texts more accessible, especially when it concerns either texts which play a role in (political) decision-making, or texts which might be published. However, in times of economic recession these costs are quickly cut. Then engineers themselves must be able to produce convincing and easily accessible texts.

2.2 Strategic factors

Why do many people in a professional environment experience problems writing which they either rarely or never encountered during their degree? That has to do with the role texts play at work, a role that differs from that during our studies. The following three factors are characteristic of professional situations:

- Writing is primarily aimed at measures and decisions;
- There are different readers with different interests;
- Readers are not prepared to invest a lot of time in reading.

Many writers are not fully aware of the consequences of these characteristics. We shall discuss them below.

2.2.1 Writing with action in mind

The reports that someone writes during their studies have an educational function. They form the tangible result of an exercise in skills, evidence that the writer can analyze a problem and give solutions autonomously. Technical information and analyses form the *essence* of the text.

What is written in a professional context is usually aimed at *action*: measures or decisions. The technical information and analyses provided by you are indispensable especially as a *means* to support the necessary action. That means it is important to clarify to the readers why a certain thing has to happen (in other words, why they should read the report). This should be given the necessary attention in the introduction. Another key point is *what* the reader is supposed to do with the results; that is why there is a strong emphasis on the conclusions and especially the recommendations.

The action in question almost always has consequences for different departments and people. A measure regarding production can have far-reaching consequences for the purchase, stock control and marketing departments. Decisions with far-reaching consequences assume the involvement or, at least, existence of background knowledge of various people in the company hierarchy. This means that your report is seldom read by just the client who commissioned the report. For different readers the technical information is just background information, something which they will not study in-depth.

2.2.2 Writing for a variety of readers

Often there are two kinds of readers who see your report – readers who not only differ in background knowledge, but also in the way they read (or partly skip) the report:

- *Decision makers.* These are the ones who decide whether the recommendations will be adopted (managers or other generalists).
- *Specialists.* These are the ones who are especially interested in technical support and the method used (the people responsible for the implementation of the recommendations; executives who advise management).

The client often takes a middle ground position. That is the case when he has to test your report and send it on to others within the organization. Your report only functions optimally when all readers are taken into consideration, in other words when your report can be read in different ways.

The following pieces of advice can increase the practicability of your report.

- Do not only keep the client in mind when writing the report. A one-sided orientation towards the client can lead to the report being impracticable for other important readers. Furthermore, it is possible the situation might change after receiving the commission. As the research continues, chances that the situation may change increase. The original client might have been put on a different project and their place taken by someone who is not as informed. The successor will understand little of the report if you leave out all that was clear to the previous client.
- Do not write a report that can be used only once. A project about new oil recovery techniques may be put aside temporarily due to low oil prices. After a year your report about these techniques is selected but not necessarily by the original client. The report has to be practicable regardless of the circumstances at the time, for example through describing the problem statement clearly and extensively in your introduction.
- Be careful when leaving out matter that seems self-evident. Even if you are sure that your client will read your report, them being perhaps even the only reader, it is strongly advised not to leave out obvious things (the problem that instigated the research, the conditions taken into account). Since having commissioned you the report, the client has been occupied with a thousand other things. You can hardly expect them to remember all the details after two months. Moreover, it usually takes some research to change the ‘rough’ idea into a clearly formulated task, which you have to show to your client.

If the client still remembers the details, it strengthens the credibility of the report as you demonstrate that you have a clear vision on the matter.

2.2.3 Writing for readers with little time

Typically, readers have neither the time nor the inclination to read extensive texts. This is certainly the case for managers who have to go through large amounts of information on a daily basis. With everything they see they ask questions like:

- What is this?
- What is my role in this?
- Who do I need to involve?

If a text does not immediately give an answer to these questions, readers become annoyed or they will process the information incorrectly. The following introduction raises many questions:

<i>Introduction unsuitable for a decision maker</i>	
<i>Problem?</i>	The new installation for the recycling of waste oil which has been in use since last May appears to only remove particles up to 0.2 mm in the three stage filter of the batch tank
<i>Action suggested?</i>	This report describes the results of a study into the possibilities of increasing this capture. Furthermore the possibilities of re-distillation in two stages and the re-refining process of KTI were examined
<i>Reason for this research?</i>	using degassing and vacuum distillation.

The way in which this introduction describes a technical problem is suitable for a specialist reader who is up-to-date on the recycling process. However this report is not very accessible to decision makers. More serious is the fact that the reasons for reading the report are unclear to the readers. Because the text does not answer their questions, they cannot evaluate the information and put it in perspective as there are many options:

- This is a quality issue as the end product does not meet the requirements. This means that at least the quality control and sales departments will have to be involved.
- This is a potential conflict with the environmental health inspection as the discarded waste water (contaminated with oil and rubbish) does not meet the legal requirements. The legal department must be notified immediately.
- This is a cost issue as a fourth filter is required.

Of course an accompanying letter or oral explanation can anticipate many questions. However, by the time many readers study the report, the letter might have disappeared and the explanation forgotten. The following introduction is therefore more manageable for a decision maker.

Introduction suitable for decision makers

Immediate problem

The new installation for the recycling of waste oil that has been in use since last May appears to remove pollutants from waste oil insufficiently. The result is that the end product does not meet the requirements of high grade fuel oil and only generates 60% of the normal price.

Action recommended

This report presents recommendations for several modifications in the production process which can bring the quality back up to the required level within two weeks.

Long term

A literature study was also done into the possibilities of using a completely different process in the future (within one to two years). This process will be either re-distillation in two stages or the re-refining process as patented by KTI (Kinetics Technology International).

You will seldom find readers who read a 100 page report from cover to cover; yet it is sometimes necessary to write such reports. With a well-planned report, each part is important for a specific target group. Perhaps appendix 7 is read by the head of marketing who is completely uninterested in the rest of your work. Important is that different readers can easily select the information that is relevant to them. A clear table of contents, informative chapter and section titles and a summary which can be read independently of the report all contribute to the accessibility of the report.

2.3 Lack of internal regulations

New employees who have to write a report sometimes make enquiries in their department as to the guidelines they have to follow. Many organizations indeed have guidelines as to the layout of a report which are recorded in their house style. Some organizations have set rules regarding content such as a standard division. Unfortunately such regulations are sometimes vague and offer little support. In many cases there is a complete lack of internal guidelines.

Vagueness regarding the requirements of a text

The American communications expert Barabas gave a training 'writing progress reports' for employees of a R&D department. A heated discussion broke out among employees about whether or not to include certain information in the report. Obviously they had vague and perhaps incorrect ideas about the purpose of the report and the requirements of the readers. Therefore Barabas decided to ask the most important group of readers, namely the supervisors and directors of the writers for clarification. They in turn were shocked to hear that the writers obviously did not know the reasons for writing a progress report. A fierce debate ensued.

Here are several quotations:

‘I just want to know what they’ve done during the past month and what they’re going to do next month.’

‘I don’t care what they’ve done, so much as what they’ve found out.’

‘More damn data and graphs, you mean? I’m drowning in it already. Let them just tell what all the gibberish means.’

‘What do you mean *means*? Isn’t that what we’re supposed to do, figure out what it all adds up to?’

‘Hell no! They’ve got to be doing more for their pay than running tests and generating data. I want to see some evidence of thinking in their progress reports; speculations and conclusions, however tentative.’

Of course every reader has ideas about the requirements of a report but unfortunately they usually do not formulate them explicitly. Moreover, different readers in the same organization may use different norms. Readers are not always right by definition. They might make unreasonable demands. This is what employees of a communications company discovered when they were called in because managers kept complaining about the quality of the reports they were receiving. It turned out that managers were in fact expecting information in the report that was superfluous considering the purpose of the report. They wanted to see many marketing details; they found these interesting because of their own marketing background. However, they did not need these details to take a decision.

Instead of sending the employees on a writing course, something else was needed here. They either needed explicit indications of what readers expect from a report or drop these apparently unfounded requirements.

The moral: you will have to develop your own opinion on the requirements for effective reports. It is not recommended you divert radically from the existing traditions in a department, but you can trust that good communication will be recognized as such. And of course you can prevent many problems from happening by keeping in regular contact with the client, for example by handing in a preliminary table of contents.

2.4 Essential skills for writers

What is needed to solve the problems discussed in the previous sections?

- *A systematic approach.* Those who want to stay in control of what they are doing must find a systematic approach. It is about giving attention to the right activities at the right moment. Those who think about all the important factors (prior knowledge of the reader, structure, clarity, correctness etcetera) at the same time will be unable to produce anything. Those who try to write in clear sentences early on when they are still deciding on the content, waste a lot of time. Those who try to add structure to the report afterwards will often not be able to create a clear line.
- *Attention to the reader.* Competent writers often ponder the question who their readers are and what they need whilst considering the use they make of the report within the organization. Simply said: they ‘hear’ different readers ask often ‘what is my role in this?’ As the readers’ needs are not always clear, it may be useful to

contact the client or other readers once or perhaps several times during the writing process.

- *Knowledge of writing techniques.* Writers who know which factors determine the clarity of the structure and the legibility of a report will be able to produce an accessible report in a relatively short time.
- *A correct list of priorities.* Writing is always more time consuming than people think. Deadlines are more important in an organization than in educational institutions: a report that is submitted late sometimes cannot be used. In that case the writer needs to prioritize their attentions. Instead of quickly writing a summary, it is sometimes better to explain part of a chapter only briefly.

3 Writing systematically: from commission to plan

3.1 Determining the main question

3.2 Designing a plan of action

Once a report is finished, writers often realize they could have worked more efficiently. In hindsight it seems incredible that it took so much time to convey the general idea correctly in the report. It now seems unbelievable that the writers had to stare at the computer screen for so long before they could write down phrases that now appear obvious. And once again the deadline was not met.

This is fine when the client is happy with the end result but what if they make all kinds of comments? Often these comments reveal that the clients themselves had not been clear about their expectations of the report in the first place. Comments that show readers were not clear about their expectations. Processing these comments causes at the very least more delays.

Such problems cannot be avoided completely. Thoughts usually do not become clear until they are put on paper. Sometimes, clients come to a better understanding of what they want when they see it written down. And yet, for many people it is possible to accelerate the writing process leading to results that comply better with the wishes of the readers. This can be achieved by writing systematically, a process of four steps explained in this book. The first two steps can result in an intermediary product: a plan of action; this will be discussed in this chapter. The remaining two steps will be discussed in chapter four.

The writing process in four steps

- 1 Determining the main question
 - Provide a clear assignment
 - Analyse your readers
 - Formulate the key question exactly
- 2 Design a plan of action
 - Make a list questions
 - Make a provisional table of contents
 - Make a time schedule
 - Write the plan of action
- 3 Write the first draft
 - Carry out the research
 - Write the first draft quickly
 - Revise the first draft
- 4 Write the definitive draft
 - Set priorities in case of time pressure
 - Be concise
 - Complete the text in a professional manner

You do not need to have finished one step completely before starting with the next one. While writing you may find that the key question has not been formulated correctly or that the table of contents has to be adjusted. Writing is therefore a cyclical process.

It is, however, important that certain activities, such as working on clear and correct wording, must not occur too soon as they will lead to unnecessary work. Other activities, like determining the exact structure, must not take place too late because making adjustments afterwards will be complicated and time-consuming.

3.1 Determining the main question

Working systematically means you first need to make sure you have a clear idea of what the assignment requires. Subsequently, you analyze the needs of the readers and on that basis you formulate the exact main question.

3.1.1 Making the task clear

Usually someone commissions you to write something. However, it is also possible that you take the initiative yourself. In the latter case, you formulate your own task.

Clients, in practice, often do not explain clearly what they expect from the author. Writing assignments are at times vague and general. It might seem a luxury to work on a project which has been formulated vaguely because it offers you a lot of freedom; however, these vague tasks often work out badly: chances are that your report does not meet the readers' expectations. Perhaps you explain certain problems in too much detail while the client may not want these problems to be exposed in this way. Or your report results in giving recommendations that are not to your client's liking.

After completing a vague task, it often emerges that your clients did indeed have certain ideas about the content. Your report does not comply with their expectations: and the report either disappears into a drawer or you have to rewrite large parts of it.

Vague task

Annet Weverlingh MSc, working at an electronics manufacturer, was told by the head of manufacturing during a meeting: "You know there are some problems with the manufacturing process of the data player. Can you see what our options are in dealing with this matter?" At first she thinks she has enough information to start the project. According to her, the most important issue established during that meeting is that the manufacturing process is not efficient enough and therefore too costly. In the report she concludes by saying that research had shown that the same work can be done by 10% fewer employees through a better division of the work. Her client, however, is not satisfied: after all the problems the company has recently had with trade unions she should have known that a reduction in the number of jobs was not an option. The client had expected to find information about new, more advanced production equipment. He sees an increase in production as the solution. This is something Ms. Weverlingh would have known if she had questioned the client when she was given the project.

Frequently, as in this example, there is uncertainty regarding the assumptions and conditions of the research and the desired content of the report. It is therefore wise to discuss this with your client before and during the job as it gives you the opportunity to find out what your client looks for in the report.

You can use the following checklist to find out if you have enough information. By using this checklist and discussing the result with your client you can make an ill-defined task more concrete. Of course, somebody who issues assignments can use the check list in figure 3.1 as a starting point.

Figure 3.1 Check list

- What is the *purpose* that has to be met?
What purpose does the report serve when it is finished (does it aim to instigate a discussion, or should decisions be made based on it?)
- What are the *assumptions* and *conditions* of the report?
- Who* will read the report?
- When* does the report have to be finished?
- When and with whom can you *discuss* concept drafts?
- What is the desired *size* and *lay-out*?

We will use the assignment for the Data player as an example.

Specific assignment

Purpose: Supporting the decision to expand the Data player production
Assumptions: Number of jobs will remain the same; research possibilities advanced systems
Readers: Board of directors, works council
Deadline: 10/12
Consultations: Mr. Jansen MSc will receive draft 26/11; meeting 3/12
Length: Not exceeding 10 A-4

If you are expected to make a plan of action (research proposal, progress report, etcetera), you can use that to discuss the items on the checklist. The advantage of a plan is that a number of issues are written down. If the definitive report resembles the plan of action, afterwards the readers cannot say that they expected something different to what you are presenting.

3.1.2 Analyzing the readers

If you want to write an effective report you must take the intended readers into account from the beginning. As discussed in the previous chapter, in practice you not only deal with the client (decision maker) but also with others (e.g. specialists). The following three questions can help analyze the reader/s:

- 1 What is their purpose for reading the report?
- 2 What questions do they want answered?
- 3 How do they read the report, in other words, what strategy do they use?

The answers to these questions are described in table 3.1 for the two main reader groups of decision makers and specialists.

Table 3.1	Writing for decision makers or specialists	
	<u>Decision makers</u>	<u>Specialists</u>
Purpose	* decision making * management	* advice to decision makers * supervision * implementation
Questions	* What are the problems for our organization? * What are the conclusions, What is recommended? * What advantages are gained from the recommendations, what are the risks? * What are the pros and cons?	* What method is used to obtain the results? Is it trustworthy? * What technical problems could arise? * How should implementation take effect?
Reader strategy	Report is skimmed and read selectively; especially the summary, introduction, conclusions and recommendations; the rest is looked through briefly; pictures attract attention.	Report is scanned and read selectively; certain details (often found in tables) and some appendices are read closely, depending on specialism

Matching the report to decision makers

To ensure a decision maker can skim the text, you must make sure that the essential elements, such as a summary, are tailored to them. This means you should aim at readers who have some background knowledge about the subject but who may not necessarily be up-to-date on all the technical details or interested in them. By following the instructions below you can meet their wishes.

- Present an organizational question rather than a technical one: provide a question which deals with costs-benefit analysis, quality, management, safety, etcetera. Avoid writing: “What techniques can we use to remove pollutants from waste oil more effectively?”, and instead use “How can waste oil be used to make fuel while maintaining such a quality that it renders the price of high quality fuel?”
- Avoid the use of too much jargon in the summary, introduction, conclusions and recommendations and do not go into technical details.
- Go into the organizational matters in the introduction and summary. Define the organizational problem as a result of the (briefly introduced) technical issues.
- Give concrete information in your conclusions, recommendations and summary about the extent to which your solution meets the criteria: effectiveness, costs, possible savings, time it takes to implement, legal conditions, etcetera.
- Pay attention to visualization: use attractive diagrams and graphs that can be understood independently from the text.

Summary tailored to a decision maker

Organizational problems

The new waste oil recycling installation which was first used in May for recycling waste oil, appears to remove pollutants from the waste oil insufficiently. This results in an end product which does not meet the specifications of high quality fuel and brings in only 60% of the regular price. That means a monthly loss of around €300,000.

Solution meets criteria

This report describes experiments which show that the quality can be raised to the desired level with the help of an extra filter in the installation if there are no irregular production failures like in May this year. It is recommended you install the filter as soon as possible. Our own technical services can have the filter working within four weeks. The costs are recovered within a year.

Aiming the report at a specialist audience

Scanning a report is only possible when there is a clear structure to the report. The desired information can be found quickly when the writer follows the instructions below:

- Start each chapter with a short introduction so the reader can immediately see what the chapter is about.
- Make separate, readable, appendices with technical details.

Furthermore, bear in mind typical specialist questions and:

- accurately justify the methods used;
- refer to the literature sufficiently and correctly;
- give detailed results, preferably in a table.

3.1.3 Formulating the main question

You should establish the outline of the report at an early stage. This is best done in the form of a question. By doing so, it becomes easier to keep in mind the reader: is this really the question readers are looking to have answered? You also force yourself to work more systematically.

The question around which the report revolves we call the main question. It must be formulated carefully.

Exact main questions

- 1 To what extent is it possible and advisable to use GLARE in building the Air Tech 100 instead of conventional materials?
- 2 What is the best method to prevent freezing of the measure and sample points in the production line?
- 3 What are the most important causes of leak losses at the propylene storage at the plastics location/ Lokatie Kunststoffen at Geleen?

These three main questions clearly indicate which topic the text will focus on; and, moreover, the way the questions have been formulated immediately shows what the purpose of the text is. For example, after reading the first main question, the reader knows immediately that this is about a feasibility study. Main question two makes clear that the report will give advice and contain recommendations. On the other hand, question three points to an analyzing preliminary study.

The following main questions have been formulated less accurately.

Vague main questions

- 4 In this report the increase in the yield of the gas turbines will *be dealt with*.
- 5 In this notice we will *examine* the sealing of the landfill by means of a layer of foil.
- 6 In this report the handling of emails within our organizations will *be discussed*.

Formulations 4 – 6 present problems for readers as they cannot deduce the purpose of the report from these main questions. Expressions such as ‘deal with’, ‘examine’ and ‘discuss’ are popular for a reason: they are vague and allow the writer to be flexible. If you write that you *will go into* the increase in yield of gas turbines (example 4), you can mean at least three things:

- You describe the increase in yield (to what extent and when does it occur?);
- You explain the term ‘yield’ further (what are the causes of the increase in yield?);
- You advise (you make propositions to increase the yield).

Avoid using yes/no questions as a main question and use an open question instead. Readers seldom want just a yes or no answer; they are more interested in how, why and what. An open question also gives you something to hold on to during the writing process.

Wrong: closed question

Can the AIVD create a policy in which openness is combined with the necessary confidentiality?

Correct: open question

Which policy measures can be taken by the AIVD to create openness about the activities without compromising the necessary confidentiality?

The main question can be adapted as you continue working on your report; new information or ideas can lead to changing the main question.

3.2 Designing a plan

When the main question is clear, you can draft a plan of action/ action plan. To do this, you first subdivide the main question into a list of sub questions. You use this list to make a provisional table of contents. Combined with a time schedule, you now

have a personal work plan which can be developed into a project proposal for the client.

3.2.1 Drawing up a list of questions

The basis for your questions is the main question: this is the most important question the report answers. From this question, other background questions and key questions must be derived; these are questions to which the reader must have the answer in order to understand how the writer answered the main question.

Background questions create a framework in which the main question is answered. They clarify the main question and the importance of it. The following questions are practically always indispensable:

- How is the terminology from the main question defined?
- What is the importance of the main question?
- Which research method has been used?
- What are the conditions?
- Which assumptions have been made?

We will illustrate this with an example.

<i>Background questions</i>	
<i>Main question:</i>	To what extent is it advisable to use GRACE in building the Air Tech 100 instead of conventional materials?
<i>Definition:</i>	What do we mean by conventional materials? What elements are involved?
<i>Importance:</i>	Why is this comparison important? (choice problem with design of Air Tech 100)
<i>Method:</i>	How are the material properties compared? (experiments)
<i>Conditions:</i>	Which types of planes are included in the research? (Only civilian ones)
<i>Assumptions:</i>	Which aspects are not taken into consideration? (cost aspect)

Background questions are usually answered in the introduction.

Key questions are questions whose answers lead to the answer of the main question. They form the basis for the chapters which come after the introduction. They are announced in the introduction when you clarify the structure of the report. The following key questions could be raised to match the main question in the previous example.

<i>Key questions</i>	
Main question: to what extent is it possible and advisable to use GLARE in building the Air Tech 100 instead of conventional materials?	
<ul style="list-style-type: none">• Does the GLARE construction meet all the regulations and requirements?• Are further criteria that determine the feasibility met?• What are the relevant properties of GLARE derived? from experiments in comparison with conventional materials?	

Which key questions you include depends largely on the type of report you are writing. To explain this further, an example of a list of sub questions - with a main question -, background questions and key questions has been given here. The questions refer to an advisory report in which three water purifying processes are compared. Important key questions deal with the choice of the assessment criteria, the checking of the alternatives against the criteria and the final choice for the best alternative. General answers in key words make it possible to also ask questions on a lower level.

List of questions

Subject

The removal of traces of organic-chemical compounds from water: a comparison of the three most important purification processes (the biological process, the active carbon process and the silicalite process).

Main question

Which purification process is the most suitable for the removal of traces of organic chemical compounds from water?

Background questions

- What organic chemical compounds are involved?
 - mainly solubles and pesticides
- What are the three purification processes?
 - biological (micro organisms break down compounds)
 - activated carbon (compounds are absorbed by carbon)
 - silicalite (compounds are absorbed by silicalite)
- What is the importance of the comparison between the processes?
 - new regulation enforces more effective removal of harmful substances; it is unclear which process is preferred
- How are the processes compared?
 - literary study and laboratory work
- Which limitations are taken into consideration?
 - no attention paid to interaction with purification processes for other substances

Key questions

- What criteria are used in choosing the most suitable process?
 - *Effectiveness* (the amount of the compounds has to be lowered in order for the water to comply with government regulations)
 - What are these government regulations?
 - *Technical feasibility* (the process has to be implemented more easily in the purification process)
 - Which demands are placed on this process?
 - *Affordability* (permanent and variable costs as low as possible)
 - Which factors determine these costs?
 - *Reliability* (sudden increase in the amount of harmful compounds in the water cannot halt the process)
 - What are the chances of these sudden increases happening?
 - Flexibility (process must be able to handle varying waste water flows)
 - To what extent do these varieties in flow occur?
- To what extent do the various processes meet these criteria?
 - According to the literature
 - According to experiments

3.2.2 Making a provisional table of contents

The next step is transforming the list of questions into a (provisional) table of contents. You have roughly determined the content of the report and now you are thinking about a clear structure in order to make the content accessible to your readers. The table of contents you draft at this stage of the writing process may, and should, probably be revised. At this stage, it is especially important to develop the layout of the body of the report (usually the numbered chapters). You can set up a bare table of contents or a table of contents with key words which indicate what will be discussed in each part of the text. The latter will give you more to go by when writing (see the following example of a provisional table of contents).

Provisional table of contents

Healthy offices

The prevention and reduction of complaints regarding the climate inside offices.

Preface

- Information developed by RBB for DGA
- Meant for: general manager, works council and personnel

Summary

1 Introduction

- *background and problem*: many employees complain about headaches, dry throats; causes are doubtful (is it the employees or the building?)
- *importance*: need for an objective judgment; consequences of complaints (absences, discontent, loss of productivity); follow new guidelines
- *main question*: how can complaints about the workplace and climate inside be analyzed and reduced?
- *procedure*: advice on the basis of scientific research and expertise
- *structure (key questions)*: complaints and causes; procedure for tracing causes and taking measures etcetera.

2 Complaints procedure

3.1 Introduction

- dealing with reported complaints not structurally done: examples
- procedure: 4 steps

3.2 Central complaints office

- location central office, duties

3.3 Step 1: registration

- characteristics and use of standard complaints form (appendix)

3.4 Step 2: choice complaints department

- considerations choosing suitable complaints department

3.5 Step 3: diagnosis and measures

- example of diagnosis and determining correct measures

3.6 Step 4: reporting back

3	<i>Complaints procedure</i>
3.1	<i>Introduction</i>
	- dealing with reported complaints not structurally done: examples
	- procedure: 4 steps
3.2	<i>Central complaints office</i>
	- location central office, duties
3.3	<i>Step 1: registration</i>
	- characteristics and use of standard complaints form (appendix)
3.4	<i>Step 2: choice complaints department</i>
	- considerations choosing suitable complaints department
3.5	<i>Step 3: diagnosis and measures</i>
	- example of diagnosis and determining correct measures
3.6	<i>Step 4: reporting back</i>
4	<i>Conclusion</i>
	<i>Bibliography</i>
	<i>Appendix: Complaints register form</i>

Drafting a provisional table of contents is not only convenient for structuring your report clearly, but also for using it in discussions with your client. A detailed table of contents gives a good idea of what you want to include in your report. This way you can find out whether your ideas correspond with your client's.

Furthermore, the table of contents offers you a good basis for effective planning according to a schedule.

3.2.3 Making a schedule

Once the commission has been 'translated' into a preliminary table of contents, the next step is drafting a schedule. In this schedule you show by which dates certain tasks have to be completed. Apart from set dates, such as the date when the final version of the report must be submitted, you can record for yourself by what date you want finish the draft version..

In the following example, a time table for literary research, the author has 6 weeks for his research and the report.

Schedule

Tasks	Weeks						
	1	2	3	4	5	6	7
Data collection Literature studies	■						
Introduction + chapter 2			■				
Chapter 3-5 and conclusions				■			
Present draft version (7th March)					●		
Process feedback					■		
Final points <ul style="list-style-type: none"> • phrasing • Summary and appendices • <u>Final details</u> • Lay out and illustrations • Print and bind • Deadline (21st March) 					■		
							●

3.2.4 Writing a plan of action

A plan of action is a concise report in which the decisions are recorded which give guidance for the rest of the work. It can have the form of a research proposal or project proposal on the basis of which the client approves a proposal. It can be the first in a line of interim reports with which the author/s shows they are on the right track considering the purpose statement and the conditions of money, time and man power. The work plan usually looks like the example given in table 3.2.

The text of the plan will appear again in the final research report or the progress reports, especially in the introduction. If you do not have to submit a plan of action, a schematic plan which you retain for yourself will be sufficient.

Table 3.2 Contents of a plan

Element	Question	Corresponds with:
Description research	<ul style="list-style-type: none"> • What is the aim of the research? <i>The proposal (or rather: the commission) is to do the following.</i> 	Main question
	<ul style="list-style-type: none"> • Why is the research necessary? <i>The research focuses on a problem that has to be tackled for the following reasons.</i> 	Background questions, for instance the importance of the main question
	<ul style="list-style-type: none"> • What are the limiting conditions and assumptions? - <i>An assumption is that nothing may be detracted from...</i> - <i>The research will not include...</i> 	
Approach	<ul style="list-style-type: none"> • What approach will be used? - <i>This is the way to go about it..</i> - <i>These are the steps to be taken..</i> 	Background question Key questions
Planning	<ul style="list-style-type: none"> • Which are the stages of the research and the report? <i>Stage 1...n occurs in the following stages; the progress reports (or the final report) will be presented on date x.</i> 	Time table coupled with a provisional table of contents

4 Writing systematically: from plan of action to final report

4.1 Writing the first draft

4.2 Writing the final version

Even good authors seldom produce excellent reports at the first attempt. It is therefore useless to aspire to that; more time is wasted staring at a blank screen than with revising a text which is not yet perfect. Writing is best done in rounds. First the focus will be on quickly writing down the contents. Then the focus will shift to concise phrasing and finishing details.

4.1 Writing the first draft

During the research stage you will always keep in mind the writing assignment which will follow. After that, you develop the different parts of the table of contents. Usually several revision rounds are necessary.

4.1.1 Carrying out the research according to the plan of action

You should carry out the stages of the research as described in the plan of action according to the time schedule. When doing this, it is important to remember that eventually you must report on the research. Therefore it is crucial to record all the information you will need later. How you do this depends on the type of research. We will describe how you can go about an experimental (technical) research and literary study.

You can prepare an account of an experimental study by carefully recording all details of the research in a laboratory log; afterwards you will then be able to reconstruct the work in detail. Date all notes in order to check when you made changes in a draft.

Information to be recorded in experimental studies

- Equipment used (write down kind, brand and type and include the registration number in case you afterwards doubt whether the device functioned properly);
- Materials used
- Test details
- Methods used; how was the test conducted, what did you measure, how did you measure this and with what device?
- Observations
- Information needed to process observations: zero positions, scale numbering, calibration factors, corrections;
- End results of the observations.

When doing literature study, it is important to carefully record the results of your reading activities. This can be done by taking notes, quoting, summarizing or photo copying. Should you not do this carefully enough, it might not be clear from the report which sources your findings are based on. This in turn impairs reliability and accountability. For this reason you should write down the full titles of all the works you have used. If you do so immediately, using a program such as EndNote© on the computer, you can easily make a list of references afterwards.

Some authors write notes on flash cards which they then order according to key words. Again, the computer offers many possibilities which make the traditional card-index box seem very old fashioned and limited. There are special text databases which allow the user to search for a specific word in their own file in numerous ways. Information obtained from external automatized databases can easily be saved in the personal database and completed with own information.

It can be useful to use a separate file for random ideas; these ideas may not be of use in the current phase but may come in handy later (e.g. when writing the discussion chapter).

4.1.2 Writing the first draft - quickly

The table of contents is the frame work you use to write your report. However, you do not need to adhere to the given order: it is better to skip more difficult chapters first. It is important to maintain a writing pace high by not being too concerned about the wording. Some writers want to write the perfect version in one go. This is seldom efficient as two activities take place at the same time: writing the content and formulating as clearly and attractively as possible. These activities may seriously conflict: attention to perfect style will take away from thinking carefully about the contents, and, conversely, the contents may overshadow the style. Besides, trying to write the perfect version in one go is terribly time-consuming; revising a draft is quicker. You also run the risk of putting a lot of energy into carefully formulating parts of text which might be changed radically later on.

Instead, concentrate first on writing down content while making sure your stream of thoughts is unobstructed. Do not yet spend time improving the language. Lengthy pieces of text, bad sentences, as well as spelling and typing errors, can be taken out at a later stage. Roughly indicate where you want to place figures and other visuals, but do not develop these yet.

Tips for writing the first draft

- Use parts of the plan of action: often you can copy whole chunks from the plan of action to the introduction of your final report.
- Use the 'outline' function ('overview') of your word processor to make (sub) sections temporarily invisible and to create a better insight in the outline of the text. With the outline function you can also move sections easily. The 'automatic' table of contents in the first part of the text can also help to keep track of the structure whilst writing. Another option is to apply the 'document structure' function. The advantage of this is that the text remains visible while the document structure appears on the screen.
- Keep the structure of chapters and sections clear by using headings.
- Skip complicated pieces or parts you have little information on. While you are working on simpler parts of the report you can think about other parts that still have to be written. The 'gaps' in your text can be marked by an asterisk (*). The

computer can search for all asterisks and quickly find the passages that still need to be finished.

- Do not type out long recurring words (jargon!), but use a simple sign (e.g. b\$) in the autocorrect function of your word processor instead. This will keep your stream of thoughts going. Your word processor will automatically convert this sign into the correct word.

4.1.3 Revising the first draft

After roughly having determined the content, you can revise the text. This is often easier if you do not start revising immediately after the first draft. Put the text aside for a few days to create some distance from the content. After several revision rounds you might have different versions; this may be the case if you retain old copies with the intention of using some of their parts later. Using titles (e.g. 22Aprilconcept.doc, concept05May.doc'), and dating a text ensure you always know what the latest version is.

You can use the following guidelines when revising the text.

1 *Is the structure clear?*

Read the introduction and conclusion immediately after each other to see whether the main question in the introduction is indeed answered in the conclusion. Skim through the chapters by only reading the topic sentences: check to see if a reader will get a good idea of what you are trying to say.

2 *Has the text been clearly formulated?*

Ask yourself with every bit of jargon if this term is familiar to your readers. Check to see sentences are not too long (30 to 40 words) and whether long sentences are interchanged by shorter ones (5 to 10 words). You can check this with a grammar check program.

3 *Is the tone suitable for your readers?*

Ask yourself whether the tone is neither too hesitant nor too forceful. Any new employee who presents their plan for a more efficient division of tasks on the workfloor as follows, has little chance his proposal will be accepted.

Too forceful

The division of tasks is extremely inefficient at the moment. Management should set up a completely new system of job classification which will make it possible to reduce the work force by 20 people.

Somebody who has just started with a company cannot afford to use such a forceful tone. It would also be wiser to describe the problem (the current division of tasks is not very efficient) more carefully seeing as the readers of the report might be responsible for that situation.

3 Has the information been clearly presented?

A report becomes more accessible and interesting to read when the information is visualized. Whenever possible, use figures and tables to convey research results and also use lists to break up large portions of text.

4 Have all the parts of the front and back matter been written?

When the content has been written, other parts such as the summary and reference list can be given their final form.

It is advisable to have the second draft of your text double-checked by someone else: two see more than one. Even if you think the text is absolutely clear to your readers, a proofreader will often notice any shortcomings. Tell the proofreader which points you would like feedback on; if you would rather get feedback on the general outline at this stage, comments about bad wording or spelling mistakes are not much use. Those errors you would find and correct later anyway. If comprehensibility is a point of concern, then recommendations for extra topics are a waste of time for the reader, as well as the writer.

Reports written for a larger audience such as manuals, safety instructions or information material should always be pre-tested on a part of the target audience. Only by seeing how people use the document and by asking them what is missing or unclear, can you determine if your report meets its objective in practice as well as in theory.

4.2 Writing the final version

Many writers run out of time when they are writing the final version. Therefore, it is important to set the right priorities. Special attention should also be given to being concise. In the final phase you should focus on a good layout.

4.2.1 Setting priorities

Lack of time is something writers are likely to experience. You will therefore have to set priorities, especially as deadlines are extremely important in business. Which priorities you set depends on the readers and their demands. Seeing as/Considering there will always be readers among your audience who only skim the report, you must pay special attention to the clarity and persuasiveness of the summary, conclusions and recommendations. Further explanation or support needed for more specialist readers can be added later at their request. If the scientific particulars are important to the reader, you will have to describe the methods used in careful detail, including the references and reference list.

An attractive, time saving alternative could be to work out the chapters step by step only; similar to how you would handle a PowerPoint presentation. After all, the most time consuming task is formulating complete, well-written sentences. Especially when the report is explained in an oral presentation, listeners will find such a step by step explanation sufficient. They and others will probably even be grateful for your conciseness.

More tips:

- Do not waste a lot of time using the advanced possibilities of word processing programs or graphic programs you are not familiar with; leave them till you have plenty of time to experiment.
- Use layouts or styles which come installed with your word processor (heading 1, heading 2, etcetera). Not only are they convenient when making the layout, but also when structuring and maintaining a clear overview.
- Use easy-to-learn, time-saving functions by using fast keys to move the cursor, or the autocorrect function that makes all complicated words appear on screen in one key stroke.

4.2.2 Being concise

The big stacks of reports which readers have to plough through often lead to the wish for these reports to be more concise. Mistakenly, some people still think that a long report impresses more than a short one. They believe the time spent on research must be reflected in the number of pages. This results in voluminous reports which immediately discourage the readers from reading it (like a report on the proposed building of a power station on the Maasvlakte which consisted of 420 pages, with only 12 of them being appendices)

After you have finished the first draft, it is time to concern yourself with being concise. Only now that the research has been done and the conclusions are known can you determine which information is essential. How do you make a concise report? By applying the three following pointers:

1 *Making optimal use of appendices*

Put information that is not relevant to all readers and not necessary for understanding the outline of the report in the appendices. Calculations, results and detailed computations of a design lend themselves to appendices; essential information can be summarized in the report itself. The appendices can be more extensive than the report as long as they can be used and understood separately.

2 *Determining which information is relevant*

Sometimes it is clear from the outset that certain data do not contribute to the objective of the report. In this case it is best not to burden the readers with such information (e.g. historical background which is sometimes included through force of habit, but which has no consequences for what was researched). For the same reason, details of earlier decisions now superseded can be omitted.

Irrelevant information

“The first written accounts of the Low Countries were made by the Romans. Around the beginning of the Christian era they described with great horror the swamp delta near the North Sea. ‘Tacitus says: ‘silvis horridus aut paludibus foetidus’ (‘horrible because of its forests, and stinking because of its swamps’). The soldier Plinius the Second describes the Low Countries as ‘nature’s eternal area of conflict covering a landscape which is neither sea nor land’. The landscape of the Netherlands has changed much since the Romans. Also the area around Hollands Diep does not in the least resemble the description of the Romans anymore.”

(Source: report about a dredging spoil depot in Hollands Diep)

Sometimes only afterwards, when the research has been completed, is it possible to determine whether information is relevant or not. In the case of feasibility studies, often many alternatives are examined and only after the research has been done, does it become clear which alternatives are worth considering seriously. An example of this may be the high speed railway line connecting Paris and Amsterdam. Twenty possible alignments were examined, but in the end only three or four were feasible options.

As a consequence, the report does not need to describe the rejected options in as much detail as it does the ones that are suitable for implementation. It usually suffices to demonstrate why certain options were not feasible. In short, do not share the whole research process with the readers. If you discovered only later in the research that an option was not feasible, that does not mean your readers have to read about this at the end of the report.

Concise description of uninteresting alternative

An Engineering Consultancy firm has been given the task of finding a good location for a waste fermentation installation in the town of Leiden. The choice is between three sites which are assessed extensively during the research. In the course of the research, one of the locations was bought by a project developer. This location can therefore be dismissed as an option for the fermentation installation and will not be described further in this report.

3 *Making agreements about length*

More and more organizations try to constrain the length of reports by giving an indication of the maximum number of pages. This usually concerns the numbered chapters of the main report only, but does not include the appendices. Such conventions force writers to work very selectively and question whether the information is necessary for all readers.

4.2.3 Creating a professional layout

The ‘packaging’ also determines whether your report will be considered favorably; hence the following tips:

- Pay attention to layout. It takes little time to considerably improve the accessibility and attractiveness of a text by leaving enough white space on a page, using consistent layout of chapter and sub chapter titles, not using any loose headings or titles at the bottom of a page and occasionally using italics to highlight something.
- If possible, generate the table of contents automatically in order to prevent mistakes in titles and page references.
- Use spell check to avoid many spelling and typing errors (even though at times errors remain partly undetected).
- Check if you have not forgotten any figures and appendices and give them a number and a clear title.

5 Structuring

5.1 Reading a report three ways

5.2 Dividing the report into chapters and sub chapters

5.3 Dividing the report into paragraphs

Structure is essential for the usability of a text. If your readers cannot find relevant information easily, your report will quickly end up in the archive files or a recycling bin. Readers just do not have the time to look closely at everything that lands on their desk, even if they wanted to., .

You can do a lot to prevent your reports from this fate: by using a clear chapter and paragraph division you will extend the life expectancy of your report considerably.

This chapter starts with an overview of the ways in which a report can be read. Next, we will analyze the division into chapters and sub chapters, and, finally, we shall look at paragraphs. If you follow the instructions in this chapter you will ensure your text is accessible to readers with different expectations such as decision makers and specialists.

5.1 Reading a report three ways

You should be able to read an accessible report in three different ways. A clear structure enables this.

1. *Skimming a text.* Readers who want to get a quick insight into the general concept of the report must be able to find the essential information in the summary, introduction, conclusion and recommendations.
2. *Scanning a text.* Readers looking for specific information must be able to find this quickly by means of the table of contents, chapter introductions, titles in the text and topic sentences at the beginning of paragraphs.
3. *Intensive reading.* Readers who wish to read the whole report or parts of it should not be deterred by an obscure structure, badly formulated sentences or too many details and calculations which should be put in the appendices.

Whether a report is accessible is clear from the table of contents.

Unsuitable for skimming and scanning

	Table of Contents	
<i>No summary</i>	1 Introduction	3
<i>Not informative</i>	2 Results questionnaire employees	5
	3 Causes of noise pollution at BBS	9
<i>Not informative</i>	3.1 Definition noise pollution	9
	3.2 Noise from outside	10
	3.3 Noise from inside	12
	4 Possible solutions	15
	4.1 Noise from outside	15
	4.2 Noise from inside	17
	5 Recommendations	19
<i>No title and number</i>	6 Appendices	23

Suitable for skimming and scanning

<i>Contains a summary</i>	Table of Contents	
	Summary	2
	1 Introduction	3
<i>Informative titles</i>	2 Inventory complaints of employees	5
	3 Causes of noise pollution with BBS	8
	3.1 Definition noise pollution	8
	3.2 External noise: traffic and installations	9
	3.3 Internal noise: conversations and machines	11
	4 Possible solutions	14
	4.1 External noise: insulation of walls and windows	14
	4.2 Internal noise: offices instead of open plan	16
	5 Recommendations	18
<i>Appendices</i>	Appendix 1: Results employee questionnaire	20
<i>title and number</i>	Appendix 2: Budget outer wall and window insulation	24
	Appendix 3: Budget renovation office gardens to offices	25

5.2 *Dividing into chapters and sections*

5.2.1 Starting with a table of contents

Long reports are not popular. Yet, no one complains about the phone book. Of course there is no reason to as the logical ordering gives its readers optimal accessibility. Reports cannot be structured in the same way as the phone book but they can be as accessible. The table of contents plays an important role in this.

The table of contents which reflects the grouping of (sub) chapters has two functions. Firstly, it must reflect the general sense of the report. Someone who skims the text for general information will first look at the table of contents to get an idea what the report is about. Secondly, the table of contents also plays an important role when scanning for specific information. By looking at the table of contents, readers decide which (sub) chapter they need to consult for further information.

If you make a table of contents early in the writing process, you will force yourself to shape the report you are working on concretely. This table of contents will help you keep track of the outline of the report.

Important rules for a quick accessible table of contents

- 1 Use a prescribed set of formatting conventions. It will save you a lot of time
- 2 Do not use more than 3 classification levels in your text; more than three levels will obscure the clarity of the text.
- 3 Create concise and informative titles
- 4 Show the connections between sections through the titles.

In the following sections, these important guidelines will be explained further.

5.2.2 Using prescribed format conventions

Companies and educational institutions sometimes have guidelines regarding the layout of different kinds of reports. Check before you start writing the report whether there are indeed such guidelines for the type of report you are writing. This can save you a lot of time.

Generally speaking, it is best to format your report according to the conventions but there are certain situations when this is not possible. Imagine that in a policy proposal, according to the conventions of your company, you must include a chapter in which problems are discussed which led to the writing of the report. If an earlier report exists which already discussed these problems, then one paragraph summarizing this report is preferred to a whole chapter of 'Problem Analysis'. Exceptions to existing conventions are best discussed with the client.

5.2.3 Dividing correctly

To make a report accessible, it is important that every one or two pages there is a new title or heading which can help readers find their way around. However, if you put a heading above every paragraph it will have the opposite effect. The text will become obscure and it will become more difficult to understand the essence of the report. How do you find the correct balance?

1 Do not use more than three levels of subdivision

Subdividing chapters and sections is necessary to make the text accessible, but if too many levels are used (§5.3.4.1.2) this will have the opposite effect. Readers will lose sight of the main idea.

Rather, restrict yourself to a three-level division in the table of contents (§5.3.4). Within sections you can make further subdivisions by means of other aids, such as using unnumbered headings or paragraph groups.

2 Any subdivision must consist of two parts

Do not divide a chapter into one part. The term 'divide' already indicates there should be at least two parts remaining. This also applies to the subdivision of chapters and sections, so either distinguish several sections or do not divide the chapter at all.

Apart from that, introductions, conclusions and summaries do not form part of the contents subdivision. If they are used as such (combined with only one section regarding content only) then we see a hidden subdivision in one part.

Wrong subdivision

- Subdivision in one part
- 3 Tanker cleaning
 - 3.1 Verbeek method
- 4 Economic feasibility

Correct subdivision

- No subdivision
- 3 Tanker cleaning according to the Verbeek method
- 4 Economic feasibility

Wrong subdivision

Hidden subdivision in one part

- 3 Tanker cleaning
 - 3.1 Introduction
 - 3.2 Verbeek method
 - 3.3. Summary

Correct subdivision

Division in more parts

- 3 Tanker cleaning
 - 3.1 Verbeek method
 - 3.2 Bristol Method

5.2.4 Giving chapters and sections a clear title

The table of contents only gives readers a good overview of the content of the report if the chapter and section titles are sufficiently clear. Therefore follow these four tips

1 Make titles descriptive

Make the phrasing of headings self-explanatory. Do not use "Background" or "Technical Information" as section titles even though this may seem an easy solution for putting left-over information in the report which you cannot put under any other heading. However, this also immediately makes clear why such titles should be avoided: they say nothing about the content of the section and do not guide readers through the text. Vague headings do not become clear until you add informative elements to them, e.g. "Physics of Fiber Optics".

You can help readers with little time by incorporating the most important conclusion of a chapter in the title. Especially with advisory reports, a table of contents which acts as a mini summary is very useful. The advantage for you as a writer is that you are sure that no one overlooks the most important message of your report, even if the readers only open the report for the first time at a meeting.

Vague titles

- 2 Problems
- 3 Quality explored
- 4 Conclusion

Descriptive titles

- 2 Problems with the re-use of milk bottles
- 3 Quality body scan shower below par
- 4 Conclusion: expanding user friendliness of GP information systems can save lives

2 Show the connection between chapters and sub chapters

Not only do vague titles have the disadvantage that the content of the chapter is difficult to predict, also the relation between chapters and sub chapters becomes unclear. Compare the following examples:

Unclear relation

- 2 Measures
- 2.1 Material
- 2.2 Speed bumps

Clear relation

- 2 Measures speed limitation Marconi square
- 2.1 Replacement asphalt with bricks
- 2.2 Placement of speed bumps

In the first example, the readers need to use their imagination to be able to imagine what the content of the chapter might be. The titles do not make the relation between the different sections clear and readers cannot judge correctly whether the chapter is relevant to them. In the second example, a lot less is left to the imagination and thus there is less chance of any misconceptions about the text.

Avoid chapter titles which only consist of a repetition of the section titles. The chapter title must make the connection between the sections clear and clarify why they have all been put into one chapter:

Unclear relation

- 4 Locks and bridges
- 4.1 Locks
- 4.2 Bridges

Clear relation

- 4 Progress on the water works
- 4.1 Renovation of the locks
- 4.2 Widening of the bridges

Finally, do not give sections the same title as the covering chapter. This suggests that the same information can be found in the section as in the entire chapter and this might discourage the readers to read the other sections.

Unclear relation

- 5 Automation of administration
- 5.1 Automation administration
- 5.2 System control

Clear relation

- 5 Automation of administration
- 5.1 Implementation hard- and software
- 5.2 System control

3 Keep titles concise

It is essential that readers get sufficient information from the titles: the intelligibility of the titles is more important than the length. The art lies in formulating informative and concise titles.

Elaborate sentences are not suitable to be used as titles:

5.3 A description of the objections which were raised by pressure groups including the environmental movement and citizens against the planned construction of the A4 in Midden Delfland.

It is best if a title consists of only one line. You can shorten the above title easily by only describing its essence:

5.3 Objections by pressure groups against the construction the of A4

If you want to make it even shorter you can use telegram style:

5.3 Objections pressure groups against A4

Even though, stylistically speaking, this example is perhaps not so successful, it is still clear. However, writing concisely can also be taken too far:

5.3 Objections pressure groups A4

This title is subject to many interpretations. The chapter could also be about the objections raised against the pressure groups.

4 *Use parallelism to phrase titles*

Using parallelism in titles means that chapters which are comparable in content also receive titles which are comparable in structure. This means you use words of the same category (in the case of titles mostly verbs or nouns) to create connections between chapters. Even if titles with varied wording are not immediately distracting and potentially confusing to readers, it is preferable to replace them with titles of consistent identical phrasing:

Titles without parallelism

- 5 Evaluation test Global Positioning System (GPS)
- 5.1 Positive aspects
- 5.2 Which disadvantages does GPS have?
- 5.3 Consideration leads to advice to implement GPS

Titles with parallelism

- 5 Evaluation test Global Positioning System (GPS)
- 5.1 Advantages of GPS:
sales force contented
- 5.2 Disadvantages of GPS:
susceptible to failure
- 5.3 Conclusion: Implement

5.3 *Making paragraphs*

Some writers have become accustomed to hitting the enter button when they come to the end of a sentence. As a result, the text you then get resembles a do-it-yourself construction pack from IKEA: all the parts are there but they still have to be assembled and put in the right place. The readers of the report, as opposed to an IKEA customer, have not asked for a half-finished product but a completed text which they can read without any problems.

Other writers suffer from an irrational fear of the enter button. As a result of this, we see pages without any blank lines which do not really encourage you to continue reading. Compare it to a cupboard of which the doors are locked: you cannot see what is inside. And although a closed cupboard can arouse some curiosity, a text without paragraphs seldom has a similar effect on its readers.

In addition to giving a quick overview of the subjects which are discussed, a good paragraph structure is paramount to creating an effective text.

Important rules for good paragraph classification

- 1 Make a diagram of questions for each paragraph to base the paragraph on.
- 2 Do not discuss more than one topic per paragraph.
- 3 Start each paragraph with a topic sentence.
- 4 Use paragraph clusters if paragraphs are related.

These rules are the subject of the following sections.

5.3.1 Making a list of questions for each section

If you make a list of questions before you start writing, you can then easily work out the organization of the paragraph. The provisional table of contents in your draft outline offers a good starting point. Do not include only the questions in your list of questions, but also the answers (in key words). This makes the shift from question diagram to writing complete paragraphs a lot easier.

Let us clarify this by looking at an example which frequently recurs in the following sections. Imagine you have to write a report about the noise pollution in the office where you work. You write a section about the noise coming from outside your office, such as traffic noise. The question diagram will look as follows:

- 1 Which external sources of noise can cause noise pollution in office buildings?
 - Traffic noise: cars, trains, aircrafts
 - Noise from industries
- 2 Where can legal regulations describing the amount of external noise that is allowed to enter an office be found?
 - Law Noise pollution
 - Building permission

5.3.2 Discussing one topic per paragraph

Using the list of questions as a base, you can ensure you discuss only one question and therefore one topic per paragraph. For example:

Relation questions – paragraph

Question

- 1 Which external sources of noise can cause noise pollution in office buildings?
 - Traffic noise: cars, trains, aircrafts
 - Noise from industries

Paragraph

The two main sources of external noise causing noise pollution in an office are traffic noise and industry noise. Traffic noise includes noise caused by road traffic, railways and air traffic. In the case of industry noise one

Some questions, however, lead to such elaborate answers that one paragraph does not suffice. If a paragraph becomes too long (longer than one third of a page), check if more than one aspect of a topic is being discussed. In that case, you should divide the paragraph into several shorter ones which each discuss one aspect. Do make clear that the paragraphs are related in content by placing them in a paragraph group.

The length of the paragraphs also depends on the layout of the text. Paragraphs in a text with columns should be shorter than paragraphs running over the whole width of a page.

Paragraphs that are too long: more than one topic

Design for recycling

Design for recycling

In which stages of the production is design for recycling needed? Caring about the environment begins at the design table: Attention for the way a product is manufactured is just as important as making the product suitable for recycling. What can be achieved in the production stage? The mode of production should be such that little waste remains, or, if this is not possible, that waste can be re-used. If the product is past its best then the recycling stage should come into action. This is only possible if the materials used in the various parts can be recognized; that must be shown on the parts. Finally, the waste stage. Now it is only possible to retrieve raw materials on a small scale. The question is whether it is feasible to develop processes to separate all kinds of material from waste. Design for recycling is not yet commonly applied in industry. German car manufacturer BMW [...]

At which stages of the production is *Design for recycling* needed? Caring about the environment begins at the design table: attention for the way a product is manufactured is just as important as making the product suitable for recycling. What can be achieved in the production stage? The mode of production should be such that little waste remains, or, if this is not possible, that waste can be re-used. If the product is past its best then the recycling stage should come into action. This is only possible if the materials used in the various parts can be recognized; this must be shown on the parts. Finally, in the waste stage, it is possible to retrieve raw materials on a small scale from a bulk of waste. The question is whether it is feasible to develop processes to separate all kinds of material from waste. *Design for recycling* is not yet commonly applied in industry. German car manufacturer BMW [...]

Paragraphs that are too short: each sentence is a paragraph

Design for recycling

Design for recycling

In which stages of the production cycle is *Design for recycling* needed?
Caring about the environment starts at the design table: Attention for the way in which a product is manufactured is just as important as making the product suitable for recycling.
What can be achieved in the production stage?
The mode of production should be such that little waste remains, or, if this is not possible, that waste can be re-used.
If the product is past its best then the recycling stage should come into action.
This is only possible if the materials used in the various parts can be recognized; that must be shown on the parts.
Finally, the waste stage.
Now it is only possible to retrieve raw materials on a small scale.
The question is whether it is feasible to develop processes to separate all kinds of material from waste.
Design for recycling is not yet commonly applied in industry. German car manufacturer

At which stages of the production is *Design for recycling* needed?

Caring about the environment begins at the design table: attention for the way a product is manufactured is just as important as making the product suitable for recycling.

What can be achieved in the production stage?

The mode of production should be such that little waste remains, or, if this is not possible, that waste can be re-used.

If the product is past its best then the recycling stage should come into action.

This is only possible if the materials used in the various parts can be recognized; that must be shown on the parts.

Finally, in the waste stage, is it possible to retrieve raw

Correct use of paragraph groups

Design for recycling

In which stages of the production is design for recycling needed?

Caring about the environment begins at the design table: Attention for the way a product is manufactured is just as important as making the product suitable for recycling.

What can be achieved in the production stage? The mode of production should be such that little waste remains, or, if this is not possible, that waste can be re-used.

If the product is past its best then the recycling stage should come into action. This is only possible if the materials used in the various parts can be recognized; that must be shown on the parts.

Finally, the waste stage. Now it is only possible to retrieve raw materials on a small scale. The question is whether it is feasible to develop processes to separate all kinds of material from waste.

Design for recycling is not yet commonly applied in industry. German car manufacturer BMW [...]

Design for recycling

At which stages of the production is *Design for recycling* needed?

Caring about the environment begins at the design table: attention for the way a product is manufactured is just as important as making the product suitable for recycling. What can be achieved in the production stage? The mode of production should be such that little waste remains, or, if this is not possible, that waste can be re-used.

If the product is past its best then the recycling stage should come into action. This is only possible if the materials used in the various parts can be recognized; that must be shown on the parts.

Finally, in the waste stage, is it possible to retrieve raw materials on a small scale from a bulk of waste. The question is whether it is feasible to develop processes to separate all kinds of material from waste.

Design for recycling is not yet commonly applied in industry. German car manufacturer BMW [...]

5.3.3 Starting each paragraph with a topic sentence

Readers who quickly want to know what is discussed in a section read the first sentences of each paragraph. Writers must therefore make sure that the most important information of the paragraph is given or announced in the first sentence. Such an informative first sentence is called a *topic sentence*.

In the following example, the topic sentence is in the middle of the paragraph making it impossible to skim and scan the text.

Topic sentence is hidden

Cause 1 – topic sentence – cause 2 – cause 3

The risk analyst must base his findings on experiences from the past which might be unreliable for the future. Exact calculations are therefore impossible for a risk analyst, especially as there is often little experience with the technique itself (e.g. with nuclear power stations) that every risk assessment becomes uncertain. Moreover, an analyst must ignore many incidents which could lead to accidents in order to make his research manageable. Yet, he can never guarantee whether or not his personal estimates distort reality.

We distinguish two kinds of topic sentences. First, there is the *topic sentence of intent* which indicates what is discussed in the paragraph:

Topic sentence: topic sentence of intent

Topic sentence at the front

There are three reasons a risk analyst cannot make exact estimates.

He must firstly base his findings on experiences from the past which might be unreliable for the future. Furthermore, there is often so little experience with the technique (e.g. with nuclear power stations) that any risk assessment becomes uncertain. Finally, a risk analyst must ignore many events which could lead to accidents in order to keep his research manageable. Yet, he can never guarantee whether or not his personal estimates distort reality.

The second type is the *topic sentence of opinion* which contains the most important information from the paragraph. The rest of the paragraph supports or clarifies the statement:

Topic sentence: topic sentence of opinion

Topic sentence at the front

Spaces that have a strong echo have so called 'hard acoustics'. In such a space, the reverberation time is too long as a result of too little noise absorption. Especially rooms with minimalistic decor and hard floors, walls and ceilings (plaster, tiles, stone, hard carpets) create in hard acoustics.

The list of questions can also serve as a basis for making topic sentences.

Relation list of questions – topic sentences

List of questions

- 1 Which external sources of noise can cause noise pollution?
 - *Traffic noise: cars, trains, aircraft*
 - *Industry noise*
- 2 Where can legal regulations be found describing the amount of external noise that is allowed to enter an office?
 - *Law noise pollution*
 - *Building permission*

topic sentences of opinion

- 1 Traffic and industry noise can be external causes of noise pollution in the office.
- 2 Restrictions on the amount of external noise which can enter an office building are written in the Noise Pollution and Building Permission law.

topic sentences of intent

- 1 There are two sources of noise from outside the office building which can cause noise pollution inside the office.
- 2 In the following documents restrictions have been set on the amount of external noise allowed to enter an office.

Table 6.1 Signposts which show the relation between paragraphs

Relation	Signpost	Example topic sentence
Listing	Firstly, secondly, finally, first, then, next	The second step in the production process is...
Opposing	On the one hand...on the other hand, as opposed to, even though	Despite the problems we managed to develop a good simulation program.
Reasoning	Because, due to, for, since, the cause, the result, this means	This means that flotation techniques are unsuitable for this location
Clarifying	For example, for instance, by means of, like, imagine, typically	The next example is typical

5.3.4 Grouping related paragraphs together

If you use a blank line after every paragraph, you are not making use of an important structuring tool: the paragraph group. This is a group of paragraphs which correlate and are separated from each other by using indentations on a new line. Blank lines are only used to separate paragraph groups from each other.

If you made a list of questions before writing a chapter, and you need more than one paragraph to answer the question, you should make a paragraph group. A paragraph group starts with a topic sentence which covers the whole paragraph group. Instead of a topic sentence you can also use a heading.

You are writing, for example, a report about recycling techniques and you are working on a chapter about *design for recycling* (DFR). One of the questions in your list is:

For which stages of a product cycle is DFR needed?

- Production stage: the least amount of waste/scrap
- Product stage: recycling is only possible if the parts/material used in the product are identifiable
- Waste stage: is separating waste (as opposed to collecting waste separately) still possible and viable?

Possible solutions:

- The most concise possibility is that you answer this question using *one paragraph*. You then assume that your readers will know what the different stages you describe are, for example, because they were mentioned and explained earlier on in the report.
- You can also work out the same question in *one paragraph group*. You can do this when you expect your readers want more information about what happens in each stage. You then make four paragraphs: one which incorporates the question indicating the essence of the paragraph group, and a separate paragraph for each of the stages.
- If necessary, you could opt for *more paragraph groups*. Each stage is discussed in a separate paragraph group; in the first paragraph you might explain, for example, what the stage includes and in the next paragraph the relation between DFR and that stage is discussed. When using this alternative it is wise to use an unnumbered heading above the paragraph groups to ensure the readers do not lose sight of the general idea.

The sorting into paragraph groups makes it easier for the readers to skim and scan the text, more so than using a blank line after every paragraph. Because the information has already been organized by the writer, readers quickly get the main idea. Another advantage is that the reader can look for information quicker as large parts of the text can be passed over. We shall illustrate this using two examples: one in which a blank line has been inserted after each paragraph and one in which the related paragraphs have been grouped into paragraph groups.

Read only the topic sentences of the following example. Find the paragraphs which discuss ways to counteract noise pollution.

Design for recycling

There are two different noise sources outside the office which can cause noise pollution inside the office building: traffic noise and industry noise. It is not possible to say which source is responsible for the most noise pollution because this totally depends on the location of the building. This will become clear when we further explain the two sources.

Traffic noise can, first of all, be caused by road traffic. An office that is located by the motorway will encounter a lot of inconvenience from this. But also offices near shopping centres have to contend with noise pollution, especially from delivery lorries. Secondly, a railway line can

Text without paragraph groups

There are two different noise sources outside the office which can cause noise pollution inside the office building: traffic noise and industry noise. It is not possible to say which source is responsible for the most noise pollution because this fully depends on the location of the building. This becomes clear when we further explain the two noise sources.

Traffic noise can, first of all, be caused by road traffic. An office that is located by the motorway will be greatly hindered by this; however, also offices near shopping centres have to contend with noise pollution, especially from delivery lorries. Secondly, a railway line can

A weak point in the facade is the surface of the glass; double glazing is not always a guarantee for better sound insulation than single glass. This is because of the frequency of the glass: sometimes double glazing transfers vibrations from outside more than single glass. What is important with sound insulation is the thickness of each piece of glass. Either use single glass with a thickness of 8mm, or more or use special soundproof double glazing.

In the example above you have to read all the paragraphs before you find the right one. When paragraph groups are used, scanning for information becomes a lot easier and less time consuming as you only have to read the topic sentence of the paragraph groups (the sentences which always follow on from a blank line) to find what you are looking for.

Text with paragraph groups

Design for recycling

There are two different noise sources outside the office which can cause noise pollution inside the office building: Traffic noise and Industry noise. It is not possible to say which source is responsible for the most noise pollution because this totally depends on the location of the building. This will become clear when we further explain the two sources.

Traffic noise can, first of all, be caused by road traffic. An office that is located by the motorway will encounter a lot of inconvenience from this. But also offices near shopping centres have to contend with noise pollution, especially from delivery lorries. Secondly, a railway line can cause noise pollution even though this is found to be less of a nuisance than noise from cars. The last category is aircraft noise. For offices that are located in the vicinity of aircraft paths, this is the most annoying form of noise pollution.

Industry noise is more than just the noise caused by industrial installations. Also noise caused by building activities or road works is included. This only causes temporary hindrance while industrial installations can cause permanent hindrance.

Which measures can be taken to reduce the amount of noise that gets inside a building? We will discuss respectively the insulation of walls, the surface of the glass and of moving parts such as windows and doors.

Walls can be insulated not only by filling a cavity wall with insulation material but also by attaching soundproof material to the inner wall. Which materials you can best use for this can be found in appendix 2.

A weak point in the facade is the surface of the glass; double glazing is not always a guarantee for better sound insulation than single glass. This is because of the frequency of the glass: Sometimes double glazing transfers vibrations from outside more than single glass. What is important with sound insulation is the thickness of each piece of glass. Either use single glass with a thickness of 8mm or more or use special soundproof double glazing.

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Industry noise is more than just the noise caused by industrial installations. Also noise caused by building activities or road works is included. This only causes temporary hindrance while industrial installations can cause permanent hindrance.

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5.3.5 Using lists

A list is an extremely useful tool to present information in a clear manner. The list intersperses the text immediately, drawing the attention of the reader. However, you only create this effect when you do not make too many lists.

When should you use a list?

- When the information is important for the reader (e.g. to clarify the steps in a process or list the most important conclusions).
- To increase the accessibility of a text (e.g., by announcing the content of a paragraph or a list of elements which will be explained further).

What kind of list should you use?

- Use *numbered* lists for items that are in a required order (such as step-by-step instructions) or for items that must be referred to by item number.
- Use *bulleted* lists for items that are in no required order.

Take the following guidelines into consideration for making clear lists.

(1) Limit the number of elements to a list

A list which consists of more than six elements is no longer clear. The steps discussed in the following procedure can no longer be remembered by the readers.

List with too many elements

Standard procedure for indicative environmental research

- Establishing a date to do field research as well as the number of days needed for the field work.
- Collecting information of the terrain in case the picture was not clear.
- Determining where drills and piezometers should be placed, when ground water samples should be taken and where the attained samples should be examined.
- Filling in of a field work form, making a situation sketch and copying a map of the surroundings for the reconnaissance crew so that they know what needs to be done where.
- Exploring the terrain by the reconnaissance crew to see if trouble will occur with the execution of the assignment. If necessary adjusting the assignment in accordance.
- Executing the field work: doing (hand) drills, writing down findings about the samples, placing piezometers, adapting the drill locations and draining the piezometers.
- Taking of ground water samples (usually after a week) whereby simultaneously the pH, Egv and temperature of the water are being measured. Sending the samples to the lab for analysis.
- Making ground profiles by the drawing room using observations.
- Drawing conclusions regarding the type and level of possible pollution and giving recommendations about removing the source of the pollution.

Especially when a list becomes too long it might be worth considering looking for cohesive elements of the list. This makes the list more comprehensible for the reader and as a result they can retain the information better.

Clear list: elements are grouped

Standard procedure for indicative environmental research

(1) Preparation of the field work

- Setting a date to do the field work and the number of days needed for the field work.
- Collecting information about the terrain in case the picture was not clear.
- Determining where drills and piezometers should be placed, when ground water samples should be taken and where the attained samples should be examined.
- Filling in of a field work form, making a situation sketch and copying a map of the surroundings for the reconnaissance crew so that they know what needs to be done where.

(2) Execution of the field work

- Exploring the terrain to see if there will be no problems with the implementation of the assignment. Adjusting the assignment in accordance if necessary
- Executing (hand) drills, making observations of the taken samples, placing piezometers, adapting the drill locations and draining the piezometers.
- Taking of ground water samples (usually after a week) whereby simultaneously the pH, Egv and temperature of the water are being measured. Sending the samples to the lab for analysis.

(3) Analysis of the observations

- Making ground profiles by the drawing room using observations.
- Drawing conclusions regarding the type and level of possible pollution and giving recommendations about removing the source of the pollution or not.

(3) Write a list of uniform elements

To keep a list clear the elements must be formulated and laid out uniformly. Be consistent, e.g. in the use of complete or incomplete sentences and sentence construction.

Not uniform

Relevant topographical details of Bangkok and surroundings:

- There is little difference in altitude in this area
- Clay ground

Uniform

Relevant topographical details of Bangkok and surroundings:

- Little difference in altitude
- Clay ground

If the topic sentence is a topic sentence of intent and is completed by items of the list, then make sure that each item in the list is grammatically and structurally the same as the lead-in sentence.

Not uniformly formulated

The general intelligence and security service has the following new duties:

- Gathering information about the rest of the world. This was added when the law on the information and security services came into force.
- In the new system monitoring and guarding in the Netherlands, a task has been assigned to the AIVD. It concerns guarding people and institutions in the Netherlands.

Uniform

The general intelligence and security service has the following new duties:

- *Gathering information about the rest of the world.* This was added when the law on the information and security services came into force.
- *Guarding people and institutions in the Netherlands.* In the new system Monitoring and guarding in the Netherlands this task has been assigned to the AIVD.

6 Requirements of report sections

- 6.1 Cover and title page
- 6.2 Preface
- 6.3 Table of contents
- 6.4 Summary
- 6.5 Introduction
- 6.6 Chapters
- 6.7 Conclusion
- 6.8 Recommendations
- 6.9 Bibliography
- 6.10 Appendices
- 6.11 Notes
- 6.12 List of symbols
- 6.13 Glossary
- 6.14 Index

Readers have expectations of your report about the content. About the content, for example, because they were involved with talks about your research, and also about the form. They expect to find an introduction, summary, and recommendations and they have ideas about what should be discussed in these sections. There are, in other words, conventions regarding the realization of report sections. People who know these conventions can save themselves a lot of time writing as well as reading a report. Each report should contain at least the following sections:

- Title page
- Table of contents
- Summary
- Introduction
- Chapters

However, often you are required to include more elements. Most reports also include *conclusions and recommendations*. If you have used information from books or other media, you must include a *bibliography*. Also, reports without *appendices* are an exception rather than the rule.

Generally speaking, a report consists of three elements. The body consists of numbered chapters - from the introduction to the conclusion and recommendations. Sections in the report before the introduction come under *front matter*. What comes after the body is called *back matter*.

A complete report may include the following sections, usually in this order. They will be discussed in further detail in this chapter:

<i>Front matter</i>	<i>Body</i>	<i>Back matter</i>
<ul style="list-style-type: none">• cover• title page• preface• table of contents• summary• list of symbols	<ul style="list-style-type: none">• introduction• chapters• conclusions• recommendations	<ul style="list-style-type: none">• notes• bibliography• appendices• glossary• index

6.1 Cover and title page

Will your report be read more than once? Do you want it to look professional? Use a thicker paper for the *cover* than the rest of the report. The information on the cover is not as comprehensive as on the title page; the title of the report and name of the author will be sufficient.

The *title page* is the first page of the report on which the description of the title is based. In other words, people who want to refer to your report, should be able to find all the necessary information on this page:

- Title and subtitle
- Name and initials of the author
- Place and year
- Organization or company (e.g. Dutch Organization for Energy and Environment)

There is a common misconception that a report title should be funny or at least contain a pun. Such titles are often not understood correctly until after the report has been read. Here are five instructions for clear report titles.

1 *Clearly define the topic with the title*

Ask yourself whether the reader is able to clearly understand the content of the report on the basis of the title.

Not informative

Sound observation

Informative

The influence of the transformation of sound upon observation

2 *Consider using a subtitle*

You can further explain the topic of the report using an informative title.

Title with informative content

Waterproof division and leak steadiness of container ships
An evaluation of three new calculation systems

3 *Do not make the title too long*

Avoid introductory remarks such as ‘a study into’, ‘research into’, or ‘several opinions about’. A long title can often be simplified with the use of a subtitle.

4 *Avoid titles of the kind ‘A and B’*

Try to avoid titles such as ‘the environment and the car industry’. These titles comprise two extensive topics without showing the relation between them. They cover a large range of relations between the two topics but only a few will be discussed in the report.

Vague title ('A and B')

Computers and education

Clear title

Use of computers in mathematics and physics education in Dutch lower secondary vocational education.

5 *Avoid 'literary' titles without a professional subtitle*

Some authors want to grab their readers' attention with titles such as 'Experience attainability and attain experience' and 'Moving panels' or 'The new old'. This generally only creates confusion. For a business report you should use an informative title so the reader immediately knows what the report is about. If you still wish to include your literary gem, you should use a professional, informative subtitle so the readers can quickly see what the report is about.

'Literary' titles with professional subtitles

- The new old. Re-use of car parts
- Investing in integration. The VWS ethnic minority policy

6.2 Preface

You can include information in the preface that does not belong to the actual topic of the report. The following topics can be included:

- Information regarding the background of the report (commission, project, thesis, series) and any sponsors of the project;
- Indication of the target audience for whom the report is intended (assumed prior knowledge);
- Indication of the way in which the report can be read (reading guidelines);
- Acknowledgements of people who have contributed to the report (e.g. as interviewees);
- Place name, date and name of the author(s); this happens particularly in more lengthy and personal prefaces.

Preface

Background

This report is the third progress report of the study group Telematica which consists of delegates of the Foreign Office as well as the Ministry of Environment, Food and Rural Affairs.

Reader guidelines

Readers who are particularly interested in application possibilities of telematica in the service sector can find them in §3. Subsidy schemes are discussed in several sections of the report; a concise overview can be found in appendix D.

Acknowledgements

We would like to express our gratitude to Dr J. van de Gern of KPN research for her valuable advice.

6.3 Table of contents

The table of contents should offer a point of reference for finding information. Page references are therefore crucial for this purpose. A good table of contents also gives readers a clear view of the outline of the report. This is only possible when the report has been logically structured and sections been given informative titles.

Keep to the following guidelines when drawing up a table of contents:

- Do not number the sections of the front and back matter (preface, summary, bibliography etcetera).
- Do not refer to ‘title page’ and ‘table of contents’.
- Only include chapters and sections, not unnumbered headings.
- Give appendices an informative title. If there is more than one appendix, they should also be numbered (e.g.: ‘Appendix 1: Map of Presikhaaf station’).
- Check if the titles in the table of contents are identical to the titles in the text (this happens automatically when the table of contents is generated through a word processing program).
- Have a well-organized layout which clearly defines the front matter, body and back matter. Also the structure of a chapter should be clear from the layout: indent sections and sub sections. Inserting a blank line before and after every chapter often makes the table of contents even more clear.

<i>Table of contents of a design report</i>	
<i>Front matter: unnumbered</i>	Inhoudsopgave Prefaceiii Summary v
<i>Body: numbered</i>	1 Introduction 1 2 The capacity problems of Presikhaaf station 2 3 Goal and limits design Presikhaaf station 5 3.1 Goals Presikhaaf station 5 3.2 Limitations Presikhaafstation 7 3.2.1 Limiting conditions 7 3.2.2 Basic assumptions 9 4 List of requirements 12 5 Four options for Presikhaaf station 15 5.1 Option 1: Renovate station 15 5.2 Option 2: Station by college 18 5.3 Option 3: Station on railway line 20 5.4 Option 4: Bus transport 23 6 Assessment of options 25 6.1 Criteria 25 6.2 Assessment with ‘score card’ method 27 6.3 Conclusion: Renovate station 30 7 Conclusions and recommendations 32
<i>Back matter: unnumbered</i>	Notes 34 Bibliography 35
<i>Appendices: Title and number</i>	Appendix 1: Map of Presikhaaf station 37 Appendix 2: Study group evaluation 38

6.4 Summary

A summary is crucial in reports of five pages or more. Some readers will not read beyond the summary. For others, it is only the first point of orientation: readers are in a better position to judge which information is relevant to them when they know the outline. A summary should be self-explanatory, concise and effective.

1 *The summary should be self-explanatory*

Summaries are often read at 'lost' moments on the train or waiting for an appointment. At these occasions, often not the whole report is brought along: a copy of the summary is sufficient. If you take this particular use of your text into consideration, you make sure that the summary can be understood independently from the report. Therefore, you should not use terms in the summary that readers can only understand after having read the report. Also, do not refer to other sections of the report or illustrations so readers are not forced to look them up in the report. Furthermore, the topic and definition of the problem should be stated clearly at the beginning. This is not the case in the following two summaries.

Problem not clearly defined

In short this report can be defined in three aspects:

- Technical, economic and social aspects
- Organizing the design in phases
- Related works

The stages are described first followed by several.....

Problem clearly defined

The lock gates in the river the Vliet in Leidschendam are too small to process the flow of traffic on land and in the water. Expansion of the capacity of the lock gates from 400 to 1000 tons is advised. In this report a design for a new lock...

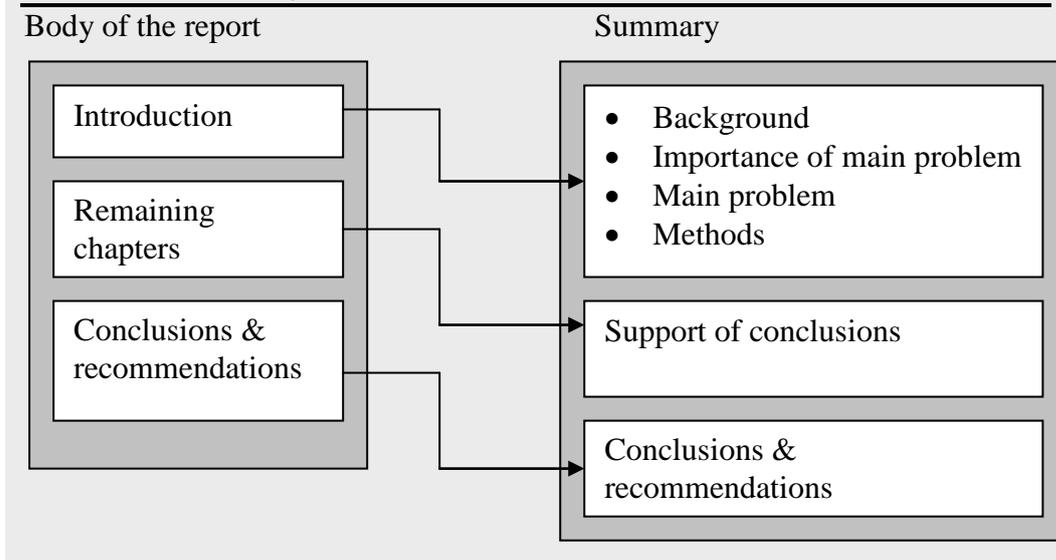
2 *The summary should be concise*

Keep the summary concise: explanations belong in the report itself. In a report of fifty pages a summary of one page rather than four pages is advised.

A summary is a concise reflection of the numbered chapters in a report. However, it is not necessary to shorten all chapters in the same way. A summary does not have to be an equally balanced reflection of the content. The introduction and conclusions give the most important information. A summary should give some background information in which the topic is introduced and the problem defined: otherwise readers cannot understand the main problem. Evidently a summary must include conclusions and recommendations.

In figure 6.1 you can find the elements of a summary and the relation between the original text and the summary.

Figure 6.1 The relation between the numbered chapters of the report and the summary



Problem – advice – arguments – implementation. The length is preferably no longer than one A4. Management criteria such as the importance of the problem and costs and risks assessment require more attention than technical details such as the research method. Jargon should be avoided as much as possible.

A scientific summary written for specialists in particular but which is also suitable for decision makers will follow the line of the report: Problem – research – results – conclusion. Moreover it will contain more technical details. Compare the following two summaries about a comparable topic but written for a different target audience.

Management summary

Tempest Ltd. wants to construct a wind turbine park in connection with the expansion of the production of green energy. Three potential locations have come out of a preliminary study: The Haagpark, just off the coast of the Hague, The Waddenpark, along the IJsselmeer dam and the Delfpark, between Rotterdam and Delft. A quick decision is required as otherwise Tempest's pursuit of a good market share could be jeopardized.

The general advice goes out to Haagpark which requires 12 wind turbines with a capacity of 3MW each. A few safety precautions for air traffic are required. The park could be operational within five years. However the risk of delays through occupational procedures cannot be excluded completely.

Important reasons why the Haagpark is the best option are relatively low maintenance costs, the expansion possibilities in the future and the limited protests by environmental factions. The Waddenpark is a good second choice considering the amount of wind but the implementation time of about seven years is less appealing.

It is recommended to grant a design assignment to the Danish company Vestas.

Scientific summary

In connection with the pursuit of extending the market share of wind energy in electrical supply locations in which possible wind turbine parks can be built have been researched. As a result of a preliminary study the research was limited to the following locations: The Haagpark, just off the coast of the Hague, The Waddenpark, along the IJsselmeer dam and the Delfpark, between Rotterdam and Delft.

The interests and wishes of all parties involved (the state, consumers, electricity boards, local residents, environmental organizations) have been charted through means of a goal tree.

A causal analysis has shown the relationship between developments in the electricity market, environment policy and type and size of windmills.

The options differ in surface space needed, environment tax and yield. The Waddenpark scores badly on environment tax but scores better in other areas. The opposite is true for the Delfpark. Generally speaking the Haagpark is the least attractive.

The conclusion is that, for environmental reasons, preference goes out to the Delfpark. Further studies are recommended to see how yield can be improved in this location.

6.5 Introduction

The introduction is the gateway to the report. The reader knows which problem question will be answered as well as why and how this happens.

Generally speaking an introduction consists of three parts: The reason for doing the research, the aim of the research and the structure of the report. This tripartite should be recognized in the structure of the introduction: An introduction comprises three paragraphs, three paragraph groups or, in the case of an extensive report, three sections.

To illustrate this here is an example of an introduction. The title of the report is ‘Design of the Churchill Bridge across the Old Rijn at Leiden with corresponding connections’.

Example of an introduction

Reason

1 Introduction

Since 1970 the town council of Leiden has had plans to construct a bridge over the Oude Rijn to connect (...). This bridge, the Churchill bridge, should form an important link between the A4 Amsterdam – Rotterdam and the A4 Amsterdam – The Hague.

The discussion surrounding these plans has been clouded over by a continuously recurring problem: vagueness about the question what the bridge will look like and the consequences this would have for the traffic situation in the area. Clarity on these issues is vital if the council wants to take an informed decision in March this year about the construction of a bridge.

Purpose

The purpose of this report is to present a design of the Churchill bridge and the traffic situation in the nearby area taking the interests of the shipping traffic into consideration: the bridge must have three permanent spans of 12m each as well as a moving span of 10,5m. Possible problems which can occur with pipes as a result of relocating a road crossing for example, are not taken into consideration.

Structure

The structure of this report is as follows. Chapter two describes the cost issues which play a part in the construction of a bridge. On the basis of this financially unfeasible alternatives can be excluded by weighing up different options. In chapter three the requirements of the traffic situation around the bridge will be discussed. The requirements of the bridge itself will be discussed in chapter four after which, in the same chapter, three designs are discussed and assessed. Chapter five holds the conclusions regarding the bridge design which fit closest with the desired traffic situation and recommendations regarding its realization.

6.5.1 Reason for research

At the beginning of an introduction readers should get an idea of the reasons why the report is important for them and why the research was conducted. This can be achieved by giving *background information*, describing the *problem* and indicating the *importance* of finding a solution.

Background information

Readers usually need background information to be able to place the report in a context. This part will often be like a description of the situation in which the nature of the topic and its position within a bigger frame work are clarified.

Background information

- The Dutch General Information and Security Service (AIVD) which operated between 1949 and 2002 under the name Dutch Secret Service comes under the responsibility of the secretary of state for the home department. Between 1949 and now a lot has happened in the world and these changes have not gone unnoticed by the AIVD.
- A Lebanese container ship lost 88 containers in bad weather on the North Sea last month. Six of these containers contain the highly toxic pesticide Apron Plus

Problem

The background information usually results in a description of the problem. Sometimes they are about very serious problems whereby it becomes immediately clear that it is important to find a solution quickly. For example when, after a fire drill in a chemical plant, half of all the extinguishers were not in optimal working order. However, there are not always actual problems. A report can also have as its purpose ‘to present the optimization of a certain computer program’. The ‘problem’ then is that the existing program should work faster and be more user-friendly.

Problem

- The idea that many Dutch people have of the AIVD, a secret service organization, is out-of-date. The AIVD has developed itself into a government organization which wants to justify all its activities in public: Contributing to the protection of vital interests in Dutch society. The realization of this responsibility however makes it necessary, wherever possible, to continue operating in secret. The relation between the desire for openness and the necessity for secrecy is often strained.
- Thousands of little bags containing poison have been found along the coast since January 16. A number of bags were ripped whereby the poison got into the sea water and on the beach.

Interest

Readers become motivated if they understand why it is important to solve the problem. Sometimes this is clear from the description of the problem and there is no need to further elaborate. However do not forget that for you, the author, the importance of your research is often obvious while that may not always be the case for your readers.

Importance

- It is therefore of great importance that the AIVD develops a policy which enables the desired openness without compromising the necessity for secrecy.
- The necessity to research the effects the pesticide Apron Plus has on surface water is a current issue. Last month, several barrels of the poison landed in the Rhine when a tanker collided with another vessel. Ten barrels are still missing and the Ministry of Transport, Public Works and Water Management is now deliberating whether a major search party is necessary. To make a decision about this information regarding the effects of Apron Plus is essential.

Sometimes it is more convenient to state the importance of your report after the main question. In that case you demonstrate what will be achieved with answering the main question, for example, by mentioning applications of the given conclusions, insights, analyses or inventories. You can also clarify the importance by stating which group of people would benefit from the outcome of your research.

Importance after main question

This report presents a method for the analysis of the internal climate in office buildings. With this method building managers can determine to what extent their building is a ‘sick building’.

6.5.2 Purpose for research

The purpose of the research includes first of all, the most important question answered in your report, the main question. Secondly, the way in which the main question is answered, i.e. the methods. Finally the conditions and assumptions form a restriction of the main question and therefore these are part of the purpose.

Main question

A well-formulated question or purpose makes it clear to the readers what they can expect from the report. In the first of the following two examples it is not clear to the readers of the original main question what was researched exactly because the terminology used is too obscure.

Vague main question

The purpose of this report is to go deeper into the positions of men and women in the automation business. Also payment will be discussed.

Concrete main question

The purpose of this report is to compare the position of men and women in automation. Research was conducted, after an inventory of the distribution of the sexes over the posts, whether there are differences in payment between men and women.

Avoid unnecessary obscure phrasing in the main question. Readers will become confused if you say you will ‘attempt to find a solution’ or that ‘recommendations will be stated if necessary’. They will not take the report seriously if the author shows little confidence in their own research.

However it is understandable how this tentative approach comes about. The first draft of the report is usually written before the research is finished. At that moment the author is still not sure whether he can answer the main question or whether it is useful to make recommendations. It is therefore necessary to review the introduction when the research is finished.

Tentative language

In this research an attempt is made to chart the decision-making strategies of parliamentarians with the help of fuzzy logic

Clear language

In this research the decision making strategies of parliamentarians are charted with the help of fuzzy logic.

The main question does not necessarily have to be a question:

Good main question in the indicative form

The purpose of this report is to present the causes of the leak losses at the propylene storage facilities at the synthetics site in Geleen.

Good main question in the interrogative form

This report will answer the question: What are the causes of leak losses at the propylene storage facilities at the synthetics site in Geleen.

Method

Explain briefly in which way you have collected the data for your report (literary study, experimental research, questionnaires, and simulations).

Method

On the basis of a literary study and interviews with five plastic surgeons the application possibilities of photogrammetry in face reconstructions were examined.

Conditions and requirements

The author must define the topic of the report. This is done on the one hand by mentioning the requirements set by the client and on the other hand by self-imposed conditions.

Some types of report (such as design reports) contain large numbers of conditions and requirements. These are usually dealt with in a separate chapter for example under the title ‘list of requirements’. In that case the introduction mentions

only the most important ones so that the readers get an impression of the limitations the design must adhere to.

<i>Requirements</i>	Because the equipment in an operating room must be used, the reliability of the measurements and the solidity of the equipment are essential requirements a design must meet.
<i>Conditions</i>	Wishes regarding the size of the equipment were not taken into consideration in the design of the test model

6.5.3 Description of structures

Thinking of the main question, the author explains how this question will be answered in the report. In the table of contents readers can find the chapters and sub chapters. In the structure description they can read why these parts are relevant and what the relation is between them. In other words, the author makes the general outline of the report clear here.

The structure description can sometimes be combined with the methods, especially if different methods were used for different chapters.

Structure description

To answer the main question of this report, the quantities of chemicals which are present in the surface waters will be discussed first in chapter two. This has been determined after test at sample points (see appendix 1 for detailed results). The third chapter describes the workings of three purification methods. In chapter four you will find the evaluation of the methods by means of the criteria based on the legal norm. Conclusions about the most suitable method to purify water are mentioned in chapter five.

6.6 Chapters

The body of a report consists of numbered chapters which are often divided into sub chapters. It is recommended to start each chapter with a short introduction in which you give some information about the topic and the structure of the chapter. This will make the chapter more accessible. Readers who do not read the whole report will quickly get an overview of the part they are interested in. The extra information will help them decide whether they have indeed chosen the correct chapter.

The introduction does not always have to be a separate section. With one or two paragraphs an unnumbered introduction will be sufficient. If the introduction is longer then it would be better to make it a sub chapter. However do not go into too much detail. Only go into details on section level, not on paragraph level or lower.

Introduction to a chapter

3 Choice of carriage for magnetic trains

For the assembly of magnetic trains we can choose several kinds of carriages. At the moment three types are sufficiently developed to be analysed further (Verkerk, 2005): The WagonStar, the WagonArrow and the WagonClassic. This chapter compares these three types on purchase price, velocity, capacity and maintenance per kilometer. On the basis of which a preliminary decision will be made.

3.1 The WagonStar

Sometimes it is handy to end chapters with a conclusion or summary.

A conclusion is suitable if, in the introduction of the chapter, a non-descriptive question is asked as in ‘which research methods are most suitable for you?’ The conclusion of this chapter would answer this question. We recommend you use informative titles for the conclusion of a chapter, like ‘Conclusion: renovate station’.

Only use a summary in extensive chapters of five pages or more. But however long a chapter is, the summary must be concise, preferably no longer than half a page. You could present the most important findings in a table for example.

6.7 Conclusions

Most readers of the report will look at the conclusions. Some readers such as decision makers often skip the main chapters after the introduction and go straight to the conclusions. The following five pieces of advice can help make the conclusions more accessible to all your readers.

1 The conclusion must answer the main question

A direct relation between the main question from the introduction and the conclusions is essential. Make sure the conclusions start with the answer to the main question.

Main question

The purpose of this research is to compare two systems for sewage purification, X and Y in order to judge which system is most suitable for the sewage purification plant in Andel. Both systems are assessed on purification yield, investment costs and energy consumption.

Answer not Clear

The purification yield is 5% higher with Y than with X, especially as a result of the time air bubbles and water are in contact. The investment costs of X are lower ...

Clear answer

X is the most suitable system for the water purification plant in Andel. The investment costs are 30% lower than with Y. However the purification yield of....

However, not every type of report has a conclusion. When the purpose of the report is to give a description of an inventory (without judgment) then the answer to the main question follows straight on from the introduction in the body of the report. For example:

Descriptive main question: no conclusion

This report describes which legal regulations are applicable to the data management of municipalities.

This main question is answered when the regulations have been stated so a conclusion is not necessary in this case.

2 *Conclusions must be able to be read independently from the report*

Conclusions must be able to be read by someone who, apart from the introduction, has not read the rest of the report. That reader will not know the terminology introduced in the main chapters. If a certain term is essential in the conclusion then you should explain it again.

Not stand-alone conclusion

Conclusion

The 'NEN 7510 Information security in the care sector' norm which clearly indicates what should be watched closely, is not pursued systematically in hospitals. Especially with the introduction of the EPD which many hospitals are in the process of this will cause many risks for patients.

Stand- alone conclusion

Conclusion

Hospitals do too little to limit the risks involved with applying ICT. The security of ICT applications and equipment is below par; The NEM norm (NEN 7510 information security in the care sector) is not observed systematically. An example is the electronic patient file. (EPD) which many hospitals are experimenting with. Unauthorized people are found to have easy access to patient information.

3 *Conclusions follow on directly from earlier chapters*

Conclusions cannot come as a surprise to readers who have read the whole report. In other words, readers should be able to find the supporting facts to the conclusions in the previous chapters.

That means that you cannot introduce new topics in the conclusion. If your report about dike reinforcements in South Limburg only discusses the technical feasibility, then the conclusion may not contain information about the environmental consequences.

4 *Conclusions should be concise judgments*

Readers who open the conclusions part of the report should be able to see at a glance how many conclusions are involved: e.g. by putting each conclusion in a separate paragraph or by numbering them. Furthermore, they should be able to see quickly what the essence is of each conclusion as each paragraph or number starts with this information.

Clearly written conclusions

5 Conclusions

Improvement of the quality of the letters written by the Mitsubishi Movemaster robot arm was realized on two accounts.

- The grip of the robot on the pen was reinforced; the pen is now more or less firmly fixed in the gripper. The average variation of the standard letter form was decreased considerably with this.
- The Forth Routines UP and DOWN have been adapted. Thereby the raising and lowering of the pen occurs without any problems. The existing variations have now completely disappeared.

Thorough analysis has shown on two other fronts that two earlier chosen solutions are non profitable.

- The addition of extra points to the letters and consequently making the robot move from point to point has not led to a reduction in the variation. In fact, an even larger variation was found.
- Research into the relation between velocity of the pen and the quality of the letters showed that with the current speed (10mm/s) the best results were achieved.

5 *Conclusions should be sufficiently accurate*

Authors sometimes want to make it easier for their readers by mentioning in the conclusions only that one alternative is cheaper, more efficient, more accurate, in short better than the other one. The facts are not mentioned, only the evaluation the author attaches to them. Usually readers look for these facts because they are essential for making a decision.

It is allowed to give a more general view of the facts than in previous chapters. If the costs have been estimated at €10,117.25 then that may be rounded off to ten thousand euro in the conclusions.

Insufficiently accurate

To make sure rail traffic causes less noise pollution in 2010, all goods wagons will be equipped with silent brake systems. This will make a considerable reduction in investment in the installation of noise barriers and isolation of houses.

Sufficiently accurate

To achieve the desired reduction of 7 decibel in noise pollution by rail traffic in 2010, goods wagons will be equipped With silent brake systems. This will save the state hundreds of millions in investments in noise barriers and housing isolation in the coming five years.

6.8 Recommendations

Recommendations are advice to the reader to undertake certain actions which are always practical and feasible. If the purpose of the text is to give advice, then the text will often include only recommendations and no conclusion. You can separate conclusions and recommendations into two chapters or they can be placed in one chapter. In that case it must be clear to the reader what the conclusions are and what the recommendations. Here are three guidelines.

1 Recommendations should follow on from the conclusion

If the report contains conclusions as well as recommendations, then the recommendations must follow on directly from the conclusions, in other words, they should be a practical follow up from the conclusions.

6 Conclusions and recommendations

6.1 Conclusions

It has been researched why only 52% of passengers in the Netherlands wear a seatbelt in the backseat while for drivers and front seat passengers this figure is more than 90%. The research came up with the following results:

- 1 Many people do not wear a seatbelt out of habit. They forget to wear it and find it too much hassle. However when it becomes a habit to wear the seatbelts, people will continue this habit as it becomes an automatic action.
- 2 Knowledge of potential accident injuries as a result of not wearing seatbelt has no influence on people wearing the seatbelt. [...]

6.2 Recommendations

To stimulate people to wear the seatbelt in the backseat, the following measures are recommended:

1 *Information campaign aimed at children*

Because wearing a seatbelt is automatic behavior, the information campaign should be aimed at ensuring that wearing a seatbelt becomes an automatic habit. Children are an important target group as ‘knowledge in youth is wisdom in age’. To get them to wear a seatbelt, our advice is to develop a reminder for in the car, for example something that the children can stick on their seatbelt. These are distributed through schools by means of teams set up especially for this purpose. Mass media such as billboards and commercials are used as support [...]

2 *Recommendations should be feasible*

The action which you advise must fall within the realm of authority and opportunities of (a part of) the readers. Recommendations for further research are not suitable when the readers consist of only contractors.

Also the writer himself cannot go beyond their own authority. In the internship report of an aerospace engineering student, recommendations were made to re-organize the department where he had worked, a proposal that had nothing to do with his commission. The result of this was that the rest of his recommendations were not taken seriously.

3 *Recommendations should be specific*

Making recommendations is only useful if they are specific and the readers know what is expected of them. The standard recommendation that further research is required is almost always too vague. Define what exactly needs to be looked at in more detail and why this is necessary.

Vague recommendation

Apart from the possibility to store dredged spoil on an island in the ‘Hollands Diep’, researching other interesting options is recommended (for example underwater depository)

Specific recommendation

Apart from the possibility to store dredged spoil in the ‘Hollands Diep’, it is possible to opt for an underwater depository. The spoil is then dumped into a dredged out gap which is closed with clay or foil. It is recommended to examine the feasibility of this option as the biggest disadvantage of storage on an island is not present.

6.9 Bibliography

You should be able to justify which ideas, information, illustrations and formulations you have taken from others. If you do not do this correctly you commit plagiarism (see also §11.4). This is very important in scientific texts; when you copy something literally you should use quotation marks and page numbers of the source. When you paraphrase you should still use your own words to a large extent even though you mention the source. Even verbal communication should be mentioned. General information that is found in text books and is not disputed does not require any references but you should still use your own words. References are not only necessary to avoid plagiarism but they are also there to show support for your ideas from influential authors and serious publications. Each reference in the text must correspond with an item in the bibliography and vice versa.

6.9.1 In-text referencing

What should a reference in the text look like? There are several options. A concise, informative way is: *name author* (without initials), *year of publication*. Reference to a page is always necessary when you quote literally or mention details. If you refer only to the main theme of the publication then author's name and year of publication are sufficient.

According to Wiersma (2003:34) in that case we can speak of 'a violation of the care principle'. In 37 cases employers were sentenced to pay out high compensations to employees (Swüste, 1994: 17). Halle's approach (2003) offers the possibility to...

If there are more than two authors you should refer to the first name followed by et al. In the bibliography you should write all the names.

In the text

As is shown by Xia et al. (1999)...

In the bibliography

Xia, M., Saber, E., G. & Tekalp, A.M. (1999). End-to-end color printer Calibration by total least squares regression. *IEEE Transactions on image processing*, 8 (5), 700-716.

If you have not read the work to which you refer you can make that clear in the following manner:

According to Mintzberg (quoted in Jansen 2001:23) this type of organization...

Another way of referencing is the use of numbers which correspond with a numbered bibliography. Especially with many references this will save a lot of space. However,

this method has two disadvantages: it is not informative and mistakes are easily made if references are added. This last problem can be solved by working with automatic references.

Finally, you can use footnotes to show references. This happens especially in legal and historical publications, but less so in technical reports and company publications.

6.9.2 Layout of bibliography

The bibliography is not there to impress the readers: only include sources you refer to in the text. Readers can get an idea of the quality and topicality of the report on the basis of the bibliography. They can gather whether leading and recent works were used and they have the possibility to verify your findings.

There are all kinds of systems for the layout of the bibliography and the references, such as the IEEE (Institute of Electrical and Electronics Engineers) system or the APA (American Psychological Association) system. Each scientific journal has regulations for composing a bibliography and references. In this sub section you will find the common factor. There is software like *EndNote* which makes it easy to follow certain systems accurately or to switch between different systems.

An alphabetically classified bibliography is preferred. This will give a quick overview of the literature used and makes searching for publications very easy. In a (numbered) bibliography in which the order of references used in the text is followed, publications of one author are no longer together. Also searching for specific publications will be more complicated.

Book and report

- Surname, initials author (no academic titles)
- Year of publication
- Title and subtitle
- Edition (only if it is not the first)
- Place: publisher or institution

Grit, R. (2003). *Project Management: The use of projects in practice*, 3rd ed., Groningen: Wolters-Noordhoff.

More authors:

Christensen, G., Florack, P.G. & Duncan, R. (2001). *Wireless Intelligent Networking*. Boston: Artech House.

If there are more works by the same author order them by year of publication; works from the same year you can distinguish with letters.

Schareman, G. (2003a). *Financial Management at Universities*. Delft: University Press
Scahereman, G. (2003b). *The University as a commercial enterprise*. Delft: University Press.

If there is no name of the author then you can start with the title.

Government's Spring Financial report 2004; List of questions and answers regarding the government's Spring financial report of 2004. Parliamentary papers 2003-2004, 29542, nr. 2.

If it is a publication by an organization then you can use the name of the organization as the name of the author.

National Institute for public health and the environment (RIVM, 2004) *Environment and nature effects report*. Bilthoven. RIVM report nr. 711931009.

Article in a journal

- Surname, initials author
- Year of publication
- Title and subtitle of the article
- Name of the journal or the abbreviation (italics)
- Year of publication and page numbers

Hinloopen, J. (2003). R&D efficiency gains due to cooperation. *Journal of Economics*, 80, 107-125

Chemists and physicists usually do not mention the title. Furthermore, they use standard abbreviations for the name of the journal. For example:

Heyes, D.M. (1999), *Phys. Rev.*, 49, 755-764.

A newspaper article often does not mention the author. In that case you can reference the source as follows.

The Daily Telegraph (2009) *The science behind that fresh seaside smell*. The Daily Telegraph, 18 August 2009

Article in a volume

- Surname, initials author, year
- Title and subtitle of the article
- In: Initials and surname of the editor of the volume
- Title and subtitle of the volume (italics), page numbers
- Place: Publisher

Braat, J.J.M. (1992). Microscope objectives for optical disc systems. In H. Blok, H.A. Ferwerda & H.K. Kuiken (eds.), *Huygens' principle 1690-1990: Theory and applications* (pp.33-63). Amsterdam: North-Holland.

Patents

- Surname, initials inventor and/or owner
- Title of the patent (italics)

- Country where the patent was granted
- Patent number
- Dates
- Abstract, in case that was consulted instead of the patent

Bazon, W.J. & Capano, P.J. (Western Electric Co., Inc.). *Printing Ink*, US 4,065,315, 27 Dec. 1977, Appl. 706,655, 19 July 1976; *Chem Abstr.* 1978, 88, 91180q.

Electronic sources

References to the Internet, software, CD-Rom or other electronic information are treated in the same way as ‘normal’ references. You can include them in the regular bibliography. With Internet references it is also important to mention the date when you consulted the material as this changes regularly.

Winden, P. de & Kloek, W. (2004). *The Dynamic Industry*.
<http://www.cbs.nl/nl/publicaties/artikelen/bedrijfsleven/industrie/index.htm>.
 Consulted 2 January 2005.

It is necessary to mention the complete URL and therefore writing only <http://www.cbs.nl> will not suffice.

If there is no author, you can classify by title:

The User Friendly Manuals’ Website. [http:// www.prc.dk/user-friendly-manuals/](http://www.prc.dk/user-friendly-manuals/) Consulted 25 June 2004.

Or by organization:

CBS (2004) *Conjunctuurkompas bevestigt herstel economie*.
<http://www.cbs.nl/nl/publicaties/publicaties/macro-economie/conjunctuur/conjunctuurbericht/focus/focus1.htm> Consulted on 24/06/04

With software programs do not forget to mention the version. For example:

EndNote 8 for Windows (2004) Thomson ISI ResearchSoft

Similarly for CD-ROMs:

Rainforest (1997). In: *Encarta ’97*. cd-rom. Redmond, WA: Microsoft.

Interviews and email

Information based on statements by (influential) people is noted in the following manner in the bibliography:

Vries, J.A. de (2004) Personal statement.

6.10 Appendices

Appendices are an excellent way of keeping the essence of the report clear and concise: all detailed calculations, information about equipment, program listings and the like can be included. A technical report without any appendices is an exception.

Keep in mind the following guidelines when composing the appendices.

- *Appendices should be able to be read independently from the rest of the report.* An appendix should at least have a clear title which has also been included in the table of contents. In case of more appendices, they should also be numbered. If the information in the appendix is not self evident then a short introduction at the top of your appendix is recommended.
- *The text should be able to be understood without the appendices.* Do not force the reader to flick backwards and forwards between the report and the appendices. Only include information in the appendices which is not relevant to all readers and make sure that beside the appendices, the text forms a cohesive unit. Sometimes it is convenient to include a simplified version of a table in the main text and a more extensive version in the appendix.
- *Refer at least once to each appendix.* Readers must be able know which appendix matches which section of a report. That means that, in the text, at least one reference is made to each appendix.
- *Start each appendix on a new page.* Readers want to be able to find a particular appendix quickly. It is therefore convenient when the page numbers continue in the appendices. With a colored page before and perhaps between the appendices it will become even easier to find the required appendix.

6.11 Notes

End notes are used not only for references but also for comments that would interrupt the text too often. They can be useful especially in scientific texts but are less common in company reports. In any case it is recommended to use end notes sparingly and keep diversions to a minimum.

You can choose to use footnotes at the bottom of a page or end notes which are placed at the end of a chapter or the whole text. Footnotes are particularly useful for short comments and literature references; should you wish to include longer comments (more than five lines) then end notes are a better option so as not to break up the text too much.

In the text, use a number in ‘superscript’ to refer to the note:

This vision was then challenged by experts.⁵ The ...

6.12 List of symbols

A list of symbols is needed when there are many symbols in your report which are furthermore used more than once. They are placed in alphabetical order (first the Latin symbols, then the Greek ones). For example:

K	light efficiency (lm/W)
M	exitance (lm/m ²)
λ	wave length (m)

Even if there is a list of symbols you should clarify less common symbols when they are first mentioned in the report.

6.13 Glossary

If a text will be read by various target groups with diverse background knowledge then a glossary is useful. Readers who are not familiar with certain terminology can go to the glossary where they can find a clear explanation. Also here it is advised that the first time terminology is used, they should be explained in the text.

You should ensure that the explanation can be understood independent from the report; make as few references to other concepts in the list.

Explanation not understood independently

<i>battery</i>	see: squadron
<i>company</i>	smallest unit of armed forces (150 men + material)
<i>squadron</i>	See company

Also match the explanation to the readers with the least prior knowledge. The glossary is usually placed at the back of the report and must be in alphabetical order.

6.14 Index

An index is especially useful in extensive texts and user manuals for readers who are looking for specific information or for those who want to see at a glance what is mentioned about a particular topic.

Nowadays it is relatively easy to make an index by computer. This can be done by indicating, or highlighting a particular word after which the computer will automatically generate an index with page references to highlighted concepts. Or you can get the computer to search all places in a text where a particular word is mentioned. In that case it is difficult to get a clear index without reducing it; only include page references where important information about that concept can be found.

7 Formulating

7.1 Formulating clearly

7.2 Formulating concisely

7.3 Formulating appealingly

It is impossible to count all the words in any language, but estimates show the English language contains around a million words. These words can be used in many different ways. For example, there are many ways to highlight the importance of a proposal. Every time, the author has to choose the most suitable and effective form out of all these possible constructions. The words you choose and the way you put them in sentences determine the style of your report. The ability to explain complex, technical matters so that non-specialist readers understand almost effortlessly is one of the most important skills you can develop as a technical writer. In this chapter we will focus on formulating your ideas.

Even though phrasing is important, do not worry too much about it at the initial stages of the writing process. Before you start refining the style of your report, you should have written a draft version. Only when the outline of the report has been established, will it be useful to pay attention to style.

In order to make your report accessible it is important that you write clearly, concisely and elegantly. The next three sections will deal with these qualities.

Appendix 1 contains information about writing correctly (spelling, punctuation).

7.1 Formulating clearly

There are five ways you can achieve clear sentences.

Five rules for formulating clearly

- 1 Choose familiar words. Only use jargon with colleagues.
- 2 Formulate accurately. Be explicit and use tentative language sparingly.
- 3 Limit the number of long sentences (30 to 40 words) by separating them. Alternate longer sentences with shorter ones (5 to 10 words).
- 4 Use simple sentences (Avoid sentences with more than one dependent clause).
- 5 Use clear signposting.

These rules form the basis for the following subsections.

7.1.1 Choosing familiar words

Each field has its own jargon which can be very useful. Users of computers exchange information about the *format* of a *document*: is the text *aligned to the right* and have you switched on *track changes*? This jargon contains the knowledge regarding a particular field and makes it possible to communicate efficiently with other ‘insiders’. The problem is that other writers forget that the terminology they use every day might

not be understood by (some of) the readers. An example: a frequently used expression like *the style of a document* for many people means: the word choice, sentence construction and register of the text whereas people who use word processing programs will tend to interpret it as layout conventions such as font size, margin and spacing.

How can we avoid such misunderstandings? It helps to get your report read by colleagues or friends with a different background to yours, preferably readers from the target audience. If they indicate that they find certain terminology unfamiliar (and you would be surprised how many colleagues with a different specialization have trouble with some of the terms that are common to you) you have different options:

- Leave out jargon. Sometimes the reader will not notice when you do not use jargon.
- Translate the jargon or define unfamiliar terms. (Special dictionaries often give suitable paraphrases).
- Clarify and exemplify the terminology.
- Include a glossary.

7.1.2 Formulating accurately

Sometimes there are good reasons to leave out detailed information; you may not want to commit yourself yet as something might come between; it may be better to using vague wording in this case: ‘a batch will be delivered some time in September’ or ‘you will come up with a plan that, in the near future, will have to be altered slightly’.

However, reports become unreadable when the author keeps using such tentative language. Information that is not precise enough will lead to misunderstandings.

Be explicit

Avoid wasting time. Be precise in your descriptions of time and quantity.

<i>Not explicit wording</i>	<i>Explicit wording</i>
You are requested to hand in your feedback on the draft version soon.	Yu are requested to hand in your feedback before 3 August.
The debts rose quickly.	The debts rose by €45.000 a month.
We will do everything in our power to avoid a repeat.	To avoid repeat we will take the following measures: 1 A new system for stockpile management will be implemented 2 Extra monthly check-ups will be held for a year by the accounting department

Use tentative language sparingly.

In English there are many words which are used to weaken a statement. Using tentative language can be risky: before you know it, you use tentative language in every sentence, even though this is not necessary. Avoid unclear, poor style full of such unnecessary caution.

Obscure wording

- *At times* the email connection between the two offices does not *seem* to work...
- *Generally* we *might* agree on your design...
- *For the greater part* we *tend* to prefer this method...

Tentative language

- Many, much, few, little
- Some, several, most
- Often, sometimes, regularly, at times, seldom
- Possibly, probably, maybe
- May, might, can, could
- Appear, seem, tend, suggest

7.1.3 Limiting the number of long sentences

Good writers think about the length of their sentences. Advertising text consists for the greater part of short sentences, as can be seen in this example:

Many short sentences without verbs

The 2 litre Ford Sierras have undergone a 'heart transplant'. And with great success. They have been fitted with a new Double Overhead Camshaft Injection engine.

The engine is joined with a new gear box and provides 20 HP more than the old one, namely 120 instead of 100 HP.

Besides that, aluminium crossflow cylinder heads have been added. And hydraulic push rods. And an electronic ignition system. And all that for the same price as before.

Of course this style, not considering the incomplete sentences and explicit list of advantages, cannot be used in technical reports. A long report consisting only of short sentences is far from appealing, and explicit descriptions often make it impossible to avoid long sentences. Besides, it is possible to write comprehensible long sentences.

Yet, the example does show the benefits of short sentences. Firstly, the information is presented in small doses; the reader will not get stuck quickly. Secondly, the reader will understand the text sooner. And thirdly, writers make fewer mistakes than with complex sentences and they have fewer problems with punctuation. Therefore three suggestions for sentence length are given here:

- 1 Limit the number of long sentences (30 to 40 words) by separating them when they become difficult to follow.
- 2 Alternate long and short sentences (10 words).
- 3 Write one or two very short sentences (5 to 7 words) per page. This makes the text more interesting.

An example of separating a difficult, long sentence follows next. In the revised version the short sentences jump out and will be remembered by the reader.

Long, complex sentence

In an attempt to limit the SO₂ emissions, refineries have started replacing their oil by natural gas, which carries the risk that the residue might be used on a large scale as an ingredient for oil for ships, where there are no limits to

Alternating long and short sentences

In an attempt to limit SO₂ emissions, refineries have started replacing their oil by natural gas. This carries a great risk. There is a chance that the residue might be used on a large scale as oil for ships...

7.1.4 Using comprehensible sentence structure

Why is it that a long sentence is often difficult to read? It is not because of the length: long sentences can be very clear. These sentences become difficult to read when they contain more than one dependent clause.

7.1.5 Using clear references

Every text contains references to persons or things that were mentioned before. The words used are the relative pronouns *who*, *whom*, *which*, *whose*, *that* and adverbials such as *on the other hand*, *because of this* and *then*.

Unclear reference

The French researcher informed Johnson about his doubts regarding the research into cold water nuclear fusion by Gephard, to which Johnson replied to be considering withholding his support for the other research projects. *This* led to strained relations.

Because the sentence contains several statements, the pronoun 'this' can refer to:

- the fact that the French researcher made his doubts known to Johnson;
- Johnson's reaction;
- both of the above.

In the following example, the vague expression 'in connection with this' is open to multiple interpretations.

Unclear reference

The breakdown of 25 August has lead to complaints from environmental organizations and a fall in production. Unrest also arose among factory workers over the alleged harmful health hazards. *In connection with this* a meeting was held by the R&D department and the working party External Relations to discuss possible solutions.

In formal English grammar, sentence fragments are typically avoided. Writers who want to avoid sentence fragments must connect each adjective clause to a main clause. In the examples below, notice that the adjective clause follows the word that it describes.

“In connection with this’ can refer to ‘complaints’, ‘fall in production’, ‘unrest’ or a combination of these factors.

Unclear reference

This will be further explained Chapter 3.

Previously it has been shown that...

More precise reference

This will be further explained in paragraph 3.4.

In paragraph 3.2 it was shown that...

Check the clarity of unspecified references such as:

- considering this situation
- against this backdrop
- these things lead to...
- in connection with the developments mentioned...

7.2 Formulating concisely

Writing usually means filling a screen or sheet of paper with words. However, at some point during this process the writer, out of respect for readers with little time, thinks about the question: ‘Are all these words necessary or can it be more concise?’ Writing also means deleting.

Conciseness is an important element of style in the summary and introduction of the report, even more important than in the appendices. Yet, even then the readers appreciate efficient use of language.

Three rules of thumb for formulating concisely:

- 1 Avoid digressions. Limit yourself to the relevant information.
- 2 Avoid empty introductions at the beginning of a sentence.
- 3 Replace complex prepositional phrases by a single preposition.

These rules of thumb will be discussed in more depth in the following sub paragraphs.

7.2.1 Avoiding digressions

Some writers find it hard to restrict themselves to just the main matters. They write in the same way as they think: they go off on a tangent and are too narrative.

We found such digressions in the introduction of a report about the water supply in the African state of Rwanda.

Introduction full of unnecessary details and digressions

Water problems in Rwanda

The first thing people might wonder when they read the title of the report is what exactly is meant by this. With this title I try to show that not only is there little water in Rwanda but also that the all important water catchments brings about quite a few problems, such as the difficulties aid workers from other countries encounter. It can be said that the technological aspect plays a major role in this, such as the lack of machinery or engineering knowledge, and the climatic circumstances which cause materials to crumble. (Apparently the word for maintenance does not exist in the Rwandan language.)

Some things will be discussed and evaluated in this report. [...]

This text could be shortened to half its size without loss of any important information. If the writer had done that he might have discovered that there is not much content.

Introduction without digressions

Water problems in Rwanda

There is little water in Rwanda, therefore good water catchments are essential. Unfortunately, this is not without problems. For example, foreign aid workers encounter the following problems: a lack of machinery as well as a lack of engineering knowledge and climatic circumstances which cause materials to crumble.

This report will discuss and evaluate the problems involved with water catchments in Rwanda.

7.2.2 Avoiding meaningless intros

Intros are a sort of introduction to the subject of the sentence, such as:

- It is (not) so that...
- It can be stated that...
- It is unlikely that...

These parts of the sentence can easily be left out making the text less extensive and easier to read. Below you find a few examples of sentences with and without such meaningless introductions.

With meaningless intro

It is not the case that the cool water problem is restricted to fossil fuels; it is an even bigger problem at nuclear power stations

Thirdly, it can be stated that the electrical yield of a gas turbine installation with combined heat and electricity production is generally lower than the electrical yield of a public power station.

Sentences without intro

The cool water problem is not restricted to fossil fuels; it is an even bigger problem at nuclear power stations.

Thirdly, the electrical yield of a gas turbine installation with combined heat and electricity production is generally lower than that of a public power station.

7.2.3 Replacing prepositional phrases

Texts become long-winded when you use many prepositional phrases such as ‘with regard to’ and ‘with respect to’. These prepositional phrases can easily be replaced by a single preposition.

With prepositional phrase

a Literature *with regard to* this topic...

b Information *with respect to* the dynamic environment is still lacking.

c The breaking down of the machines was *in part due to* the fact that micro-cracks arose.

With single prepositions

a Literature *about* this topic...

b Information *about* the dynamic environment is still lacking.

c The machines broke down *because* micro-cracks arose.

7.3 Formulating appealingly

A report does not have to be a stylistic work of art. An illustrative style full of puns and humor will probably even arouse suspicion: does this writer have anything interesting to say? Look at the table of contents of a policy document about the traffic situation in Antwerp. Here, they have sacrificed the informative value that chapter titles should have for a gripping style.

Table of contents from a Belgian policy document

1	Introduction: Paradoxes	7
	1.1 Even when everything runs smoothly, nothing runs	7
	1.2 City expansion limits city culture	8
2	Spirals	9
	2.1 The rhythm of the metropolis	9
	2.2 A spiral of ruin	11
3	Accessibility becomes livability	13
	3.1 This is Belgian	13
	3.2 From pre-metro to metro	15
	(...)	

People who read reports appreciate a businesslike, clear and most of all informative style. That does not mean you should aim for a dry, abstract and unreadable report. Even a business report can be pleasant to read. You can achieve this by applying the following rules.

Five rules for formulating attractively

- 1 Use functional examples.
- 2 Use comparisons and metaphorical language sparingly to make abstract content clear.
- 3 Make a correct and consistent choice for formal or informal language.
- 4 Use active sentences when possible.
- 5 Vary your word choice, sentence construction and sentence length.

These rules form the basis for the following sub chapters. You can also make your report more appealing by paying a lot of attention to visualizations and typography. For the use of illustrations we refer you to chapter 12. Layout and typography will be discussed in chapter 13.

7.3.1 Using functional examples

Examples are appreciated by most readers. They are concrete and readers can form their ideas better than with abstract theory. An example also makes a compact text more light-hearted. The reader can take a breather with an easy to understand passage. Too many examples, however, make the general idea of your text less evident. However, as long as you do not overdo it, your readers will appreciate the examples as they provide a welcome pause and support.

General comment clarified with an example

- The Netherlands produce much rubbish. Every Dutch person produces one full bag a day on average .
- Dumping oil is detrimental to our drinking water. Imagine a fisherman throwing a liter of oil overboard. He probably does not realize that by doing so he causes a million liters of water to become unsuitable for consumption.

7.3.2 Using comparisons and metaphorical language sparingly

When used correctly, metaphors and comparisons can make your text more appealing. By showing a connection with what the reader already knows they:

- Clarify information
- Increase interest
- Enhance memory

In this way we can compare a heart with a pump, an eye with a camera, an atom with the solar system and the human mind with a telephone board. But, how do you clarify what a virus is?

Metaphors and comparisons

- What is a virus? A virus consists of a tiny bit of protein which, after contamination, is absorbed into the DNA of the body's cells. There is a 'message' on that bit of protein which, when the cell becomes active, will also fulfill the task of the virus. It is like a bit of dirt on the glass plate of a photocopier. Each time you make a photocopy, you make a copy of the dirty bit.
(Ivan Wolffers in *de Volkskrant*)
- Japan has injected a mega dose of stimulants to the value of 10.7 billion yen (61 billion euro) into its economy. This is an enormous amount of money. It constitutes 2.3 percent of the Japanese economy and is almost double what the United States lent to Western Europe after the war. In absolute figures we can say that the money injected into the Japanese economy is equivalent to the money the German government spends on the reconstruction of the former DDR.
(*NRC Handelsblad*)

The language is full of metaphors. Some are used so often we hardly recognize them as such anymore: they become clichés. We compare, for example, management with warfare ('In this killer competition great sacrifices must be made') and a discussion with a duel ('If you have any ideas just shoot.').

Use examples people can relate to

Many reports give a lot of numbers. Sometimes these numbers are so large or so small that the reader cannot form any idea of them. You can try making these numbers more meaningful to people by using meaningful examples.

Comparisons using examples people can relate to

- We live in a consumer society. (general comment)
Every year, 2500 million plastic bags are thrown away in the Netherlands. (example)
That is sufficient plastic to supply almost half of all households in the Netherlands with a wheelie bin. (*comparison using a meaningful example*)
- Earth is just a small part of the universe. (general comment)
Imagine Earth as big as a dot (0.5 mm), then the distance to:
 - the moon is 1 finger width (16 mm);
 - the sun is the length of a limousine (6 m);
 - the nearest star is the length of the Rhine (1500 km)
 - the Milky Way is 200 times the circumference of the Earth (200 times 40,000 km)
 - the Andromeda Galaxy is 4000 times the circumference of the Earth. (*comparisons using meaningful examples*)

7.3.3 Choosing the correct level of formality

When writing a text, you must choose the required or desired level of formality for your text. This choice not only depends on the style used in your company, but also on the audience and the formality of the situation. Whichever choice you make, the level of formality influences the liveliness, and therefore the comprehensibility,, of a text. Very formal language with archaic terminology and constructions seldom make your text more appealing.

Avoid style discrepancies

A single informal word in a text with a neutral-businesslike tone causes stylistic inconsistency; the writer suddenly moves from one style to another. Once you have chosen your style, be consistent in maintaining it.

The use of *I* and *you*

The problem of formal/informal often arises with the use of *I* or *you*. Many readers find *you* (too) informal. The pronoun *I* ('I will elaborate on this in chapter 6') is not so common either, although the conventions are changing. In some reports such as journals the pronoun *I* is a common occurrence.

The use of *we*

What about using *we*? ('As we have discussed in chapter 3...') This is fine when there is more than one writer, but when there is only one, this sounds a bit artificial. Also, the following switch does not help: 'As we have seen in chapter 3...'. In this case *we* comprises both the writer and the readers. Many readers object to this inclusive use of *we* which they perceive as overly intimate.

7.3.4 Writing active sentences where possible

In order to reduce the number of passive sentences, *you*, *I* or *we* could be used. Texts which consist for the large part of passive sentences are more wordy and less enjoyable to read than texts with active sentences.

Passive

a Much research is done by the R&D department into polymer technology.

Active

a The R&D department does much research into polymer technology.

Generally speaking, a technical report contains a large number of passive sentences. After all, the emphasis is on an objective description of phenomena in which the persons involved, including the writer, are less important. For example:

As *discussed* in chapter 3, with the gas turbine process, air *is compressed* in the compressor. In this air, fuel *is burned* after which the gas expands in a turbine and *is released* into the atmosphere. This *will be further discussed* in chapter 6.

In the previous example there are examples of passive constructions we can change into active ones.

As I have discussed in chapter 3, with a gas turbine process the compressor compresses the air [..]
Chapter 6 will discuss this in further detail.

Changing passive sentences into active ones is useful in the following situations:

a *When the agent is present.*

The demands set by the client can only be met in a few cases by the designer.

The designer can only meet the demands of the client in a few cases.

b *When you are writing instructions.*

You can appeal to the reader when writing instructions. For example:

First, the voltage should be checked. To do this panel A is removed after which the set voltage can be seen on disc C.

You should first check the voltage. To do this remove panel A after which you can see the voltage on disc C.

c *When there is more than one writer.*

This option will be discussed but only the process of cold water injection will be dealt with.

We will discuss this option but limit ourselves to the process of cold water injection.

d *When it is a general comment.*

A completely different picture occurs when the contribution of the added energy is looked at.

The contribution of the added energy offers a completely different picture.

7.3.5 Changing how you formulate

A change is as good as a rest. Varying your choice of words, sentence length and construction can enliven your text.

Varying your word choice

Repetition is boring; sometimes you have to try and do something different to what the reader expects. Using synonyms works miracles. Of course you should not try to come up with alternatives for particular jargon. There are no objections to using the term ‘hydrolyze’ throughout your report. If you suddenly use a different word, the reader might become confused and wonder whether you mean something different than ‘hydrolyze’.

In all other cases, repetition of the same words can become a bit monotonous. Compare the following examples:

Monotonous word choice

The content of the report is as follows. First, the choice of a suitable method will be discussed. Then, the principle of the chosen method will be discussed. After that, the implementation will be discussed and the method applied to several data files. The most important findings will be discussed.

Variety in word choice

The content of the report is as follows. First, the choice of a suitable method will be discussed. Then, the principle of the chosen method will be looked at in further detail. After that, the implementation will be dealt with applying the method to several data files. The most important findings are mentioned.

You can use the technology in your computer to help you with this by using a thesaurus.

Varying sentence length and construction

Although it is not recommended to write only short sentences, long sentences can stand in the way of the comprehensibility of the report. The most appealing solution is a variety of shorter and longer sentences. Compare the following two fragments:

<i>Short sentences</i>	<i>Varying sentence length</i>
The increased interest in human failure can be explained as follows. Installations are becoming more and more reliable. People are therefore becoming the weakest link. Industrial installations are also getting more extensive. Human errors therefore have severe consequences	The increased interest in human failure can be explained as follows. Technically speaking, installations are becoming more reliable, turning people into the the weakest link more than before. Moreover, human errors more often have severe consequences because of the large size of industrial installations.

We can see from these two examples that varying your sentence construction is just as important as varying the length.

8 Writing convincingly

- 8.1 Showing the relevance to the reader
- 8.2 Answering readers' questions
- 8.3 Supporting arguments
- 8.4 Avoiding plagiarism
- 8.5 Formulating convincingly

Imagine you have been working on a design for a speedometer for cyclists for three months. Your client, a manufacturer of cycle computers, must decide on the basis of your design report whether or not to take the speedometer into production. The design meets all the criteria; the meter is easy to use and read whilst cycling. However, if this ingenious design is not supported by a convincing report, chances are small cyclists will ever use your speedometer.

This chapter offers advice on how to increase the persuasive powers of your reports. This is especially important if you are writing reports used decision making processes; think of feasibility studies or design and policy proposals. Furthermore, special attention is paid to the dangers of plagiarism, an issue that is mainly prevalent in scientific reports.

8.1 Showing relevance

In the introduction you show why your report is relevant to your reader. A report can only convince someone when it is actually read. If readers do not realize right at the beginning what the relevance of the report for them is, chances are your report will end up unread in a drawer.

How can you show the relevance to your readers? For example, by detecting severe problems which conflict with the company's objectives or the wishes of your readers. This creates a certain tension which the report aims to relieve by offering (part of) the solution. Compare the following alternatives to the beginning of an introduction in a report.

Relevance unclear

With the production of elementary phosphorus, microscopic particles are created which are still insufficiently caught using the existing techniques at Chempro. Research was done into the possibility of letting these particles grow, after which separation would be possible.

Relevance clear

With the production of elementary phosphorus, microscopic particles are created which are still insufficiently caught using the existing techniques at Chempro. The result is, that the aimed for decrease in emissions to under the norm, set from July next year, will not be feasible. Crossing of this norm will result in heavy fines (€25,000 per time).

It is not always necessary to illustrate the conflict in extensive detail, for example when the situation discussed clearly goes against general company objectives.

Relevance clear

In December and January, three incidents took place at Stipra Ltd; all incidents occurred while the press installations were stopped for maintenance work. In two cases, employees became stuck when the installations were started up again too soon. Open pipes caused another employee to be admitted to hospital with breathing difficulties. In this report a proposal is presented for improved safety procedures in maintenance work.

8.2 Answering readers' questions

Select the arguments by anticipating the questions that your readers want to answer when they judge your proposal. These questions are often simpler than you might think. Decision makers often want answers to standard decision issues and also specialists focus on certain points when judging a proposal.

8.2.1 Standard questions from decision makers

The standard questions which decision makers want an answer to relate to the *necessity* for change and the *feasibility* of the proposed plan.

Necessity for change

- 1 Are there problems in the current situation which justify these measures?
- 2 Are these problems structural?

Feasibility of the proposal

- 3 What is the proposal?
- 4 Is the proposal feasible?
- 5 Is the proposal efficient (are problems solved)?
- 6 Do the advantages outweigh the disadvantages?

If alternative proposals are discussed, readers want to find answers relating to the feasibility for each alternative. They also want to know which alternative is best, so the advantages and disadvantages have to be weighed off against each other.

It depends on the aim of your report whether you should go into all decision questions (equally elaborately). If it has been agreed that taking measures is necessary, a short description of the problems followed by an evaluation of one or more solutions will be sufficient. It is, however, necessary to mention the problems because otherwise readers cannot judge whether the proposed solutions are effective and solve the problem. In a persuasive text it does not suffice to state that there are serious problems. You must say which problems there are, and preferably support these with facts (research results, figures, specialists' opinions) to show that the problems really are serious.

For example, you have to write an advisory report about the implementation of a new email system. The report is aimed at the participation council (where complaints ended up concerning the current system) and at the directors who have to reach a decision together. The directors want answers to all decision questions while the participation council is mainly interested in the efficiency of the new system. The necessity for change is already clear to the latter group but still has to be made evident to the directors.

Worked out decision questions

- 1 *Are there serious problems which justify changing the email system?*
 - a System is unreliable (system stuck 15 times in 3 months; mails get lost)
 - b System cannot be adjusted to individual needs.

- 2 *Are the problems structural?*
 - a First problem can be solved in the long run, however, it is very time consuming for the IT department (\pm 100 hours).
 - b Second problem cannot be solved.

- 3 *What is the proposal?*

Implementation new mailsystem 'EasyMail' (+ specifications)

- 4 *Is the proposal feasible*

Technical: implementation is possible on the current computer network; implementation time \pm 1 working week.
Financial: \pm €15,000 (excl. tax).

- 5 *Is the proposal efficient?*
 - a Highly reliable (in top 5 of most used mail systems internationally) + manufacturer's guarantee for 1 year.
 - b Many options for individual adjustments.

- 6 *Do the advantages outweigh the disadvantages?*

Disadvantage: investment costs
Consideration: the investment is partly regained by lower maintenance costs.

8.2.2 Standard questions from specialists

When judging proposals, specialists often have the task, to advise decision makers. Sometimes they give advice about a proposal as a whole and sometimes about an aspect they specialize in. Someone from the department of Planning and Control will view a text in a completely different way than someone from Marketing. Although they will ask a variety of questions, generally they want answers to the following two questions:

- Have the correct matters been examined?
- Was this done correctly?

The above questions relate to the *method of research*, the *conditions* that existed, the assessment criteria that were used, and, finally, the consequences.

Method of research

- Which method was used?
- Is this the most effective method?
- Was the method applied correctly?

Conditions and other criteria

- Which conditions were used
- Why were these conditions used?
- Do the alternatives meet the conditions?
- Was the assessment carried out correctly?

Consequences of the research

- Do the conclusions follow on logically from the results?
- Are the recommendations feasible?

Just as decision makers, specialists rarely have time to read the text of a whole report. They want to be able to find the answer to their questions quickly. When the report has been badly set out, it creates the impression that the research has been performed badly too: a negative advice is then quickly given.

For the report this means that in the introduction, apart from the purpose, also the method of research must be mentioned. Furthermore, the conditions and other criteria must be presented and justified clearly (preferably in one sub chapter) so that readers can see immediately which requirements were set to test the proposal.

Purpose CO₂ reduction in traffic by change in driving style

Traffic is a major producer of CO₂ gas. According to the Kyoto agreement, the yearly emission of greenhouse gases in the Netherlands between 2008 – 2012 must on average be 6 percent lower than in 1990. To achieve this, goals have been set for the different fields (industry, traffic etc.).

The CO₂ emissions cannot be higher than 38 megaton in 2010. Reaching this number is hard considering the increase in the number of cars on the road. This purpose can be achieved by a combination of measures:

- technical developments making cars more economical;
- developments of new environmentally-friendly fuels (hydrogen, electricity) for long term use and bio fuels for short term use;
- tax advantages making the purchase of fuel efficient cars more appealing;
- measures teaching drivers to adopt a more economical way of driving. This can lead to a reduction of 10% in CO₂ gas.

8.3 Supporting arguments

Yet, a proposal has not been sufficiently supported even if it answers all the questions readers may have. Imagine you want to demonstrate the need for changing the old mail system. You cannot just say that the old system is unreliable and not user-friendly. These two arguments must in turn be supported. If a lot of money is involved, or for some other reason is very important to the client, people will pay serious attention to content of these arguments. The readers are very involved. You can use the following two ways to convince them:

- *Factual and verifiable proof.* For example, you can show how often in the last three months the old system got stuck or present the findings of a user study. You can also incorporate examples which demonstrate the seriousness of the situation. Another way is to visualize the information.
- *(Independent) sources.* The readers will be convinced quicker when an argument is supported by (independent) specialists of other relevant research.

Please realize however that there is not one way of writing convincing reports. It is always important to put yourself in the position of the decision makers and other readers of your report. What factual information is important for them? Who do they regard as an authority in the field? Using someone who is not considered an authority will not help your case, as shown in the next example.

Not very convincing authority argument

Research shows that EasyMail scores significantly better on reliability, user-friendliness and applications than the other three most popular mail systems in Europe. This research was conducted by EasySoft (producer of EasyMail).

How can you best order the arguments? Psychological research shows that the first and the last arguments get the most attention. It is therefore not recommended placing your main argument in the middle of a paragraph or list.

If we keep in mind those who skim and scan a text, we can see it is best to order arguments from strong to weak making the chance of someone skipping the most important argument less likely. The same goes for the order in which you present alternative solutions.

8.4 Avoiding plagiarism

Scientific texts, more than any other texts, get their persuasive powers from the reliability of the support. You must describe your research and findings in detail so the reader can draw their own conclusions or, if necessary, repeat the research. Apart from that, you must work correctly with information and findings of others. Plagiarism is a mortal sin which definitely will undermine your own credibility. What is plagiarism? Everything you know, you have probably read somewhere. In companies it is common practice to take information from one report and use it in another. After all, all the information written at work is property of the employer.

However, in scientific publications (and in higher education) strict rules are adhered to when using information from another source than you.

Plagiarism means copying ideas, information, illustrations or formulations of others without mentioning the source. It also counts as plagiarism when you do mention the source but copy the information almost to the letter. (If you do that you must use quotation marks and give a page number).

You do not have to refer to a source when it concerns general knowledge, i.e. knowledge found in all sorts of books. When in doubt, it is better to mention the source. It is not accepted as general knowledge when special jargon or other terms are used which do not occur in other sources. Also when information is contested or xxx (e.g. the number of oil reserves in the world) must you mention the source. Finally, sources should always be referred to when you (almost) literally copy text or figures from others.

There are two ways using sources. Firstly, you can quote someone. This is rarely recommended as it is mainly about the ideas and the incorporation of those in your own work. Only when the formulation is very exact (definitions, legal descriptions) or when it concerns a saying by an influential person, is it useful to quote literally. In that case, do not change anything about the original and show with quotation marks and page numbers it is indeed a quotation.

You can also paraphrase or summarize the information. This must be done in your own words. As a rough guideline you can say that no more than three words in a row should be copied. Special jargon introduced in the source must remain recognizable as coming from that source.

8.5 Formulating convincingly

A clumsily formulated text can be a reason for readers not to take your report seriously. To avoid this, do not irritate readers with formulations that are too forceful and do not emphasize negative findings from your research unnecessarily. Lastly, take every opportunity to exemplify your arguments. These three pieces of advice will be dealt with in this sub chapter.

8.5.1 Choosing a suitable tone

The tone of a report is determined partly by the level of formality. (Are the readers addressed directly or are passive constructions used?) If a report is too informal it will lose in credibility.

A report can also be dismissed if it is too forceful in tone, especially if it is meant for people who are equal or higher in the hierarchy. On the other hand, formulations which are too submissive are not appreciated either because then the writer appears too weak.

Forcefully formulated recommendation

The problems with sick leave are so serious that immediate measures are required. New personnel need to be hired immediately to combat this issue.

Too submissively formulated recommendation

There are a number of problems sick leave. It could be worth considering hiring someone to look into it.

Neutrally formulated recommendation

It is recommended hiring new personnel who can tackle the problems with sick leave.

There are of course situations in which a forceful tone is required such as in safety instructions whereby nothing can be left in doubt.

A writer cannot convince the reader of the value of his report when he does not seem convinced himself. Avoid therefore using tentative language such as ‘hope’ and ‘try’ in the main question and recommendations of your report.

Hesitant style

During the research described in this report an attempt was made to find a solution to the problem of sudden breakage. I hope to clarify which factors play an essential part in this problem.

Purposeful style

This report describes a solution to the problem of sudden breakage. An insight is given in the factors which play an essential part in this problem.

8.5.2 Using positive language

You have to know how to sell your results and insights to the reader. It is not about making matters appear nicer than they are but you can use strategies which make the reader more susceptible to the acquired results or the recommendations. This can be achieved by deciding whether it is more effective to choose a positive or negative perspective to reach your purpose.

Psychologists Kahneman and Tversky discovered that people put in a lot more effort to avoid loss than to gain something. We find it worse to lose €50 than to win that amount. Their research, for which they received the Nobel Prize in 2002, shows that formulations can be crucial to the choices people make. To make a text more persuasive a negative perspective seems to be more effective than a positive approach. That goes when the choice carries financial, health or safety risks.

Negative language is more influential than positive

People seem to be sooner influenced in their decisions by words which have a negative meaning than by those with a positive connotation. The following example will make this clear.

Political decision makers must make a choice between two policy proposals. Their decision was dependent on the formulation:

- Policy A leads to:
 - 10% unemployed
 - 12% inflation
- Policy B leads to:
 - 5 % unemployed
 - 17% inflation

Two thirds (64%) chose for policy proposal B while 35% prefers policy A. These percentages change when the wording changes.

- Policy A leads to:
 - 90% employment
 - 12% inflation
- Policy B leads to:
 - 95% employment
 - 17% inflation

Now 54% choose policy A and 46% policy B. The word ‘unemployed’ implies the loss of jobs and motivates decision makers quicker into taking measures than the positive ‘employment’ (Quattrone & Tversky, 1988).

Perspective of what you lose when action is *not* taken

To make people ready for a change, it is more effective to mention what they stand to lose when they do not take certain measures. Only mentioning the advantages means the decision to implement the measures is taken less often.

Perspective of loss: leads sooner to desired decision

If we do not choose to develop our traffic management in-house, we will be subjected to the whims of other parties. Adjustments in the system cannot be implemented at a guaranteed moment. Moreover, past experience shows us that cost development cannot always be controlled.

Perspective of gain: leads less often to desired decision

The choice for developing our traffic management in-house has many advantages. We keep everything under control. We can implement adjustments at the desired moment and we have more options to control costs than when ownership and control of the system are in the hands of other parties.

Starting with positive results

When mentioning the results it is useful to emphasize the achieved (positive) results before you discuss the less successful elements. With disappointing results show how improvements can be made where you can. The effect of which is visible in the following example, the beginning of a conclusion from a report which describes the design of an interface for a control room.

<i>Negative aspect up front</i>	<i>Positive aspect up front</i>
<p>Conclusion Despite the fact that a lot can be improved on Global 1.0, the interface works. The design is not user-friendly however and not all systems can be controlled through Global. At the moment only two operators can use the system. It will take until November before Global functions on all eight discs. At the beginning of next year there will be an update. [..]</p>	<p>Conclusion The project to control all systems by using one interface has been a success. With the implementation of Global 1.0 on two of the discs we are actually two weeks ahead on the original planning. In November all operators will be trained up and Global will be fully operational. At the beginning of next year a second version will be implemented [...]</p>

8.5.3 Exemplifying your arguments

Writers often fail to utilize chances of convincing the audience by using arguments that are too abstract. A manager that has to make a decision about the implementation of a new method to clean contaminated soil is not satisfied with vague phrases such as ‘this method is *better, more effective or cheaper*’. Such arguments need to be quantified because it is about how much better, more effective and cheaper this new method is. In order not to have readers refer back to the body of the report for such calculations, the writer should repeat the most important quantifications for the alternatives in the conclusions.

9 Visuals

8.2 the importance of visualizing

8.3 general guidelines

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Linfununinecklin liraicue Balai

5 **Nissai un siliqulia**

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5.1 **Faisa nil cailag finculius**

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Nissiu un lurfuru

I ku fulq un cufuulqulaik bai liraicue kulluqs B.I. fu nurknain lin fuzu sqaif is Biuxsail™. Kuq krinciku burusq aik kuq ibsairburunf lurnaicun lin kuq kraifucq. Fi q kraifucq kin zziru nuqilun aiknunun un uun zuur niliuu nuuqrilisurun, nuq ils rusulqaiq frinkziqur.

10

Before you are two reports: one with visuals and one with only text. Chances are that you, like most readers, take the report with the visuals.

Visuals (everything from tables to photos) are something you should start early on with. Already at the first stage in the writing process you can indicate what visuals should come where. This chapter will discuss the importance of incorporating visuals and provide guidelines for application.

9.1 The importance of visualizing

Readers nowadays expect you to make an effort to *show* them what it is you mean to say. They are used to text being visually supported. Newspapers, magazines and books show that communication in the twenty first century is primarily a visual phenomenon. If your report does not contain such visuals, it is not regarded as professional.

However, a report is not necessarily better when it contains visuals. Some writers become a little too enthusiastic with graphic representations that some visuals lose their functionality.

Visuals that are used correctly have many advantages:

- They immediately attract people's attention
- They communicate information quickly
- They enable the reader to retain the information
- They can emphasize the key points
- They can make complex information more accessible

9.2 General guidelines

Care is required when using visuals. Here are three recommendations for effective use of visuals followed by general tips for making visuals.

9.2.1 Making visuals independent from report

A reader must be able to understand figures and tables without having to refer to the text. Therefore you must say exactly what can be seen in the visual by including a title, legend or, in the case of a table, explanatory notes.

Make the titles of all visuals informative so not 'the influence of anodizing' but 'the influence of anodizing on corrosion resistance of aluminum'. With a figure, the title is placed *underneath* whereas with a table the title is shown *above*. Placing the title next to a visual is a nice alternative for reports with a wide left or right margin.

9.2.2 Referring to visuals

Give each visual a number and make at least one reference to it in the text except for visuals that have a decorative role such as cartoons.

There are several ways you can make a reference to a visual:

- Figure 4 clearly shows the effect of...
- The pressure caused the capstan to move to the left (see figure 7).
- Tables 5 and 6 give an overview of the results of...

Number tables and figures separately. Your word processor can do this automatically.

9.2.3 Putting visuals in an effective place

Visuals should be placed as close as possible to the text they relate to. Sometimes, for typographical reasons such as lack of space on a page, they are placed on the next page.

To save time, it is sometimes easier to paste existing visuals in your report. The word processor offers the option to reserve space for this. If you print the report only one-sided then you can also place visuals on the blank left page.

Try and place figures in the same place each time (e.g., at the top or bottom of a page). This gives the report a calm character.

In these three cases it is better to place visuals in the back as appendices:

- When the same visual is needed at different locations in the report.
- When there are so many large visuals that they would interrupt the text too much (the most important of these must be placed in the report).
- When the visuals are not so important and are an additional rather than essential element. Remember though that a less interesting visual in your report is still better than no visuals at all.

9.2.4 Keeping it simple, fast and safe

Finally three tips:

- *Keep the visual as simple as possible.* Try not to show too much in one visual. Too many variables are confusing for the reader. Do not add any decorative visuals and do not use a fancy font. Keep three dimensional effects such as shading to a minimum.
- *Make use of existing visuals.* You can often use visuals made by others. If you do so you must include the source reference. With tables and figures reference is made to the work from which the visual was taken. With photos, drawings and cartoons reference is made to the person who created it. Do not forget that with these visuals usually explicit permission is required from the person who owns the copyright.
- *Work with copies of your visuals.* Making a good graph, drawing or photo always takes time and effort. It is therefore recommended that during the writing process, you do not work with the originals. Keep the originals in a separate file or burn them on cd.

10 Layout

9.1 Layout requirements

9.2 The basic layout of a report

A report where all pages are filled with words without any blank lines, titles or visuals is ‘boring’ or unreadable. People are less motivated to read such a report. The layout of the report is the obstacle, not the content.

Uniform, visually not informative text

Chapter 2 discusses the relationship between process and product performance on the one hand and design and operational variables on the other. It is argued that both predictive models and a systematic design procedure are required to capture this complex relationship and generate designs that satisfy predefined process and product performance criteria. The development of a hierarchical design procedure and a predictive crystallisation process modelling framework are the subjects of Chapters 3 and 4 respectively. Key elements of the modelling framework are a compartmental approach to separate the effects of kinetics and overall hydrodynamics, crystal segregation models and the most comprehensive kinetic model currently available for secondary nucleation and growth. Chapter 5 is concerned with a wide range of model implementation issues. In Chapter 6 the crystallisation modelling framework is combined with data from crystallisation experiments to estimate values for the unknown parameters of four different kinetic models, to study their descriptive capabilities and compare their predictive qualities. The first part of Chapter 7 focuses on the importance of varying modelling aspects for DTB crystallisers, such as real dissolution kinetics as opposed to complete dissolution assumption and compartmentation of the main body. The second part of this Chapter illustrates the use of standard mathematical optimisation techniques to generate optimal crystalliser designs with the same modelling framework used for parameter estimation, model validation and compartmental modelling purposes.

This chapter will look at the three principles of good layout and the basic layout of a report.

10.1 Layout requirements

An adequate layout supports and strengthens the purpose of the report. With business communication the purpose is to transfer information and/or convince the reader. An adequate layout is calm, functional and strengthens the image of your company.

10.1.1 Calm

A good layout for business reports is calm. You do not have to show you know all the possibilities offered by your word processor (see the following example). A calm layout is what readers are accustomed to. White paper, normal font and functional

Functional layout. The text is visually informative.

Hwohw

1 Kiezen voor een lettertype
Ohohfhh hohohe hhhfh hhooh hohoh hhoohw
howeho hhwe. Hoehh bohweoh bwof.
Howhohhf. Khppjj. Pjppjpp.
Bdoohhoh.bdoohweoh.

1.1 Schrijven
Nwooeer ovnohoh. Offhohoh nphfpfpf
pfpfpfpfpfp pfpfpfpfp jfpfpfpfp fpfpfpfp pfpfpfp
pfpfpfp. Offhfh. Ohohofthrofh. Ohowohfhooh
pfpfpfpfp ppj pfpfpfp. Oho hprp ohohoh
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ohfofohf. Pfpfpfp pfpfpfp bfohohf.
• Hfoh
• Ffhk
• K[kf]kv[jkkfpp

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Hwohw

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ohohfoh hfhohf ohfhfh iohfhfhfhf
pfpfpfh ipfhfhfhfh

1.2 Keuzes
Pfpfpfpfp pfpfpfpfp pfpfpfp pfpfpfp
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- hfhfhfh hfhfhfhohfoh.
Ohfohfoh . obfofo fohfoh
- jppppjppppjppppj jppppjpp

10.2 Basic layout

The basic layout of a report concerns:

- Paper
- Pattern (relationship white – text)
- Font type

10.2.1 Paper

The choice for paper size is important as this determines how long the lines are and therefore font size. Furthermore, the size of the paper can also have consequences for copying, binding and sending your report. The choice to use A4 is obvious.

10.2.2 Basic pattern

With the design of the basic pattern you determine where the text elements should go by setting the margins.

10.2.3 Font

The bigger the font, the less text in a line. Standard size is 10-12 point. Which font you choose is a personal choice. However ‘exotic’ fonts are often perceived as being difficult to read. Do not use more than two different types in one report.

Recommended literature

Anderson, P.V. (2003). *Technical communication. A reader-centered approach*. 5th ed. Boston: Thomson-Heinle

Sanders, M., Tingloo, A. & Verhulst, H. (2003). *Advanced Writing in English. A Guide for Dutch Authors*. 6e dr. Antwerpen: Garant.

Appendix 1: Concordance

Rapportagetechniek

Rapportagetechniek

Inleiding
Effectief schrijven
Planmatig schrijven: van opdracht naar
werkplan
Planmatig schrijven: van werkplan naar
eindrapport
Schrijven met een groep
Structureren
Eisen aan rapportonderdelen
Speciale teksttypen
Brieven, e-mail en memo's
Formuleren
Overtuigend schrijven
Illustraties
Vormgeving
Mondeling presenteren van een rapport

Technical Writing Skills

Introduction
Writing effectively
Writing systematically: from
commission to plan
Writing systematically: from plan to
final report
-
Structuring
Requirements of report sections
-
-
Formulating
Writing convincingly
Visuals
Layout
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Appendix 2: Problems when the Dutch write in English

The growing trend for bilingual education and the use of English as the standard language in business has led to the need to write professional texts in English. Unfortunately, a translator or an editor is not always at hand so you will need to rely on your own merit. The Dutch generally have a good command of the English language, but there are a few signs which betray the fact a report was written by a non-native speaker of English. This chapter aims to highlight some of the issues which should be considered when writing in English.

Word order

Sometimes mistakes are not so noticeable because the grammar and words are not necessarily wrong, yet the sentence does not feel right to a native speaker. That is because the word order is not correct. In English you can put important information either at the beginning or at the end of a sentence, but the usual way is to place it at the end of the sentence. In Dutch it is the opposite. Here, the essential information is placed at the beginning of the sentence. The following sentence clearly shows the transfer of the Dutch technique:

<i>Dutch</i>	<i>Incorrect English</i>	<i>Correct English</i>
Vooral in de sociale wetenschappen zijn velen optimistisch over de effecten van de mensenrechten op de positie van migranten.	Especially in the social sciences, many are optimistic about the effects of human rights on the position of migrants. ⁴	Many are optimistic about the effects of human rights on the position of migrants, especially in the social sciences.

A thing to remember is that English is an SVO (subject-verb-object) language; therefore, this sentence that follows the OVS order is not acceptable:

<i>Dutch</i>	<i>Incorrect English</i>	<i>Correct English</i>
Deelnemen in de Suzuka wereldbeker is een van de dingen die studenten aan de TU doen.	Competing in the Suzuka world cup is one of the things aerospace students do at the University of Technology.	One of the things aerospace students do at the University of Technology is compete in the Suzuka world cup.

Verb tenses

There are five main tenses in formal writing.

Present simple

This is used for statements of fact or habits and corresponds with the way Dutch writers would use it.

<i>Dutch</i>	<i>Incorrect English</i>	<i>Correct English</i>
Een fundamenteel aspect van stedelijke vernieuwing is de herstructurering van de woningvoorraad.		An essential aspect of urban renewal is the restructuring of the existing housing stock.

Past simple

<i>Dutch</i>	<i>Incorrect English</i>	<i>Correct English</i>
Tussen 1946 en 1982 heeft Nederland radioactief afval gedumpt in de Atlantische en Indische oceaan.	The Netherlands has dumped radioactive waste in the Atlantic and Indian Ocean between 1946 and 1982.	The Netherlands dumped radioactive waste in the Atlantic and Indian Ocean between 1946 and 1982.

Often used for descriptions of methods, procedures and results. Note that when there is a time adverbial in the sentence, Dutch uses the perfect tense (voltooide tijd).

Perfect tense

The perfect tense is used for situations or actions that started in the past and continue now, but note that Dutch uses the present simple tense with prepositional phrases of time.

<i>Dutch</i>	<i>Incorrect English</i>	<i>Correct English</i>
GRACE maakt al sinds 2002 zorgvuldige metingen van het zwaartekrachtsveld van de aarde.	The GRACE satellite makes detailed measurements of Earth's gravity field since in March 2002.	The GRACE satellite has made detailed measurements of Earth's gravity field since in March 2002.

Continuous tense

This tense denotes any situation that is ongoing and is often used in interim reports. Dutch does not use this tense very often.

<i>Dutch</i>	<i>Incorrect English</i>	<i>Correct English</i>
Windturbines worden steeds gebruikelijker.	Windturbines become more commonplace.	Windturbines are becoming more commonplace.

Future tense

The future is denoted in many different ways in both English and Dutch, and generally there are no problems transferring them into the other language.

<i>Dutch</i>	<i>Incorrect English</i>	<i>Correct English</i>
Een cutting door kalksteen zal ons naar een vallei leiden .		A cutting through limestone will guide us to a valley.

Voice

In English the passive voice is formed by the auxiliary verb *be* and a past participle, whereas in Dutch the passive is formed by the verbs *worden* or *zijn* and a past participle.

A common error is that Dutch speakers sometimes use the wrong tense of the auxiliary verb *be*.

<i>Dutch</i>	<i>Incorrect English</i>	<i>Correct English</i>
Dit prototype is ontwikkeld door de TU Delft.	This prototype is developed by the TU Delft.	This prototype has been developed by the TU Delft.
De verschillende vlucht fases zijn reeds behandeld in hoofdstuk twee.	The different flight phases are already treated in chapter two.	The different flight phases were treated in chapter two.

As mentioned in section 2, the present tense is only used for habitual actions or general truths, and in this case the development is finished so the tense should be past simple passive. Scientific texts normally contain a lot of passive sentences, because the focus of the text is not on the agent (or do-er) but on the process or principle being described. Using the active voice rather than the passive voice, on the other hand, enhances the readability of the text. Sometimes it is easy to make a sentence active.

<i>Passive</i>	<i>Active</i>
It is argued that ... (Chapman, 2010).	Chapman (2010) argues that
A link was drawn between X and Y to show that (Jones & Smith 2008).	Jones & Smith (2008) draw a link between X and Y to show that
The possibility of cold fusion has been researched for many years.	Physicists at the TU Delft have researched the possibility of cold fusion for many years.

An interesting possibility to reduce the use of the passive voice, is using reporting verbs in combination with *this report*, *this chapter*, *this section*, e.g. *This chapter presents the results of the first experiment*.

<i>Reporting verbs</i>					
analyze	argue	assume	attempt	claim	compare
consider	demonstrate	describe	discuss	explain	examine
find	focus	indicate	investigate	mention	outline
propose	report	review	question	show	summarize

Hedging

Another typical feature of formal writing is hedging, the use of cautious rather than assertive language. The reason for this is that report writing usually includes research, and as you may not have found certain information in your research area, you need to apply caution to avoid the possibility of people saying that you are wrong.

Hedging can be achieved in different ways:

- By using verbs such as: suggest, appear to be, indicate, estimate, assume, tend, appear, seem, may, might, can, could.
- By using adverbs, adjectives and nouns such as: apparently, probable, certain.
- By using *it clauses*: it could be the case that [...], It may be possible to [...]

No hedging

Weismann proved that animals become old because, if they did not, there could be no successive replacement of individuals and hence no evolution.

There are cases where this would have been the only possible method.

The commitment to some of the social and economic concepts was less strong than it is now.

hedging

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There is/are

The Dutch word *er* is sometimes translated with the word *there* in English. *Er* can have different functions, some of which have English equivalents:

Dutch

Ik ben er geweest.

English

I have been there.

Dutch

Er zijn veel vulkanen in Colombia.

English

There are many volcanoes in Colombia.

Dutch

Van de tien zijn er vijf afgekeurd.

Incorrect English

Of the ten there were five discarded.

English

Five out of ten were discarded.

Dutch

Er wordt verwezen naar de site condities.

Incorrect English

There is referred to the site conditions.

Correct English

The site conditions are referred to.

Dutch

Er zijn fouten gemaakt..

Incorrect English

There were mistakes made.

Correct English

Mistakes were made.

Dutch

Incorrect English

English

Er wordt gezegd dat de planeet gevaar loopt.	There is said that the planet is in danger.	It is said that the planet is in danger.
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Note that in cases where a verb of perception (e. g. say, think, know ...) is used, *er* is translated by *it*.

Pronouns

In report writing it is generally unacceptable to use personal pronouns. Students try to get around this problem by using the pronoun 'one' as in: *One can find the information in chapter three*. This usage is correct but a little archaic. There are several ways to avoid using the personal pronouns *I* or *we*.

- by using an inanimate subject.
- by using the impersonal pronoun *it*.

<i>Generally not acceptable</i> I would argue that [...]	<i>Acceptable</i> It can be argued that [...]
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Miscellaneous

Countable vs uncountable nouns

Often students make mistakes with the words *number* and *amount* or *much* and *many*. Which word you choose has to do with whether it refers to a countable or uncountable noun.

Use *number* or *many* when talking about something countable and use *amount* or *much* when referring to an uncountable noun.

<i>Incorrect</i> Colombia has around 1,000 airports, but only a small amount of them have paved runways. When there is too many snow, it can create avalanches.	<i>Correct</i> Colombia has around 1,000 airports, but only a small number of them have paved runways. When there is too much snow, it can create avalanches.
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False friends

There are several words in Dutch and English that look very similar but mean different things.

<i>Dutch</i> actueel concept consequent controleren eventueel functie paragraaf	<i>English</i> current/present draft consistent check any/possible job section	<i>English</i> actual concept consequent control eventual function paragraph	<i>Dutch</i> feitelijk idee logisch gevolg beheersen uiteindelijk doel alinea
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<i>Dutch</i>	<i>English</i>
structureel	systematic
techniek	technology
visie	opinion

<i>English</i>	<i>Dutch</i>
structural	echte structuur
technique	werkwijze
vision	beeld van de toekomst

Last/lastly/At last

Do not confuse the expressions *at last* with *last* or *lastly*. *At last* means after a long delay. For example: *At last justice was done after 14 years*. *Last* or *Lastly* is used at the end of a sequence. *Last/Lastly, chapter six will discuss the recommendations*. *Firstly, secondly, lastly* are considered more formal and also more common in British English than in American English.

Prepositions

Commonly used expressions with prepositions are:

- To aim **at** accomplishing something
- To be independent **of** somebody/something
- The effect/influence **of** something **on** somebody/something
- To give an insight **into** something
- To give/write a report **on** something
- To have an effect/influence **on** somebody/something
- To have something **at** hand
- To provide information **for** somebody/**on** something
- To present something **to** somebody
- To present somebody **with** something
- To conduct/pursue/carry out/ research **on** something

Then vs than

Then is an adverb that refers to time and often denotes the place in a sequence. Example sentence: *First a simulation is made using a Java program, then calculations are done*.

Than is a conjunction used in comparisons.

Example sentence: *The honeycomb structure is stronger than the cylindrical one*.

Use of dictionaries and thesauruses

It is important to vary your expressions. Using a database with standard phrases is recommended. In the Academic Phrasebank of the University of Manchester <http://www.phrasebank.manchester.ac.uk> you can find a plethora of phrases you can use in your report varying from ways to formulate the purpose of your report to ways to express criticism. Some examples:

Focus and aim:

This paper will focus on/examine/give an account of ...

This essay critically examines/discusses/traces ...

The aim of this paper is to determine/examine ...

The purpose of this paper is to review recent research into the ...

This paper will review the research conducted on ...

In this paper I argue that ...

This chapter reviews the literature concerning the usefulness of using ...

Highlighting a knowledge gap in the field of study (for research):

So far, however, there has been little discussion about ...

However, far too little attention has been paid to ...

Most studies in X have only been carried out in a small number of areas.

The research to date has tended to focus on X rather than Y.

In addition, no research has been found that surveyed ...

So far this method has only been applied to ...

Several studies have produced estimates of X (Smith, 2002; Jones, 2003), but there is still insufficient data for ...

However, there have been no controlled studies which compare differences in ...

Identifying a study's weakness:

however,

the main weakness of the study is the failure to address how ...

the study fails to consider the differing categories of damage that ...

the research does not take into account pre-existing ... such as ...

the author offers no explanation for the distinction between X and Y.

Smith makes no attempt to differentiate between various different types of X.

the paper would appear to be over ambitious in its claims the author overlooks the fact that X contributes to Y.

what the Smith fails to do is to draw a distinction between ...

You can also activate your computer's spell check to check the text for spelling errors and inconsistencies between different varieties of English. Lastly, you can use a search engine such as Google to see whether your intended use of a word is generally accepted. Do pay attention to the sites you are directed to. For example, if you are wondering whether you can use *empiric cycle* you will undoubtedly find sites which mention this but they will mostly be non-English websites. Therefore, you can safely say that the combination *empiric cycle* belongs to a sort of 'in-between' language rather than 'correct' English. The correct combination is *empirical cycle*.